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Post Audit Environmental Information – Non-Proprietary

Audit Question Number (ENV-xxx)	Topic	Description of Information Requested by NRC Staff	AmerGen or Non-AmerGen
ENV-004	Terrestrial	Response to ENV-004	AmerGen
ENV-005	Terrestrial	FirstEnergy Vegetation Management Specifications (FE_Veg_Mgmt_Specs_2007.pdf)	Non-AmerGen
		TMI and surrounding circuits Weekending by contractor.xls	Non-AmerGen
ENV-006	Terrestrial	"Figure 3.1-2, TMI Transmission System"	AmerGen
		"Transmission System" (aerials)	AmerGen
ENV-007	Terrestrial	Response to ENV-007	AmerGen
		"Vegetation Control With Herbicides"	Non-AmerGen
		TMI and surrounding circuits Herbicide maintenance	Non-AmerGen
ENV-008	Terrestrial	Response to ENV-008	AmerGen
		PGC 2008. Letter to ARM Group, Inc. (M. Cohen) re: OTSG Replacement Project, Three Mile Island, PNDI#20071204119381. Mar. 3.	Non-AmerGen
		ARM 2008. Letter to PGC re: Request for detailed review of potential impacts on State-listed species of special concern. Feb. 13.	Non-AmerGen
ENV-009	Terrestrial	Response to ENV-009	AmerGen
ENV-011	Terrestrial	"National Wetlands Inventory Information" (Wetlands.pdf)	AmerGen
ENV-012	Terrestrial	Response to ENV-012	AmerGen
ENV-014	Terrestrial	Response to ENV-014	AmerGen
ENV-015	Terrestrial	Response to ENV-015	AmerGen
ENV-016	Terrestrial	Response to ENV-016	AmerGen
		Telecon Record dated August 28, 2006 b/t Tetra Tech and PADEP (M. Murphy) re: T&E Species Known to Occur in the Vicinity of TMI	AmerGen
		Telecon Record dated August 24, 2006 b/t Tetra Tech and PADEP (J. Forrester) re: T&E Species Known to Occur in the Vicinity of TMI	AmerGen
ENV-023	Cultural	Lancaster Sunday News article dated July 4, 1982	Non-AmerGen
ENV-024	Cultural	Aerial Photos of TMI before, during, and after construction (Site views – Before During After.pdf)	Non-AmerGen

Audit Question Number (ENV-xxx)	Topic	Description of Information Requested by NRC Staff	AmerGen or Non-AmerGen
ENV-028	Cultural	Response to ENV-28	AmerGen
ENV-029	Cultural	Response to ENV-29	AmerGen
ENV-031	Cultural	Aerial Photos of TMI before, during, and after construction (Site views – Before During After.pdf)	Non-AmerGen
ENV-032	Cultural	Composite of Three Mile Island Map and Site Layout	AmerGen
		Map of Three Mile Island in 1777	Non-AmerGen
ENV-035	Cultural	Response to ENV-035	AmerGen
ENV-036	Cultural	Response to ENV-036	AmerGen
		Request to initiate Consultation in Compliance with the History Code and Section 106 of the National Historic Preservation Act for the TMI-1 Steam Generator Replacement Project	AmerGen
ENV-037	Cultural	Map showing the boundaries of AmerGen property ownership	AmerGen
ENV-040	Environmental Justice	Response to ENV-040	AmerGen
		Excerpts about meat sampling from the Annual Radiological Environmental Monitoring Program (REMP) Reports for the period from 1990 through 2001	AmerGen
ENV-041	Environmental Justice	Response to ENV-041	AmerGen
		Map identifying Federal Facilities within 50 miles of the TMI-1 site	AmerGen
ENV-045	Hydrology	Copy of the Application for NPDES Permit #PA0009920 (including all drawings and figures)	AmerGen
ENV-046	Hydrology	2. NPDES Report – Industrial Cooler Leak, April 2003	AmerGen
		3. NPDES Report – Digested Sludge Spill, August 2003	AmerGen
		4. NPDES Report –Auxiliary Boiler Spill, December 2003	AmerGen
		5. NPDES Report -- Industrial Cooler Leakage, May 2004	AmerGen
		6. NPDES Report -- Sulfuric Acid Tank Leak, July 2007	AmerGen
ENV-048	Hydrology	Response to ENV-048	AmerGen
ENV-053	Radiological	Response to ENV-053	AmerGen
ENV-054	Radiological	Response to ENV-054	AmerGen
ENV-055	Radiological	Response to ENV-055	AmerGen

Audit Question Number (ENV-xxx)	Topic	Description of Information Requested by NRC Staff	AmerGen or Non-AmerGen
ENV-062	Non-Rad Waste	Response to ENV-062	AmerGen
ENV-064	Non-Rad Waste	Response to ENV-064	AmerGen
ENV-065	Non-Rad Waste	Response to ENV-065	AmerGen
ENV-066	Non-Rad Waste	Response to ENV-066	AmerGen
		Hazardous Materials Certification of Registration; USEPA Acknowledgement of Notification of Regulated Waste Activity for TMI-1; USEPA Acknowledgement of Notification of Regulated Waste Activity for TMI-2	AmerGen
ENV-067	Non-Rad Waste	Response to ENV-067	AmerGen
ENV-070	Air Quality/Met	Response to ENV-070	AmerGen
		Monthly Report On The Meteorological Monitoring Program, February 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, March 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, April 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, May 2007	AmerGen
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		Monthly Report On The Meteorological Monitoring Program, August 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, September 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, October 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, November 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, December 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, January 2008	AmerGen
		Monthly Report On The Meteorological Monitoring Program, February 2008	AmerGen
		TMI Joint Frequency Distribution Report, January – March 2007	AmerGen
		TMI Joint Frequency Distribution Report, April – June 2007	AmerGen
		TMI Joint Frequency Distribution Report, July – September 2007	AmerGen

Audit Question Number (ENV-xxx)	Topic	Description of Information Requested by NRC Staff	AmerGen or Non-AmerGen
		TMI Joint Frequency Distribution Report, October – December 2007	AmerGen
ENV-071	Air Quality/Met	Response to ENV-071	AmerGen
		TMI-1 Annual Air Emissions Report – 2006 Calendar Year	AmerGen
		TMI-1 Annual Air Emissions Report – 2007 Calendar Year	AmerGen
ENV-072	Air Quality/Met	Response to ENV-072	AmerGen
		State Only Operating Permit #22-05029 (Synthetic Minor; issued 12/22/2006)	AmerGen
ENV-073	Air Quality/Met	Monthly Report On The Meteorological Monitoring Program, April 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, October 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, November 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, December 2007	AmerGen
		Monthly Report On The Meteorological Monitoring Program, January 2008	AmerGen
		TMI Joint Frequency Distribution Report, April – June 2007	AmerGen
		TMI Joint Frequency Distribution Report, October – December 2007	AmerGen
ENV-075	Air Quality/Met	Response to ENV-075	AmerGen
		Excel Workbook containing tables demonstrating the magnitude of emissions from the TMI-1 Steam Generator Replacement Project	AmerGen
ENV-076	Air Quality/Met	Response to ENV-076	AmerGen
ENV-079	SG - Rad Waste	Response to ENV-079	AmerGen
ENV-080	SG - SocioEcon	Response to ENV-080	AmerGen
ENV-081	Aquatic	Response to ENV-081	AmerGen
ENV-083	SG – Water Use	Response to ENV-083	AmerGen
ENV-084	Aquatic	Response to ENV-084	AmerGen
ENV-091	Aquatic	Response to ENV-091	AmerGen
ENV-094	Aquatic	Response to ENV-094	AmerGen
ENV-095	Aquatic	Response to ENV-095	AmerGen
ENV-097	Terrestrial	Response to ENV-097	AmerGen
ENV-098	Thermophilic	Response to ENV-098	AmerGen
ENV-099	SG – Rad Waste	Response to ENV-099	AmerGen
ENV-100	Aquatic (Terrestrial)	Response to ENV-100	AmerGen

Audit Question Number (ENV-xxx)	Topic	Description of Information Requested by NRC Staff	AmerGen or Non-AmerGen
ENV-101	Terrestrial/T-Lines	Response to ENV-101	AmerGen
		Map of Transmission Lines By Circuit	Non-AmerGen
ENV-102	Thermophilic	Response to ENV-102	AmerGen
ENV-103	Cultural	Response to ENV-103	AmerGen
ENV-106	Cultural	Response to ENV-106	AmerGen
ENV-109	Thermophilic	Response to ENV-109	AmerGen
ENV-110	Terrestrial	Environmental Evaluation Form for the TMI-1 Steam Generator Replacement Project	AmerGen
		Environmental Review Checklist for the TMI-1 Steam Generator Replacement Project	AmerGen
ENV-114	Water Use	Response to ENV-114	AmerGen
		Excel Workbook containing TMI Water Use and Water Withdrawal calculations for 2007	AmerGen
		Annual Surface Water Report - Calendar Year 2007, SRBC Project Docket No. 19950302. February 2008.	AmerGen
Additional Documents	Terrestrial	Wildlife Habitat Council. 2005. *Site Assessment and Wildlife Management Opportunities Report for Exelon Corporation's Three Mile Island Generating Station.* October.	Non-AmerGen
	Air Quality/Met	Annual Report on the Meteorological Monitoring Program at the Three Mile Island Generating Station 2006	AmerGen

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-4 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Have any invasive species been seen or documented on the site? Are any invasive species populations being managed, or have been managed in the past?

Date Received: 3/19/2008 **Response Date:**

Response: No invasive terrestrial species have been documented on the site, and none are being managed or have been managed in the past.

TMI has been treating river water and circulating water systems for Asiatic clams since the 1990s. TMI continues to treat plant cooling water and fire service water twice per year using a GE Betz biocide (Spectrus CT 1300). The chemical treatment is effective and is authorized under the station NPDES permit.

TMI and other Susquehanna River power plants continue to actively monitor for zebra mussels and other fresh water mussels. Zebra mussels have been identified in the upper reaches of the Susquehanna River. There have been no impacts on any Susquehanna River power plants so far.

Non-AmerGen

FIRSTENERGY VEGETATION MANAGEMENT SPECIFICATIONS

Revision 2007

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OBJECTIVE

The objective of all work covered by these documents is to maintain safe, reliable and economical electric service, through effective line clearance and satisfactory public relations.

SCOPE OF SERVICES

The right-of-way shall be free of all vegetative obstructions which interfere or may interfere with the construction, operation, maintenance and repair of the electric facilities. The Contractor's work is described in detail and shall be completed in conformance with these specifications and all other provisions of the contract documents.

GENERAL POLICY STATEMENT

This contract will be under the direct supervision of the contracting agency or its authorized representatives. FirstEnergy, at its sole discretion may make changes altering, adding to, or reducing the extent of the Work. Such changes shall be initiated by written order of FirstEnergy and Contractor shall submit the proposed cost or credit to FirstEnergy for any changes in the Work within 15 working days after receipt of the written order for FirstEnergy's approval. Such changes to the Work shall not proceed without FirstEnergy's approval.

The Contractor shall furnish competent supervision as required, and may designate a Supervisor as the Contractor's representative in all manners relating to the work to be performed. The Contractor shall have full responsibility for the work and good conduct of its employees. Directions and instructions shall be given to such employees by the Contractor or its representatives and in no circumstances by FirstEnergy or its representatives.

A copy of the FirstEnergy Vegetation Management Specifications shall be given to every crew before starting work on any project and Contractor and the Contract Supervisor shall go over the FirstEnergy Vegetation Management Specification with every crew

member prior to starting work under any project.

CONTRACTOR EMPLOYEE STAFFING

The Contractor shall keep and be able to provide to FirstEnergy a list of employees working on FirstEnergy property including name, classification and home phone of all employees.

When projects have begun there will be sufficient personnel and equipment working on that project to maintain a presence at all times until the job is completed unless otherwise approved by the FirstEnergy Representative.

REPLACEMENT OF CONTRACTOR EMPLOYEES

The Contractor shall employ personnel qualified to perform the work. If a FirstEnergy Representative determines Contractor's employee to be unsatisfactory, the Contractor shall replace this employee immediately. This does not require the Contractor to terminate the employment of any employee replaced.

IDENTIFICATION OF CONTRACTOR'S EMPLOYEES AND EQUIPMENT

All Contractor personnel shall have photo identification that includes the employee name, company and the Contractor's office telephone number.

All vehicles utilized for work under this specification shall be clearly marked with Contractor's name or logo.

APPEARANCE OF CONTRACTOR'S EMPLOYEES AND EQUIPMENT It shall be Contractor's responsibility to provide employees which are neat and orderly. Contractor's equipment shall be maintained in a safe, clean and satisfactory working condition to keep downtime to a minimum. Charges shall cease for any labor and/or equipment that becomes unproductive by incapacitated equipment. Charges will resume when equipment is restored to its normal operating condition.

STORM EMERGENCY WORK

Throughout the term of the contract it may become necessary for the Contractor to assist FirstEnergy in providing emergency tree clearing services. The Contractor shall provide telephone numbers in order to be reached on a 24-hour basis.

EMERGENCY CALL OUT

In the event of an emergency, including but not limited to a storm, First Energy shall have the right to direct the Contractor to relocate crews working in the system to areas where they are needed, as a result of the emergency. All requests for line clearance tree crews to be released to another utility for storm work (or any other reason) shall be approved by FirstEnergy, prior to relocation of any crews.

When severe winds, ice storms, or other conditions require emergency assistance, the Contractor shall provide necessary labor and equipment within 45 minutes of receiving the call-out request from FirstEnergy. Charges for call-out work will begin when the crew reports to the FirstEnergy reporting location and will end when the crew is advised that work is no longer required by FirstEnergy. The Contractor shall maintain equipment, materials and supplies in preparedness for storm or emergency work and provide emergency assistance in the manner as set forth by FirstEnergy.

COMMUNICATION BETWEEN CONTRACTOR AND UTILITY

All Contractor field supervisors shall provide a mobile communication system that will enable the FirstEnergy representative to contact them regarding both routine and emergency issues. This system shall be capable of transmitting and receiving communications.

CONTRACTOR COMPLIANCE

The Contractor shall review assigned work in progress to ensure compliance with clearance requirements, work standards, planned work procedures, and efficient utilization of personnel, equipment, tools, and material. Contractor personnel shall be properly trained to perform the work proficiently and safely so as to comply with all

applicable laws, regulations, and local ordinances. Contractor shall adhere to the requirements and intent of this Specification which requires that the necessary forms and reports are properly prepared and processed.

COMPLAINT RESOLUTION

The Contractor shall make every effort to contact the customer within 48 hours after a claim is turned in to FirstEnergy. The Contractor shall make every effort to satisfactorily settle, within a reasonable time any loss, damage, or liability after it arises or occurs for which the Contractor is responsible under these specifications. A written report of the claim and settlement shall be submitted within one week of settlement as directed to do so by a FirstEnergy representative. (Exhibit 1, Form 1014)

DAMAGES AND UNPLANNED OUTAGES CAUSED BY CONTRACTORS ACTIONS

The Contractor will be billed by FirstEnergy for any unplanned outages resulting from the Contractor's actions, including the cost incurred by FirstEnergy to repair facilities that are damaged by the Contractor's negligent action.

The Contractor shall do all things necessary or expedient to properly protect any and all parallel, converging or intersecting lines, joint line poles, highways and any and all property of others from damage. In the event that damage occurs in the course of the work, the Contractor shall, at its own expense, restore any of all such damaged property immediately to as good a state as before such damage occurred. The Contractor shall report the outcome to FirstEnergy as directed to do so by a FirstEnergy representative.

In case of power line flash, line contact, interruption, or damage FirstEnergy Dispatching shall be notified immediately and then Regional Forestry. If a tree should contact a sub-transmission or transmission line, the Contractor should not remove the tree from the conductor until a FirstEnergy Representative states that the Contractor is clear to remove the tree.

DAMAGED ELECTRICAL EQUIPMENT NOT CAUSED BY CONTRACTOR'S ACTIONS

Damaged electrical equipment (for example: broken crossarms, broken insulators, loose guy wires, leaking transformers, etc.), unusual vegetative conditions, or unsafe electrical conditions shall be reported to FirstEnergy.

TRAFFIC CONTROL

The Contractor shall follow all appropriate Federal, State and Local traffic control laws and procedures while performing any work under this specification. The Contractor shall provide safe and effective work areas and warn, control, protect and expedite vehicular and pedestrian traffic.

GUARDS AND PROTECTIVE DEVICES

The Contractor shall provide and keep the necessary guards and protective devices at locations where work is being performed to prevent accidents to the public or damage to the property of FirstEnergy or the Public.

SAFETY PRECAUTIONS AND PROTECTION TO PROPERTY

The Contractor shall plan and conduct the work to adequately safeguard all persons and property from injury.

The Contractor shall take the necessary precautions to render the Work secure in order to decrease the probability of accident from any cause and to avoid delay in completion of Work. The Contractor shall use proper safety appliances and provide first aid treatment and ambulance for emergency treatment of injuries and shall comply with all applicable Federal, State and Local Laws, rules and regulations with regard to the safe performance of the work.

SCHEDULING

The Contractor shall schedule and report daily and annual work, coordinate and assign labor, equipment, tools and material required for efficient and timely completion of assigned work.

Work locations of all crews must be reported to the respective FirstEnergy office before 8:00am each day or as directed by an authorized FirstEnergy representative.

The scheduling of all projects is the Contractor's responsibility except in cases of critical need as determined by FirstEnergy. FirstEnergy may, at its discretion, require that specific sites be completed in order to maintain service reliability.

PROGRESSION OF WORK

The Contractor shall work progressively along the main circuit feeder from the substation and shall complete all work in the circuit before starting work on another circuit.

LANDOWNER NOTIFICATION

Except in outage situations or emergency restoration, the Contractor shall make reasonable attempts to notify all landowners, municipalities, government agencies or others having jurisdiction, prior to doing work, unless such notification has been attained and furnished to the Contractor in writing by FirstEnergy. Upon request the contractor shall provide proof of notification for removal and or application of a FirstEnergy approved herbicide to brush or trees that interfere or could interfere with conductors.

PROCEDURE FOR REFUSALS AND SKIPS AND INTERRUPTION OF ELECTRIC SERVICE

When work is refused or limited in such a manner as to not allow prescribed clearances in accordance with the FirstEnergy Vegetation Management Specification, the Contractor shall not perform any work on the property until the refusal is resolved. The Contractor shall notify FirstEnergy in writing within ten working days.

FirstEnergy will attempt to resolve work refusals within 60 days or before Contractor relocates to another area (greater than 15 miles from reporting location). When work refusals are not resolved within 60 days or before Contractor relocates to another area (greater than 15 miles from reporting location) only travel time to complete refusal work will be paid on a Time and Material basis.

When consent for herbicide application is refused or when an area is intentionally skipped, the Contractor shall notify FirstEnergy promptly in writing.

The following information is to be provided for work refusals and herbicide refusals: 1) name and address of property owner refusing or owner of area skipped, 2) when and by whom the request was made including the nature of the request, 3) the reason for the refusal or skip, 4) the location of the refusal or skip in relation to FirstEnergy facilities, 5) a description of the type and amount of work which needs to be performed, 6) any other background information which may be of assistance in determining the location of the property owner, and 7) the nature of refusal or possible solutions. (Exhibit 3, Form 418).

When it is necessary to interrupt electric service due to the hazardous condition of the vegetation the Contractor shall notify FirstEnergy promptly in writing. FirstEnergy will attempt to schedule the interruption of electric service within 60 days or before Contractor relocates to another area (greater than 15 miles from reporting location). When the interruption of electric service is not scheduled within 60 days or before Contractor relocates to another area (greater than 15 miles from reporting location) only travel time to complete the work will be paid on a Time and Material basis.

RECORD KEEPING

The Contractor shall complete weekly timesheets supplied by FirstEnergy for all work completed during the previous week. The timesheets are to be submitted by the following Tuesday morning to the Regional Forestry Office. When filling out the weekly Timesheets, the Contractor shall refer to the Instructions for Filling out the FirstEnergy Weekly Timesheets. (Exhibit 4- Form 400.1).

For recording purposes, a tree qualified for "tree pruned" status shall be defined as being a plant with a central trunk that is six inches (6") in diameter at breast height (DBH). Breast height shall be 4.5 feet above ground level. Multiple trunks originating from the same common root crown shall be considered as one (1) tree. The trunk with the largest diameter will be considered to be the size of the tree.

DISTRIBUTION CLEARING ZONE

The degree and type of tree clearance required for electric lines to function effectively is dependent on the voltage of the conductor, the type of tree, its growth rate and branching habit.

The distribution clearing zone is defined as a corridor measured at a distance of fifteen feet (15') on either side of the pole line or to the established large tree edge, whichever is greater in width. Emphasis is to be placed on controlling all incompatible vegetation within this clearing zone. All incompatible vegetation overhanging the clearing zone corridor shall be pruned back to the main stem, only if specified by Regional Forestry. In cases where incompatible vegetation is not controlled, such as in maintained lawn areas, vegetation shall be pruned following directional pruning methods and as further defined in the current ANSI 300 Standards and Amendments. Pruning shall be done in such a manner to achieve a minimum of four years of clearance from FirstEnergy primary conductors based on tree species and growing conditions. In cases where four years of clearance is unattainable twelve feet (12') of clearance around primary conductors shall be achieved. (Refer to Procedure for Refusals and Skips page 9.)

Regardless of tree species, structures with fuses or disconnects must have all woody vegetation cleared within an eight foot (8') radius of the fuse/disconnect side of the structure.

When pruning for an individual tree on an assigned circuit, the contractor must clear for all circuits on the structure whether it is Transmission or Distribution.

When pruning for overhang clearance, dead or structurally weak limbs which could fall or blow into the conductor shall be removed.

Priority trees located in the inspection zone, which is the area between fifteen feet (15') and twenty feet (20') from pole line, shall be maintained as directed by an authorized FirstEnergy representative, to mitigate obvious hazards to FirstEnergy facilities. Priority trees located outside the inspection zone shall be addressed as directed by the FirstEnergy representative.

SECONDARY VOLTAGES CLEARING ZONE

The degree and type of tree clearance required for secondary voltages to function effectively is dependent on the construction of the conductor, the type of tree, its growth rate and branching habit.

Secondary circuits include all facilities between the transformer pole and the final pole on the line. Services are defined as the span from the last pole to the customer's service entrance.

Open Wire Secondary Conductors Branches that are contacting bare open wire secondary conductors are to be pruned to achieve four feet (4') of clearance and/or eliminate mechanical strain, displacement or abrasion of the conductor. Parent branches and the main tree trunk may remain in the secondary clearing zone providing that the branches and the tree are structurally sound and not mechanically straining, displacing or in direct contact with the conductors.

Open Wire and Triplex Services and Triplex Secondary Conductors Branches that are contacting open wire and triplex services and triplex secondary conductors that are creating mechanical strain, displacement, or abrasion shall be pruned to eliminate the strain, displacement or abrasion of the conductor. Large limbs in excess of 3-inches in diameter that are contacting the conductor and are causing mechanical strain, displacement or abrasion shall be reported in writing to the Forestry Representative.

Street Light Wire and **Luminaries** ***This work is only required as directed by an authorized FirstEnergy representative.*** When required, branches contacting street light wires shall be pruned to provide at least one foot (1') of clearance. The clearing zone for street light luminaries extends five feet (5') from, and 360 degrees around the luminary horizontally. The area below the luminary shall be cleared in the manner of a cone with 45-degree sides.

TRANSMISSION CLEARING ZONE

The transmission clearing zone corridor will be identified and its information given to the Contractor prior to commencement of corridor maintenance activities. Emphasis is to be placed on controlling all incompatible vegetation within this identified clearing zone corridor or to the large tree edge, whichever is greater in width. In cases where incompatible vegetation is not controlled, vegetation shall be pruned following directional pruning methods as defined in the ANSI 300 Standards and Amendments. Pruning for the transmission corridor is dependent on the voltage of the conductor and shall be done in such a manner to achieve a minimum of five years of clearance. In cases where five years of clearance is unattainable the following clearances shall apply:

- **Transmission lines operating at 23kV – 69kV** shall be cleared fifteen feet (15') from the conductor.
- **Transmission lines operating at 115kV – 138kV** shall be cleared twenty-five feet (25') from the conductor.
- **Transmission lines operating above 138kV** shall be cleared thirty feet (30') from the conductor.

In New Jersey, 34.5 off road corridors, not on common corridor with transmission, all incompatible vegetation overhanging the clearing zone corridor shall be pruned back to the main stem. If a tree cannot be pruned properly, then the tree should be removed.

For 34.5kV cable construction *in **New Jersey***, vegetation shall be pruned to provide a minimum of five feet (5') of clearance from the cable or equipment. Any growth within five (5') feet should be pruned back to the main stem. If the tree cannot be pruned in this manner it should be removed.

Transmission & Distribution on a Common Corridor

All vegetation management for the transmission facilities will be performed on the transmission vegetation management cycle. In cases where distribution facilities are located on the transmission corridor, incompatible brush on the floor of the transmission corridor will be controlled. All other vegetation activities for distribution facilities within the transmission corridor will be performed on the distribution cycle. Distribution facilities include primary, secondary and services. Note: in ***New Jersey***, where 34.5 facilities are within the transmission corridor the entire corridor will be managed on the transmission vegetation management cycle. Also, the 34.5/distribution corridor will be maintained on the 34.5 maintenance cycle in ***New Jersey***.

Transmission Facilities with Distribution Under build

Transmission over build will be maintained with the transmission facilities on a 4 or 5 year transmission vegetation management cycle. An inspection of the distribution facility will be performed and if work is required Distribution Forestry will be notified.

Distribution under build will be maintained with the distribution facilities on a 4 year vegetation management cycle. An inspection of the transmission facility will be performed and if work is required Transmission Forestry will be notified.

Common Corridor- Highest Voltage Hierarchy

Vegetation management work on transmission corridors that have multiple transmission facilities running parallel on a common corridor shall be performed in accordance with the schedule for the highest voltage line on the corridor. (Example a 345kV line runs parallel with a 138 kV line. If the 345kV facility is on schedule for maintenance then the entire corridor is managed. If the 138kV is on schedule then this common corridor area is not maintained until the 345 kV vegetation management schedule).

Requirements for Clearing Access

On transmission clearing zone corridors, a fifteen foot (15') wide access lane shall be cut and treated with herbicide to allow travel from structure to structure (including fence

rows). This access lane shall be wide enough for line maintenance and vegetation control equipment and personnel for the duration of the maintenance cycle. Where practical, utilize the path of least resistance or existing access lanes located on the corridor. The access path is required on corridors that are accessible by mechanical equipment, unless otherwise specified by FirstEnergy.

All brush and trees shall be removed and treated in the tower centers. All brush and trees shall be cleared from all structures at the ground line to a distance of five feet (5') unless otherwise specified by FirstEnergy.

CLEARING ZONE CORRIDOR CLEARANCE FOR NEW DISTRIBUTION, SUBTRANSMISSION, OR TRANMISSION CONDUCTORS

On new construction, the clearing zone corridor shall be cleared to the width and under the conditions as stated on the detailed property and provision list furnished by FirstEnergy, or as otherwise instructed by FirstEnergy.

Trees dangerous to the conductor located on the clearing zone corridor and those adjacent to the clearing zone corridor shall be removed as determined by FirstEnergy.

All vegetation that is removed shall be cut as closely to the ground line as possible and shall not exceed a height of three inches (3") above the ground level unless otherwise specified by FirstEnergy.

Trees, brushwood, and slash shall be placed or disposed of as designated by the detailed property and provision list or specified by FirstEnergy. Designated trees are to be left in lengths as long as possible, preferably whole tree lengths and shall be placed in neat piles with the tree lengths parallel to and along the edge of the clearing zone corridor and separated from other piles or wind rows.

Slash and brushwood generated from the clearing operation shall be placed in piles or windrows along the edge of the clearing zone corridor and separated from other piles unless otherwise specified by FirstEnergy. Any disposal of brush, wood, slash, logs or trees shall be in accordance with the laws and regulations of the appropriate governing

authority.

TREE PRUNING METHODS

All pruning, both initial and re-pruning, shall be done in accordance with modern arboriculture standards using the current ANSI 300 Standards and Amendments. Directional pruning is the preferred method of line clearance pruning. Whenever possible, the Contractor shall obtain clearance in this manner.

The drop crotch method will be used.

Pruning cuts are to be made back to the main stem; or to a lateral branch which is at least one third the diameter of the portion being removed. Limbs shall not be stubbed off at the edge of the clearing limits. Pruning shall be done in a manner that will promote growth away from the power lines.

Dead branches and structurally weak limbs overhanging primary conductors shall be removed.

A minimum number of cuts shall be utilized to achieve required clearances.

Where practical, cuts should be primarily restricted to large diameter branches, made well within the crown. Shaping through the use of small diameter branches in the outer crown shall be avoided.

Cuts are to be made outside the branch bark ridge leaving no stub.

Precautions shall be taken to avoid stripping or tearing of bark when cutting limbs.

All severed twigs, branches and limbs shall be removed from pruned trees.

The practices known as "shearing", "stubbing", pollarding, or "rounding over" shall be avoided. Exceptions to drop crotch and directional pruning techniques shall be used only when indicated as being acceptable by the FirstEnergy representative.

TREE REMOVAL

A woody plant six inches (6") in diameter at four and one-half feet (4.5') above the ground (DBH) will be considered for purposes of recording a tree. All growths less than this measurement will be considered brush.
Trees that are expected to be removed are those that are:

- Dead or defective which constitute a hazard to the conductor.
- Trees that have fast growth rates or trees that cannot be pruned for effective conductor clearance.
- Immature trees, generally classified as brush.
- Trees that are overhanging the primary conductors and are unhealthy or structurally weak.
- All priority trees located adjacent to the sub-transmission and transmission clearing zone corridor that are leaning towards the conductors, are diseased, or are significantly encroaching the clearing zone corridor.
- All incompatible trees that are located within the clearing zone corridor.

All trees removed shall be cut flush with the ground line except where other treatment is designated by mutual agreement with property owners or public authorities. All live stumps (except conifers) shall be treated with a FirstEnergy approved herbicide.

BRUSH REMOVAL

Brush that is interfering with the conductor or may grow to such height that will interfere with the conductor shall be removed and or treated with a herbicide.

The Contractor shall remove all incompatible brush and shall not prune brush.

All tree and brush removals shall be cut as low as practical, no higher than three inches (3") from and parallel to the ground line.

Mowing of brush on the clearing zone corridor by use of a hydroaxe, brushog, etc., is only permitted with prior authorization of an authorized FirstEnergy representative. Mowing shall be performed as specified by FirstEnergy. Every effort shall be made, during mowing, to preserve patches of desirable vegetation.

HERBICIDE BRUSH CONTROL

The contractor shall use the proper and appropriate herbicide treatment in accordance with the FirstEnergy Guide to Vegetation Control with Herbicides. FirstEnergy expects all incompatible vegetation on the corridor be controlled, with the cut surface treatment being the minimum chosen treatment. In cases where a landowner will not allow at least the minimum treatment, the contractor will consider this a refusal and provide the required refusal information to the FirstEnergy representative, as described in this specification.

Unless otherwise specified, the herbicides used shall be provided by FirstEnergy. All herbicides shall be applied by the Contractor in accordance with the manufacture's label instructions.

The Contractor shall meet the following requirements when applying herbicides: Hold a current and appropriate pesticide application license from the appropriate State Department of Agriculture or its approved equivalent. Conform to all state, local and federal laws governing the herbicide used. Apply the herbicide under the direct supervision of a certified applicator and in accordance with the herbicide label instructions.

Herbicide applications are to be made in a manner assuring restriction of applied material to the target.

Areas of treated clearing zone showing evidence of incomplete coverage shall be re-treated immediately. It shall be the responsibility of the Contractor to inspect the treated clearing zone within one month of treatment and retreat those areas which have received incomplete application.

Areas requiring re-treatment will be determined by inspection during the year following the treatment and shall be done at no additional cost to FirstEnergy. Re-treatment will be with the original herbicide solution and will be applied according to the guideline in effect at the time of initial treatment. An authorized FirstEnergy representative will determine the necessity for re-treatment. The general criteria for re-treatment of brush is reduction of brush density and reduction in average height of brush.

All areas left untreated by the Contractor or that do not pass inspection shall be treated during the next treatment season at no cost to FirstEnergy.

All stems of treated brush that are within five (5') of distribution voltages and that are within fifteen feet (15') of the lines that are 23kV or above shall be cut. This shall apply to all herbicide treatments and to locations where the conductor height is less than one-hundred feet (100').

All areas that have conductor height of one-hundred feet (100') or more at center line must be approved by FirstEnergy before the area is left untreated. In areas where conductor height is less than twenty-five feet (25'), all brush over five feet (5') must be treated and removed on 23kV and above.

The Contractor shall furnish all mixing and application equipment and shall be responsible for transporting, storing, handling, mixing and applying herbicides used in the immediate current operation. The Contractor shall supply the liquid carrier for the herbicides unless it is made available by FirstEnergy.

Empty herbicide containers shall be triple rinsed by the Contractor using the manufacture's label instructions unless refillable/returnable storage containers are being used.

The contractor shall dispose of all empty herbicide containers by following all local, state and federal requirements.

HERBICIDE APPLICATION METHODS & TREATMENT

Herbicide application methods and treatment shall follow the guideline and be in accordance with the FirstEnergy Guide for Vegetation Control with Herbicides.

SPECIAL CONDITIONS

On clearing zone corridors, a fifteen-foot-wide (15') access lane shall be cut and treated with herbicide, to allow travel from structure to structure, unless otherwise specified by FirstEnergy.

All brush and trees shall be cleared away from all structures at the ground line to a distance of three feet (3') unless otherwise specified by FirstEnergy.

When tree houses are observed in trees that require pruning for clearance from the conductors, the Contractor shall contact the property owner, explain the hazard, and offer to remove the tree house. If consent is given, the contractor shall remove the tree house at that time and prune the tree to the proper clearance distance or remove the tree if consent is given.

If the property owner refuses to allow the contractor to remove the tree house, the contractor shall prune the tree for line clearance at that time and notify FirstEnergy by phone. While clearing the tree from the conductor, the contractor shall obtain the property owner's name, address and phone number and reason for refusal. The contractor is also to notify the FirstEnergy representative promptly in writing, giving property owner's name, address, phone number and reason for refusal. A copy of the written notice is to be sent to the Corporate Claims Department, 76 South Main St. Akron, OH 44308.

Trees that are near conductors and show signs of being climbed or being used in children's play require special attention. The contractor observing this situation shall contact the property owner, explain the hazard, and offer to remove the tree. If the property owner consents to having the tree removed, it should be removed immediately.

If the property owner refuses to allow the tree to be removed, the contractor shall prune the tree for line clearance at that time, and notify the FirstEnergy representative by phone. While clearing the tree from the conductor, obtain the property owner's name, address and phone number, and reason for refusal. The contractor is also to notify the FirstEnergy representative promptly in writing, giving property owner's name, address, phone number, and reason for refusal. A copy of the written notice is to be sent to the Corporate Claims Department, 76 South Main Street, Akron, Ohio 44308.

Down and span guys are to be freed of weight, strain or displacement because of pressure caused by contact with tree parts, particularly from fast-growing trees. Vines growing on poles, towers, and guy wires will be cut at ground line and as high as can be safely reached from the ground. Stumps of vines will be treated using an approved cut surface treatment. Notification to the property owner shall be given prior to removing cultivated vines. All noxious vines should be removed, as directed by the designated FirstEnergy representative, from poles, towers, and guys and treated with an appropriate herbicide. If vines are entwined in electrical equipment, FirstEnergy shall be notified.

Communication conductors owned by FirstEnergy shall be maintained to the same clearance as secondary voltages, or as directed by the designated FirstEnergy representative. Allowance shall be made for wire sag and horizontal displacement due to extreme weather conditions and high winds.

Antennas, their supports or other objects attached to or in a tree such that their placement or maintenance has or would cause someone to be in close proximity to the conductor are to be reported promptly in writing to FirstEnergy.

DEBRIS & WOOD DISPOSAL

The Contractor shall leave the wood that is too large to be chipped in handling lengths for the property owner to cut into final firewood lengths. The Contractor shall communicate this to the property owner at the time of notification. The Contractor shall document this notification as directed by FirstEnergy.

The Contractor shall satisfactorily dispose of all tree parts that are pruned or removed in a manner that is acceptable to the landowner and FirstEnergy. Accepted FirstEnergy methods of disposal include windrowing, chipping, lopping, and stacking. Lopping must be below knee height. Brush and logs must not be left in any waterway or within fifteen (15') feet of the centerline of any distribution line or more than ten feet (10') from the edge of a transmission line clearing zone, in areas accessible by mechanical equipment. Debris from clearing zone areas that are adjacent to a road shall be kept on the edge of the clearing zone away from the edge of the road.

Debris that is generated from emergency work, where tree clearing is required, is to be left in a reasonably safe manner. Under these conditions an Emergency Work door card (Form 441) is to be left for the property owner. Situations may occur that require debris generated by emergency work to be cleaned up, the work shall be done at the direction of FirstEnergy.

WORK SITE APPEARANCE UPON COMPLETION OF WORK

Work sites shall be left in a condition equal to that which existed prior to the commencement of the Contractor's operations.

All Contractor-generated trash, including empty drinking cups, lunch papers, oil containers, cigarette butts etc. must be properly disposed of and not left on site.

WORK INSPECTION

FirstEnergy has the responsibility for inspecting and approving work performed under these specifications. The exercise of this responsibility by FirstEnergy Forestry shall not lessen or relieve the Contractor from responsibility under this agreement. The purpose of this inspection is to ensure specification compliance. Payment will be withheld for areas that cannot be satisfactorily cleared and will not be included in payment for the overall project.

An authorized FirstEnergy representative shall make a final inspection of the completed work, to insure all line clearance work has been completed in accordance with the line clearance specifications. FirstEnergy will inspect and communicate findings to the Contractor, in a form that is acceptable to both parties, within 30 days of receiving notification that work is completed.

Any work not done to FirstEnergy's satisfaction and acceptance shall be redone by the Contractor at no additional cost to FirstEnergy. All re-work done at the Contractor's expense shall not be counted as work units. The Contractor shall complete all rework within 30 days of receiving an inspection form and/or map from the FirstEnergy representative. (Exhibit 5- Form 1051) A penalty may be assessed for re-work that is not completed within 30 days of receiving notice from FirstEnergy.

A 10 percent penalty, calculated based on the percentage of work not completed, will be assessed to each project not completed on time.

If more than two inspections are required for a location then the contractor will be billed for the FirstEnergy inspector's time and vehicle mileage for additional trips to the same work site.

DEFINITIONS

"As Required", "As Permitted", "Approved", Acceptable", "Satisfactory", or similar terms shall mean by or to FirstEnergy.

Bidder: Party or parties submitting a proposal for the specified work.

Brush: Incompatible vegetation with trunk diameter less than six (6") in diameter at breast height.

Brush Acre: Brush acre is calculated to by multiplying the length by the width of the Transmission span. If the span is able to support incompatible vegetation within the span then the entire span is to be counted. In cases where there is an agricultural farm field, pavement, or a large body of water such as a lake, these areas are not to be included in the acreage.

Contract: the agreement, between FirstEnergy and Contractor, including the specification, insurance requirements, and any bond, together with any other material specifically incorporated therein.

Contractor: The party or parties entering into this contract with FirstEnergy for work.

Contractor's Representative: Contractor's employee who is directly responsible for the work.

Control: Means that all incompatible vegetation must be removed with a herbicide or be removed mechanically along with a herbicide application to eliminate the root system.

Critical Tree: Any tree identified as a cost effective candidate for removal for removal, growing under or very near overhead conductors. (Not a DANGER TREE)

Days: Unless otherwise specified shall mean calendar days.

FirstEnergy's Representative: An authorized representative of the utility as specified in the Contract and in the "Terms and Conditions Labor Services-Forestry".

Hazard Materials and Hazard Wastes: Any material defined as such in any local, state or federal rule, regulation, law or code in the location in which the work is performed.

Incompatible Vegetation: Is defined as all vegetation that will grow tall enough to interfere with overhead electric facilities.

Inspection Zone: Is defined as area between 15' (fifteen feet) and 20'(twenty feet) from the pole line.

Maintain: Ensuring line reliability.

Maintained Lawn Area: Defined as an area where conductor(s) are located, typically residential, where the area is covered with grass that is kept closely mowed and/or areas where the landscape is being cultivated. Cultivated landscapes may include flower beds, hedge rows and landscape plantings. This does not include wooded, agricultural, industrial sites, or areas along county and state highways.

Non-Maintained Lawn Area: Defined as a rural setting where the area covered with grass is **Not** kept closely mowed and/or areas where the landscape is **Not** being cultivated. Including wooded, agricultural, industrial sites and areas along county and state highways, etc.

Notification: To inform and let landowners know that tree work will be performed on the property for power line clearance. Notification may take place using door card, personal contact, or other approved methods.

Priority Tree(s): Tree(s) located adjacent to the clearing zone corridor that are either dead, diseased, declining, severely leaning or significantly encroaching the clearing zone.

Specification: FirstEnergy's requirement including these general conditions, the specific conditions, and other documents specified under the contents page.

Structurally Weak Limbs: Is defined as limbs that have narrow angle of attachment, included bark, co-dominant stems of equal diameter or any other structural condition that may cause limbs to fail.

Subcontractor: The party or parties entering into a subcontract with Contractor or another subcontractor to perform a portion of the work covered by this contract.

Work: Labor, material, equipment, and all requirements specified.

FIGURES

The following pages contain examples of various clearing distances, requirements and directional pruning.

Figure 1. Street Light Luminaire Clearing Requirements

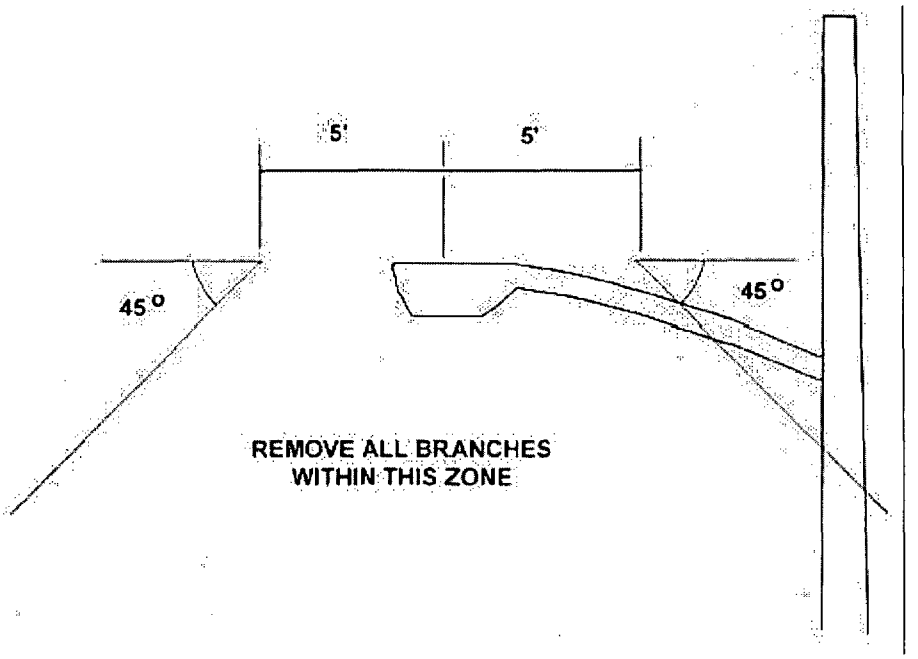
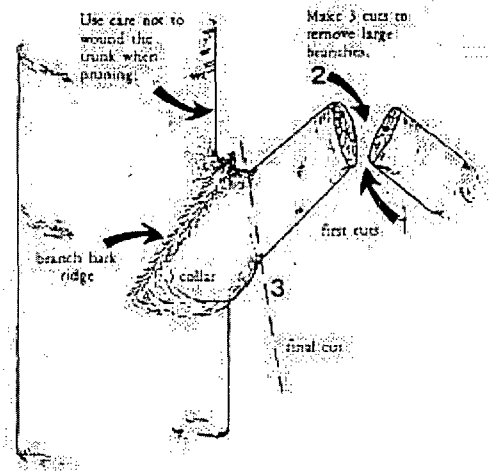


Figure 2. Natural Target Pruning Figure



Cut as close as possible to the branch collar. Do not injure or remove the collar. Injury or removal of the collar destroys a major defense system of the tree, and also leads to excessive sprouting. Do not leave stubs. Stubs are entry points for rot-causing fungi. Do not paint the pruning cuts. Wound dressings do not stop rot.

Figure 3. Removing Leader on Young Trees

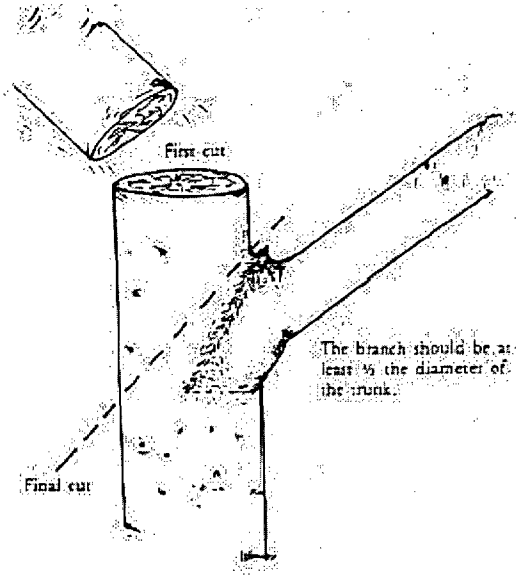


Figure 4. No Set Angle for a Correct Cut Figure

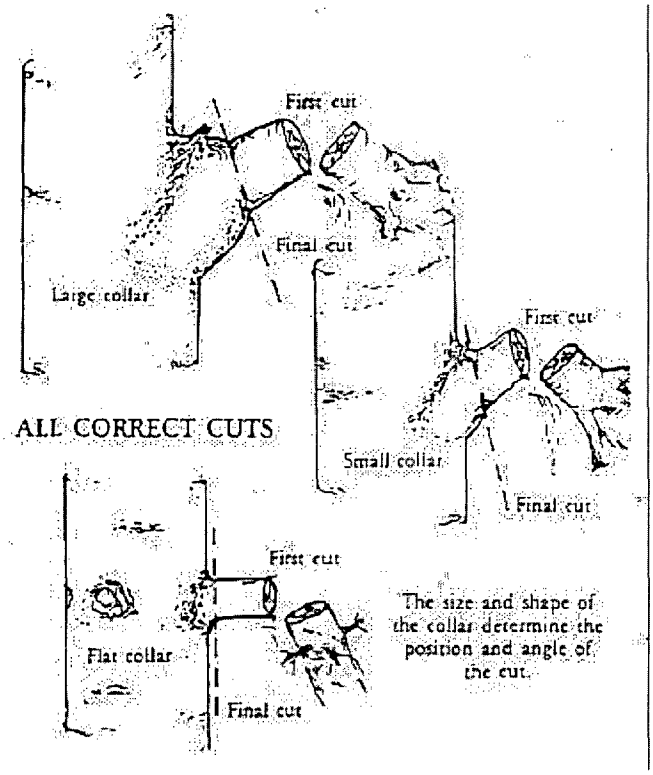


Figure 5. Primary Distribution Clearing Zone, 15 Feet

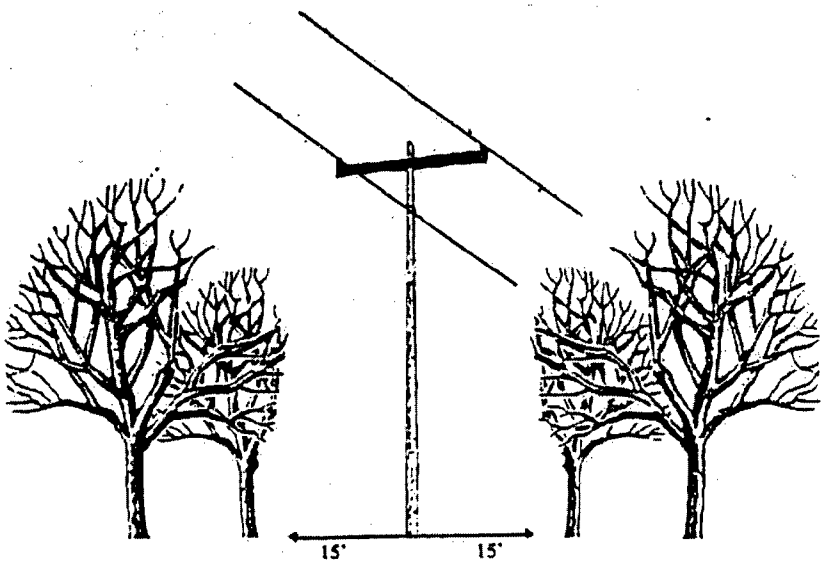


Figure 6a. Secondary Distribution Clearing Zone, 4 feet

Open Three Wire

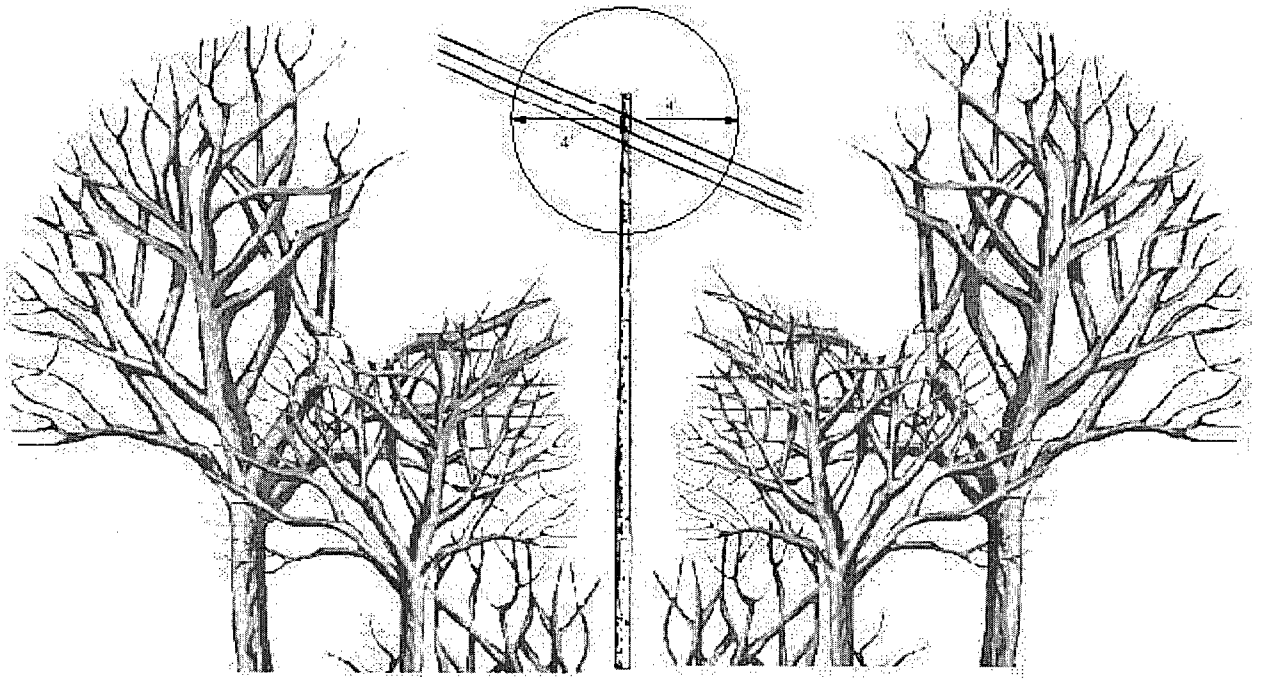


Figure 6b. Secondary Distribution Clearing Zone, 4 feet

Triplex

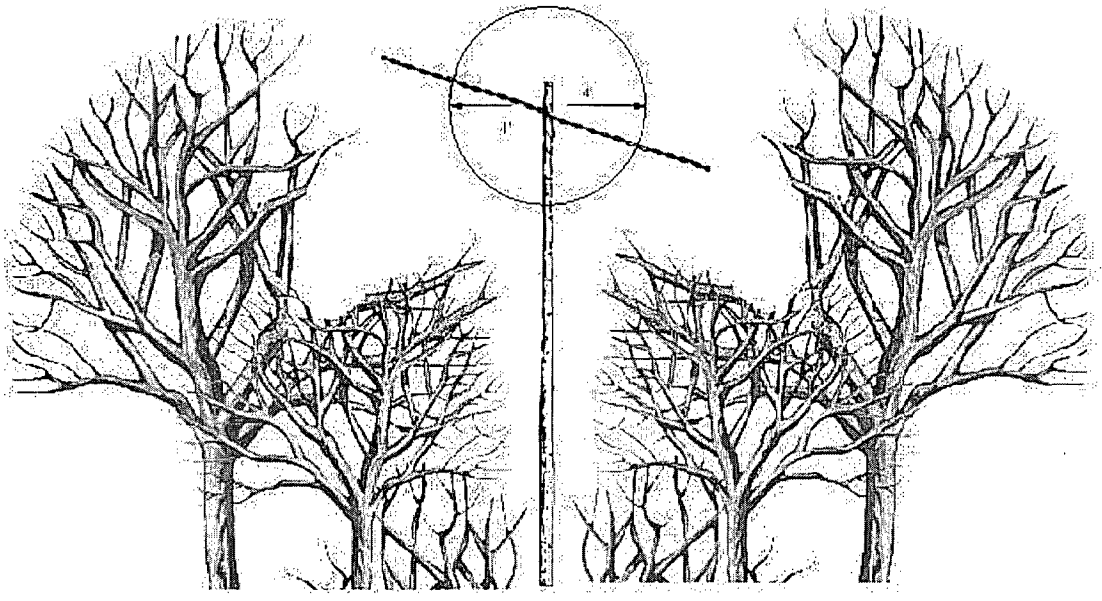
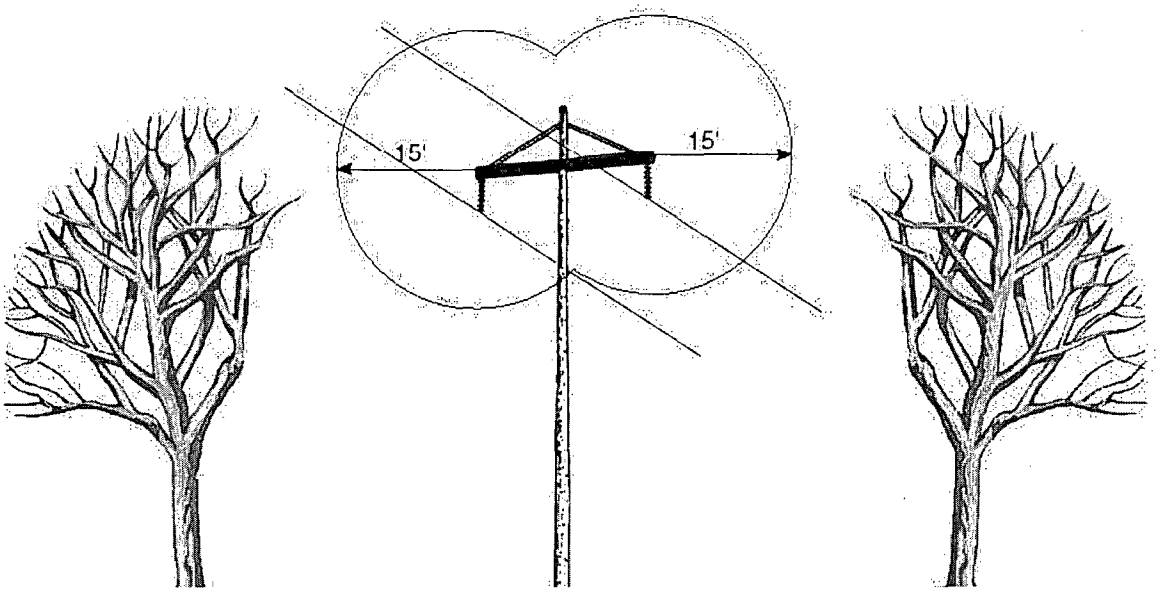


Figure 7. Transmission Pruning Clearance 23 kV – 69kv, 15 feet



*** Transmission Clearing Zone Corridor will be identified prior to start of maintenance activities.**

Figure 8. Transmission Pruning Clearance 115kv – 138kv, 25 feet

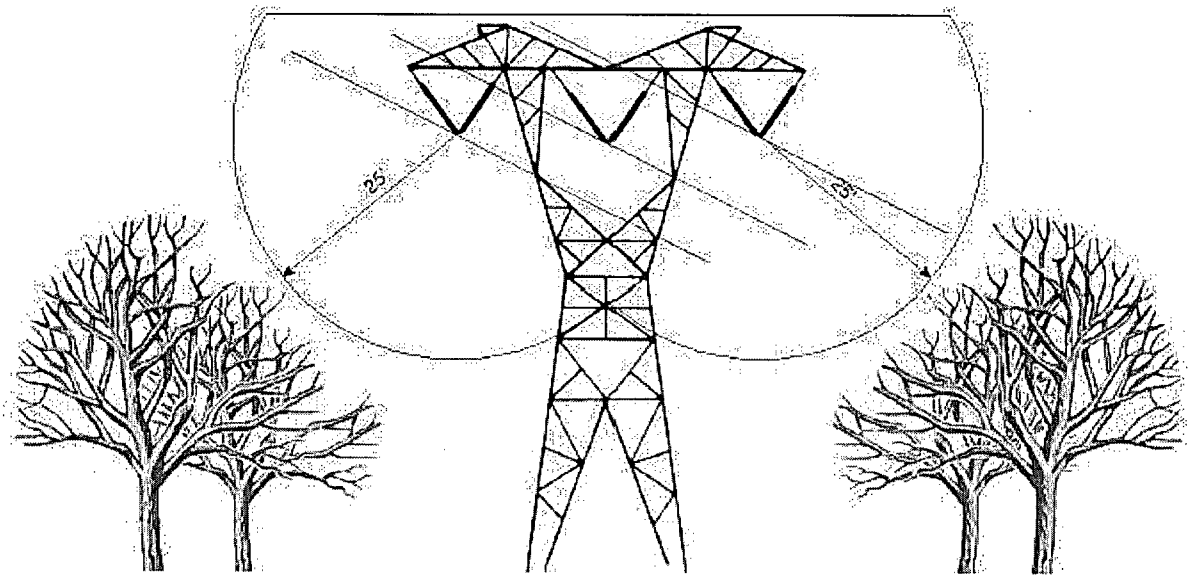
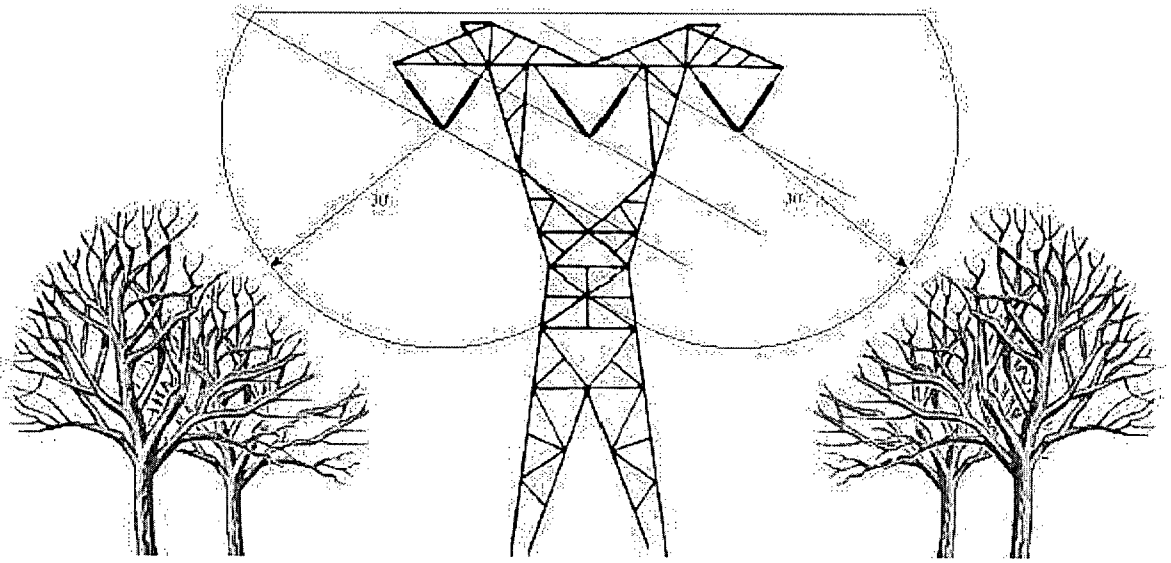
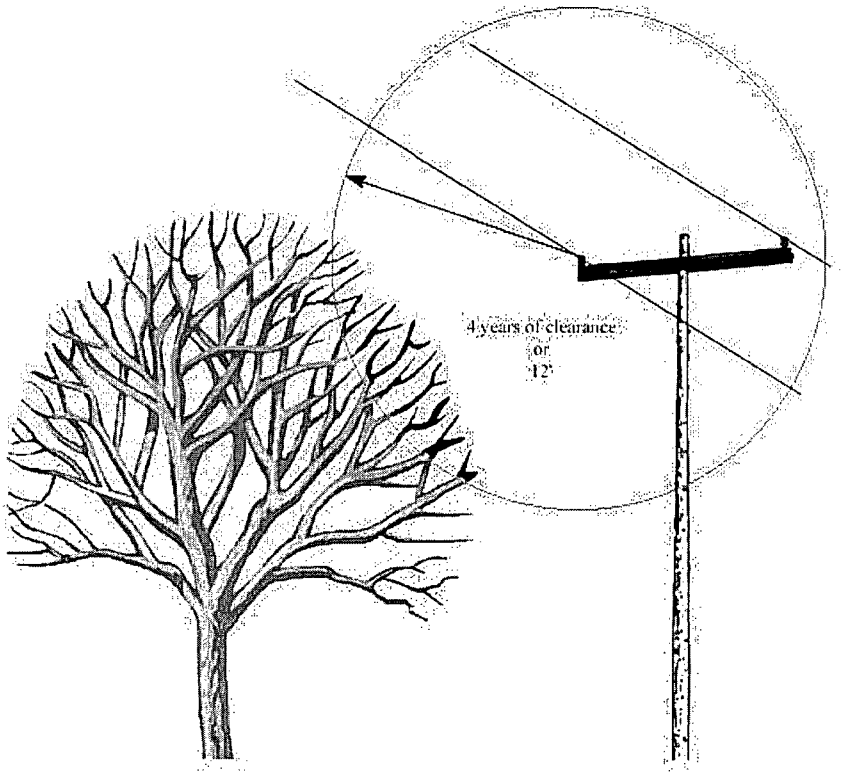


Figure 9. Transmission Pruning Clearance above 138kv, 30 feet



*** Transmission Clearing Zone Corridor will be identified prior to start of maintenance activities. Clearance Required – diagram 1**

Figure 10. Example of Directional Pruning (2 diagrams)



Continuation of Figure 10. Example of Directional Pruning (2 diagrams)

Appearance Of Tree Pruned For Clearance Using Directional Pruning - diagram 2

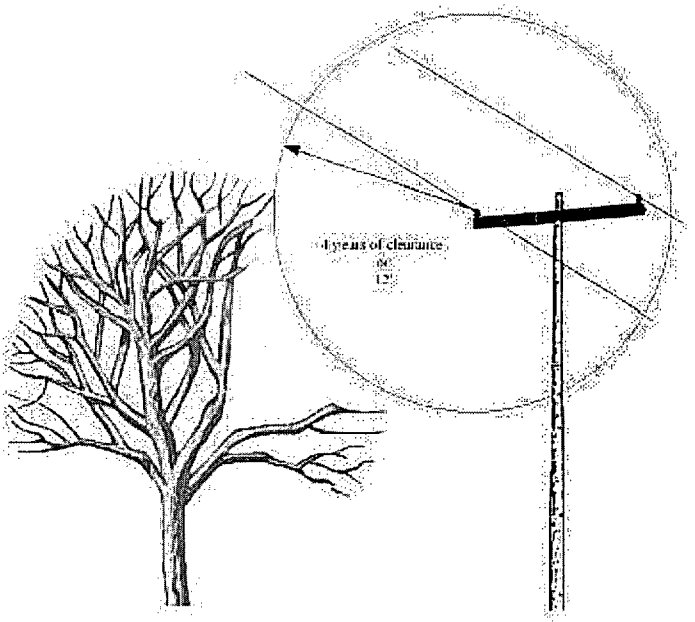
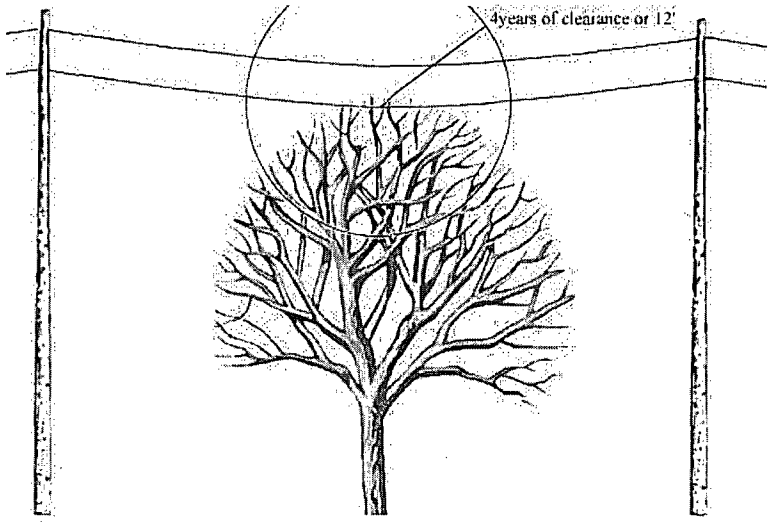


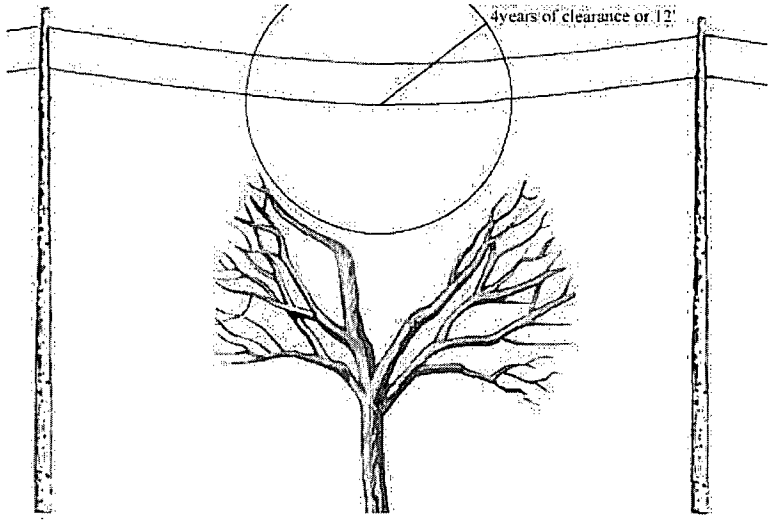
Figure 11. Example of Directional Pruning (2 diagrams)

Clearance Required - Diagram 1



Continued Example of Directional Pruning

Appearance Of Tree Pruned For Clearance Using Directional Pruning When Tree Is Under Line – Diagram 2



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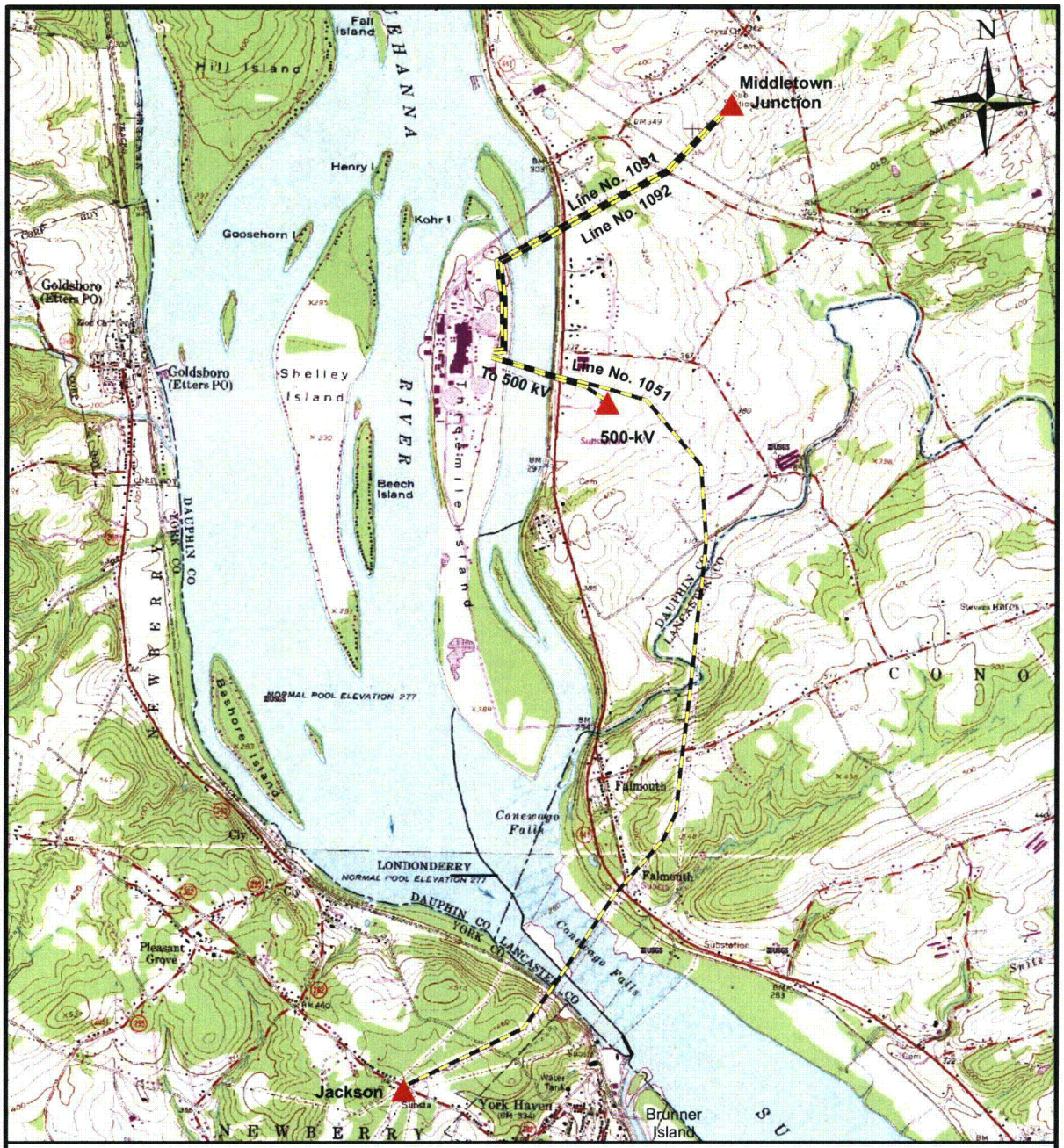
Contractor Name	Circuit	Week Ending	Herbicide Mix
Asplundh Tree Experts	1051	06/28/03	1.0% Glysophate (Accord) + Escort (1 oz./100 Gal) in Water
Asplundh Tree Experts	1051	07/05/03	1.0% Glysophate (Accord) + Escort (1 oz./100 Gal) in Water, 1.5% Krenite + Arsenal (4oz/100 Gal) in water, 25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	1051	07/12/03	1.5% Krenite + Arsenal (4oz/100 Gal) in water
Asplundh Tree Experts	5026	07/05/03	1.5% Krenite + Arsenal (4oz/100 Gal) in water
Asplundh Tree Experts	5026	07/10/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	07/17/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	07/24/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	07/31/04	1.5% Krenite + Arsenal (4oz/100 Gal) in water, 25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	08/14/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	08/21/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
Asplundh Tree Experts	5026	08/28/04	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	1091	02/21/04	20% Garlon 4 + 5% Tordon K + .78 % Arsenal + 74% Basal Oil
	CC1092		
K.W. Reese	5008	10/30/04	20% Garlon 4 + 5% Tordon K + .78 % Arsenal + 74% Basal Oil
K.W. Reese	5008	04/28/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5008	05/05/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5008	05/19/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5008	05/26/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5008	06/16/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	06/23/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	06/30/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	07/07/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	07/14/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	07/21/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	07/28/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	08/04/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	08/11/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5008	09/15/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5008	11/10/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons

TMI and surrounding circuits We

Contractor Name	Circuit	Week Ending	Herbicide Mix
K.W. Reese	5026	01/27/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	02/03/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	02/17/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	03/03/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	03/10/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	03/17/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	03/24/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	03/31/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	04/07/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil, 50% Glysophate (Accord) + 50% Water + Colorant
K.W. Reese	5026	04/21/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	04/28/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	05/05/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	05/19/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	06/02/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	06/09/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	06/16/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	06/23/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	06/30/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	07/07/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	07/14/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	07/21/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 1.5% Glysophate (Accord) + in Water
K.W. Reese	5026	07/28/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	08/04/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 50% Glysophate (Accord) + 50% Water + Colorant
K.W. Reese	5026	08/11/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 7% Glysophate (Accord) in water
K.W. Reese	5026	08/18/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons, 50% Glysophate (Accord) + 50% Water + Colorant
K.W. Reese	5026	09/01/07	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons
K.W. Reese	5026	09/22/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	10/20/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	10/27/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	11/03/07	4 quarts of Garlon 4+7 oz of Milestone VM+water to make 50 gallons
K.W. Reese	5026	11/10/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil
K.W. Reese	5026	11/17/07	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil


Middletown Junction
N
Line No. 1091
Line No. 1092
To 500 kV
Line No. 1051
500-kV
Jackson
Legend
Substation
Transmission Line
Pennsylvania
0
0.5
1
Miles
Three Mile Island Nuclear Station Unit 1
License Renewal Environmental Report
Transmission System



Three Mile Island Nuclear Station Unit 1
License Renewal Environmental Report
Figure 3.1-2 TMI-1 Transmission System

Request No: ENV-7 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: What pesticides and/or herbicides are used on site or within the in-scope transmission line ROWs? What protocol do contractors follow when applying chemicals near streams and wetlands?

Date Received: 3/19/2008 **Response Date:**

Response: TRANSMISSION LINE RIGHTS-OF-WAY:

The Excel spreadsheet titled "TMI and Surrounding Circuits He" is provided. It lists the herbicides used within the in-scope transmission line ROWs.

The report titled Vegetation Control with Herbicides, is being provided. It describes the protocol that contractors follow when applying chemicals along the in-scope transmission line rights-of-way.

TMI PLANT SITE:

The following pesticides were used on the TMI plant site during 2007:
- Contrac Blox (.005% Bromadiolone)
- Suspend
- Delta Dust (.05% Deltamethrine)
- MaxForce Roach Bait (.01 Fipronil)

The following herbicides used on the TMI plant site during 2007:
- Karmex XP
- Oust XP
- Tordon K
- Accord
- Clean Cut
- Journey
- Habitat

The protocol used by contractors applying pesticides or herbicides near streams or wetlands on the TMI plant site is to

follow the instructions provided for each product in its MSDS (Material Safety Data Sheet).

****

List Attachments Provided:

TRANSMISSION LINE RIGHTS-OF-WAY:

TMI and Surrounding Circuits He (TMI and surrounding circuits Herbicide maintenance.xls)

Vegetation Control with Herbicides (FE_Veg_Cntrl_Proc.doc and FE_Veg_Cntrl_Proc.pdf)

TMI PLANT SITE:

MSDSs

Non-AmerGen

TMI and surrounding circuits He

Circuit	Year2	Next	Activity Code	Herbicide Mix	Description4	Sq Feet Of Brush
1051	2,003	2,008	22	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Low-Volume Basal Application	264,000
1051	2,003	2,008	24	1.0% Glysophate (Accord) + Escort (1 oz./100 Gal) in Water	Low-Volume Foliage Application	975,000
1051	2,003	2,008	24	1.5% Krenite + Arsenal (4oz/100 Gal) in water	Low-Volume Foliage Application	577,500
1091	2,004	2,009	22	20% Garlon 4 + 5% Tordon K + .78 % Arsenal + 74% Basal Oil	Low-Volume Basal Application	386,000
CC 1092						
5008	2,004	2,009	21	20% Garlon 4 + 5% Tordon K + .78 % Arsenal + 74% Basal Oil	Brush Removal + Treatment	255,000
5008	2,007	2,012	21	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Brush Removal + Treatment	50,000
5008	2,007	2,012	22	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Low-Volume Basal Application	673,400
5008	2,007	2,012	23	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons	High-Volume Foliage Application	11,645,000
5008	2,007	2,012	25	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Stump Treatment Application	280,000
5008	2,007	2,012	25	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons	Stump Treatment Application	0
5026	2,003	2,008	23	1.5% Krenite + Arsenal (4oz/100 Gal) in water	High-Volume Foliage Application	1,200
5026	2,004	2,009	21	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Brush Removal + Treatment	789,000
5026	2,004	2,009	22	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Low-Volume Basal Application	640,000
5026	2,004	2,009	23	1.5% Krenite + Arsenal (4oz/100 Gal) in water	High-Volume Foliage Application	522,000
5026	2,007	2,012	21	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Brush Removal + Treatment	1,873,975
5026	2,007	2,012	21	50% Glysophate (Accord) + 50% Water + Colorant	Brush Removal + Treatment	335,300
5026	2,007	2,012	22	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Low-Volume Basal Application	4,122,600
5026	2,007	2,012	23	.63% Garlon 3A + .01% Escort + Surfactant + enough water to make 100 gallons	High-Volume Foliage Application	12,354,650
5026	2,007	2,012	24	1.5% Glysophate (Accord) + in Water	Low-Volume Foliage Application	3,306,025
5026	2,007	2,012	24	7% Glysophate (Accord) in water	Low-Volume Foliage Application	2,559,600
5026	2,007	2,012	25	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Stump Treatment Application	155,800
5026	2,007	2,012	25	4 quarts of Garlon 4+7 oz of Milestone VM+water to make 50 gallons	Stump Treatment Application	274,270
5026	2,007	2,012	26	25% Garlon 4 + 2% Stalker in Mineral Oil/Basal Oil	Mowing and Treating	935,500

Vegetation Control With Herbicides

Brush Control With Herbicides

1. All herbicides shall be applied in accordance with the manufacturer's label instructions. All herbicides shall be applied in accordance to all state, local and federal laws governing the use of herbicide.

2. Woody vegetation that will never interfere with the conductors or the operation and maintenance activities of the line should not be treated (within the capability of the application method used). In cases where a ten-foot (10') access path is being maintained, it will be necessary to treat compatible vegetation.

3. The following plants are not to be treated on the right-of-way.

    1. All grasses, ferns, and herbaceous plants.
    2. All annual weeds and annual plants.
    3. Low growing shrubs including but not limited to:

a.	Mountain Laurel -	Kalmia latifolia
b.	Sweetfern -	Comptonia peregrina
c.	Pinxterbloom -	Azelea nudiflorum
d.	Huckleberries -	Gaylussacia spp.
e.	Blueberrries -	Vaccinium spp.
f.	Trailing Arbutus -	Epigaea repens
g.	Checkerberry -	Gaultheria procumbens
h.	Partridgeberry -	Mitchella repens
i.	Meadowsweet -	Spirea spp.
j.	Canadian Yew -	Taxus canadensis
k.	Black Chokeberry -	Pyrus melanocarpa
l.	Elderberry -	Sambucus spp.
m.	Rhododendron -	Rhododendron spp.
n.	Highbush Blackberry -	Rubus allegheniensis
o.	Black Raspberry -	Rubus occidentallis
p.	Viburnums -	Viburnum spp.
q.	Holly -	Illex spp.
r.	Common Spicebush -	Lindera benzoin

4. Contractors should be aware of the hazards that certain plants, such as black cherry, present to livestock, and they should take the needed precautions to eliminate the exposure of livestock to the plants after treatment.

5. The Contractor, when applying pesticides in the appropriate state, shall meet the following requirements:

    a. Hold all appropriate pesticide license(s) from the state(s) working in.

    b. Conform to the Ohio and Federal laws governing the pesticides used including, but not limited to, Chapter 921 of Ohio Revised Code, Chapter 901:5-11 of Ohio Administrative Code, Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. 135).

    c. Conform to Pennsylvania Pesticide Control Act (Act of March 1, 1974, P.L. 90, No. 24) and

the recently promulgated Department of Agriculture regulations thereunder (Chapter 128 of PA Code Title 7).

d. Conform to all pesticide laws in NJ including but not limited to the **New Jersey Administrative Code Title 7 Chapter 30Subchapters 1-12.** Be aware of special regulations in wetlands and the ban of herbicides in the PineLands. Department of Environmental Protection oversees restricted pesticide use.

e. Conform to all New York pesticide laws including but not limited **to Article 33 and Article 15 and 71 of the Environmental Conservation Law .** The Department of Environmental Conservation oversees restricted pesticide use.

Apply the pesticide under the direct supervision of a certified applicator and in accordance with the pesticide's label instructions.

6. The following precautions shall be used on the right-of-way:

   a. Use as low a pressure as possible.

   b. Spray down the right-of-way, not across it.

   c. Keep spray nozzles below the horizontal as much as possible.

   d. Use a spray thickener when required, or change application methods when adjacent to a cultivated crop that is sensitive to the pesticide being used.

   e. Try to use Amine formulation of herbicides during hot weather when leaves are out and Ester formulation of herbicides during late fall, winter, and early spring.

   f. Herbicide formulation and/or application on roadside vegetation is to be timed or done in a way that reduces the brown out appearance.

7. The Contractor shall furnish all mixing and application equipment, and shall be responsible for transporting, storing, handling, mixing, and applying of herbicides used in conjunction with the project. The Contractor shall take necessary measures and precautions to avoid spills during handling and transporting of herbicides. Contractor will supply the liquid carrier for the herbicides, unless available from FirstEnergy.

8. The spray solution must be thoroughly agitated prior to and during application to insure uniform dispersion of the concentration through the carrier.

9. Pump equipment used to pump or mix herbicide spray materials shall not be used to pump water from streams or ponds into the spray tanks. A separate pump shall be provided by the Contractor for this purpose.

10. Contractor shall use anti-drift additives at times when wind conditions increase the chance of excessive herbicide treatment drift off site.

11. Empty pesticide containers shall be triple rinsed using the following procedure:

TRIPLE RINSE PROCEDURE

Step 1 Empty container into spray tank* by holding container in a vertical position and wait one minute for 30 gallon and 55 gallon containers and 30 seconds for containers smaller than 30 gallons. If container is still dripping after waiting the required time, continue to wait until most of the dripping has stopped.

Step 2 Rinse container by adding water or oil, depending on the carrier being used with the pesticide, to fill pesticide container 1/5 to 1/4 full. Make sure the container's caps are secured in place. Then shake or roll container depending on the size.

Step 3. Empty the container's contents into the spray tank and drain for the appropriate length of time as in Step 1.

Step 4 Repeat Steps 2 and 3 two more times.

* If supporting the partially filled drum presents a physical problem, an intermediate pan or pail may be used. These latter items should then be treated as a pesticide container.

12. Herbicide applications near streams, lakes, ponds and reservoirs. Herbicides not registered for use near or in water when used in a foliage application or used with an oil carrier, are not to be applied within 10' or greater of lakes, streams, ponds or reservoirs. Vegetation on the bank of a lake, stream, pond or reservoir is to be cut and not treated with a herbicide. When applying herbicides near streams, lakes, ponds, and reservoirs the applicator's back is to be towards the stream.

13. High Volume Foliage applications shall be made as follows, unless otherwise directed by FirstEnergy:

a. Apply during the period June 1 to September 1.

b. The vegetation treated in general shall not exceed an average height of eight feet unless otherwise directed.

c. The herbicide mixture shall be applied to completely wet the entire leaf, stem, and trunk surface of each plant to the point of runoff.

d. Foliage applications shall not be applied within 30 minutes after fog, dew or rain that is heavy enough to cause run-off of water on the leaves of the plant. Foliage treated 30 minutes or less prior to such fog, dew, or rain shall be re-treated, but not until 30 minutes after run-off has stopped.

e. Foliage application on roadside distribution lines shall only be made with Krenite unless otherwise directed by a designated FirstEnergy representative. Krenite can be used starting July 15.

14. Low Volume Foliage applications shall be made as follows unless otherwise directed by FirstEnergy:

a. Apply after full leaf development and up to fall leaf coloration.

b. The vegetation treated, in general, shall not exceed an average height of eight feet, unless otherwise directed.

c. The incompatible vegetation shall be treated using either the 15° nozzle, the straight stream nozzle, or the 40° nozzle. Tank pressure should be sufficiently maintained to provide the desired spray pattern. It should not produce fine mists, but rather produce course, raindrop-like droplets.

d. The technique should simulate an aerial application that just wets the surface of the leaves of the entire canopy of the brush stem being treated. Run-off is not to occur. A back and forth motion beginning from the top of the canopy and moving downward to the lowest leaves is most effective. The entire plant needs to be treated for best results. Avoid over-shooting plants. Stand 5 to 15 feet away from the stem being treated. This allows the spray pattern to become fully developed and fall down onto the leaf surfaces, rather than shooting through the plant canopy and onto compatible vegetation in the understory or only treating one side of the canopy.

e. Foliage applications shall not be applied within 30 minutes after fog, dew, or rain that is heavy enough to cause run-off of water on the leaves of the plant. Foliage treated 30 minutes or less prior to such fog, dew, or rain shall be retreated but not until 30 minutes after run off has stopped.

15. Low Volume Foliage applications with Emulsifier (Thinvert) shall be made as follows, unless specified by FirstEnergy:

a. Thinvert applications shall be made in accordance with the manufacturer's label.

b. The incompatible vegetation shall be treated using a nozzle that is most appropriate and effective for the brush conditions found on the right-of-way. The nozzle used shall be in accordance with the manufacturer's label.

16. Basal applications of herbicides shall be made as follows, unless otherwise specified by FirstEnergy:

a. The herbicide shall not be applied when the stem and trunk are excessively wet.

b. Application shall be used during late fall, the dormant season and before one-half leaf development occurs in spring unless otherwise directed by FirstEnergy.

c. The herbicide mixture shall be applied to the stem and trunk so as to wet the entire surface of the stems or trunk from the root crown up the stem 12 to 18 inches.

d. All obstructions such as tall grass, dead leaves, etc., will be cleared away from the stem to be sprayed.

e. All evergreen tree species over three feet (3') in height shall be cut. Those under three feet (3') in height shall be treated over their complete height, including all needles, twigs, and stems, in addition to the basal treatment covered in this guideline.

f. All stems within ten feet (10') of the conductors must be treated and cut.

17. Stump applications of herbicides with a water carrier mix shall be made as follows, unless

otherwise specified by FirstEnergy:

a. The herbicide mixture shall not be applied when the stumps are excessively wet or later than eight hours after cutting, unless otherwise directed.

b. The herbicide mixture shall be applied to the freshly cut stump so as to completely wet the cambium area, which is the area next to the bark.

c. All stumps visible to the eye, except stumps of coniferous species (exception Pitch Pine) and those hardwood species that will never interfere with the line, should be treated.

18. Stump applications with oil carrier mixes, such as with Basal Mineral Oil and Garlon 4, shall be made as follows, unless otherwise specified by FirstEnergy:

a. Stumps are to be treated the same day that the vegetation is cut.

b. The herbicide mixture shall be applied to the stump so as to wet the cambium area, the bark area, root crown, and any exposed roots.

c. All stumps visible to the eye, except stumps of coniferous species (exception Pitch Pine) and those hardwood species that will never interfere with the line, should be treated.

19. Frill or Hack and Squirt herbicide applications shall be made as follows, unless otherwise specified by FirstEnergy:

a. Frills are to be made with a sharp cutting tool (hatchet, axe, brush axe, etc.) so as to overlap and completely encircle the stem.

b. Frills are to be made at a convenient working height but shall always be below three feet high and below the first branch.

c. Where multiple stems originate from a common stump each stem is to be treated individually instead of treating the common stump.

d. Frills should be as deep as possible to expose the maximum amount of conductive tissue to the herbicide applied.

e. Herbicide is to be applied to the frill so as to only wet the cut surfaces.

20. Cut Stubble Treatment Method shall be made as follows:

a. The manual cutting or mechanical mowing of brush shall be done in accordance with the FirstEnergy Vegetation Management Specifications.

b. Proper coverage of the cut stubble and soil surface shall be made to provide the required spray volume per acre as indicated by the herbicide label.

21. Bare Soil Treatment Herbicide Applications shall be made as follows, unless otherwise specified by FirstEnergy:

a. Apply herbicide in spring or early summer before weeds are 3" to 4" tall.

b. Apply herbicide only to areas where complete vegetation control is desired, i.e. gravel

areas in substation yards, pole yards, storage areas etc.

c. Apply herbicide mix so as to only wet gravel surface.

22. Weed Control in Landscape Beds with Herbicides shall be made as follows, unless otherwise specified by FirstEnergy:

a. Roundup is to be used according to the label instructions for post-emergent weed control in landscape planting beds.

b. Treatment is to be made when the weeds to be controlled are in active growth. Perennial weeds should be approaching maturity when treated to insure control of underground root systems.

c. The weeds to be treated should not be heavily covered with dust.

d. Application of herbicide solution is to be made in a manner so as to avoid contact with desirable vegetation. Small amounts of herbicide may cause damage to desirable vegetation.

23. In herbicide application work the Contractor shall have the right to skip any portion of the line when, in his opinion, crops, orchards or ornamental plantings, not intended to be treated may be damaged. The skip is to be documented and reported as described in this guideline.

24. The Contractor is to notify FirstEnergy of misapplication and chemical spills immediately and is to follow notification procedures and instructions on the product label as required by regulatory agencies. The Contractor is to keep FirstEnergy apprised of cleanup activities and progress.

25. Procedure for refusal and skips - when permission for herbicide application is refused or when an area is intentionally skipped the contractor is to notify FirstEnergy promptly in writing, using the form provided by FirstEnergy, giving the following information:

a. Name and address of property owner refusing permission or owner of area skipped.

b. When and by whom the request for permission to use herbicides was made including the nature of the request.

c. Where possible the reason for the refusal or skip.

d. The location of the refusal or skip in relation to FirstEnergy facilities (line name, span numbers, nearest roads, etc.).

e. Describe the type and amount of work that needs to be performed.

g. Any other background information that may be of assistance in determining the location of the property owner, nature of refusal or possible solutions.

Herbicides, Adjuvants, Surfactants and Dyes that are approved for use.

GARLON 3A	TORDON 101	BASAL MINERAL OIL
WEEDAR 64	KRENITE S	TORDON K
ARSENAL	ESCORT	STALKER
GARLON 4	GLYPHOSATE (ACCORD)	OUST
CROP OIL CONCENTRATE	CADCO 90	
DRIFT RETARTDANT	ROUNDUP	

BULLSEYE 55	EMULISIFIER(THINVERT)
NUFILM IR	GLYPRO PLUS
GLYPRO	KARMEX(DIURON)

Note: Other herbicides, adjuvants, surfactants and dyes may be used with a FirstEnergy representative's approval.

(02/18/2008)

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-8 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide any current management plans for the Osprey and peregrine falcon nesting sites on the meteorological tower and the TMI-1 reactor building. Are there any plans for future attempts to create new suitable nesting areas?

Date Received: 3/19/2008 **Response Date:**

Response: The site has been in communication with the PA Game Commission on the subject of the Peregrine Falcon and the Osprey that have taken up residence on site. The PGC has reviewed the work scope and timing for the 2009 EOTSG replacement project and has not identified any interferences at this time (PGC 2008). Their review focused on the timing of activities for scheduled work associated with the Steam Generator Replacement project in the area of the TMI-1 reactor building in the summer of 2009, and determined that they agreed with AmerGen's proposed avoidance and monitoring methods. Such methods were documented in a request for a threatened and endangered species review submitted by AmerGen's consultant, ARM Group, Inc., in February 2008 (ARM 2008).

During 2003, an alternate nesting location was constructed and placed on the TMI-2 reactor building. The alternate nesting location remains in place, but has yet to be successful. AmerGen has no plan to either remove the existing alternate nesting location or erect another one.

The Site has erected an alternate nesting location for the Osprey in an attempt to lure them away from the Met Tower. However, the alternate nesting location has yet to be successful. At the present time the site continues to co-exist with the Osprey and their chosen nest location. AmerGen has no plan to either remove the existing alternate nesting location or erect another one.

List Attachments Provided:

PGC 2008 Pennsylvania Game Commission (PGC). 2008. Letter to ARM Group, Inc. (M. Cohen) regarding OTSG Replacement Project, Three Mile Island, Londonderry Township, Dauphin County, PA, PNDI#20071204119381. March 3.

ARM 2008 ARM Group, Inc. 2008. Letter to Pennsylvania Game Commission regarding request for a detailed review of potential impacts on State-listed species of special concern. February 13.

Non-AmerGen

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
2001 ELMERTON AVENUE, HARRISBURG, PA 17110-9797

March 3, 2008

Ms. Michelle S. Cohen
ARM Group, Inc.
1129 West Governor Road
PO Box 797
Hershey, PA 17033

In re: OTSG Replacement Project
Three Mile Island
Londonderry Township
Dauphin County, PA
PNDI#20071204119381

Dear Ms. Cohen:

This is in response to your letter (attached) dated February 13, 2008 requesting a detailed review of potential impacts indicated on the PNDI Project Environmental Review Receipt for state listed species of special concern as related to the above referenced project(s).

As indicated in your letter, the state listed endangered peregrine falcon (*Falco peregrinus*) and state listed threatened osprey (*Pandion haliaetus*) are known to occur in the project area. The Pennsylvania Game Commission (PGC) is in agreement with the avoidance and monitoring methods indicated in your letter. Please continue coordinating the potential nest enhancements and monitoring as the project commences.

The PGC does not have any other records of state listed birds or mammals in the project area. Should project plans extend beyond the present study area, or if additional information on endangered or threatened species of birds or mammals becomes available, this review may be reconsidered. This reply relates only to endangered and threatened species and does not address other concerns of the Pennsylvania Game Commission.

Please contact me directly at (717) 787-4250 if you have any questions.

Very truly yours,

Kevin L. Mixon
Division of Environmental
Planning and Habitat Protection
Bureau of Wildlife Habitat Management

Cc: Brauning, PGC
Arthur McMorris, PGC

Non-AmerGen

ARM Group Inc.

Earth Resource Engineers and Consultants

February 13, 2008

Mr. Kevin Mixon
Pennsylvania Game Commission
Bureau of Wildlife Habitat Management
2001 Elmerton Avenue
Harrisburg, PA 17110

Re: Threatened and Endangered Species Review Request
OTSG Replacement Project
Three Mile Island
Londonderry Township
Dauphin County
Research ID # 20071204119381
ARM Project M08105

Dear Mr. Mixon,

On behalf of Exelon Corporation, ARM Group Inc. (ARM) is requesting a threatened and endangered species review for the above referenced project located in Londonderry Township, Dauphin County, Pennsylvania. The project is located on Three Mile Island at the Unit 1 Reactor Building. A project location map (Figure 1) is attached (United States Geological Survey [USGS] 7.5 minute quadrangle, Middletown, Pennsylvania).

The proposed project involves replacement of the steam generator (OTSG) at the Unit 1 Reactor Building. The replacement work is scheduled to begin in 2009. Additionally, the tendons at the Unit 1 Reactor Building are also being inspected. The inspection work is conducted every five years and is also to begin in 2009.

The Pennsylvania endangered Peregrine Falcon (*Falco peregrinus*) and the Pennsylvania threatened Osprey (*Pandion haliaetus*) are known to occur on Three Mile Island within the property limits of Exelon Corporation. The established Peregrine Falcon nest is along the tendon end caps behind (or south) of the Unit 1 Reactor Building ventilation shaft. The falcons have been nesting at this location since 2002.

The Pennsylvania Game Commission (PGC) was contacted due to the potential for impacts upon the Peregrine Falcon and Osprey as a result of the tendon inspection and OTSG replacement project. A meeting was held with Dr. Arthur McMorris of the PGC on November 19, 2007 to discuss the project process and schedule, potential impacts upon the falcon and osprey, and measures to avoid and minimize impacts upon the bird species. A copy of the agenda and meeting minutes are attached.

1129 West Governor Road • P.O. Box 797 • Hershey, PA 17033-0797
voice: (717) 533-8600 • fax: (717) 533-8605 • e-mail: info@armgroup.net

Potential impacts upon the Osprey are not expected, based upon the November 19, 2007 discussions and site inspection, and this determination is reflected in the minutes. Additionally, potential impacts upon the Peregrine Falcon are not expected if the proposed work is to fall within the construction period as discussed (mid – July, preferably August – December 2009) as reflected in a PGC Memo, December 14, 2007, attached. This time frame is reflective of when the falcons are least susceptible to the disturbance and when the falcons are least likely to be aggressive towards the workers.

Dr. McMorris also outlined in the December 14, 2007 Memo potential management requests. The requests involve measures to enhance the nests and measures to allow future monitoring of the falcons and their nest. Currently, Dr. McMorris and Exelon are engaging in ongoing coordination to determine the most feasible way to provide access and to monitor the falcon nest site in a manner that complies with Exelon's safety standards.

The Natural Heritage Program's Environmental Review Tool was accessed to determine the potential for threatened and endangered species in the project area and satisfy the agency coordination process. The results indicated that two potential project impacts within the jurisdiction of the PGC exist. The receipt is attached.

ARM requests the PGC's review of this project with respect to potential involvement with Pennsylvania species of special concern. If you have any questions regarding this request please call me at 717-533-8600 or Mr. Neil Peters, Project Manager, at 410-290-7775. Your time and attention to this matter is greatly appreciated.

Sincerely,

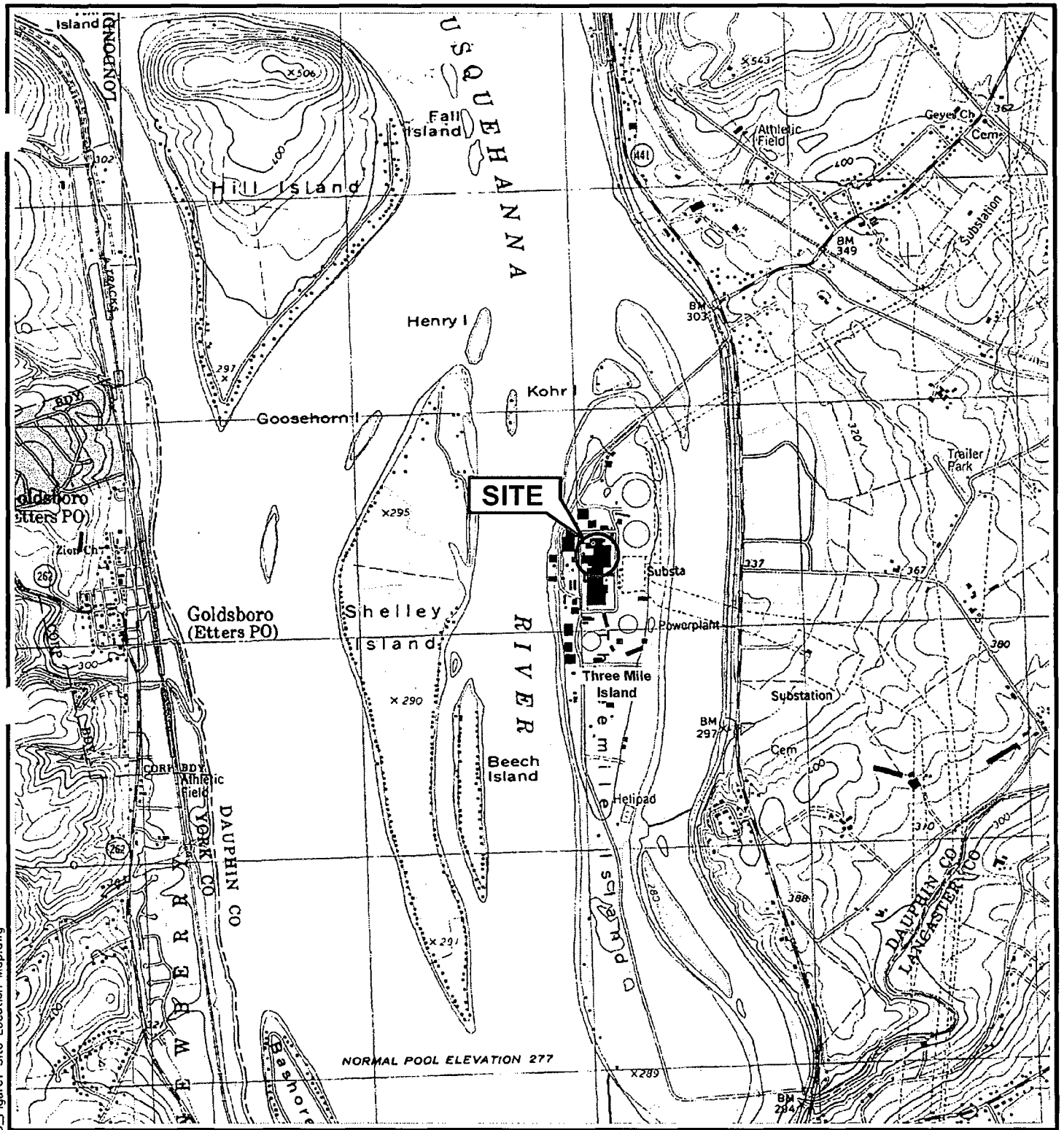
ARM Group Inc.

Michelle S. Cohen

Michelle S. Cohen
Senior Scientist

Enclosures

cc: Neil Peters, ARM
Peter Omaggio, Exelon Corporation
Scott Cogley, Exelon Corporation
Mark Sweigart, Exelon Corporation
Chris Baker, Exelon Corporation
Arthur McMorris, PGC
Dan Brauning, PGC



Base map from Middletown USGS 7½ minute quadrangle dated 1999.

Site Location Map

OTSG Replacement Project
Londonderry Township
Dauphin County, Pa

February 2008	Scale: 1" = 2,000'	M08105

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road • Hershey, PA 17033-0797

Figure 1

T:\M07138 Three Mile Island_Drwg\M08105_Figure1 Site Location Map.dwg

OTSG Replacement Project
Peregrine Falcon Review

Peregrine Falcon Cycle

- Roosting – Non-nesting locations (perching)
  - More than one location
- Mating
  - Pairs mate for life
  - TMI pair will be in sixth season in Feb. 2008
  - Mating is in February
  - Eggs hatch in six weeks (mid April)
  - Fledglings leave nest after 4-5 weeks (May – June)
    - Roost nearby until August
  - Mating pair leave nest and roost around August
  - Mating pair return to nest in December

Work Scope Unlikely to Disturb Falcons

- Work activities at grade
  - Surveying
  - Excavation
  - Concrete placement
  - Erection work at lower elevations

Work Scope That Could Disturb Falcons (Pre-outage work could start in July 2009)

- Erection of Tower Crane
- Setting of equipment on top of reactor building
- Tendon Removal and Installation
  - Work on top of dome
  - Work along Buttress 4 (south west side)
- Construction Opening
  - Erection and removal of scaffolding (elevation 390')
  - High pressure water cutting (elevation 375')
  - Removal and installation of rebar and concrete (elevation 375')
- High pressure water pump compressors at grade (noise levels)

OTSG Replacement Project
Peregrine Falcon Review

Invitees

- Michael Murphy, Bureau of Rad Protection
- Dr. Arthur McMorris, Game Commission
- Scot Cogley, AmerGen Environment
- Ray Brown, OTSG Replacement Project Installation Manager
- Peter Omaggio, OTSG Replacement Project Installation Engineer
- Michelle Cohen, ARM Group Environmentalist

November 16, 2007

OTSG Replacement Project
Peregrine Falcon Review Meeting
November 19, 2007

Meeting at Three Mile Island North Office Building at 11:00am

Attendees:
Michael Murphy, DEP
Arthur McMorris, Pennsylvania Game Commission
Peter Omaggio, Demark, Inc. /OTSG Replacement Project - Three Mile Island
Scott Cogley, Exelon Corp - Three Mile Island
Michelle Cohen, ARM Group Inc.

Discussion

TMI Peregrine Falcon Details
Mr. Michael Murphy showed on-site photos of the falcons, their young and nest site location. The established nest is along the tendon end caps behind (or south) of the TMI Unit #1 Reactor Building ventilation shaft. The falcons use this tendon alcove along the west side of the reactor building to perch and strengthen wings for flight. Mike indicated that no one has ever seen the nest up close, as it is difficult to access due to its location along the exterior wall below the building dome.

Mike noted that in 2003 a nest box was put up at the Unit #2 reactor building to try to lure the birds to nest in a safer area. The male seemed interested but the female did not approve. The box was unsuccessful and the existing nest location has been reused since 2002. The Unit #2 nest box remains in place.

Prior mating for the TMI pair has followed the following timeline:

- February through April - mating through hatching
- May through July - nesting through fledging
  - Fledging is when the young are strengthening their wings and are attempting to fly (the TMI falcons have fledged in early June)
- August through January is period when the young have fledged and when both young and adults roost / perch away from the nest

In summary, the TMI timeline when work would disturb falcons is February through July

- **Note: This is when work above the falcons or in the air space around their nest can produce attacks by the adults (primarily the female)**

Also, caution is needed when operating equipment from the end of July and through August as the young are learning to fly it may be difficult for them to move out of the way of equipment.

Mr. McMorris provided input on falcon attacks. In Philadelphia, PA, a Peregrine Falcon pair has a nest at the Benjamin Franklin Bridge. Work that started during the falcon nesting-fledging period produced attacks on the workers. The job was stopped when workers refused to continue.

Mr. McMorris and Mr. Murphy stated that while the mating cycle has been consistent, should one of the pair die and a new mate be accepted that the cycle could be later.

Mr. McMorris advised that the peregrine falcons are still classified as "endangered" in the State of Pennsylvania. He could not comment on legal issues.

Additional Items Discussed

Mr. McMorris asked if it was feasible to have an access platform designed to provide access to the nest for banding and observations. Mr. Omaggio and others indicated that would be challenging due to plant design criterion for the reactor building and adjacent equipment...

- In addition, the actual location of the nest is not known. The falcons are observed walking and perching along the building but the nest has never been seen. It's location relative the vent stack is not truly known.

Mr. McMorris brought up the possibility of repelling from the reactor-building dome. He was advised that this was unlikely based due to the rigorous safety program and culture at TMI.

Mike Murphy recommended that TMI start regular observations starting in February 2008 to become very familiar with the falcon's activities and especially to locate their perches.

Mr. Murphy stated that he has noticed that the bird's perching patterns have changed with new security activities along roofs.

The group discussed the project work and concluded it should have no affect on the TMI Osprey

Mr. McMorris thought that it would ***not*** be worth trying to move the nest. The birds are coming into their 7th year of nesting in 2008 and they have always selected the same nesting site. (The nesting box / platform has not been used by the falcons to date). Dr. McMorris thought chances of success in moving the nest would be slightly greater if a new mate was involved.

Destroying the current nest and forcing a move was discussed. It did not seem viable to Mr. Murphy or Mr. McMorris. The peregrine pair have had a high return rate to the same nest site.

The participants performed a walked down and observed and discussed the vent stack location. During the walkdown a falcon was observed perched on the west side of the Unit #2 reactor.

OTSG Replacement and Tendon Surveillance Work

Pete Omaggio reviewed the tendon inspection and project work that is scheduled for 2009.

- Work at on the north-west side of the reactor building that should ***not*** disturb the falcons
  - Surveying at grade
  - Modification of fencing at grade
  - Excavation and concrete placement at grade
  - Erection work north of the vent stack and below the height of the dome

- Work activities in the air space that ***could*** disturb falcons:
  - All work on the reactor building dome
  - Tower crane erection at or above the dome
  - Setting of platforms and equipment on top of reactor building
  - Movement and lowering of tendon platforms above and adjacent to nest
  - Tendon work on top of reactor building dome
  - Tendon work along reactor building wall south of vent stack (Buttress #4)

OTSG Replacement and Tendon Surveillance Work (continued)

- Reactor Building Opening (north of vent stack and tendon buttress #4)
  - Erection and removal of scaffolding (elevation 390')
  - High pressure water cutting (elevation 375')
  - Removal and installation of rebar and concrete (elevation 375')
  - High pressure water pump compressors at grade (noise levels)

Work Schedule

Per Pete Omaggio the actual work schedule in not yet defined however work activities at grade could start in Spring 2009. The tendon surveillance work could start as early as July 2009. (Note: Tendon Surveillance is done every five years and inspects a percentage of the tendons)

All work in the area of the reactor building should complete by the end of December 2009.

Follow Up Actions

1. Scott Cogley and Pete Omaggio will check to determine if there were any issues related to the falcons from the last tendon surveillance performed in 2004.
2. Mr. McMorris requested access on tendon scaffolding when in place in the vicinity of the nest to inspect the nest in 2009. Can TMI support this? **Action:** P. Omaggio
3. The goal is to keep the workers safe during the inspection and maintenance activities and to not cause any undo disturbance of the falcons. Can work activities that would disturb falcons and endanger workers be scheduled after July? **Action:** Pete Omaggio
4. The 2008 and 2009 mating and fledging should be documented. Can TMI set up an observation program? **Action:** Scott Cogley
5. Mr. McMorris will issue a letter summarizing the PGC suggestions and requests.
6. A camera installation for observation of the nest was requested by Mr. McMorris
   a. **Action:** Mr. McMorris and Mr. Murphy to provide camera specification details
   b. **Action:** Mr. Cogley to discuss camera installation with TMI senior management

MEMO

TO: Peter Omaggio, Demark, Inc. /OTSG Replacement Project - Three Mile Island
Scott Cogley, Exelon Corp - Three Mile Island

CC: Michael Murphy, DEP
Michelle Cohen, ARM Group Inc.
Daniel W. Brauning, Pennsylvania Game Commission (PGC)

FROM: Arthur McMorris, PGC

RE: OTSG Replacement Project Peregrine Falcon Review Meeting, Nov. 19, 2007

DATE: December 14, 2007

Dear Peter and Scott,

Thank you for the opportunity to discuss the OTSG replacement project scheduled for 2009 vis à vis the nesting Peregrine Falcons at TMI and the potential for effects of the falcons and the engineering work on each other.

The time period when the falcons are most susceptible to disturbance begins in February when courtship and nesting activity commence, and continues until the young falcons become competent flyers in mid-July. The time line that you described is that work above grade in the vicinity of the reactor building would start in mid-July or preferably August 2009, and that all work in this area would be complete by the end of December 2009. Therefore, your proposed work schedule thankfully falls within the period when the falcons are least susceptible to disturbance, and when the falcons are least likely to be aggressive towards the workers.

I would like to summarize the requests that I and the PGC would like to make, as referred to in your minutes of the Nov. 19 meeting:

1. When permitted by work related to the project (e.g. when tendon scaffolding is in place), I would like to inspect the falcon nest area.

2. Contingent on what we find on inspection of the nest area, we may request enhancements to the nesting area, to be discussed at that time and carried out in cooperation with TMI engineers. Examples of such enhancements are:
   a. Cleanup of grease or other materials
   b. Addition of gravel to the nesting area
   c. Provision of wooden platform(s) or a nest box to provide a more secure base to the nesting site and/or protection from the weather.

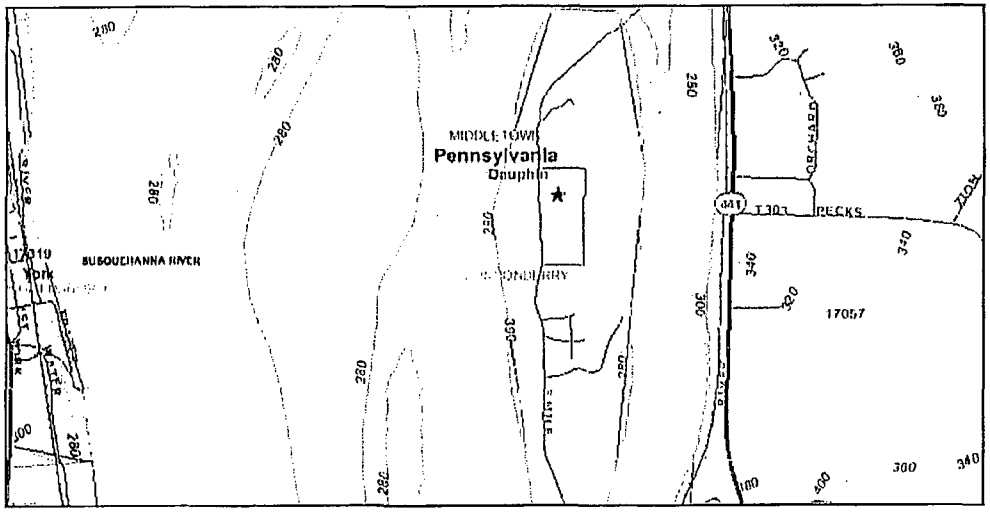
3. Installation of a video camera at the nest site for monitoring of activity at the nest.

4. Some means of accessing the nest annually (typically in May or June) to band the young falcons. This could be of a temporary or permanent nature, as determined by plant engineering requirements. PGC is used to accessing nests in difficult locations on bridges, buildings and cliffs, so our physical requirements are minimal.

Many thanks for your assistance. I would be glad to discuss any questions you may have about the falcons or the issues addressed above; you can reach me at 610-664-2174 or (cell) 610-220-6566; mcmorris@mac.com. Questions of a legal nature should be directed to Kevin Mixon, PGC 717-787-5957, kmixon@state.pa.us. Follow-up questions can be directed to Daniel W. Brauning, PGC, 570-547-6938; dbrauning@state.pa.us.

PNDI Project Environmental Review Receipt
Project Search ID: 20071204119381
Project Name: TMI - OTSG Replacement Project
Date: 12/4/2007 4:31:52 PM

Project Location



Location Accuracy

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

2 Potential Impacts

Under the Following Agencies' Jurisdiction:
Pennsylvania Game Commission

Project Name: TMI - OTSG Replacement Project
On Behalf Of: Private Individual
Project Search ID: 20071204119381
Date: 12/4/2007 4:31:42 PM
# of Potential Impacts: 2
Jurisdictional Agency:
Pennsylvania Game Commission
Project Category: Energy Storage, Production, and Transfer,Energy Production (generation),Nuclear Power Plant -- maintenance, modification, or *expansion*
Project Location
Decimal Degrees: 40.15462 N, -76.72515 W
Degrees Minutes Seconds: 40° 9' 16.6" N, 76° 43' 30.6" W
Lambert: 356350.39808959, 423263.38765098 ft
ZIP Code: 17057
County: Dauphin
Township/Municipality: LONDONDERRY
USGS 7.5 Minute Quadrangle ID: 260
Quadrangle Name: MIDDLETOWN
Project Area: N/A

 APPLICANT INITIALS: YMsC

PNDI Project Environmental Review Receipt

Project Search ID: 20071204119381
Project Name: TMI - OTSG Replacement Project
Date: 12/4/2007 4:31:52 PM

Pennsylvania Natural Diversity Inventory (PNDI) records indicate there are potential impacts on special concern species and resources within the project area. If the project is pursued, the jurisdictional agency/agencies indicated require that the instructions below regarding potential impacts and/or avoidance measures be followed in their entirety.

These determinations were based on the project-specific information you provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the information you provided does not accurately reflect this project, or if project plans change, DEP and the jurisdictional agencies require that another PNDI review be conducted.

This response represents the most up-to-date summary of the PNDI data files and is good for one(1) year from the date of this PNDI Project Environmental Review Receipt.

2 potential impacts
The Applicant should MAIL/FAX a copy of this Project Environmental Review Receipt, a cover letter with project narrative, acreage to be impacted, how construction/maintenance activity is to be accomplished, township/municipality and county where project is located, and a USGS 7.5 minute quadrangle with project boundary and quad name marked on the map.

Bureau of Land Management
Pennslyvania Game Commission
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
FAX Number: (717) 787-6957

Please mail or fax only one (1) copy of the project review request. Do not email the project information. The search results provided by this review are specific to species of special concern. The Pennsylvania Game Commission reserves the right to comment on additional aspects of this project (Ex. wetland or stream impacts).

Based on the project-specific information you provided, no impacts to federally listed, proposed, or candidate species are anticipated. Therefore, no further consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required with the U.S. Fish and Wildlife Service. Because no take of federally listed species is anticipated, none is authorized. For a list of species that could occur in your project area (but have not been documented in PNDI), please see the county lists of threatened, endangered, and candidate species. A field visit or survey may reveal previously undocumented populations of one or more threatened or endangered species with a project area. If it is determined that any federally listed species occur in your project area, the U.S. Fish and Wildlife Service requires that you initiate consultation to identify and resolve any conflicts. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

DISCLAIMER

The PNDI environmental review website is a preliminary environmental screening tool. It is not a substitute for information obtained from a field survey of the project area conducted by a biologist. Such surveys may reveal previously undocumented populations of species of special concern. In addition, the PNDI only contains information about species occurrences that have actually been reported to the Pennsylvania Natural Heritage Program.

TERMS OF USE

Upon signing into the PNDI environmental review website, and as a condition

 APPLICANT INITIALS: MSC

of using it, you agreed to certain terms of use. These are as follows:

The web site is intended solely for the purpose of screening projects for potential impacts on resources of special concern in accordance with the instructions provided on the web site. Use of the web site for any other purpose or in any other way is prohibited and subject to criminal prosecution under federal and state law, including but not limited to the following: Computer Fraud and Abuse Act of 1986, as amended, 18 U.S.C. Â§ 1030; Pennsylvania Crimes Code, Â§ 4911 (tampering with public records or information), Â§ 7611 (unlawful use of computer and other computer crimes), Â§ 7612 (disruption of service), Â§ 7613 (computer theft), Â§ 7614 (unlawful duplication), and Â§ 7615 (computer trespass).

The PNHP reserves the right at any time and without notice to modify or suspend the web site and to terminate or restrict access to it.

The terms of use may be revised from time to time. By continuing to use the web site after changes to the terms have been posted, the user has agreed to accept such changes.

This review is based on the project information that was entered. The jurisdictional agencies and DEP require that the review be redone if the project area, location, or the type of project changes. If additional information on species of special concern becomes available, this review may be reconsidered by the jurisdictional agency.

PRIVACY and SECURITY

This web site operates on a Commonwealth of Pennsylvania computer system. It maintains a record of each environmental review search result as well as contact information for the project applicant. These records are maintained for internal tracking purposes. Information collected in this application will be made available only to the jurisdictional agencies and to the Department of Environmental Protection, except if required for law enforcement purposesâ€"see paragraph below.

This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system consents to such monitoring and is advised that if such monitoring reveals evidence of possible criminal activity, system personnel may provide the evidence to law enforcement officials. See Terms of Use.

In order for this project to be considered for subsequent review, a signed and initialed copy of this receipt is required by the agency or agencies indicated. DEP requires that a signed and initialed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted in applications for permits requiring PNDI review. See DEP PNDI policy at www.naturalheritage.state.pa.us or visit the following websites for further information.

Regional Offices
Http://www.dep.state.pa.us/dep/deputate/fieldops/map.pdf

District Mining Operations
Http://www.dep.state.pa.us/dep/deputate/minres/Districts/homepage/Default.htm

Oil and Gas Management
Http://www.dep.state.pa.us/dep/deputate/minres/OILGAS/CustomerNeeds.htm

Print this Project Review Receipt using your Internet browser's print function and keep it as a record of your search.

Signature: Michelle S. Cohen

 APPLICANT INITIALS: MSC

PNDI Project Environmental Review Receipt

Project Search ID: 20071204119381
Project Name: TMI - OTSG Replacement Project
Date: 12/4/2007 4:31:52 PM

Date: 2/13/08

Project applicant on whose behalf this search was conducted:

APPLICANT

Contact Name: Mr. S. Chris Baker, Manager, Chemistry Environmental & Radwaste
Address: Three Mile Island Nuclear Station Route 441 South
City, State, Zip: PO Box 480 ~~Middletown, PA 17057~~
Phone: 717-948-8983 (w) [redacted]
Email: Chris.Baker@exeloncorp.com

PERSON CONDUCTING SEARCH (if not applicant)

Contact Name: Michelle Cohen
Address: ARM Group Inc. 1129 West Governor Road
City, State, Zip: Hershey, Pennsylvania 17033
Phone: 717-533-8600
Email: mcohen@armgroup.net

Bureau of Land Management
Pennslyvania Game Commission
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
FAX Number: (717) 787-6957

The following contact information is for the agencies involved in this Pennsylvania Natural Diversity Inventory environmental review process. Please read this entire receipt carefully as it contains instructions for how to contact these agencies for further review of this particular project.

 APPLICANT INITIALS: MSC

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-9 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

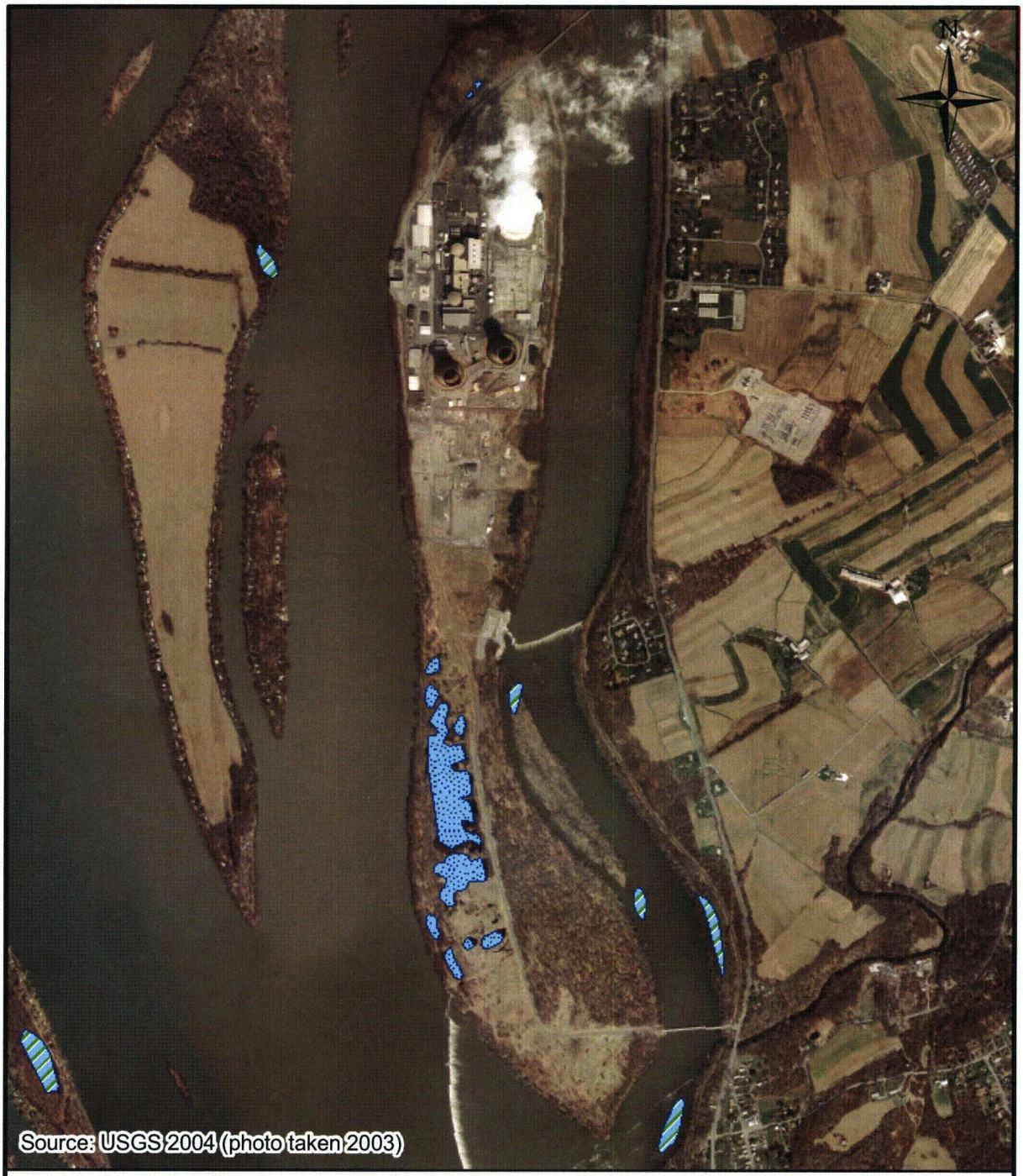
Information Request: Please provide information on any bird deaths (including birds of prey and migratory birds which have occurred at the reactor building or the meteorological tower.

Date Received: 3/19/2008 **Response Date:**

Response: Three Mile Island is the host to a nesting pair of Peregrine Falcons and a pair of Ospreys. The Falcon nest site is located behind the vent stack on the west side of the TMI-1 reactor building. The Ospreys reside on top of the Met Tower located in the northwest side of the plant site. There have been no deaths of either the Falcons or Osprey that were a direct result of the operation of the facility.
In early summer of 2003 a young male falcon had been rescued on the west side of the plant inside the protected area. The falcon fledgling had gotten tangled in the razor wire of the protected area fencing. The young falcon had suffered tendon damage to one of his legs. The bird was sent to a bird of prey rehabilitation center in the area for medical care and rehab. The tendon damage to the falcon had been repaired, but unrelated to his injuries of the summer, the bird subsequently died of liver disease in the late fall of 2003. Site Environmental representatives, Pa Game Commission Ornithologist and Pa Game Commission Warden for Dauphin county reviewed the incident and concluded that, since the nest contained a young female falcon as well as the young male and both were in the learning-to-fly stage, the most likely scenario for the young male's razor wire injury would had been that the female knocked the smaller male off the ledge while flexing her wings during pre-flight stretching.

During the summer of 2007, a second young male falcon was found unharmed on the west side of the plant at ground level below the falcon nest. Representatives from the Pa Game Commission and Pa DEP, in coordination with the site, captured the bird. As the bird was unharmed, the Pa Game Commission took the opportunity to band it, and it was subsequently released back to the wild later the same day.

No injuries have been observed to the Ospreys, which have nested on the Met Tower since the spring of 2004, or to their young.



Legend

NWI Classifications

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

0 0.125 0.25 0.5 Miles

Three Mile Island Nuclear Station Unit 1
License Renewal Environmental Report
National Wetlands Inventory Information

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-12 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide any wildlife management plans that are used on site.

Date Received: 3/19/2008 **Response Date:**

Response: The Wildlife Habitat Council has provided a Site Assessment and Wildlife Management Opportunities Report for Exelon Corporation's Three Mile Island Generating Station. The station is evaluating this report to develop plans for habitat improvement opportunities. In March 2008, for example, TMI completed the installation of new Wood Duck houses on the south end of the island in cooperation with the Susquehanna River Waterfowl Association. The station has met with the Pa. Game Commission Peregrine Falcon expert to develop plans for future nest inspections, fledgling banding, future monitoring and possible nest relocation. The station is receiving support and advice from the Pa Dept. of Conservation & Natural Resources on ways to improve the habitat on the south end of the island. TMI is also working with another representative from the Pa Game Commission to gather more input for wildlife habitat enhancements on the island.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-14 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Section 4.9 states that animal species in the forested riparian buffer areas in the southern section of the island might be displaced by noise and vibration increases from refurbishment activities, but that this displacement would be temporary and minor. Please provide a reference or reasoning for how it was determined that the displacement effects would be temporary and minor, as well as a list of specifically affected animals, if available.

Date Received: 3/19/2008 **Response Date:**

Response: Based on information in the Environmental Impact Data Book (Golden et. al. 1980), a comprehensive list of noise related impacts from construction equipment and the peak and attenuated noise levels (dBA) were analyzed. As the distance from the source increases, dBA levels are dramatically reduced. The thresholds for disturbance of birds and small mammals are listed at 80-85 dBA (Golden et al. 1980). At a distance of 400-feet, noise levels from construction related equipment is below this 80-85 dBA threshold for significant (i.e. heavy equipment, jackhammers) noise impacts. Given the proximity of the planned refurbishment activity to the undeveloped portions of the island (approximately 2,000 feet from the proposed steam generator storage facility to the Red Hill Dam, and approximately 8,000 feet to the southern tip of the island), noise levels from refurbishment activities in these areas, which are where wildlife on Three Mile Island are often found, would be below 85 dBA. Accordingly, related impacts are expected to be temporary and minor to animal species. A variety of songbirds and migratory waterfowl utilize the island for resting, nesting, and foraging. Mammals commonly identified on the island include, white-tailed deer, raccoons, red foxes, and gray squirrels.

List Attachments Provided:

Golden et al. 1980 Golden, J., R.P. Ouellette, S. Saari, and P.N. Cheremisinoff. 1980. Environmental Impact Data Book. Ann Arbor Science Publishers Inc. Ann Arbor, Michigan.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-15 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Section 2.5 mentions that the threatened species American Holly is found on TMI-1 property, but Section 4.9 adds that it is not found in the industrial/paved areas of the site. Please specify where American Holly is found on site.

Date Received: 3/19/2008 **Response Date:**

Response: American holly was referenced from the Wildlife Habitat Council Site Assessment for Three Mile Island (October 2005). Table 12 lists plants and animals identified by the WHC Biologist during the site visit or previously identified by plant employees or contractors. American holly is commonly used in landscaping applications and may have been identified near administrative buildings or observed in the southern and undeveloped portion of the island; the exact location of individual plants is not known. The statement in Section 4.9 describing refurbishment activity refers to areas surrounding the containment dome for Unit 1, temporary construction yards, and the location of the steam generator storage facility. These locations that would be used during refurbishment/construction activities are existing paved, asphalt, or graveled areas and are devoid of vegetation.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-16 **Topic:** Terrestrial Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Section 4.9 states that the refurbishment activities will not adversely affect the peregrine falcon population that nests on the property because construction will not commence until October 2009 and "the peregrine falcon nestlings have historically fledged the nest by late summer and the adult birds have migrated to their wintering ranges". However, the same reference (PADEP 2007) claims that the peregrine falcon nestlings typically do not fledge the nest until September or October. Will there be measures taken to ensure that these birds have in fact migrated away from the site by the time that construction begins?

Date Received: 3/19/2008 **Response Date:**

Response: The information reported in Section 4.9 was based on telecommunication records with two PADEP employees (Jack Forrester and Mike Murphy) regarding site specific behavior of Peregrine falcons at the TMI-1 reactor building (see attached telecommunication records). Between 2002 and 2006, juvenile birds have been observed to fledge the nest site by August. Adult birds also vacated the nest in August. PADEP (2007) states "dispersal from the hack site occurs in September or October." However, hack sites are categorized by some type of human involvement, relocating of eggs, artificial nest, etc., whereas the Peregrine falcon nest at TMI-1 is a natural nest. An artificial nesting box was placed on top of the TMI-2 reactor building in 2002, but no birds have used it.

AmerGen has been in communication with the PA Game Commission regarding the potential impacts of the Steam Generator Replacement project on the Peregrine falcons. Based on these communications, which are described in the response to Question #8, AmerGen believes that its planned activities will not adversely affect the Peregrine falcons, even if the birds are still present in the nest when such activities begin.

List Attachments Provided:

Telecon Record dated August 28, 2006 between Tetra Tech NUS and PADEP (M. Murphy) regarding Threatened and Endangered Species Known to Occur in the Vicinity of Three Mile Island Nuclear Generating Station.

Telecon Record dated August 24, 2006 between Tetra Tech NUS and PADEP (J. Forrester) regarding Threatened and Endangered Species Known to Occur in the Vicinity of Three Mile Island Nuclear Generating Station.

TETRA TECH NUS, INC.
AIKEN, SOUTH CAROLINA

MEETING/TELECON RECORD

Topic/Purpose: Interview for background information on Threatened and Endangered Species Known to Occur in the vicinity of Three Mile Island Nuclear Generating Station.		Date/Time: August 28, 2006 1500 hours
Project: Three Mile Island License Renewal Environmental Report		Charge No.: 112C00391-Draft ER
Attendees: Mike Whitten and Brian Cole Mike Murphy (Telephone # 717.948.8308)	Organization: Tetra Tech NUS, Inc. Pennsylvania Department of Environmental Protection	
Discussion: Focus on T&E birds known to occur at Three Mile Island.		
Action Items: None		Responsibility NA
Distribution: C00394 File		File: 0394

Summary:

Mr. Mike Murphy is currently the Pennsylvania Department of Environmental Protection's on-site full time monitor of the Three Mile Island Nuclear Generating Station.

Mr. Murphy mainly discussed Peregrine falcon information, 5 seasons of breeding Peregrine falcons since 2002 have been observed in a nest at the top of the reactor building for Unit 1. A nesting box was placed on top the reactor building for Unit 2 in 2002, but no birds used the nest.

The following chicks have been observed:
2002- 2 nestlings, from late nesting adult birds, suspected bridge birds from New Jersey with no leg bands; one fledged and one died
2003- 3 nestlings fledged
2004- 2 nestlings, was able to band on male
2005- 3 nestlings, was able to band one female
2006- 3 nestlings, was able to band one female

He stated the timeline for the nesting birds as follows:
February-typically pair bonding is renewed
March-a clutch of 2-3 eggs is typical at TMI
June-birds begin to fledge, but still maintain a relationship with parents
August-full autonomy achieved and young birds depart area

Mr. Murphy stated the Steam Generator Replacement activity is planned for the fall season and should not have any impacts on the Peregrine falcons, as they have vacated the nest usually by August.

He stated the typical life span of the Peregrine falcon is approximately 9 years.

Mr. Murphy also stated he was aware of an Osprey nest located on the meteorological tower at TMI that has been active for three years. The first year there were eggs in the nest but none hatched. The second year, four offspring were observed in two clutches. The third year, two offspring were observed. The nest is removed twice a year for scheduled maintenance to the tower. A 55-foot nesting platform was erected near the tower, but no birds used the nest.

Mr. Murphy also stated Bald eagles would occasionally visit the island and were observed near the river. Also a nest was located approximately 20 miles south of the island at Holtwood Dam.

Mr. Murphy stated egrets were observed on the island, but was unaware of the specific species.
Mr. Murphy was not aware of any other plant or animal T&E species on the island.

TETRA TECH NUS, INC.
AIKEN, SOUTH CAROLINA

MEETING/TELECON RECORD

Topic/Purpose: Interview for background information on Threatened and Endangered Species Known to Occur in the vicinity of Three Mile Island Nuclear Generating Station.		Date/Time: August 24, 2006 1000 hours
Project: Three Mile Island License Renewal Environmental Report		Charge No.: 112C00391-Draft ER
Attendees: Mike Whitten and Brian Cole Jack Forrester (Telephone # 717.705.3767)	Organization: Tetra Tech NUS, Inc. Pennsylvania Department of Environmental Protection	
Discussion: Focus on T&E birds known to occur at Three Mile Island.		
Action Items: None		Responsibility NA
Distribution: C00394 File		File: 0394

Summary:

Mr. Jack Forrester is currently the Pennsylvania Department of Environmental Protection's Director of Environmental Education; formerly he was a conservation officer for the Pennsylvania Game and Fish Commission.

Mr. Forrester mainly discussed Peregrine falcon information, a successful breeding pair returns annually, since 2002, to a nest at the top of the reactor building for Unit 1. He stated the nest was located in a location that made handling (leg banding, weighing, etc.) difficult, and observation of the nest/pair was also difficult.

He stated the timeline for Peregrine falcons nesting in Pennsylvania as follows:
February-typically pair bonding is renewed
March-a clutch of 2-3 eggs is typical at TMI
June-birds begin to fledge, but still maintain a relationship with parents
August-full autonomy achieved and young birds depart area

He stated that mortality issues for birds in the state of Pennsylvania, not specifically TMI, ranked as follows:1-glass/window strikes, 2-collision with wires (transmission, telephone), 3-electrocution (transmission lines, Amtrak rail lines).

Mr. Forrester also stated he was aware of an Osprey nest located on the meteorological tower at TMI.
Mr. Forrester also stated he thought a Bald Eagle nest was located approximately 5 miles south of the island.
Mr. Forrester referred Tetra Tech to contact Mr. Mike Murphy, Pennsylvania Department of Environmental Protection's employee that is assigned full time to the Three Mile Island Nuclear Generating Station, and also reports to Mr. Forrester to Peregrine falcon activities at the site.

First Bought in 1749

Three-Mile Island Had a Sometime Stormy Past

By Elaine Huber
Special to Sunday News

If the most disputed spot on the map were up for sale, would you buy it? Probably not, at least if you thought it might give your heirs any headaches. But then, you weren't Thomas Cookson. And in 1749, buying Three Mile Island couldn't have seemed as questionable an investment as some might think today.

If more than youthful ambition drove Cookson from his native England, we cannot know. But we do know that within a short time of his arriving at a dangerous, backwoodsy place in Penn's province called Lancaster, lawyer Cookson was recorded deeds, keeping the peace, and governing as chief burgess.

Busy as he was, young Cookson found enough time also to serve as Penn's Deputy Surveyor for Lancaster County. The county was then some three or four times as large as it is today; so When Cookson trekked up the Susquehanna as far as what is now Harrisburg, he was well within his own county.

Cookson knew how to judge land; that was part of his job. So it didn't take him long to recognize that there was one place he wouldn't mind having for his own. It was a nice big island along the eastern shore of the treacherous Conewago Falls that had so often discouraged both Indian and trader canoes.

IT SEEMED LOGICAL enough for Cookson to want the island; he already owned almost 2,000 acres of shoreline next to the island. So when he tacked onto the end of a December 1749 business letter to Thomas Penn his request to "purchase this Island on ye Common Terms," he figured the matter was as good as settled.

Oh, sure, there was that little matter of an application fee and the purchase money before he held final title. But that shouldn't be such a big thing. Any man who could give his young wife a large funeral, order an expensive, custom-decorated chaise, and hold the right to several thousand acres should be able to swing such a little thing as an application fee or purchase money for an island of a few hundred acres.

But on March 15, 1753, when Cookson finally had to admit he wasn't going to get well this time, he still hadn't paid that fee. All he could do was hastily will its unclaimed title to his second wife Mary and his two tiny daughters, Hannah and Margaret, hoping they could claim it.

Five days later, Mrs. Cookson buried her 43-year-old husband and began worrying how to raise two tiny stepdaughters -- Hannah and Margaret — what to do with the fancy new house they had just

caster's YWCA now stands), and who would settle all those land transactions her late husband had left as unfinished as he had that island.

AS EXECUTOR, Penn's Secretary of the Land Office, the Rev. Richard Peters immediately got the land headaches. A few months later, Edward Shippen, Cookson's successor in office, got the house at high rent. And some 18 months later in 1756, two fatherless girls, Hannah and Margaret, got a stepfather when their stepmother, Mary Cookson, married widower George Stevenson, another surveyor and court official across the river from that island.

Caring for stepdaughters Hannah and Margaret from Cookson's first marriage, a stepson from Stevenson's previous marriage, and then new little Stevensons, Mary Cookson Stevenson could easily have forgotten her old life as Mary Cookson.

But then little Margaret died. And in September 1760 teenage Hannah married wealthy Joseph Galloway of Anne Arundel County, Maryland. So Cookson's estate again demanded attention.

Galloway, Hannah's new husband, didn't wait long to press for his wife's two-thirds claim to her late father's lands. September 1761, Galloway spent their first wedding anniversary at Stevenson's York home insisting that Stevenson and Rev. Peters divide Cookson's lands between Hannah and her stepmother, Mary Cookson Stevenson.

Well versed in land matters, Rev. Peters and Stevenson wisely advised renting out the lands until Hannah reached legal age; underage division for a primary heiress was costly.

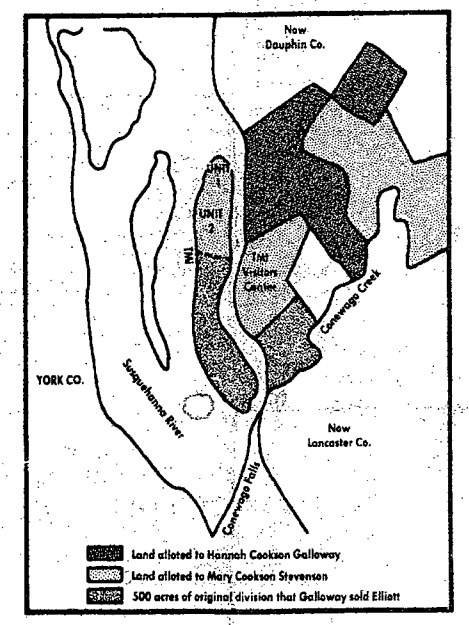
But, cost or no cost, Galloway insisted on his way.

So, one cool September Wednesday in 1762, Hannah and her husband and Mrs. Stevenson and her husband trekked from Anne Arundel County, Md., and York County, Pa., to the island. There they watched as the Lancaster County sheriff and 12 jury men solemnly drew division lines around the shore tracts and across the island.

WHEN HANNAH AGAIN left for Maryland, she held unpaid right to the lower two-thirds of the island and 960 shore acres the length of the island. Her stepmother, Mary Cookson Stevenson, went back to York with two shore tracts and the island's upper third.

Galloway was probably more elated over his acquisition than concerned that he now owed more than the Penns; he also owed Lancaster County the cost of dividing acres Hannah could have had free at 21.

Perhaps that didn't hit home



way had buried first his only child and then his wife. If Galloway expected Hannah's lands would automatically revert to him, he was disappointed. He was Hannah's husband, not her issue, and as such was only a lifetime tenant — not an heir — of her properties. If he wanted those properties so he could pass them on to his future heirs, he would have to purchase that right from a Cookson heir-at-law.

More pounds sterling or not, Galloway decided to press for the privilege.

June 1764, ailing Rev. Peters took a leave of absence from his dual positions as rector of Philadelphia's Christ Church and as Penn's Secretary of the Province and sailed for England seeking relaxation and recuperation. But Rev. Peters had promised Galloway he would also seek something else — Cookson heirs-at-law who would sell Galloway their reversionary right to Hannah's properties.

Eighteen months later, Rev. Peters returned with a tentative OK from Hannah's two Sunderland, Cookson's deceased only sister). But it was another year before Rev. Peters was well enough to help Galloway complete the legal steps necessary to close the transaction.

Finally, one chilly December day in 1768, Galloway and Edward Shippen (who followed Cookson in office and home) hurried to the island. There was no boat at the landing, so both men squinted across the few hundred yards between shore and island trying to decide what an island with common timber and no spring might bring at public sale.

Hannah's English cousins seemed satisfied enough with Galloway's offer of L 1000 sterling for the two-thirds island, the shore tracts, and Shippen's rented Lancaster house, so in May 1768, they issued a release and Galloway was again quasi-owner.

BUT NOW GALLOWAY owed more than the Penns. He owed that L 1000 sterling to his more wealthy merchant brother Samuel.

In the meantime, Galloway had

that underage division fee, so in 1772, when an Indian trader from Pittsburgh came east looking for a home and 500 acres, Galloway parted with one of his shore tracts, tossing in the lower island to make up the 500 acres requested. To make the deal however, Galloway had had to promise to get that neglected island title for trader Elliott.

Two years later, however, Galloway still hadn't kept that promise, so Daniel Elliott stopped payment to Galloway and went on raising his family on Galloway's end of the island.

Twenty-three years later, the story was the same.

Galloway owed the Penns. And Elliott owed Galloway.

So, January 1798, Galloway deeded everything to his new son-in-law and sent him to collect.

But there was no Elliott to collect from; he had died in Pittsburgh some seven years before. Elliott's father-in-law, Col. Alexander Lowrey (of Donegal Witness Tree fame), offered to pay off Elliott's debt, but not before he saw that island title.

Galloway had one little problem though. Now he had no ready cash to satisfy the Penns for the title. And Elliott's island neighbor, Jacob Metzger, wasn't about to chip in either; Stevenson had promised him title to his end of the island and hadn't kept that promise before he'd died in 1783.

After months of haggling, aging Lowrey gave Galloway Elliott's overdue payments and the Penns Cookson's overlooked fees. But Lowrey kept the title for himself. He wanted his Elliott grandchildren to enjoy their hunk of island.

But if they did, it was because they could overlook death and feuding.

John, the oldest Elliott grandson, wanted that piece of island. January 1800, the orphans court said he could have it if he paid his sister and two brothers their share of its value. He did, but that didn't satisfy his youngest brother William who was sure the jury had deliberately underestimated its acres. So in 1807, William got his guardians — his sister and her husband, James Hamilton of Middletown — to help him kick up a seven year legal fuss the whole way to the Supreme Court. They told all three to be satisfied.

BY THAT TIME, John was a young widower, but well enough off to remarry and set himself up as a gentleman in a bustling place called Elizabethtown. But July 1820, three years after their wedding, John's wife, Elizabeth Coble Elliott, found herself a widow with a 14-month old baby, two small stepchildren from John's first marriage, and an island.

The island — manned by

tenants — was put into a trust for the children and a dower for the widow. By Christmas 1823, Elizabeth had married the young Michael Brenneman then managing the tavern her father, Michael Coble, had built on the northwest corner of Elizabethtown's square (where the Moose Theater now stands).

But 30 short months later, typhus fever rudely snatched away young Brenneman, and this time, twice-widowed Elizabeth Coble Elliott Brenneman had to cope with debt, a tavern, and five tot-to-teen children from three marriages.

In the fall of 1827, Elizabeth bought the tavern from her late husband's debt-ridden estate. Several months later, she sold the tavern to its widowed bartender, Abraham Greenawalt. Then she married him and became a stepmother — again.

For the next dozen years, both Elizabeth and Abraham were unquestionably too busy to concern themselves much with Elizabeth's island.

But after Daniel, Elizabeth's oldest son by her marriage to John Elliott, married Harrisburg's Mary Anne German in the fall of 1839, he asked the court for the island so he could raise his young family there while he managed its three unusually productive shad fisheries.

Several years later, however, borrowing and mortgaging no longer satisfied Elliott's $2500 debt to a near relative of his sister's husband, and he had to watch wealthy creditor Jacob Haldeman (founder of New Cumberland) put that end of the island on the sheriff's auction block.

ELLIOTT'S STEPFATHER, Greenawalt, however, repaid the sheriff in the spring of 1845 so the family could retain that one-third share of Elizabeth's dower. The favor was short-lived, however, for in August, mother ElIZabeth, stepfather Abraham, and wife Mary Anne buried young Elliott.

Greenawalt rented out the island.

Twenty-six years later, Elizabeth's and Abraham's oldest daughter, Elizabeth Saylor wanted Daniel's share. But within six months, Mrs. Saylor was a widow with a $25,000 debt from her late husband Lafayette's estate.

Mrs. Saylor hoped to cover that debt by auctioning off her 220-island acres with its comfortable two-story house, roomy barn, and four tobacco sheds at Middletown's Railroad Hotel. But 1873 was a bad year. The whole country was reeling with financial woes of its own, and nobody would bid, not even Aaron or William Shireman contentedly farming the other end of the island.

That same fall, Mrs. Saylor

3-MILE — Page B-4

3-Mile Island

Continued From Page B3

tried again. This time, dear old Papa Greenawalt came through and bought back the place.

But two years later, both Mama and Papa Greenawalt were in their graves, and there were no more family to help three female heiresses keep their river fortune afloat.

Greenawalt's heiress daughters Elizabeth Saylor and Caroline Sheets and granddaughter Ella Bardwell let executors Henry Wade and Samuel Eby arrange a public auction at Harrisburg. But before the thing was over, the women had stormed off to the judges complaining that those fellows had deliberately mismanaged and talked down the vlue of the one place that had been their father's pet project so they could buy the island cheap for themselves.

The judges listened to the women rant. For 18 unconvincing months. Finally, the women gave up fighting an imagined case without proof, and in January 1878 they bought the place for themselves.

HOWEVER, IN AS MUCH time as it had taken to argue themselves into buying the place, the women found the fun had run out. So by Thanksgiving 1879, when James Duffy, a monied gentleman farmer from nearby Marietta proposed $1,000 less than they had paid Greenawalt's executors, the women passed their headache on to him.

Duffy had grand plans for the place, but it was another 21 years before the Shiremans on the other end of the island would sell out and let Duffy's son put substantial rivets in the dream.

Young Duffy was monied too,

but he was no shirker. Greenawalt's once proud farm was soon polished back to plantation shine. Shireman's depleted lands were fertile. And a novel tobacco producing station was turning into a Pennsylvania first.

But then that unpredictable Susquehanna River had its swing at the place.

Everyone expected the March thaw of 1904 would bring more ice and high water than usual; that winter had been ferociously cold.

But Duffy didn't expect what he saw floating past his Marietta Holloware and Enameling Co. that Tuesday, March 8. There went his tobacco sheds — and his valuable

and novel shade-grown Havanna tobacco.

Dashing up to his island, Duffy found those newly redone houses and barns twisted wrecks, his crops damaged, his prized tobacco station a shambles.

The first man who offered him something got the whole mess. But Duffy didn't know that through an agent, George Bower, he had sold the place to the very one he blamed for the disaater, the power company. So he promptly sued York Haven Water and Power Co. for putting in a river dam that would send mountains of ice smashing across an island.

It took the judges seven years

to agree, but in 1913 they told York Haven to shell out damages. But York Haven didn't mind too much. It had its island. It could do with it what it pleased. And there could be no more dispute over the place.

And perhaps there wouldn't have been.

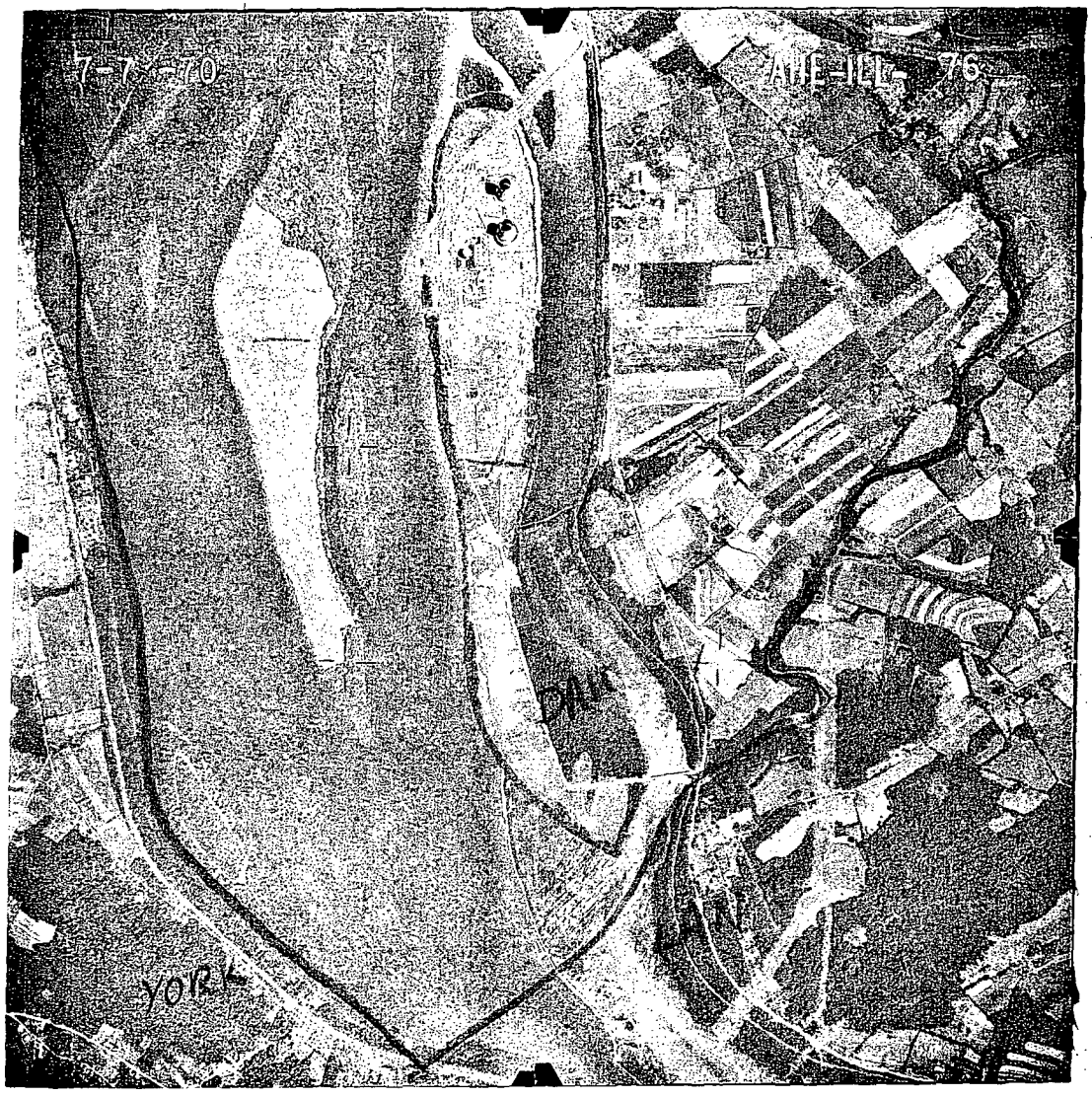
. . . if Metropolitan Edison hadn't bought the place in 1924.

. . . if it hadn't replaced its farmers with a nuclear plant in 1967.

. . . if that reactor — sitting right on top of Galloway's division line — hadn't leaked radioactivity and fear on March 28, 1979.

And that migraine the world still hasn't cured.

Non-AmerGen



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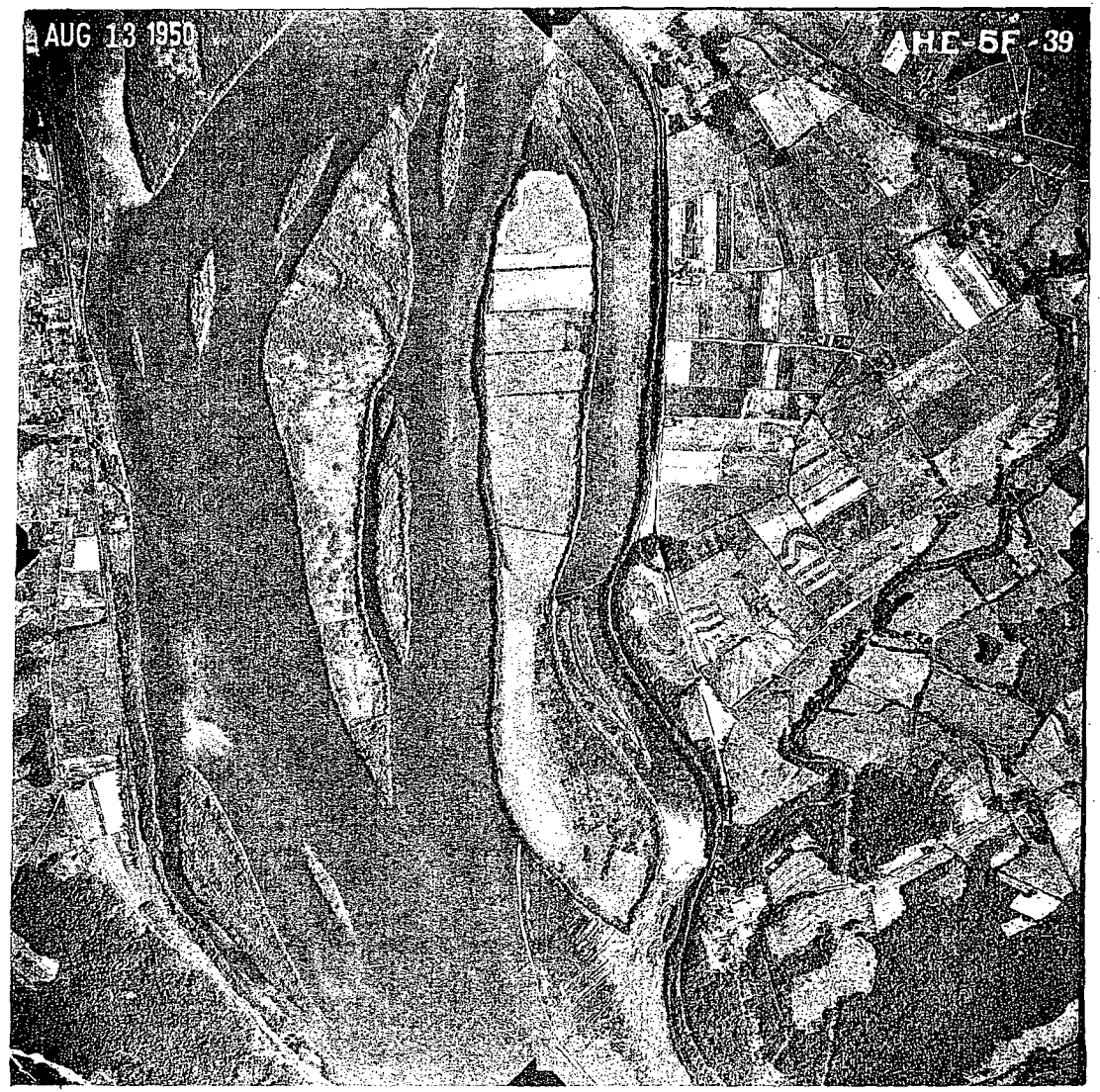


Non-AmerGen

Request No: ENV-28 **Topic:** Cultural Resources Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: For such procedures, please state whether they include "stop work" provisions, and if they do, provide examples of those provisions.

Date Received: 3/19/2008 **Response Date:**

Response: The following corporate procedures provide a tool for identifying potential environmental implications of proposed plant configuration changes and work requests.

EN-AA-103, Environmental Review
EN-AA-103-0001, Environmental Evaluations

Configuration changes that may trigger an environmental review include changes to the plant's design bases, design documentation, or physical configuration. Once it has been determined that a configuration change to the facility is necessary, various considerations, including the possibility of environmental impacts, must be evaluated to determine relevance. Corporate procedures CC-AA-102, Design Input and Configuration Change Impact Screening, and WC-AA-106, Work Screening and Processing, direct the Responsible Engineer or Screening Committee Member for the proposed configuration change or work request, respectively, to determine whether an environmental impact may occur by one of three methods:

1. Interfacing with site environmental personnel;
2. Using checklists provided in EN-AA-103; or
3. Applying process knowledge.

If it is determined that a proposed configuration change or work request may have an environmental impact, then an Environmental Evaluation must be performed in accordance with procedure EN-AA-103-0001, which specifies when an Archeological and Cultural Evaluation is needed. If station Environmental personnel need assistance in completing an Archeological and Cultural Evaluation, then consulting services are secured. An example of a project for which outside consulting services were obtained is the TMI Steam Generator Replacement Project. In that case, the Project Team retained an environmental consulting firm (ARM Group, Inc.) to assist with all aspects of the project, including archeological and cultural resources.

None of the procedures specifies "stop work" provisions for circumstances in which archeological or cultural resources are encountered. Notwithstanding, the SHPO would be contacted if historical or cultural resources were inadvertently discovered during onsite activities. AmerGen would then work closely with the Pennsylvania Historical & Museum

Commission, Bureau for Historic Preservation to ensure that adequate professional resources were involved to evaluate such discoveries.

By December 31, 2008, Exelon Nuclear plans to promulgate procedural changes to ensure that clear guidance exists regarding (1) consideration of potential impacts on archaeological and historical resources prior to disturbing land at nuclear power stations owned by Exelon and (2) actions to be taken, including a "stop work" provision, when historical or archaeological resources are inadvertently discovered during activities that disturb land at nuclear power stations owned by Exelon. AmerGen will then implement the Exelon Nuclear corporate procedural changes for TMI-1.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-29 **Topic:** Cultural Resources Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: What training does the Environmental Coordinator have in relation to Section 106 guidelines?

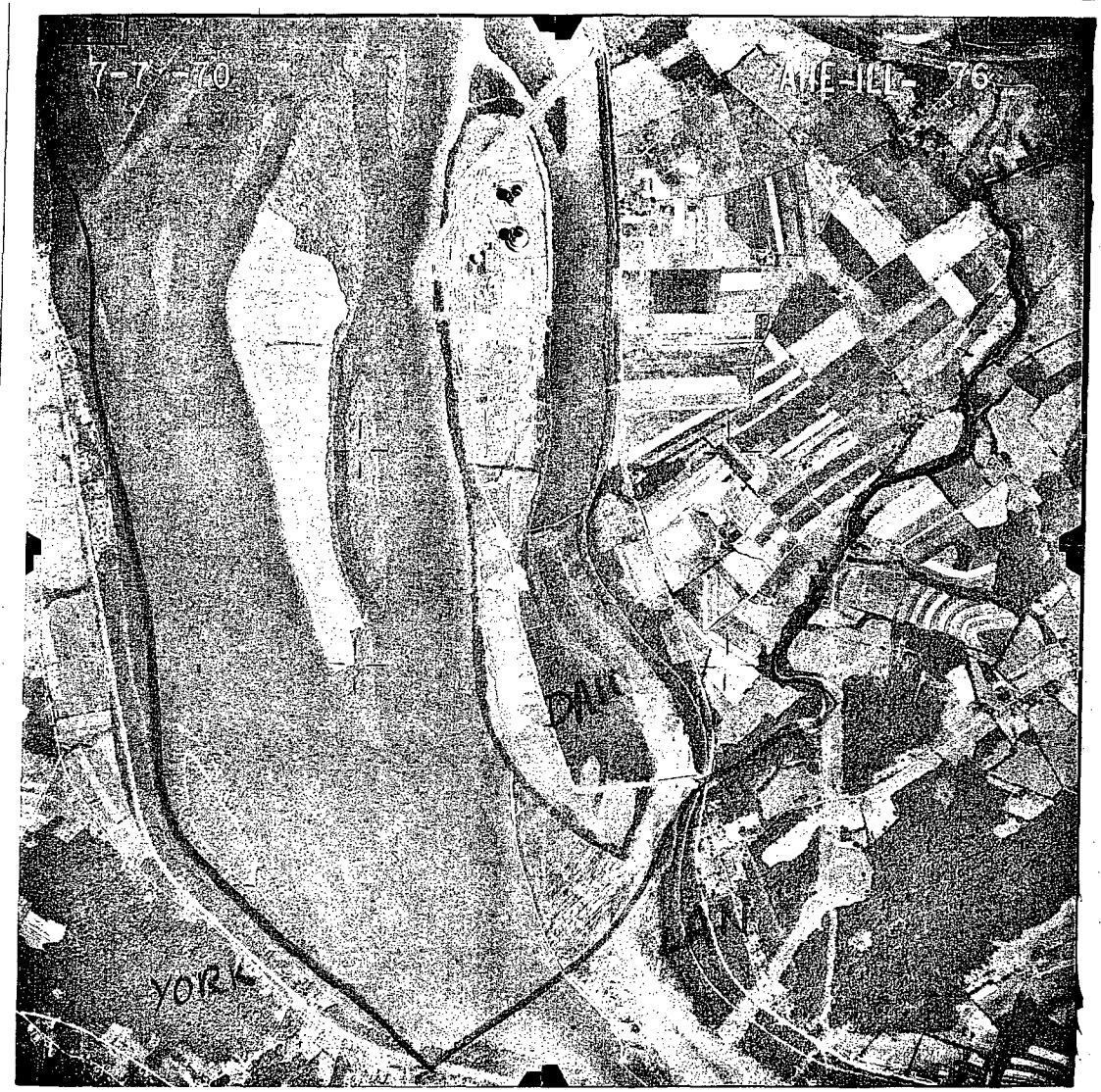
Date Received: 3/19/2008 **Response Date:**

Response: Response:

TMI Environmental personnel are not trained in Section 106 requirements. If it is determined that a proposed configuration change or work request may have an environmental impact, then an Environmental Evaluation must be performed in accordance with procedure EN-AA-103-0001, which specifies when an Archeological and Cultural Evaluation is needed for configuration changes and work requests. If station Environmental personnel need assistance in completing an Archeological and Cultural Evaluation, then consulting services are secured.

An example of a project for which outside consulting services were obtained is the TMI Steam Generator Replacement Project. In that case, the Project Team retained an environmental consulting firm (ARM Group, Inc.) to assist with all aspects of the project, including archeological and cultural resources. The entire area occupied by the nuclear power plant on Three Mile Island has been disturbed by construction and operation of the plant.

Non-AmerGen



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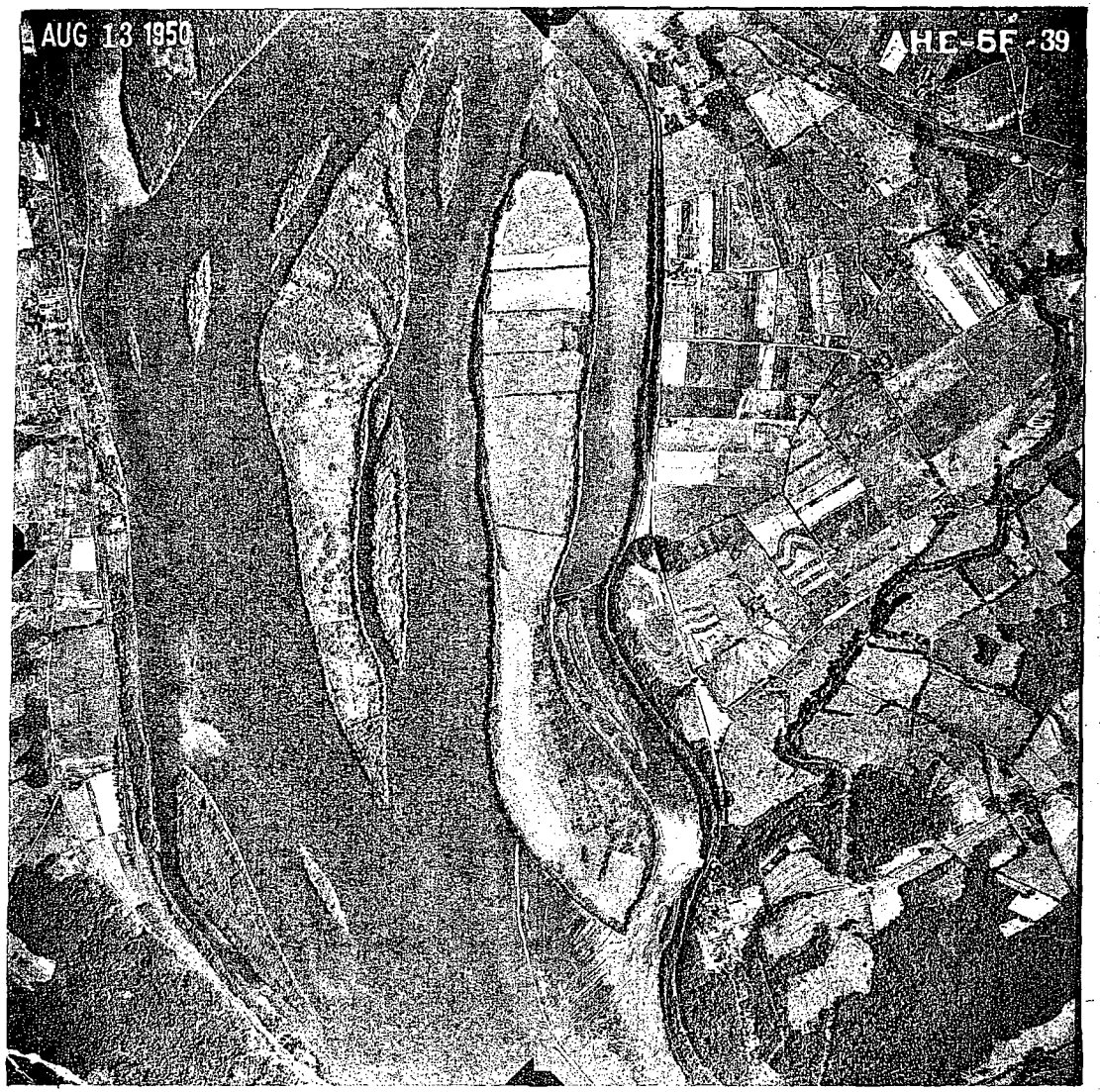

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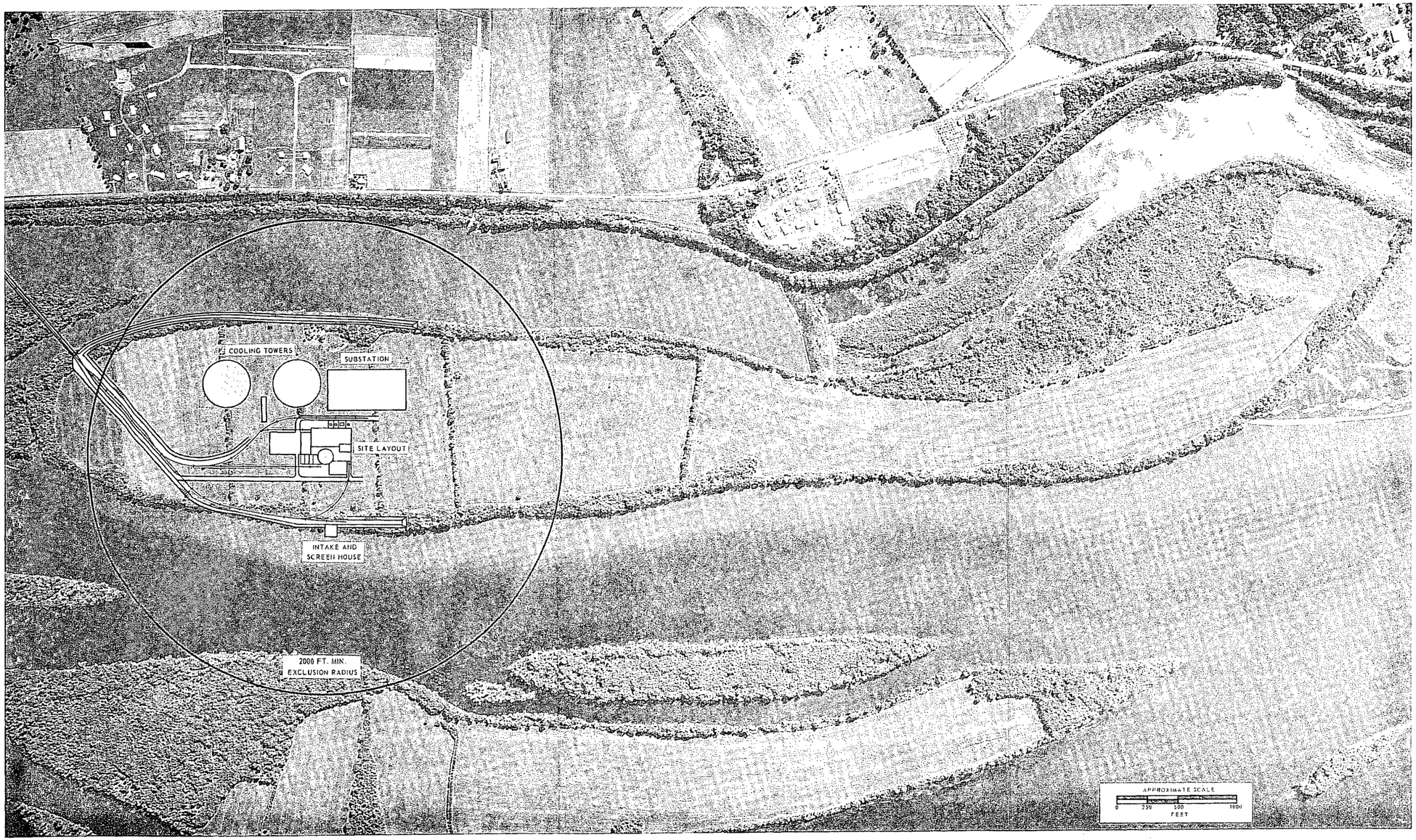


PLOT PLAN AND LOCAL AREA PHOTO

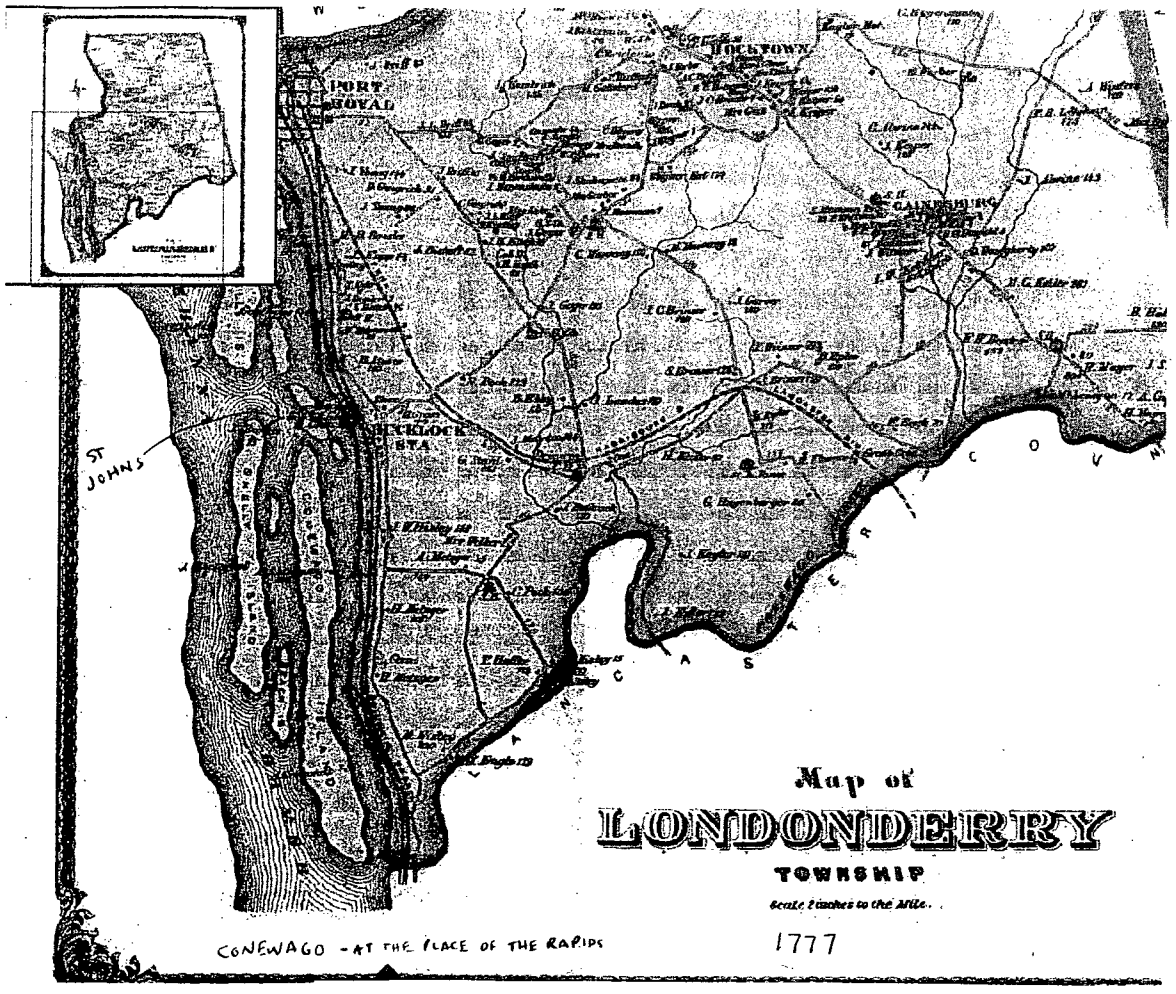
Met Ed

FIGURE 2-3

THREE MILE ISLAND NUCLEAR STATION

AMEND. 4 (12-8-67)

Non-AmerGen


ROCKTOWN
PORT
ROYAL
ST
JOHNS
Map of
LONDONDERRY
TOWNSHIP
Scale 2 inches to the Mile.
CONEWAGO - AT THE PLACE OF THE RAPIDS
1777

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-35 **Topic:** Cultural Resources Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: NRC would like to review maintenance procedures for t-lines; specifically , do they take into account the protection of cultural resources?

Date Received: 3/19/2008 **Response Date:** 5/19/2008

Response: The FirstEnergy vegetation maintenance plan and protocols for the in-scope transmission lines are being provided in response to Questions 5 and 7. These documents do not address protection of cultural resources. The vegetation management activities carried out in transmission line rights-of-way by FirstEnergy do not normally disturb soil layers. Similarly, FirstEnergy policies and procedures applicable to mechanical maintenance of the transmission system do not specifically address protection of cultural resources. However, FirstEnergy has advised Exelon that if evidence of archaeological or historical resources is inadvertently discovered during mechanical maintenance, work would be stopped to investigate.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-36 **Topic:** Cultural Resources Review

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: NRC would like to have copies of any correspondence with the Pennsylvania Historical and Museum Commission that was not included in the ER.

Date Received: 3/19/2008 **Response Date:**

Response: A copy of the "Request to Initiate Consultation in Compliance with the History Code and Section 106 of the National Historic Preservation Act" for the TMI-1 Steam Generator Replacement Project is attached.

List Attachments Provided:

Request to Initiate Consultation in Compliance with the History Code and Section 106 of the National Historic Preservation Act

Pennsylvania Historical & Museum Commission
Bureau for Historic Preservation

BHP Use Only
ER #

Request to Initiate Consultation in Compliance with the State History Code and Section 106 of the National Historic Preservation Act

Applicant Information (print neatly, this will be used in the return envelope)			
Applicant Name	Exelon Corporation		
Street Address	Route 441 South,	P.O. Box 480	
City	Middletown	Phone Number	717 948- 8290
State/ZIP	Pennsylvania 17057		

Contact Person to Receive Response (if applicable) (print neatly, this will be used in the return envelope)			
Name/Company	Scott Cogley		
Street Address	Route 441 South	P.O. Box 480	
City	Middletown	Phone Number	717 948-8290
State/ZIP	Pennsylvania 17057		

Project Information			
Project Title	TMI-1 Steam Generator Replacement Project		
Project Location and/address	Three Mile Island Route 441 South		
Municipality	Londonderry Twp.	**County Name**	Dauphin
If this project was ever reviewed before, include previous ER #	Yes – 1971?	See attached 2.3 Historic Significance	

Project Type (Check all that apply)

Government Funded/Sponsored or On Government Land?

☐ **Yes** ☒ **No** **Specify Agency and/or Program Name Below**

State Agency:		Local:	
Federal Agency:		Other:	

Permits or Approvals Required

☐ **Yes** ☒ **No** **Specify Agency and/or Program Name Below**

Anticipated Permits:	Operations to be conducted under existing permits		
State Agency:		Program:	
Federal Agency:		Program:	

Agency Office to Receive Response (Check all that apply)

Army Corps of Engineers: ☐ Philadelphia ☐ Baltimore ☐ Pittsburgh

DEP Office:	☐ Central Office	☐ Regional Office:	
☐ District Mining Office:		☐ Oil & Gas Office:	
☐ Other: (provide address)			

Pennsylvania Historical & Museum Commission
Bureau for Historic Preservation

BHP Use Only
ER #

Required Project Information for BHP/SHPO Review

☒ Total Acres in the property under review: 35

☒ Total acres of earth disturbance for this proposed activity: 0.5 acre

☒ Are there any buildings or structures within the project area? ☒ Yes ☐ No
Approximate age of buildings:

☒ Project located in or adjacent to a historic district? ☐ Yes ☒ No ☐ Unsure

Name of Historic District _____

Submissions Must Also Include:

☒ MAP LOCATION: A 7.5 USGS Map showing the project boundary and the Area of Potential Effect (APE). The APE should include indirect effects, such as visual and audible impacts. Federal Projects must provide an explanation of how the APE was determined.

☐ PHOTOS: Photos of all buildings or structures in the APE over 50 years old. If the property is over 50 years old submit a Historic Resource Form with this initial request. The forms are available at http://www.phmc.state.pa.us/bhp/inventories.

☒ PROJECT DESCRIPTION NARRATIVE: Provide a detailed project description describing the project, any ground disturbance, any previous land use, and age of all effected buildings in the project area. Attach a site map showing the location of all buildings in the project area.

☒ I have reviewed all DEP Permit Exemptions listed on the DEP website www.dep.state.pa.us.

In addition, federal agencies must provide:

☐ Measures that will be taken to identify consulting parties including Native Americans.

☐ Measures that will be taken to notify and involve the public.

The information on this form is needed to determine whether potential historic or archaeological resources are present. Additional historic information or investigation may be requested to determine the significance of the resources or the effects of the project on those resources. ***Form and attachments must be submitted by mail. Submissions via e-mail will not be accepted.***

Signature Block

Applicant's Signature Date

Please Print and Mail Completed Form and Required Information to:

PA Historical & Museum Commission
Bureau for Historic Preservation
400 North Street
Commonwealth Keystone Building 2nd Floor
Harrisburg, PA 17120-0093

Phase I

The Phase I survey is intended to provide an inventory of all potentially eligible archaeological resources within the project area as per Federal Reg. 51 (169) of 9/2/86 and CFR 800.4 as revised 10/1/86. Predictive models are used by the BHP to delineate areas requiring Phase I survey. The consultant should also devise a predictive model to focus the Phase I survey, however, the model must be justifiable and designed to locate all potentially eligible archaeological sites within a proposed project area. The methodology of a Phase I survey should be adequate to make it highly probable that all sites will be recorded. Sites may be identified and recorded through a combination of documentary research, informant interviews, surface reconnaissance, and subsurface testing. Any or all of these techniques may be used in a particular survey. The Phase I survey will result in the discovery of any unrecorded sites and the confirmation of the existence and location of previously recorded sites. It should be emphasized that a Phase I survey will identify and record both prehistoric and historic period sites within the project area.

The results of the Phase I survey should be incorporated in a report meeting the standards and specifications of the BHP (see Report Requirements, below). The report serves as the basis for a recommendation by the BHP as to the need for additional work and the adequacy of the Phase I survey. If no sites were discovered and the report reflects an adequate consideration of the potential for archaeological resources, the BHP will recommend that no further investigations are needed and that the project will have no effect on archaeological resources.

For projects covering an area of five acres or less, involving simple residual soils or no stratified Holocene deposits and where no sites are found, a shortened report format is acceptable. (See Chapter III, section A for an outline).

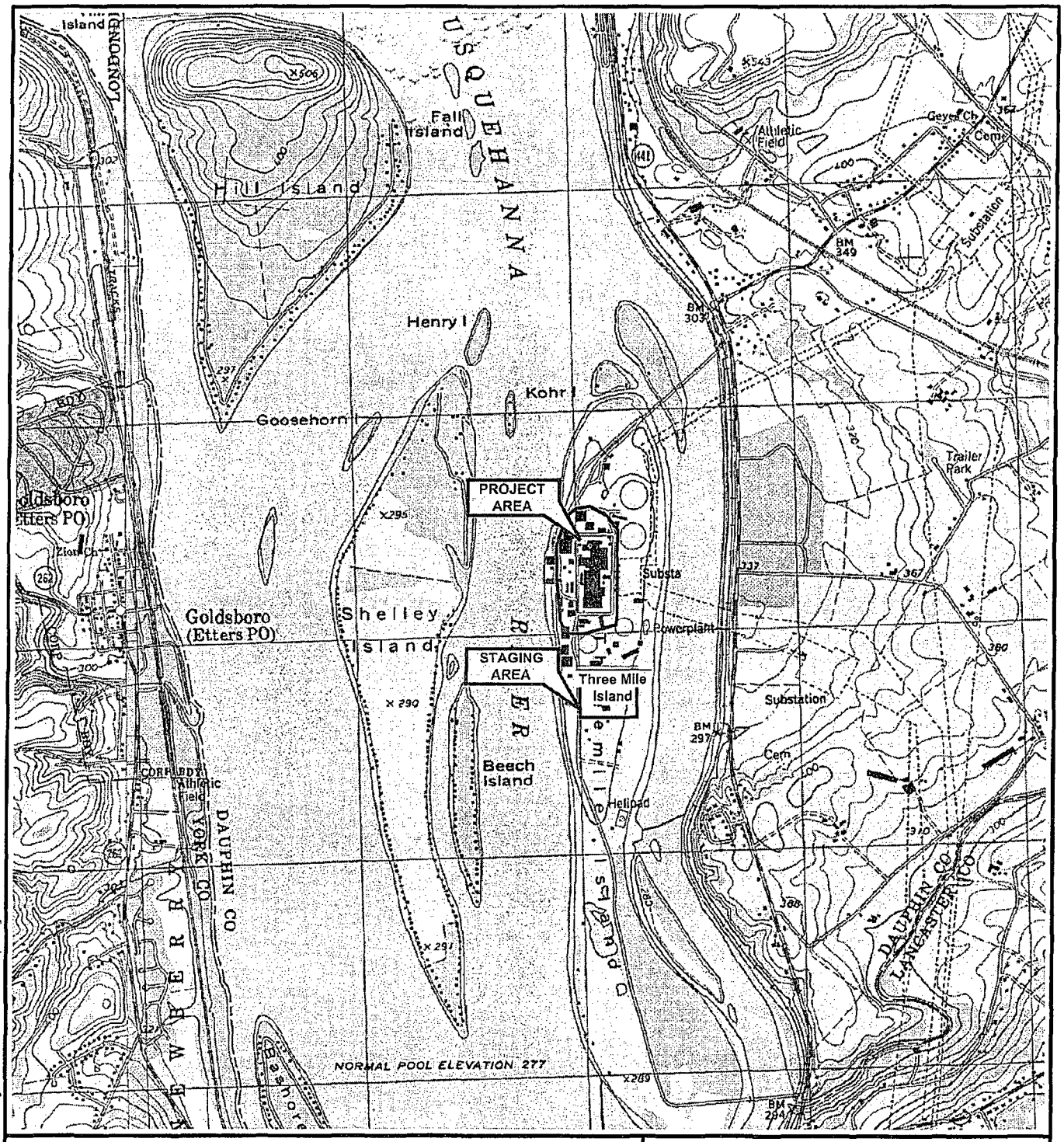
Prehistoric and historic period archaeological survey work and reports should be coordinated with the historic structures survey. The information gained from the historic structures survey work should be incorporated into the investigation of historic archaeological sites.

PROJECT NARRATIVE

Excelon Corporation is proposing to replace the steam generator (OTSG) at the Unit 1 Reactor Building located on Three Mile Island, Londonderry Township, Dauphin County, Pennsylvania. The replacement work is scheduled to begin in 2009. Additionally, the tendons at the Unit 1 Reactor Building will also be inspected. The inspection work is conducted every five years and is also to begin in 2009.

Construction activities by Metropolitan Edison began after 1971. The present structures are all less than 40 years of age. Several ancillary activities associated with the generator replacement and the tendon inspection will involve excavation of previously disturbed areas primarily in the vicinity of reactor building 1 (one). Generally this activity will be associated with storage facilities necessary to support the proposed activities. Excavation is not anticipated to exceed four (4') feet and is exclusively located in previously disturbed and filled areas. An attached plot plan prepared by Gilbert Associates (E-744-001) shows final grades and building location details of the area proposed for this replacement activity.

A staging area for temporary personnel is proposed for an area south of the cooling towers. This area is paved and presently used for parking. Some temporary support structures may be erected and will be located at existing grade. Some minor grading and stoning of existing graveled roads will also occur, but excavation is not anticipated.



Base map from Middletown USGS 7½ minute quadrangle dated 1999.

0 2,000 4,000 6,000

SCALE IN FEET

N

Site Location Map

OTSG Replacement Project
Londonderry Township
Dauphin County, Pa

February 2008	Scale: 1" = 2,000'	M08105

ARM Group Inc.
Earth Resource Engineers and Consultants
8965 Guilford Road • Columbia, MD • 21046

Figure 1

K:\2008 Projects\M08105 TMI_Drwg\M08105_Figure1 Site Location Map.dwg

1971

Met Ed

Metropolitan Edison Company

Jersey Central
Power & Light Company

ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

Three Mile Island
Nuclear Station
Unit 1 and Unit 2

2.3 HISTORIC SIGNIFICANCE

The general area of the Three Mile Island site has been examined for the presence of historic landmarks in accordance with the requirements of the Historic Preservation Act. The nearest historical landmark as listed in the National Register of Historic Places is the Bellmeyer House located in York, Pennsylvania, approximately 14 miles from the site. The Cornwall Iron Furnace located in Lebanon County is approximately 17 miles from the site.

A candidate for inclusion in the National Register of Historic Places is St. Peter's Evangelical Lutheran Church in Middletown, approximately three miles north of the site. The site is not visible from the church and the Three Mile Island Nuclear Station will in no way interfere with the church.

The island itself had been occupied thousands of years ago by the Susquehannocks who were the most recent Indians to inhabit the River Flats and islands, particularly in the area from Harrisburg to southern Lancaster County. Predecessors of the Susquehannocks in the region were the more primitive Algonkians.

The Pennsylvania Historical and Museum Commission in 1967 requested permission from Met-Ed to "dig" the island before preliminary work for the construction of the proposed nuclear plant began. Met-Ed agreed with the Commission that the archaeological work should be done, and the project was carried out under a grant from the company. Several sites on the island were pointed out to the state archaeologists by amateur archaeologists who had collected in the area over a period of years. Also assisting in the salvage operations were members of the Susquehannock Chapter of the Society for Pennsylvania Archaeology and a local troop of Boy Scouts. State archaeologists felt that sufficient information was obtained to enable the archaeologists to reconstruct a general outline of the Island's culture prehistory.

Work on 36Da50, the designation assigned to the Three Mile Island site, has been completed and the artifactual materials analyzed.

The final results, which are filed in manuscript form at the William Penn Memorial Museum and Archives Building and which have been used as foundation data in several papers read before professional societies, contributed significantly to the understanding of the cultures of the Early and Middle Woodland periods (1000 B.C. to 1000 A.D.) in eastern Pennsylvania.

Approximately 700 pottery sherds were recovered from the excavation. These were categorized into eight types dating between 1700 B.C. and 1100 A.D. The earliest surviving vessel type was represented by several sherds from stone (soapstone) bowls; the earliest clay form was an imitation of the flat-bottomed, straight-sided stone bowls. Much of the remaining pottery from the site showed affinity to types popular in the Potomac drainage.

A number of projectile points (knives, spearpoints, and arrowheads) were found. Some of these date prior to 1700 B.C. and a few to cultures after 1100 A.D.; however, the majority of the sample also shows affinity to cultures to the south and dates between 1000 B.C. and 1000 A.D.

One hundred and twenty flake tools - small knives and scrapers fashioned from flat spalls of stone - were uncovered. These are typical food processing tools of the Early and Middle Woodland cultures. Nearly 5000 unmodified flakes were also recovered together with a few miscellaneous additional objects.

The head of Three Mile Island was obviously popular as a hunting and fishing station during nearly 2000 years of prehistory. By examining the distribution of artifact types, we have been able to define numerous camp sites separated both in time and space.

The area traversed by the Three Mile Island transmission lines does not involve any known historical or archaeological sites.

Legend

AmerGen Property

0 0.125 0.25 0.5 Miles

Three Mile Island Nuclear Station Unit 1
License Renewal Environmental Report
AmerGen Property

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-40 **Topic:** Environmental Justice

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide information about current and past wildlife sampling and testing of game animals, such as deer, squirrel, turkey, pheasant, duck, and other game birds and animals, conducted in the vicinity of TMI-1 by AmerGen and previous owners/operators of the plant. Specifically, please provide information sufficient to establish the time periods and the results of wildlife sampling and testing. The purpose of this request is to obtain information to determine whether people who consume meat from wild life in the vicinity of the plant are at risk from nuclear power plant operations.

Date Received: 3/19/2008 **Response Date:**

Response: The environmental sampling program for TMI is described in the TMI Offsite Dose Calculation Manual and is in accordance with NRC NUREG 1301. The environmental sampling program does not require sampling of meat.

The meat pathway is modeled in TMI's effluent dose calculation methodologies for gaseous plant releases.

That being said, TMI has historically sampled some deer meat available from local hunters and/or resulting from car accidents.

Scanned excerpts from historical REMP reports back to 1990 that contain information on meat sampling are being provided.

List Attachments Provided:

1990 – 1996 (pdf)
1997 (pdf)
1998 (pdf)

1990 Report

concentration of 0.013 ± 0.003 pCi/g (wet). One control sample had detectable Sr-90 at a concentration of 0.0021 ± 0.0009 pCi/g (wet). Generally, the broad leafy vegetables (cabbage and Chinese cabbage) contained the highest levels of Sr-90. This was expected because these particular plants have high Sr-90 concentration factors (soil to plant).

All of the 1990 results were consistent with Sr-90 concentrations detected in indicator and control samples from prior years. The presence of Sr-90 in the vegetation samples was attributed to fallout from past nuclear weapon tests. To a lesser extent, fallout from the Chernobyl reactor accident may also have contributed to the Sr-90 content found in these samples.

Four indicator vegetation samples (one leafy vegetable and three fruits) contained detectable H-3. The results ranged from 0.14 ± 0.08 pCi/g (wet) to 0.22 ± 0.09 pCi/g (wet) and averaged 0.17 ± 0.07 pCi/g (wet). All of the results were consistent with the 1989 average for control samples of 0.16 ± 0.10 pCi/g (wet). The occurrence of H-3 in all four samples was attributed to natural production of this radionuclide in the atmosphere and fallout from prior atmospheric nuclear tests.

Meat Results

Gamma analyses of three deer meat samples (two indicators and one control) revealed naturally-occurring K-40. Cesium-137 was also detected in the control sample at a concentration of 0.12 ± 0.01 pCi/g (wet). The presence of Cs-137 was a result of fallout from prior nuclear weapon tests.

Strontium-89 and Sr-90 were not detected in the 1990 game meat samples.

Tritium was detected in one indicator sample at a concentration of 0.16 ± 0.06 pCi/g (wet). This result was consistent with H-3

1990 Report

concentrations detected in other food product samples. It w similar to the concentration detected in the 1988 control meat sample (0.14 ± 0.05 pCi/g - wet). Therefore, the H-3 detected in the meat sample was not caused by TMINS operations.

Soil Results

Gamma analyses of soil samples collected at the GPU Nuclear gardens yielded detectable levels of naturally occurring K-40, Ra-226, and Ac-228, as well as fallout Cs-137 in both indicator and control samples. The Cs-137 concentrations for indicator and control station samples were similar, averaging 0.15 ± 0.14 pCi/g (dry) and 0.14 ± 0.04 pCi/g (dry), respectively. The presence of Cs-137 in the soil samples was attributed to worldwide fallout from prior nuclear weapon tests and to a lesser extent the fallout from the Chernobyl accident.

Strontium analyses of soil samples revealed no Sr-89. Strontium-90 was detected in two indicator samples. The positive results ranged from 0.018 ± 0.010 pCi/g (dry) to 0.023 ± 0.009 pCi/g (dry). They were similar to the analytical sensitivities achieved for the control samples and consistent with results from prior years. A major component of fallout from atmospheric nuclear tests, Sr-90 persists in the terrestrial environment because of its 28-year half-life. Therefore, the presence of this radionuclide in the soil samples was not unexpected.

Strontium may become incorporated into plants by either uptake from soil or direct deposition on foliar surfaces. In 1991, strontium analyses of fruit and vegetable samples revealed no Sr-89; however, low level Sr-90 was detected in about one-third (16 of 45) of the samples. Generally, cabbages and red beets contained the highest levels of Sr-90. This was expected because these plants have relatively high Sr-90 concentration factors (soil to plant).

Indicator samples averaged 0.0055 ± 0.0023 pCi/g (wet) and 0.011 ± 0.011 pCi/g (wet) for leafy vegetables (cabbages only) and root vegetables (red beets only), respectively. Two fruit samples collected at indicator sites also contained detectable Sr-90. For 1991, they averaged 0.00077 ± 0.00014 pCi/g (wet).

Except for fruit samples, similar concentrations of Sr-90 were found in the control samples. The duplicate analysis result for a control cabbage sample yielded a Sr-90 concentration of 0.0065 ± 0.0024 pCi/g (wet) while the control root vegetable (red beet) sample contained Sr-90 at a concentration of 0.0074 ± 0.0009 pCi/g (wet). Strontium-90 was not identified in the control fruit samples. However, the analytical sensitivities achieved for these samples were similar to the concentrations of Sr-90 found in the indicator fruit samples.

All of the 1991 results were consistent with or below Sr-90 concentrations detected in indicator and control samples from prior years. The presence of Sr-90 in the vegetation samples was attributed to fallout from past atmospheric nuclear weapon tests.

Tritium was detected in 31 of 37 (84%) indicator fruit and vegetable samples, while only 2 of 8 (25%) control samples contained this radionuclide. For indicator leafy vegetables, root vegetables and fruits, the average H-3 concentrations were 0.22 ± 0.22 pCi/g (wet), 0.18 ± 0.13 pCi/g (wet) and 0.24 ± 0.26 pCi/g (wet), respectively. As a group they ranged from 0.11 ± 0.07 pCi/g (wet) to 0.48 ± 0.08 pCi/g (wet). Two control samples (cabbage and green peppers) contained H-3 at a concentration of 0.13 ± 0.07 pCi/g (wet). The control results were consistent with levels associated with fallout and natural production.

The highest H-3 concentrations were found in leafy vegetables (lettuce and cabbage) and fruits (green peppers and tomatoes) from the E1-2 (TMI Visitors Center) and F1-1 (500 kV Substation) gardens which are proximate to TMINS and are located in dominant wind directions (E and ESE, respectively). The elevated results in the produce at these gardens were a direct result of the evaporation process. Tritium concentrations found in samples from the other indicator locations were lower and similar to those detected in the control samples. The presence of H-3 in these samples was associated with natural production and fallout from prior weapon tests.

A dose estimate was performed assuming annual ingestion rates of produce at the highest average concentrations (0.34 pCi/g (wet) and 0.38 pCi/g (wet) for non-leafy vegetables and fruits and leafy vegetables, respectively). A background contribution of 0.13 pCi/g (wet) was subtracted from the average concentrations. The maximum combined dose was 0.023 mrem to the total body of a child. This dose equates to about 0.008% of the dose received from natural background radiation.

Meat Results

Gamma analyses of two deer meat samples (one indicator and one control) revealed naturally-occurring K-40. Cesium-137 was also detected in the control sample at a concentration of 1.5 ± 0.1 pCi/g (wet). The presence of Cs-137 was a result of fallout from prior nuclear weapon tests.

Tritium was detected in both the indicator and control sample at a concentration of 0.15 ± 0.06 pCi/g (wet) and 0.11 ± 0.05 pCi/g (wet), respectively. Because these results were similar to each other and to the concentrations detected in other 1991 control food products (milk, fruits and vegetables), the H-3 identified in the 1991 meat samples was probably unrelated to TMINS operations.

0.0065 pCi/g (wet), 0.0019 ± 0.0028 pCi/g (wet) and 0.014 ± 0.021 pCi/g (wet) for leafy vegetables, fruits and root vegetables, respectively.

Similar concentrations of Sr-90 were found in the control samples. Ranging from 0.0014 ± 0.0003 pCi/g (wet) to 0.035 ± 0.006 pCi/g (wet), the average for all control samples was 0.012 ± 0.031 (wet). By category, leafy vegetables averaged 0.0054 ± 0.0078 pCi/g (wet); the concentrations detected in the fruit and root vegetable samples were 0.0014 ± 0.0003 pCi/g (wet) and 0.035 ± 0.006 pCi/g (wet), respectively.

All of the 1992 results were consistent with or below Sr-90 concentrations detected in indicator and control samples from prior years. The presence of Sr-90 in the vegetation samples was attributed to fallout from past atmospheric nuclear weapon tests.

Tritium was detected in 5 of 29 (17%) indicator fruit and vegetable samples(one fruit and four green leafy vegetables). None of the control samples contained H-3 above the lower limit of detection. Indicator leafy vegetables averaged 0.24 ± 0.27 pCi/g (wet) and ranged from 0.11 ± 0.07 pCi/g (wet) to 0.38 ± 0.08 pCi/g (wet). The lone indicator fruit (tomato) result was 0.14 ± 0.07 pCi/g (wet). All but two indicator results were consistent with levels associated with fallout and natural production and similar to historical control sample concentrations.

The two highest H-3 concentrations, 0.33 ± 0.08 pCi/g (wet) and 0.38 ± 0.08 pCi/g (wet), were found in leafy vegetables (leaf lettuce) from the E1-2 (TMI Visitor's Center) and F1-1 (500 kV Substation) gardens which are proximate to TMINS and are located in dominant wind directions (E and ESE, respectively). The elevated results in the produce at these gardens were a direct result of the TMI-2 evaporation process. When compared to 1991, there were fewer 1992 indicator vegetation samples containing H-3 above historical control concentrations as a result of lower TMI-2 evaporator operating time.

A conservative dose estimate was performed assuming annual ingestion rates of leafy vegetables at the highest 1992 concentration (0.38 ± 0.08 pCi/g, wet). A background contribution was not subtracted. The maximum hypothetical dose was 0.0026 mrem to the total body of an adult. This dose equates to about 0.0009% of the dose received from natural background radiation.

Meat Results

Gamma analyses of three deer meat samples (two indicators and one control) revealed naturally-occurring K-40. Cesium-137 was also detected in the control sample at a concentration of 0.028 ± 0.006 pCi/g (wet). The presence of Cs-137 was a result of fallout from prior nuclear weapon tests.

Tritium was detected in one of the indicator samples at a concentration of 0.091 ± 0.054 pCi/g (wet). Because this result was similar to the 1991 control sample concentration (0.11 ± 0.05 pCi/g, wet), the H-3 identified in the 1992 indicator deer meat sample was probably unrelated to TMINS operations.

Strontium-89 was not detected; Sr-90 was identified in one indicator sample at a concentration of 0.00049 ± 0.00030 pCi/g (wet). Because the indicator result was consistent with the 1989 control sample result (0.0015 pCi/g, wet), the presence of Sr-90 in the deer meat sample was attributed to fallout from prior atmospheric nuclear weapon tests.

Soil Results

Gamma analyses of soil collected at the GPU Nuclear gardens yielded detectable levels of naturally-occurring K-40, Ra-226, and Th-232, as well as fallout Cs-137 in both indicator and control samples. The Cs-137 concentrations for indicator and control station samples were similar, averaging 0.17 ± 0.04 pCi/g (dry) and 0.11 ± 0.01 pCi/g (dry), respectively. These averages compared well with the 1991 averages of 0.13 ± 0.16 pCi/g (dry) and 0.12 ± 0.01 pCi/g (dry) for indicators and controls, respectively. The presence of Cs-137 in the soil samples was attributed to worldwide fallout from prior atmospheric nuclear weapon tests.

Strontium analyses of soil samples revealed no Sr-89. Strontium-90 was detected in three indicator samples and one control sample. The indicator results averaged 0.045 ± 0.012 (dry) and ranged from 0.041 ± 0.012 pCi/g (dry) to 0.052 ± 0.020 pCi/g (dry). They were similar to the control sample concentration of 0.035 ± 0.010 pCi/g (dry) and consistent with results from prior years. A major component of fallout from atmospheric nuclear tests, Sr-90 persists in the terrestrial environment because of its 28-year half-life. Therefore, the identification of this radionuclide in the soil samples was not unexpected.

Based on the 1992 soil results, no buildup of TMINS-related radioactivity was detected in the local environment.

Rodent Results

A gamma analysis of groundhog flesh yielded Cs-137 and naturally-occurring K-40. Although control data for rodents were not available, the Cs-137 result (0.014 ± 0.007 pCi/g, wet) was similar to that detected in the control deer meat sample. Therefore, the Cs-137 detected in the rodent sample was attributed to fallout from prior weapon tests. road kill – outside protected area

samples was attributed to fallout from past atmospheric nuclear weapon tests.

Tritium was detected in 8 of 28 (29%) indicator fruit and vegetable samples (four fruit and four green leafy vegetable samples). None of the 1993 control fruit and vegetable samples contained H-3 above the detection limit. The 1993 H-3 in vegetation results are listed in Table O-4. The average H-3 concentrations in indicator green leafy vegetables and fruits were 0.30 ± 0.18 pCi/g(wet) and 0.21 ± 0.17 pCi/g(wet), respectively. As a group, they ranged from 0.13 ± 0.07 pCi/g(wet) to 0.39 ± 0.08 pCi/g(wet). The 1993 indicator averages and individual results were similar to those found in 1991 and 1992 indicator produce samples.

Detectable H-3 concentrations were identified only in samples collected from the gardens at the TMI Visitors Center (E1-2) and the 500 kV Substation (F1-1). All but one of the results were slightly elevated when compared to historical control sample data. This was expected since these gardens are located proximate to TMINS and in dominant wind directions (E and ESE, respectively). The slightly elevated H-3 concentrations detected in the produce from these gardens were a direct result of releases from the TMI-2 evaporator.

One of the indicator samples had an H-3 concentration consistent with historical control sample results. The presence of H-3 in this sample was considered to be associated with natural production in the atmosphere and fallout from prior weapon tests.

A conservative dose estimate was performed assuming annual ingestion rates for leafy vegetables and fruits at the highest 1993 concentrations (0.39 ± 0.08 pCi/g,wet and 0.33 ± 0.08 pCi/g,wet, respectively). A background contribution was not subtracted. The maximum hypothetical dose was 0.0097 mrem to the whole body of an adult. This dose is equivalent to 0.0032% of the dose that an individual living in the TMI area receives each year from natural background radiation.

Meat Results

Gamma analyses of two deer meat samples (one indicator and one control) revealed naturally-occurring K-40. Cesium-137 was also detected in the control sample at a concentration of 0.47 ± 0.05 pCi/g (wet). The presence of Cs-137 in the deer flesh was attributable to fallout from prior nuclear weapon tests.

Tritium was detected in the indicator sample at a concentration of 0.58 ± 0.19 pCi/g(wet). A recount and reanalysis were performed and the results (0.47 ± 0.19 pCi/g,wet and 0.37 ± 0.09 pCi/g,wet, respectively) confirmed the original analysis result. The control sample did not contain H-3 at a concentration above the detection limit.

Because the indicator result was higher than historical control sample results,

the presence of this radionuclide in the deer meat was related to routine TMINS operations. More specifically, the occurrence was most likely due to TMI-1 operations since the sample was collected more than one month after the evaporation of TMI-2 processed water was completed. Other indicator media collected in the same time period also contained detectable H-3 at concentrations above the analogous control samples.

A conservative dose estimate was performed assuming that an individual consumed the indicator deer meat for a period of one year. For this calculation, a background contribution was not subtracted. The maximum hypothetical dose was 0.0067 mrem to the whole body of an adult. This dose is equivalent to 0.0022% of the dose that an individual living in the TMI area receives each year from natural background radiation.

Strontium-89 was not detected; Sr-90 was identified only in the control sample at a concentration of 0.0037 ± 0.0015 pCi/g (wet). The presence of Sr-90 in the control deer meat sample was attributed to fallout from prior atmospheric nuclear weapon tests.

Soil Results

Gamma analyses of soil collected at the GPU Nuclear gardens yielded detectable levels of naturally-occurring K-40, Ra-226, and Th-232, as well as fallout Cs-137 in both indicator and control samples. Naturally-occurring U-235 was also detected in one indicator sample. The Cs-137 concentrations for indicator and control station samples were similar, averaging 0.12 ± 0.15 pCi/g (dry) and 0.11 ± 0.01 pCi/g (dry), respectively. These averages compared well with the 1992 averages of 0.17 ± 0.04 pCi/g (dry) and 0.11 ± 0.01 pCi/g (dry) for indicators and controls, respectively. The presence of Cs-137 in the soil samples was attributed to worldwide fallout from prior atmospheric nuclear weapon tests.

Strontium analyses of soil samples revealed no Sr-89. Strontium-90 was detected in three of six indicator samples. The results reported for the control samples were below the calculated detection limits of 0.04 pCi/g(dry). However, a duplicate analysis and a quality control analysis of a control sample yielded 0.035 ± 0.014 pCi/g(dry) and 0.023 ± 0.008 pCi/g(dry), respectively.

The average Sr-90 concentration for 1993 indicator samples was 0.039 ± 0.008 pCi/g(dry) with a range of 0.036 ± 0.013 pCi/g(dry) to 0.043 ± 0.007 pCi/g(dry). The 1993 indicator average was consistent with the 1992 indicator average and 1992 control sample concentration of 0.045 ± 0.012 pCi/g(dry) and 0.035 ± 0.010 pCi/g(dry), respectively. Additionally, the individual indicator results for 1993 were similar to those reported for the 1993 control samples.

The presence of this long-lived radionuclide in the 1993 soil samples

Meat Results

Gamma analyses of two deer meat samples (one indicator and one control) revealed naturally-occurring K-40. Cesium-137 also was detected in the control sample at a concentration of 0.048 ± 0.008 pCi/g (wet). The presence of Cs-137 in the deer flesh was attributable to fallout from prior nuclear weapon tests.

Soil Results

Gamma analyses of soil samples collected at the GPU Nuclear gardens yielded detectable levels of naturally-occurring Be-7, K-40, Ra-226, and Th-232, as well as fallout Cs-137 in both indicator and control samples. The Cs-137 concentrations for indicator and control samples were similar, averaging 0.12 ± 0.15 pCi/g (dry) and 0.11 ± 0.01 pCi/g (dry), respectively. These averages compared well with the 1993 averages of 0.12 ± 0.15 pCi/g (dry) and 0.11 ± 0.01 pCi/g (dry) for indicators and controls, respectively.

The station with the highest annual average was the garden located on the south end of TMI (Station J2-2). The samples from this station contained an average Cs-137 concentration of 0.19 ± 0.01 pCi/g (dry) which was consistent with the average concentration calculated for this station in 1993 (0.18 ± 0.01 pCi/g, dry).

The presence of Cs-137 in the soil samples was attributed to worldwide fallout from prior atmospheric nuclear weapon tests.

Strontium-89 and Sr-90 were not detected in the soil samples collected in September. Based on the 1994 soil results, no buildup of TMINS-related radioactivity was detected in the local environment.

Rodent Results

Three rodent carcasses (two mice and one rat) were frisked and/or analyzed in 1994. A mouse found dead in the parking lot near the TMI-1 Processing Center was frisked and analyzed for gamma-emitting radionuclides. Reactor-related materials were not identified.

A second mouse carcass was found in the TMI-1 Tendon Access Galley. A gamma analysis identified Co-58, Co-60, Cs-134 and Cs-137. The result was expected because the area where the mouse was found contains radioactive material.

Finally, a rat carcass was found in the TMI-2 Turbine Building. The carcass was frisked and the result indicated that the rat was not radiologically contaminated. A follow-up gamma analysis was not performed because the carcass was partially decomposed.

No definitive conclusion can be made on whether radioactive materials are being transported by rodents since the mouse which contained radioactive

materials was found dead inside a contaminated building and not outside in an uncontaminated area.

A pest control program is in place at TMINS. This program minimizes the potential for any rodents to transport contamination to unrestricted areas.

indicator and control cow milk samples since 1979. Generally, the Sr-90 concentrations have trended downward. This decrease is related to the cessation of atmospheric nuclear weapon testing and the radioactive decay and depletion of both atmospheric and terrestrial Sr-90 associated with prior weapon testing.

Terrestrial Vegetation Results

Samples of broad leaf vegetables (cabbages), fruits (tomatoes, sweet corn and green peppers) and root vegetables (red beets and potatoes) were collected in 1995. Naturally-occurring K-40 was detected in all of these samples. Two red beet samples (one indicator and one control) and four cabbage samples (three indicators and one control) also contained naturally-occurring Be-7. No gamma-emitting radionuclides (including I-131) attributable to TMINS operations were detected above the MDC.

Strontium may become incorporated into plants by either uptake from soil or direct deposition on foliar surfaces. In 1995, strontium analyses of leafy vegetable samples (cabbages) revealed no Sr-89, but low-level Sr-90 was detected in all of these samples. This was expected because cabbages have a relatively high Sr-90 concentration factor (soil to plant).

The annual average Sr-90 concentration for all indicator samples was 0.0061 $\pm$ 0.0095 pCi/g (wet). The concentrations ranged from 0.0028 $\pm$ 0.0005 pCi/g (wet) to 0.013 $\pm$ 0.001 pCi/g (wet).

Strontium-90 also was measured in the control sample. The 1995 control sample concentration of 0.029 $\pm$ 0.002 pCi/g, (wet) was similar to those detected in the 1995 indicator samples.

All of the 1995 results were consistent with Sr-90 concentrations detected in indicator and control broad leaf vegetable samples from prior years. The presence of Sr-90 in the 1995 cabbage samples was attributed to fallout from past atmospheric nuclear weapon tests.

Meat Results

Gamma analyses of three deer meat samples (two indicators and one control) revealed naturally-occurring K-40. Cesium-137 also was detected in the control sample at a concentration of 0.055 $\pm$ 0.010 pCi/g (wet). A similar Cs-137 concentration (0.048 $\pm$ 0.008 pCi/g, wet) was measured in the 1994 control deer meat sample. The presence of Cs-137 in the deer flesh was attributable to fallout from prior nuclear weapon tests. No radionuclides attributable to TMINS operations were detected in the 1995 deer meat samples.

Soil Results

As a result of changing the collection frequency from twice per year to once every other year, soil samples were not collected in 1995. The next collection of soil is scheduled for the Fall of 1996.

Rodent Results

Two rodent carcasses were frisked and/or analyzed in 1995. A mouse found dead in the TMI-1 Circulating Water Pump House (a radiologically unrestricted area) was frisked and analyzed for gamma-emitting radionuclides. Reactor-related materials were not identified.

A second mouse carcass was found in the Miscellaneous Waste Evaporator Room. A frisk of the carcass indicated that the mouse was radiologically contaminated. The gamma analysis identified Cs-134 and Cs-137. The results were expected because the area where the mouse was found contains radioactive materials.

No definitive conclusion can be made on whether radioactive materials are being transported by rodents since the mouse which contained radioactive materials was found dead inside a contaminated building and not outside in an uncontaminated area. However, the absence of reactor-related materials in the mouse found in the TMI-1 Circulating Water Pump House suggested that rodents are not transporting radioactive materials to unrestricted areas.

A pest control program is in place at TMINS. This program minimizes the potential for any rodents to transport radioactive materials to unrestricted areas.

2.8 – 13

in the data and missing data points on graphs.

Generally, the Sr-90 concentrations have trended downward. This decrease is related to the cessation of atmospheric nuclear weapon testing and the radioactive decay and depletion of both atmospheric and terrestrial Sr-90 associated with prior weapon testing.

Terrestrial Vegetation Results

Samples of broad leaf vegetables (cabbages), fruits (tomatoes, sweet corn and green peppers) and root vegetables (red beets and potatoes) were collected in 1996. Naturally-occurring K-40 was measured in all samples. One red beet sample also contained naturally-occurring Be-7. No gamma-emitting radionuclides (including I-131) attributable to TMINS operations were detected above the MDC.

Strontium may become incorporated into plants by either uptake from soil or direct deposition on foliar surfaces. In 1996, none of the leafy vegetables (cabbages) contained Sr-89 above the MDC. Low-level Sr-90 was detected in the control and three of five indicator samples. The annual average Sr-90 concentration for indicator samples was 0.0060 ± 0.0030 pCi/g (wet). The 4.3-7 concentrations ranged from 0.0043 ± 0.0019 pCi/g (wet) to 0.0071 ± 0.0025 pCi/g (wet). The control sample had a similar Sr-90 concentration, 0.0043 ± 0.0021 pCi/g (wet).

The 1996 Sr-90 concentrations were consistent with those reported in previous years. In 1995, for example, indicators averaged 0.0061 ± 0.0095 pCi/g (wet) and ranged from 0.0028 ± 0.0005 pCi/g (wet) to 0.013 ± 0.001 pCi/g (wet). The 1995 control sample contained Sr-90 at a concentration of 0.029 ± 0.002 pCi/g (wet).

As in previous years, the Sr-90 detected in 1996 cabbage samples was attributed to fallout from prior nuclear weapon tests. The detection of this long-lived fallout product was expected because measurable amounts of Sr-90 are still present in the terrestrial environment. Additionally, cabbages have a tendency to absorb Sr-90 residing in the soil.

Rodent Results

During 1996, two rodent carcasses were frisked and then analyzed for gamma-emitting radionuclides. Both rodents were mice and both were found in restricted, but radiologically 'clean' areas. One carcass was found in the TMI-1 Machine Shop. The other was discovered near the condenser vacuum pumps in the TMI-1 Turbine Building. Gamma-emitting reactor-related materials were not identified in either carcass.

No definitive conclusion can be made on whether radioactive materials are being transported by rodents. However, since the rodent collection and analysis program began, none of the carcasses collected from either restricted, radiologically 'clean' areas or unrestricted areas have contained radioactive materials attributable to TMINS operations. The data suggest that rodents are not transporting radioactive materials to unrestricted areas.

6.1

measured concentration was 0.0044 ± 0.0028 pCi/g (wet).

In previous years, similar Sr-90 concentrations were detected in both indicator and control samples. For example, 1996 indicator cabbage samples contained Sr-90 concentrations which ranged from 0.0043 ± 0.0019 pCi/g (wet) to 0.0071 ± 0.0025 pCi/g (wet) and averaged 0.0060 ± 0.0030 pCi/g (wet). This radionuclide also was measured in the 1996 control sample at a concentration of 0.0043 ± 0.0021 pCi/g (wet).

As in previous years, the data indicated that the Sr-90 measured in the 1997 cabbage sample was attributed to fallout from prior nuclear weapon tests and, therefore, was unrelated to operations at TMINS. The detection of Sr-90 was not unexpected because measurable amounts of this long-lived fallout product are still present in the terrestrial environment. Additionally, cabbages have a tendency to absorb Sr-90 residing in the soil.

Deer Meat Results

Gamma analyses of four deer meat samples (three indicators and one control) revealed naturally-occurring K-40. Cesium-137 also was detected in the control sample at a concentration of 0.093 ± 0.016 pCi/g (wet). A similar concentration (0.055 ± 0.0.010 pCi/g, wet) was measured in the 1995 control deer meat sample. The presence of Cs-137 in this sample was attributed to fallout from prior nuclear weapon tests. No radionuclides attributable to TMINS operations were detected in the 1997 deer meat samples.

Rodent Results

During 1997, one rodent carcass, a squirrel fatally injured by a motor vehicle, was analyzed for gamma-emitting radionuclides. The squirrel carcass was obtained from an unrestricted area of TMINS. Gamma-emitting, reactor-related materials were not identified in the carcass.

No definitive conclusion can be made on whether radioactive materials are being transported by rodents. However, since the rodent collection and analysis program began, none of the carcasses collected from either restricted, radiologically 'clean' areas or unrestricted areas have contained radioactive materials attributable to TMINS operations. The data suggest that rodents are not transporting radioactive materials to unrestricted areas.

A pest control program is in place at TMINS. This program minimizes the potential for rodents to transport radioactive materials to unrestricted areas.

medium was primarily due to the transfer of this long-lived fallout product from soil to animal feed (fresh or stored) to cow to milk.

Figure 17 depicts the trends of Sr-90 concentrations in indicator and control cow milk samples since 1979. The data plotted for 1996 through 1998 were based on actual sample concentrations because many of the results were below the MDC. Using actual concentrations eliminates biases in the data and missing data points on graphs.

As shown on Figure 17, the Sr-90 concentrations have trended downward. This decrease is directly related to the cessation of atmospheric nuclear weapon testing and the radioactive decay and depletion of both atmospheric and terrestrial Sr-90 associated with prior weapon testing.

Terrestrial Vegetation Results

A total of six terrestrial vegetation samples - broad leaf vegetables (cabbages), fruits (tomatoes) and grains (sweet corn) - were collected and analyzed in 1998. Red beets, a root vegetable, are normally collected and analyzed as part of the REMP. None were analyzed in 1998 because the indicator samples did not mature.

Naturally-occurring K-40 was measured in all terrestrial vegetation samples. No gamma-emitting radionuclides (including I-131) attributable to TMINS operations were detected above the MDC.

Strontium may be incorporated into plants by either uptake from soil or direct deposition on foliar surfaces. In 1998, none of the leafy vegetables (cabbages) contained Sr-89 above the MDC. Low-level Sr-90 was detected above the MDC in both the indicator and the control sample. The measured concentrations were 0.0074 ± 0.0021 pCi/g (wet) and 0.0047 ± 0.0020 pCi/g (wet), respectively.

In previous years, similar Sr-90 concentrations were detected in both indicator and control samples. For example, 1996 indicator cabbage samples contained Sr-90 concentrations which ranged from 0.0043 ± 0.0019 pCi/g (wet) to 0.0071 ± 0.0025 pCi/g (wet) and averaged 0.0060 ± 0.0030 pCi/g (wet). The 1997 indicator sample contained Sr-90 at a concentration of 0.0044 ± 0.0028 pCi/g (wet). This radionuclide also was measured in the 1996 control sample at a concentration of 0.0043 ± 0.0021 pCi/g (wet).

As in previous years, the data indicated that the Sr-90 measured in the 1998 cabbage samples was attributed to fallout from prior nuclear weapon tests and, therefore, was unrelated to operations at TMINS. The detection of Sr-90 was not unexpected because measurable amounts of this long-lived fallout product are still present in the terrestrial environment. Additionally, cabbages have a tendency to absorb Sr-90 residing in the soil.

Rodent Results

During 1998, three rodent carcasses were analyzed for gamma-emitting radionuclides. All three rodents were mice. Two of the mice were found in the TMI-1 Plant Preservation Lunchroom, a restricted, but radiologically 'clean' area. The third mouse was obtained

from Building 222, an unrestricted area of TMINS.

Gamma-emitting, reactor-related materials were not identified in two of the three carcasses. One of the carcasses found in the TMI-1 Plant Preservation Lunchroom contained Cs-137, a radioactive material that may be due to TMINS and/or fallout from prior weapon tests.

Since the source of the Cs-137 is unknown, no definitive conclusion can be made on whether radioactive materials are being transported by rodents. However, since the rodent collection and analysis program began, only one of the carcasses collected from either restricted, radiologically 'clean' areas or unrestricted areas have contained radioactive materials attributable to TMINS operations. The data suggest that rodents are not transporting radioactive materials to unrestricted areas.

A pest control program is in place at TMINS. This program minimizes the potential for rodents to transport radioactive materials to unrestricted areas.

The results indicated that the Sr-90 measured in the 1999 milk samples was unrelated to operations at TMINS. Its presence in this medium was primarily due to the transfer of this long-lived fallout product from soil to animal feed (fresh or stored) to cow to milk.

Figure 17 depicts the trends of Sr-90 concentrations in indicator and control cow milk samples since 1979. The data plotted for 1996 through 1999 were based on actual sample concentrations because many of the results were below the MDC. Using actual concentrations eliminates biases in the data and missing data points on graphs.

As shown on Figure 17, the Sr-90 concentrations have trended downward. This decrease is directly related to the cessation of atmospheric nuclear weapon testing and the radioactive decay and depletion of both atmospheric and terrestrial Sr-90 associated with prior weapon testing.

Terrestrial Vegetation Results

A total of eight terrestrial vegetation samples - leafy vegetables (cabbages), root vegetables (red beets), fruits (tomatoes) and grains (sweet corn) - were collected and analyzed in 1999. Naturally-occurring K-40 was measured in all terrestrial vegetation samples. Indicator concentrations were similar to controls. No gamma-emitting radionuclides (including I-131) attributable to TMINS operations were detected above the MDC.

Strontium may be incorporated into plants by either uptake from soil or direct deposition on foliar surfaces. In 1999, none of the leafy vegetables (cabbages) contained Sr-89 above the MDC. Low-level Sr-90 was detected above the MDC in both the indicator and the control sample. The measured concentrations were 0.0036 ± 0.0017 pCi/g (wet) and 0.0025 ± 0.0015 pCi/g (wet), respectively.

In previous years, similar Sr-90 concentrations were detected in both indicator and control samples. For example, the 1998 indicator cabbage sample contained Sr-90 at a concentration of 0.0074 ± 0.0021 pCi/g (wet). This radionuclide also was measured in the 1998 control sample at a concentration of 0.0047 ± 0.0020 pCi/g (wet).

As in previous years, the data indicated that the Sr-90 measured in the 1999 cabbage samples was attributed to fallout from prior nuclear weapon tests and, therefore, was unrelated to operations at TMINS. The detection of Sr-90 was not unexpected because measurable amounts of this long-lived fallout product are still present in the terrestrial environment. Additionally, cabbages have a tendency to absorb Sr-90 residing in the soil.

Deer Meat Results

Deer meat samples are normally obtained via local hunters and/or road-kills and analyzed as part of the routine REMP. During 1999, no deer meat samples were analyzed because indicator samples were not available.

Rodent Results

No rodent carcasses were available for analysis in 1999. Previous data suggest that

rodents are not transporting radioactive materials to unrestricted areas.

A pest control program is in place at TMINS. This program minimizes the potential for rodents to transport radioactive materials to unrestricted areas.

samples was attributed to fallout from prior nuclear weapon tests and, therefore, was unrelated to operations at TMINS. The detection of Sr-90 was not unexpected because measurable amounts of this long-lived fallout product are still present in the terrestrial environment. Additionally, cabbages have a tendency to absorb Sr-90 residing in the soil.

Deer Meat Results

Deer meat samples are normally obtained via local hunters and/or road-kills and analyzed as part of the routine REMP. During 2000, however, no deer meat samples were analyzed because indicator samples were not available.

Rodent Results

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A pest control program is in place at TMINS. This program minimizes the potential for rodents to transport radioactive materials to unrestricted areas.

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Deer Meat Results

Deer meat samples are normally obtained via local hunters and/or road-kills and analyzed as part of the routine REMP. During 2001, however, no deer meat samples were available for analysis.

Rodent Results

No rodent carcasses were available for analysis in 2001. Previous data suggest that rodents are not transporting radioactive materials to unrestricted areas.

A pest control program is in place at TMINS. This program minimizes the potential for rodents to transport radioactive materials to unrestricted areas.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-41 **Topic:** Related Federal Project Activities and Consultations

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: NRC needs a list of all Federal facilities including national parks, forests, and wildlife lands and distances within 50 miles of the TMI-1 site. ER Section 2.12 (page 2-36) identifies military installations and EPA-related facilities within or near the vicinity of TMI-1, but this does not appear to be a complete and comprehensive discussion. The lack of this information impedes an assessment of the need for contacting other Federal agencies about becoming a cooperating agency with NRC in the preparation of the Supplemental Environmental Impact Statement.

Date Received: 3/19/2008 **Response Date:**

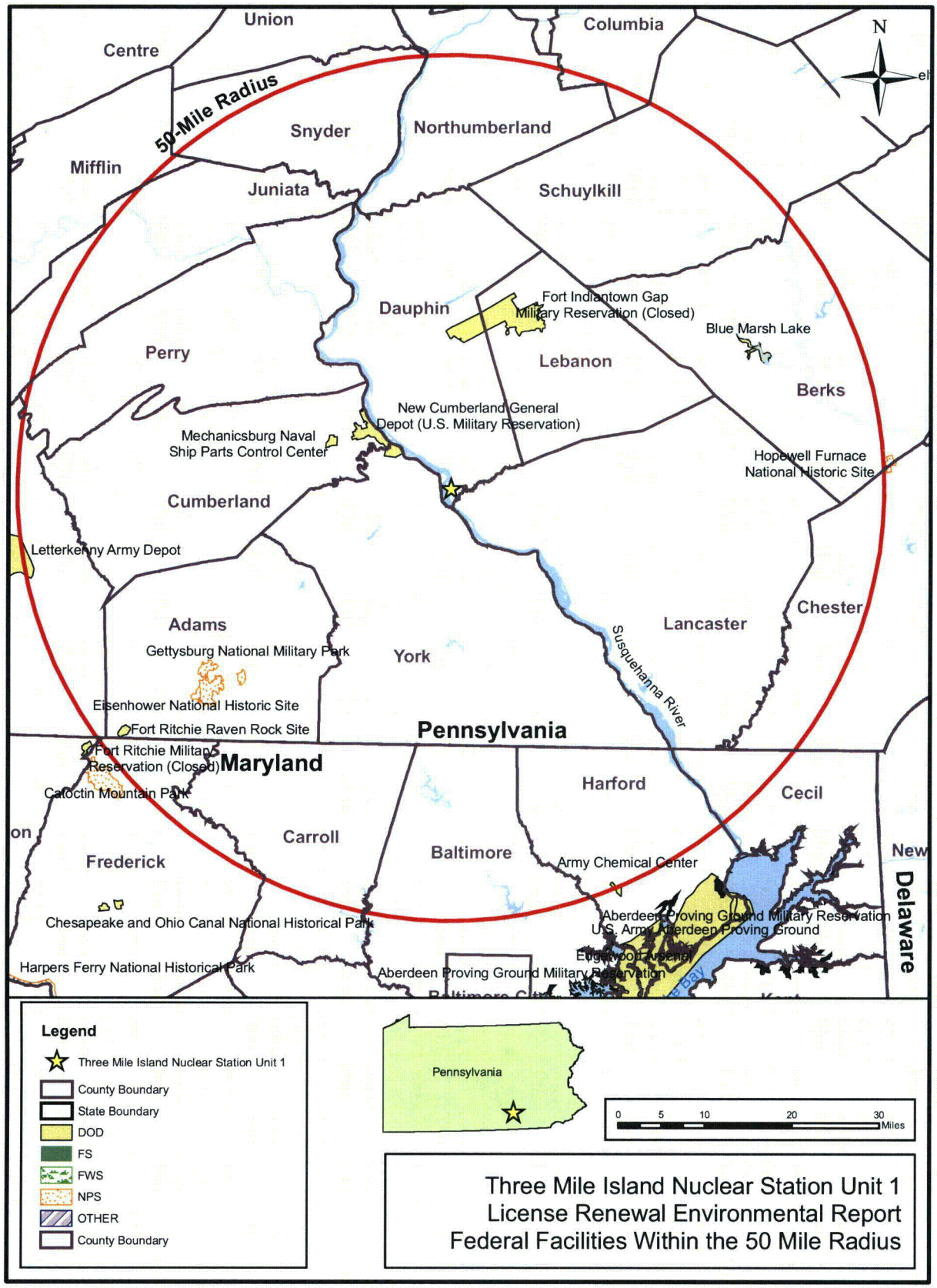
Response: Provided below is a list of the Federal facilities located within 50 miles of the TMI-1 site. A map identifying the location of these facilities will be provided.

1. Fort Indiantown Gap Military Reservation
2. Blue Marsh Lake
3. New Cumberland General Depot (U.S. Military Reservation)
4. Mechanicsburg Naval Ship Parts Control Center
5. Letterkenny Army Depot
6. Gettysburg National Military Park
7. Eisenhower National Historic Site
8. Fort Ritchie Raven Rock Site
9. Army Chemical Center

List Attachments Provided:

Map identifying Federal facilities within 50 miles of the TMI-1 site

SOURCE: ESRI, 2006. ESRI Data and Maps. 2006 World, Europe, United States, Canada, and Mexico. Redlands, California. October 1.


Union
Centre
Columbia
N
50-Mile Radius
Snyder
Northumberland
Mifflin
Juniata
Schuylkill
Dauphin
Fort Indiantown Gap
Military Reservation (Closed)
Blue Marsh Lake
Perry
Lebanon
Berks
New Cumberland General
Depot (U.S. Military Reservation)
Mechanicsburg Naval
Ship Parts Control Center
Hopewell Furnace
National Historic Site
Cumberland
Letterkenny Army Depot
Adams
Lancaster
Chester
Gettysburg National Military Park
York
Susquehanna River
Eisenhower National Historic Site
Fort Ritchie Raven Rock Site
Pennsylvania
Fort Ritchie Military
Reservation (Closed)
Maryland
Harford
Cecil
Catoctin Mountain Park
Carroll
Baltimore
Army Chemical Center
Frederick
New
Delaware
Aberdeen Proving Ground Military Reservation
U.S. Army Aberdeen Proving Ground
Chesapeake and Ohio Canal National Historical Park
Edgewood Arsenal
Harpers Ferry National Historical Park
Aberdeen Proving Ground Military Reservation
Legend
Three Mile Island Nuclear Station Unit 1
County Boundary
State Boundary
DOD
FS
FWS
NPS
OTHER
County Boundary
Pennsylvania
0 5 10 20 30
Miles
Three Mile Island Nuclear Station Unit 1
License Renewal Environmental Report
Federal Facilities Within the 50 Mile Radius

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

An Exelon Company

April 2, 2007.
5532-2007-022

James D. Miller
Permits Engineer - Water Management Program
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

SUBJECT: PERMIT RENEWAL APPLICATION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT NO. PA 0009920
THREE MILE ISLAND NUCLEAR STATION

Dear Mr. Miller:

Pursuant to the Department's regulations and the current facility NPDES permit, please find attached one original and two copies of the completed NPDES permit renewal package. The completed permit application package is comprised of the following attachments:

- Completed PADEP Permit Application - General Information Form (GIF).
- Proof of Public Notification - Londonderry Township and Dauphin County.
- Permit Application Fee of $500.00 payable to "Commonwealth of Pennsylvania" Check No. 51015108.
- Completed PADEP Application for NPDES Permit - Permit To Discharge Industrial Wastewater.
- Application Drawings (Topographic Map, Process Water Flow Diagrams, and Site Plan Identifying Industrial Outfalls & Stormwater Outfall/Drainage Areas).
- Material Safety Data Sheets (MSDSs) for the Chemical Additives listed in Module 1 of the application package.

- 40CFR122.21(r) Report - NPDES Application Requirements for Facilities with Cooling Water Intake Structures. The 40CFR122.21(r) Report includes referenced maps and drawings, and a copy of the referenced report, Analysis of Three Mile Island Area Hydrographic Survey, November 2005.

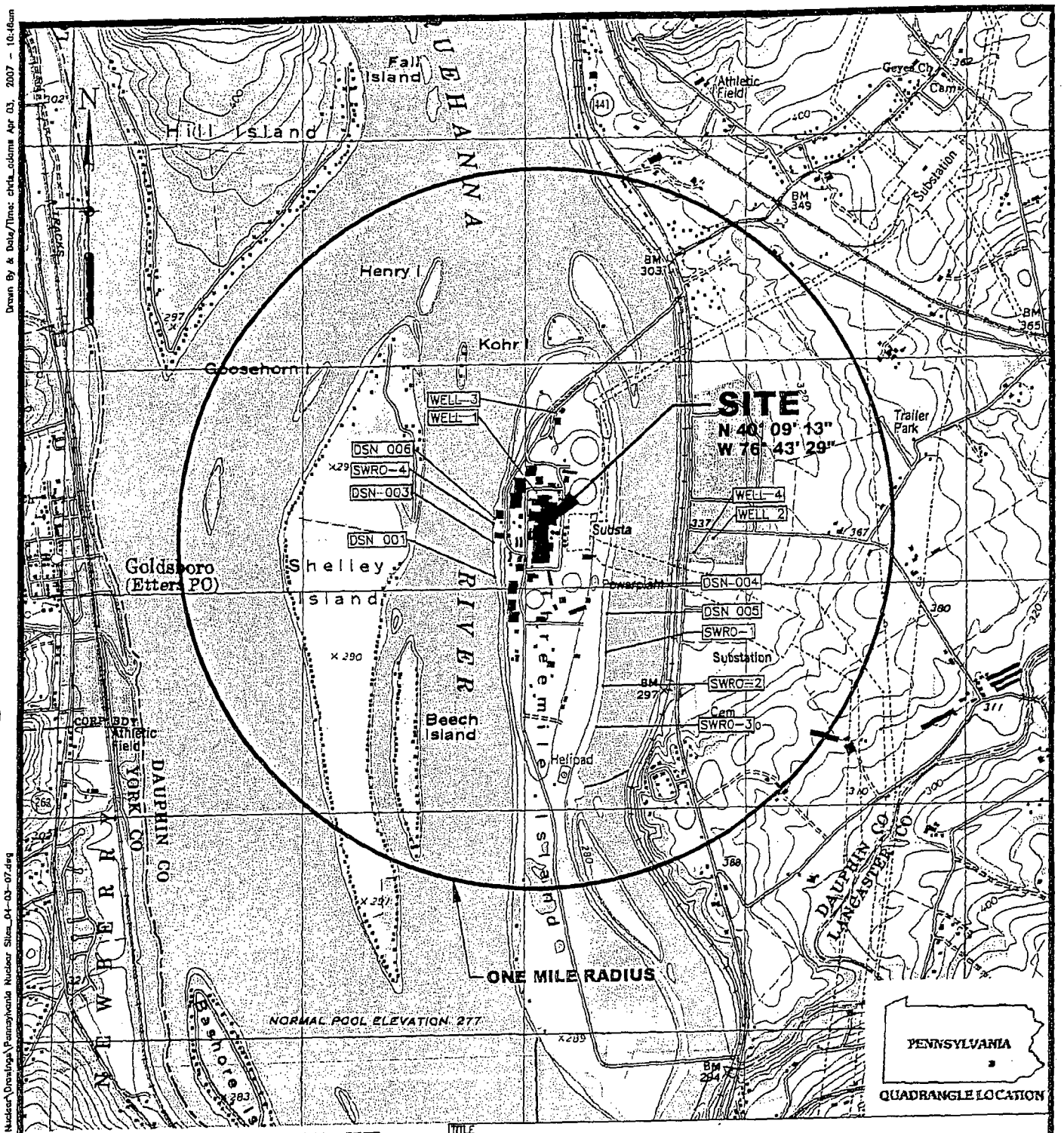
Should the Department have questions concerning the attached NPDES permit application or require additional information, please contact Scott R. Cogley, Environmental Chemist, at (717) 948-8881 or e-mail at *scott.cogley@exeloncorp.com*.

Sincerely,

T. J. Dougherty
Plant Manager, TMI Unit 1

Attachments

TJD/src



CONTOUR INTERVAL = 20 FEET

REFERENCE: A PORTION OF USGS 7.5 MINUTE TOPOGRAPHIC MAPS: MIDDLETOWN QUADRANGLE, PA; 1999; STEELTON, QUADRANGLE, PA, 1998.

TITLE: SITE LOCATION/TOPOGRAPHIC MAP

PROJECT: EXELON NUCLEAR – THREE MILE ISLAND NUCLEAR STATION
MIDDLETOWN, PA

Exelon

SCALE	DWN. BY	JOB NO.
AS SHOWN	TBS	20242531.00001
DATE	APPR. BY	FIG. NO.
04/03/07	GCA	

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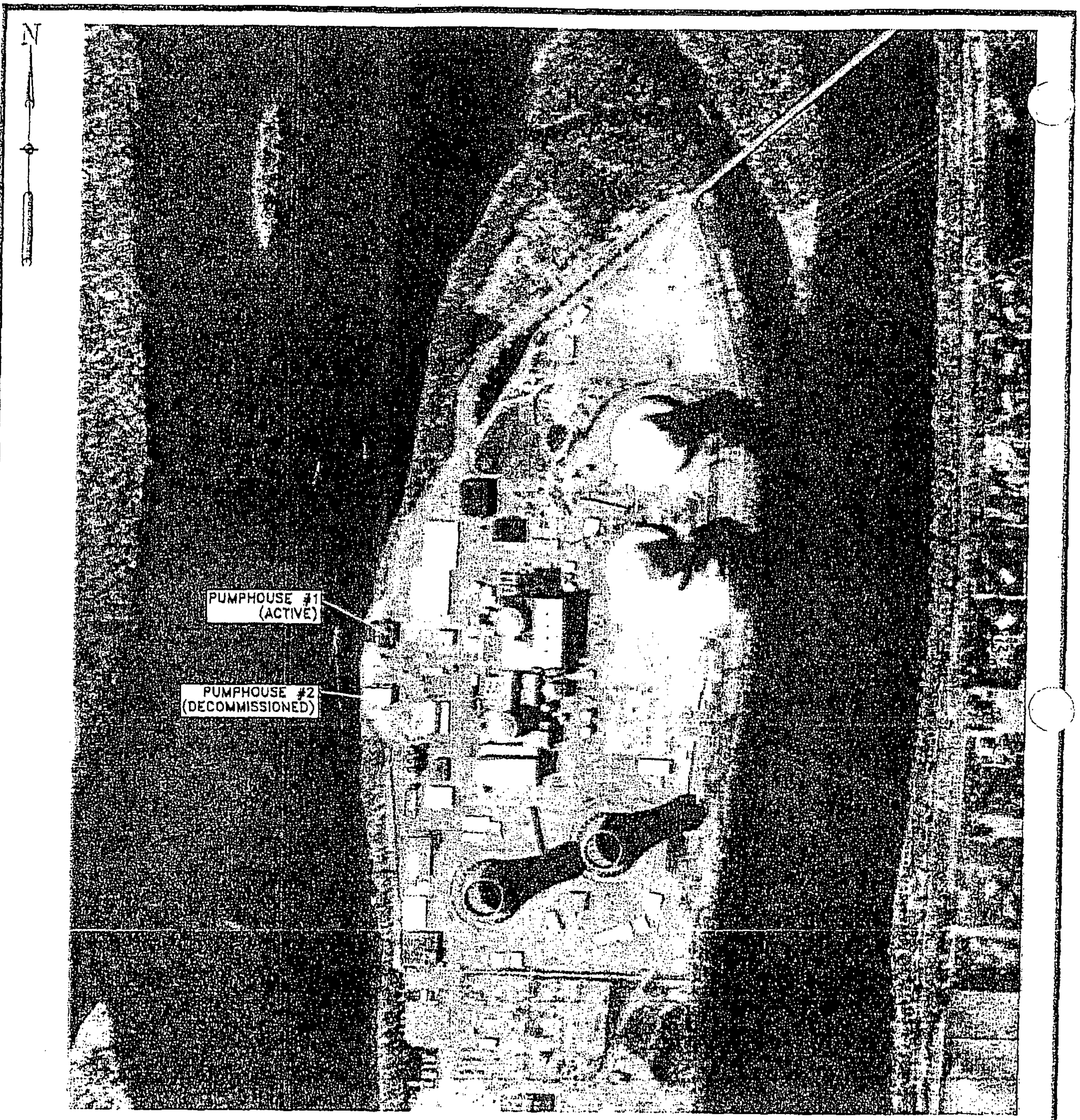
Drawn By & Date/Time: chris_adams Apr 03, 2007 - 10:48am

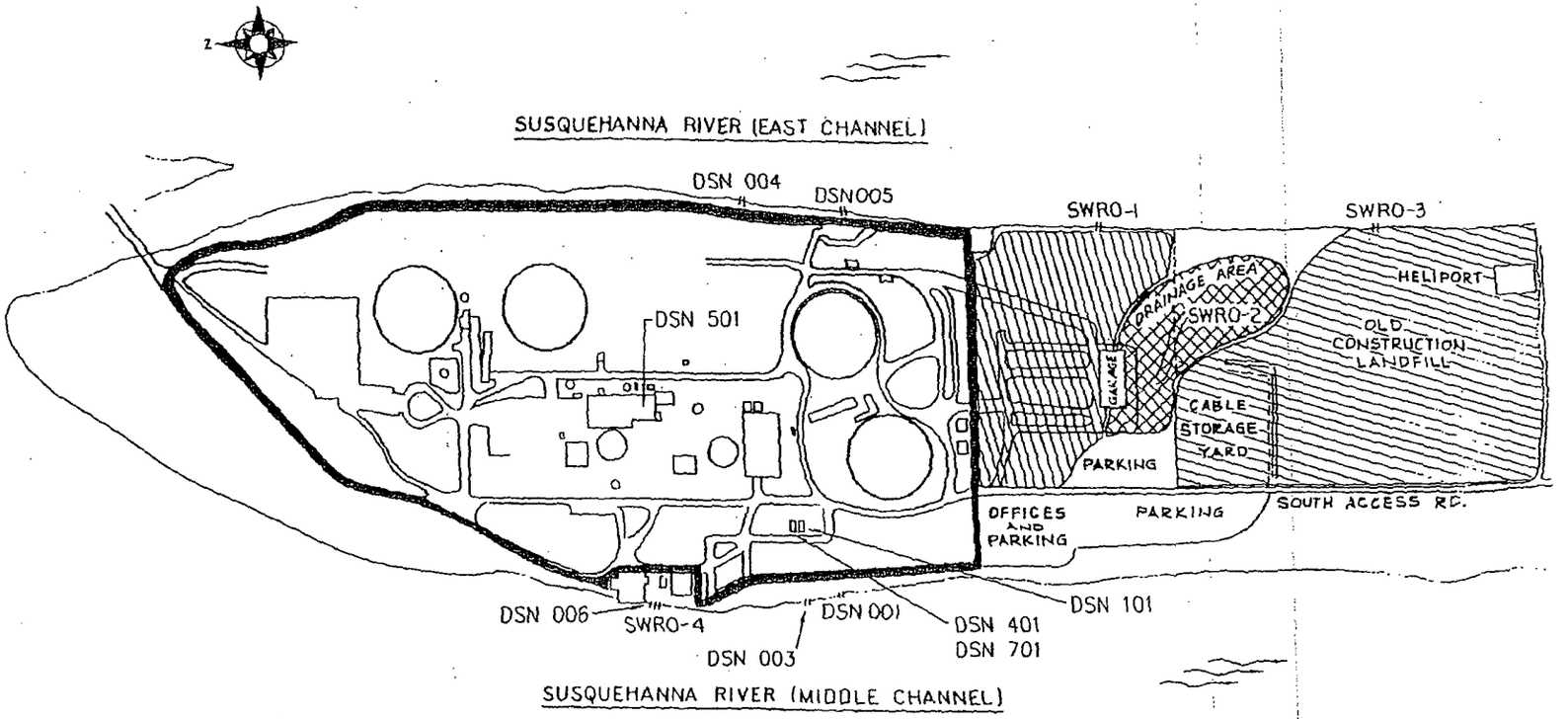


0 800 FEET

GRAPHIC SCALE

REFERENCE
TERRA SERVER - USA WEBSITE
IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
24 APR 1999

TITLE	SUSQUEHANNA RIVER PUMPHOUSE AERIAL PHOTOGRAPH				
PROJECT	EXELON NUCLEAR - THREE MILE ISLAND GENERATING STATION LONDONDERRY TOWNSHIP, DAUPHIN COUNTY, PA				
	Exelon.				
SCALE	AS SHOWN	DWN. BY	TFP	JOB NO.	20242532.00001
DATE	4/3/05	APPR. BY	MZ	FIG. NO.	



STORM WATER OUTFALL (SWRO)

DESIGNATED OUTFALL	ACREAGE
DSN 005A	115.5
SWRO-1	16.5
SWRO-2	11.9
SWRO-3	21.5
SWRO-4	0.7
TOTAL	166.1

INDUSTRIAL OUTFALLS (DSN)

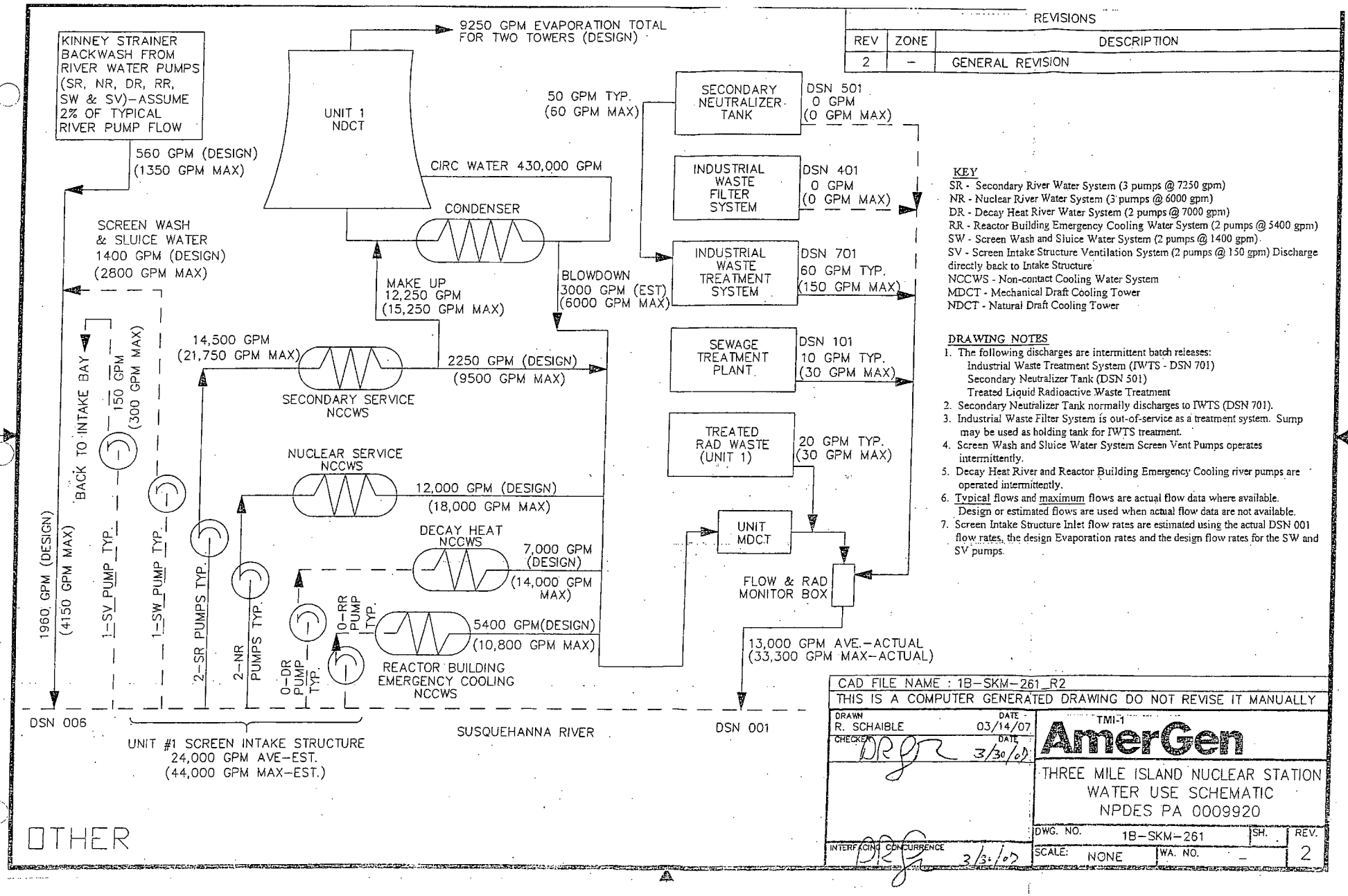
DSN 001	MAIN STATION OUTFALL
DSN 003	TMI-1 MDCT EMERGENCY OUTFALL
DSN 004	BYPASS TMI-1 MDCT
DSN 005B	INDUSTRIAL WASTEWATER TO YARD DRAINAGE
DSN 006	TMI-1 SCREEN INTAKE STRUCTURE OUTFALL
DSN 101	SEWAGE TREATMENT PLANT (INTERNAL)
DSN 401	INDUSTRIAL WASTE FILTER SYSTEM (INTERNAL)
DSN 501	SECONDARY NEUTRALIZER TANK (INTERNAL)
DSN 701	INDUSTRIAL WASTE TREATMENT SYSTEM (INTERNAL)

THREE MILE ISLAND NUCLEAR STATION

NPDES PERMIT PA 0009920

STORM WATER AND INDUSTRIAL OUTFALL LOCATIONS

CAD FILE: S1A-SKC 10_R3



REVISIONS

REV	ZONE	DESCRIPTION
2	–	GENERAL REVISION

KEY

SR - Secondary River Water System (3 pumps @ 7250 gpm)
NR - Nuclear River Water System (3 pumps @ 6000 gpm)
DR - Decay Heat River Water System (2 pumps @ 7000 gpm)
RR - Reactor Building Emergency Cooling Water System (2 pumps @ 5400 gpm)
SW - Screen Wash and Sluice Water System (2 pumps @ 1400 gpm)
SV - Screen Intake Structure Ventilation System (2 pumps @ 150 gpm) Discharge directly back to Intake Structure
NCCWS - Non-contact Cooling Water System
MDCT - Mechanical Draft Cooling Tower
NDCT - Natural Draft Cooling Tower

DRAWING NOTES

1. The following discharges are intermittent batch releases:
   Industrial Waste Treatment System (IWTS - DSN 701)
   Secondary Neutralizer Tank (DSN 501)
   Treated Liquid Radioactive Waste Treatment
2. Secondary Neutralizer Tank normally discharges to IWTS (DSN 701).
3. Industrial Waste Filter System is out-of-service as a treatment system. Sump may be used as holding tank for IWTS treatment.
4. Screen Wash and Sluice Water System Screen Vent Pumps operates intermittently.
5. Decay Heat River and Reactor Building Emergency Cooling river pumps are operated intermittently.
6. Typical flows and maximum flows are actual flow data where available. Design or estimated flows are used when actual flow data are not available.
7. Screen Intake Structure Inlet flow rates are estimated using the actual DSN 001 flow rates, the design Evaporation rates and the design flow rates for the SW and SV pumps.

CAD FILE NAME : 1B–SKM–261_R2
THIS IS A COMPUTER GENERATED DRAWING DO NOT REVISE IT MANUALLY

DRAWN	R. SCHAIBLE	DATE 03/14/07
CHECKED	DRG	DATE 3/30/07
INTERFACING CONCURRENCE	DRG	3/31/07

TMI-1 AmerGen

THREE MILE ISLAND NUCLEAR STATION
WATER USE SCHEMATIC
NPDES PA 0009920

DWG. NO.	SH.	REV.
1B–SKM–261		2
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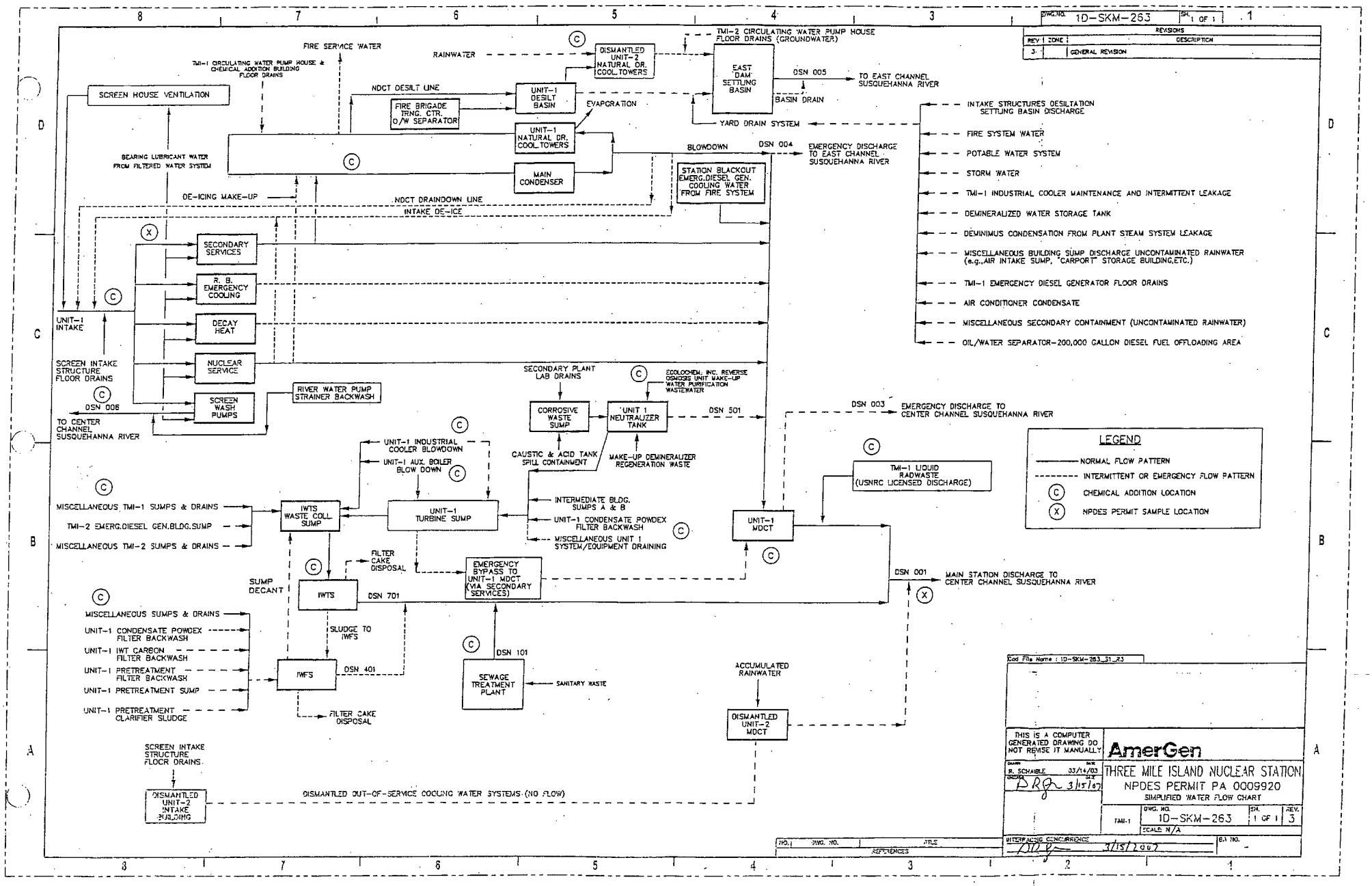
OTHER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REVISIONS
REV | ZONE | DESCRIPTION
3 | GENERAL REVISION
FIRE SERVICE WATER
RAINWATER
TMI-1 CIRCULATING WATER PUMP HOUSE & CHEMICAL ADDITION BUILDING FLOOR DRAINS
TMI-2 CIRCULATING WATER PUMP HOUSE FLOOR DRAINS (GROUNDWATER)
DISMANTLED UNIT-2 NATURAL DR. COOL. TOWERS
EAST DAM SETTLING BASIN
DSN 005
TO EAST CHANNEL SUSQUEHANNA RIVER
BASIN DRAIN
SCREEN HOUSE VENTILATION
NDCT DESILT LINE
UNIT-1 DESILT BASIN
FIRE BRIGADE TRNG. CTR. O/W SEPARATOR
EVAPORATION
UNIT-1 NATURAL DR. COOL. TOWERS
MAIN CONDENSER
YARD DRAIN SYSTEM
BLOWDOWN
DSN 004
EMERGENCY DISCHARGE TO EAST CHANNEL SUSQUEHANNA RIVER
STATION BLACKOUT EMERG. DIESEL GEN. COOLING WATER FROM FIRE SYSTEM
BEARING LUBRICANT WATER FROM FILTERED WATER SYSTEM
DE-ICING MAKE-UP
NDCT DRAINDOWN LINE
INTAKE DE-ICE
INTAKE STRUCTURES DESILTATION SETTLING BASIN DISCHARGE
FIRE SYSTEM WATER
POTABLE WATER SYSTEM
STORM WATER
TMI-1 INDUSTRIAL COOLER MAINTENANCE AND INTERMITTENT LEAKAGE
DEMINERALIZED WATER STORAGE TANK
DEMINIMUS CONDENSATION FROM PLANT STEAM SYSTEM LEAKAGE
MISCELLANEOUS BUILDING SUMP DISCHARGE UNCONTAMINATED RAINWATER (e.g., AIR INTAKE SUMP, "CARPORT" STORAGE BUILDING, ETC.)
TMI-1 EMERGENCY DIESEL GENERATOR FLOOR DRAINS
AIR CONDITIONER CONDENSATE
MISCELLANEOUS SECONDARY CONTAINMENT (UNCONTAMINATED RAINWATER)
OIL/WATER SEPARATOR-200,000 GALLON DIESEL FUEL OFFLOADING AREA
SECONDARY SERVICES
R. B. EMERGENCY COOLING
DECAY HEAT
NUCLEAR SERVICE
SCREEN WASH PUMPS
UNIT-1 INTAKE
SCREEN INTAKE STRUCTURE FLOOR DRAINS
DSN 006
TO CENTER CHANNEL SUSQUEHANNA RIVER
RIVER WATER PUMP STRAINER BACKWASH
SECONDARY PLANT LAB DRAINS
ECOLOCHEM, INC. REVERSE OSMOSIS UNIT MAKE-UP WATER PURIFICATION WASTEWATER
CORROSIVE WASTE SUMP
UNIT 1 NEUTRALIZER TANK
DSN 501
DSN 003
EMERGENCY DISCHARGE TO CENTER CHANNEL SUSQUEHANNA RIVER
UNIT-1 INDUSTRIAL COOLER BLOWDOWN
UNIT-1 AUX. BOILER BLOW DOWN
CAUSTIC & ACID TANK SPILL CONTAINMENT
MAKE-UP DEMINERALIZER REGENERATION WASTE
TMI-1 LIQUID RADWASTE (USNRC LICENSED DISCHARGE)
LEGEND
NORMAL FLOW PATTERN
INTERMITTENT OR EMERGENCY FLOW PATTERN
CHEMICAL ADDITION LOCATION
NPDES PERMIT SAMPLE LOCATION
MISCELLANEOUS TMI-1 SUMPS & DRAINS
TMI-2 EMERG. DIESEL GEN. BLDG. SUMP
MISCELLANEOUS TMI-2 SUMPS & DRAINS
IWTS WASTE COLL. SUMP
UNIT-1 TURBINE SUMP
INTERMEDIATE BLDG. SUMPS A & B
UNIT-1 CONDENSATE POWDEX FILTER BACKWASH
MISCELLANEOUS UNIT 1 SYSTEM/EQUIPMENT DRAINING
UNIT-1 MDCT
FILTER CAKE DISPOSAL
EMERGENCY BYPASS TO UNIT-1 MDCT (VIA SECONDARY SERVICES)
DSN 001
MAIN STATION DISCHARGE TO CENTER CHANNEL SUSQUEHANNA RIVER
SUMP DECANT
IWTS
DSN 701
MISCELLANEOUS SUMPS & DRAINS
UNIT-1 CONDENSATE POWDEX FILTER BACKWASH
UNIT-1 IWT CARBON FILTER BACKWASH
UNIT-1 PRETREATMENT FILTER BACKWASH
UNIT-1 PRETREATMENT SUMP
UNIT-1 PRETREATMENT CLARIFIER SLUDGE
SLUDGE TO IWFS
IWFS
DSN 401
FILTER CAKE DISPOSAL
DSN 101
SEWAGE TREATMENT PLANT
SANITARY WASTE
ACCUMULATED RAINWATER
DISMANTLED UNIT-2 MDCT
SCREEN INTAKE STRUCTURE FLOOR DRAINS
DISMANTLED UNIT-2 INTAKE BUILDING
DISMANTLED OUT-OF-SERVICE COOLING WATER SYSTEMS (NO FLOW)
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THIS IS A COMPUTER GENERATED DRAWING DO NOT REMSE IT MANUALLY
AmerGen
DRAWN R. SCHAIBLE 03/14/03
CHECKED DRG 3/15/07
THREE MILE ISLAND NUCLEAR STATION
NPDES PERMIT PA 0009920
SIMPLIFIED WATER FLOW CHART
TMI-1 DWG. NO. 1D-SKM-263 SH. 1 OF 1 REV. 3
SCALE: N/A
NO. | DWG. NO. | TITLE
REFERENCES
INTERFACING CONCURRENCE 3/15/2007
B.I. NO. -

8000-PM-IT0001 Rev 06/07/2002

FORM

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

Related ID#s (If Known)				DEP USE ONLY
Client ID#	27814	APS ID#		Date Received & General Notes
Site ID#	450833	Auth ID#	377132	
Facility ID#				

CLIENT INFORMATION

DEP Client ID#	Client Type / Code
27814	LLC

Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Dun & Bradstreet ID#
AmerGen Energy Company, LLC	23-2921417	

Individual Last Name	First Name	MI	Suffix	SSN

Additional Individual Last Name	First Name	MI	Suffix	SSN

Mailing Address Line 1	Mailing Address Line 2
Route 441 South, P.O. Box 480	

Address Last Line – City	State	ZIP+4	Country
Middletown	PA	17057-0480	USA

Client Contact Last Name	First Name	MI	Suffix
Cogley	Scott	R	

Client Contact Title	Phone	Ext
Environmental Chemist	717-948-8881	

Email Address	FAX
scott.cogley@exeloncorp.com	717-948-8793

SITE INFORMATION

DEP Site ID#	Site Name
450833	AmerGen Energy Co, LLC Three Mile Island Nuclear Generating Station

EPA ID#	Estimated Number of Employees to be Present at Site	500+

Description of Site
Steam Electric Generating Station

County Name	Municipality	City	Boro	Twp	State
Dauphin	Middletown	☒	☐	☐	
County Name	Municipality	City	Boro	Twp	State
		☐	☐	☐	

Site Location Line 1	Site Location Line 2
Rt. 441 South, P.O. Box 480	

Site Location Last Line – City	State	ZIP+4
Middletown	PA	17057-0480

Detailed Written Directions to Site

Site Contact Last Name	First Name	MI	Suffix
Cogley	Scott	R	

Site Contact Title	Site Contact Firm
Environmental Chemist	AmerGen Energy Co., LLC

Mailing Address Line 1	Mailing Address Line 2
Rt. 441 South, P.O. Box 480	

Mailing Address Last Line – City	State	ZIP+4
Middletown	PA	17057-0480

Phone	Ext	FAX	Email Address
717-948-8881		717-948-8793	scott.cogley@exeloncorp.com

NAICS Codes (Two- & Three-Digit Codes – List All That Apply) 6-Digit Code (Optional)
221113

Client to Site Relationship
OWNOP

FACILITY INFORMATION

Modification of Existing Facility	Yes	No
1. Will this project modify an existing facility, system, or activity?	☐	☒
2. Will this project involve an addition to an existing facility, system, or activity?	☐	☒

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☐	Air Emission Plant		☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	MineDrainageTrmt/LandRecyProjLocation	
☐	Coal Ash Beneficial Use Operation		☐	Municipal Waste Operation	
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☐	Other:	

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
DSN 001	40	09	17	76	43	40

Horizontal Accuracy Measure: Feet --or-- Meters

Horizontal Reference Datum Code:
- ☐ North American Datum of 1927
- ☒ North American Datum of 1983
- ☐ World Geodetic System of 1984

Horizontal Collection Method Code

Reference Point Code

Altitude: Feet --or-- Meters

Altitude Datum Name:
- ☐ The National Geodetic Vertical Datum of 1929
- ☐ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code

Geometric Type Code

Data Collection Date

Source Map Scale Number: Inch(es) = Feet
--or-- Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
AmerGen Energy Company, LLC; Three Mile Island Nuclear Generating Station

Project Description
Renewal of NPDES Permit PA0009920 – Project by Owner

Project Consultant Last Name | First Name | MI | Suffix

Project Consultant Title | Consulting Firm

Mailing Address Line 1 | Mailing Address Line 2

Address Last Line – City | State | ZIP+4

Phone | Ext | FAX | Email Address

Time Schedules	Project Milestone (Optional)
April 4. 2007	NPDES Permit Renewal Application is due 180 days before current permit expires.
	Permit expiration date is October 1. 2007.
	Deliver permit application to PADEP by April 4, 2007.

1.	Is this application for an authorization type on the list of authorizations affected by the land use policy? Note: If "Yes", you must complete the following Land Use Information section, unless exempted by Questions 2 or 3 below. If "No", skip Questions 2 & 3 below as well as the following Land Use Information section. *For referenced list, see Appendix A attached to the GIF Instructions.*	☐	Yes	☒ No
2.	For an Air program authorization only. All other authorizations continue with Question 3 below. Will the permit authorize the construction of facilities outside an existing permitted area? Note: If "Yes", you must complete the following Land Use Information section unless exempted by Question 3 below. If "No", skip Question 3 below as well as the following Land Use Information section.	☐	Yes	☐ No
3.	Have you attached or submitted municipal and county 'Early Opt Out' approval letters for the project? Note: If "Yes" to Question 3, skip the following Land Use Information section. This should only be checked "Yes" if applicant is choosing the early opt-out option. Required approval letters described in the GIF Checklist and Instructions should be attached. If "No" to Question 3, continue with the following Land Use Information section.	☐	Yes	☐ No

LAND USE INFORMATION

Note: Applicants are encouraged to submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances. *SECTION NOT APPLICABLE*

1.	Is there a municipal comprehensive plan(s)?	☐	Yes	☐ No
2.	Is there a county comprehensive plan(s)?	☐	Yes	☐ No
3.	Is there a multi-municipal or multi-county comprehensive plan?	☐	Yes	☐ No
4.	Is the proposed project consistent with these plans? If no plan(s) exists, answer "Yes".	☐	Yes	☐ No
5.	Is there a municipal zoning ordinance(s)?	☐	Yes	☐ No
6.	Is there a joint municipal zoning ordinance(s)?	☐	Yes	☐ No
7.	Will the proposed project require a zoning approval (e.g., special exception, conditional approval, re-zoning, variance)? If zoning approval has already been received, attach documentation.	☐	Yes	☐ No
8.	Are any zoning ordinances that are applicable to this project currently the subject of any type of legal proceeding?	☐	Yes	☐ No
9.	Will the project be located on a site that has been or is being remediated under DEP's Land Recycling Program?	☐	Yes	☐ No
10.	Will the project result in reclamation of abandoned mine lands through re-mining or as part of DEP's Reclaim PA Program?	☐	Yes	☐ No
11.	Will the project be located in an agricultural security area or an area protected under an agricultural conservation easement?	☐	Yes	☐ No
12.	Will the project be located in a Keystone Opportunity Zone or Enterprise Development Area?	☐	Yes	☐ No
13.	Will the project be located in a Designated Growth Area as defined by the Municipalities Planning Code?	☐	Yes	☐ No

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below. *SECTION NOT APPLICABLE*

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	Is this a coal mining project? If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0. (DEP Use/48y1)	☐	Yes	☒	No
1.1	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day? (DEP Use/4x70)	☐	Yes	☐	No
1.2	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year? (DEP Use/4x70)	☐	Yes	☐	No
1.3	Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used? (DEP Use/4x70)	☐	Yes	☐	No
1.4	For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters? (DEP Use/4x62)	☐	Yes	☐	No
1.5	Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet? (DEP Use/3140)	☐	Yes	☐	No
1.6	Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well? (DEP Use/4z41)	☐	Yes	☐	No
2.0	Is this a non-coal (industrial minerals) mining project? If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0. (DEP Use/48y1)	☐	Yes	☐	No
2.1	Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel? (DEP Use/4x70)	☐	Yes	☐	No
2.2	Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials? (DEP Use/4x70)	☐	Yes	☐	No
2.3	Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)? (DEP Use/4x70)	☐	Yes	☐	No
2.4	For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters? (DEP Use/4x62)	☐	Yes	☐	No
2.5	Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet? (DEP Use/3140)	☐	Yes	☐	No

3.0	Will your project, activity, or authorization have anything to do with a well related to oil or gas production, site development for such activity, or the waste from such a well? If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0. (DEP Use/4z41)	☐	Yes	☒	No
3.1	Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)? (DEP Use/4z41)	☐	Yes	☐	No
3.2	Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system? If "Yes", discuss in *Project Description*. (DEP Use/4z41)	☐	Yes	☐	No
3.3	Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities? (DEP Use/4z41)	☐	Yes	☐	No
4.0	Will the project involve a construction activity that results in earth disturbance? If "Yes", specify the total disturbed acreage. (DEP Use/4x66) 4.0.1 Total Disturbed Acreage	☐	Yes	☒	No
5.0	Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)? (DEP Use/4x66)	☐	Yes	☒	No
6.0	Will the project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system? If "Yes", discuss in *Project Description*. (DEP Use/4x62) *Existing NPDES Permit Renewal*	☒	Yes	☐	No
7.0	Will the project involve the construction and operation of industrial waste treatment facilities? (DEP Use/4x62)	☐	Yes	☒	No
8.0	Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations? If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. (DEP Use/4x62) 8.0.1 Estimated Proposed Flow (gal/day)	☐	Yes	☒	No
9.0	Was sewage planning submitted and approved? If "Yes", attach the Act 537 approval letter unless the submitted application is actually requesting Act 537 approval (Approval required prior to 105/NPDES approval). (DEP Use/4x61) 9.0.1 Is Act 537 Approval Letter attached?	☐	Yes	☒	No
10.0	Is this project for the beneficial use of biosolids for land application within Pennsylvania? If "Yes" indicate how much (i.e. gallons or dry tons per year). (DEP Use/4X62) 10.0.1 Gallons Per Year (residential septage) 10.0.2 Dry Tons Per Year (biosolids)	☐	Yes	☒	No
11.0	Does the project involve construction, modification or removal of a dam? If "Yes", identify the dam. (DEP Use/3140) 11.0.1 Dam Name	☐	Yes	☒	No
12.0	Will the project interfere with the flow from, or otherwise impact, a dam? If "Yes", identify the dam. (DEP Use/3140) 12.0.1 Dam Name	☐	Yes	☒	No
13.0	Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)? If "Yes", identify each type of emission followed by the amount of that emission. (DEP Use/4x70) 13.0.1 Enter all types & amounts of emissions; separate each set with semicolons.	☐	Yes	☒	No

14.0	Is an on-site drinking water supply (well), other than individual house wells, proposed for your project? If "Yes", indicate total number of people served and/or the total number of connections served, if applicable. Also, check all proposed sub-facilities. (DEP Use/4x81)	☐	Yes	☒	No
	14.0.1 Number of Persons Served				
	14.0.2 Number of Employee/Guests				
	14.0.3 Number of Connections				
	14.0.4 Sub-Fac: Distribution System	☐	Yes	☐	No
	14.0.5 Sub-Fac: Water Treatment Plant	☐	Yes	☐	No
	14.0.6 Sub-Fac: Source	☐	Yes	☐	No
	14.0.7 Sub-Fac: Pump Station	☐	Yes	☐	No
	14.0.8 Sub-Fac: Entry Point	☐	Yes	☐	No
	14.0.9 Sub-Fac: Transmission Main	☐	Yes	☐	No
	14.0.10 Sub-Fac: Storage Facility	☐	Yes	☐	No
15.0	Will your project involve purchasing water in bulk, excluding during the construction period? If "Yes, name the provider. Also, indicate the daily number of employees or guests served. (DEP Use/4x81)	☐	Yes	☒	No
	15.0.1 Provider's Name				
	15.0.2 Number of Employees/Guests				
16.0	Is your project to be served by public water supply? If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project. (DEP Use/4x81)	☐	Yes	☒	No
	16.0.1 Supplier's Name				
	16.0.2 Letter of Approval from Supplier is Attached	☐	Yes	☒	No
17.0	Will this project involve a new or increased drinking water withdrawal from a stream or other water body? If "Yes", provide name of stream. (DEP Use/4x81)	☐	Yes	☒	No
	17.0.1 Stream Name				
18.0	Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste? If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed. (DEP/Use4x32)	☐	Yes	☒	No
	18.0.1 Type & Amount				
19.0	Will your project involve the removal of coal, minerals, etc. as part of any earth disturbance activities? (DEP Use/48y1)	☐	Yes	☒	No
20.0	Does your project involve installation of a field constructed underground storage tank? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	20.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
21.0	Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	21.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
22.0	Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	22.0.1 Enter all substances & capacity of each; separate each set with semicolons.				

23.0	Does your project invoive installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
23.0.1	Enter all substances & capacity of each; separate each set with semicolons.				

CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

Type or Print Name: Thomas J. Dougherty

Signature

Plant Manager, TMI Unit 1
Title

4/2/07
Date

3800-PM-WSFR0008c Rev. 3/2006
Checklist

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

APPLICATION FOR NPDES PERMIT FOR INDUSTRIAL DISCHARGERS

APPLICANT'S ✓ CHECKLIST

APPLICANT NAME	AmerGen Energy Co. LLC Three Mile Island NPDES Permit 0009920

Please check the following list to make sure that you have included all the required information. Place a checkmark in the column provided for all items completed and/or provided.

Failure to provide all of the requested information will delay the processing of the application and may result in the application being placed on hold with no action, or will be considered withdrawn and the application file closed.

	Item	Check If Included	DEP Use Only
1.	General Information Form (8000-PM-IT0001)	☒	
2.	One original and (2) copies of application package submitted [original must be notarized]	☒	
3.	Additional copy for Erie and Allegheny counties (if required)	☐	
4.	Additional copy for the river basin commission (if required)	☒	
5.	Application Fee - $500	☒	
6.	Proper evidence of Act 14 municipality and county notification	☒	
7.	Proof of local newspaper public notice (for new and substantially changed discharges only)	☐	
8.	Topographic Map	☒	
9.	Industrial Wastewater - Module 1	☒	
10.	Wastewater Treatment Technologies - Module 2	☒	
11.	Sources Of Wastewater sheet(s) - Module 3	☒	
12.	Analysis Results Table(s) - Modules 4-9	☒	
13.	Hazardous Substance Table - Module 10	☒	
14.	Toxic Chemicals (Optional) - Module 11	☒	
15.	Stormwater (if required) - Module 12	☒	
16.	Stormwater Sampling Data Table (if required) - Module 13	☒	
17.	No Exposure Certification (if required) - Module 14	☐	
18.	Other:	☐	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

COPY

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) APPLICATION FOR PERMIT TO DISCHARGE INDUSTRIAL WASTEWATER

Before completing this form, read the step-by-step instructions provided in this application package.

Related ID#s (If Known)				DEP USE ONLY
Client ID#	27814	APS ID#		Date Received & General Notes
Site ID#	450833	Auth ID#	377132	
Facility ID#				

APPLICANT IDENTIFIER

Applicant/Operator Name: AmerGen Energy Company Three Mile Island Nuclear Station

Is this an application for a:

☐ New permit

Complete the General Information Form (GIF) 8000-PM-IT0001 and attach to the front of the application.

☒ Permit Renewal

List the current NPDES Permit number PA0009920

Complete the Client and Site Sections of the GIF and attach to the front of the application.

☐ Permit Amendment or Permit Renewal with Amendment

List the current NPDES Permit number PA_____

List the current WQM Permit number _____

Complete the GIF and attach to the front of the application.

GENERAL INFORMATION

1. SIC Code	NAICS Code	Corresponding SIC/NAICS Description
4911	221113	Steam Generating/Nuclear Steam Generating

2. Is the facility required to obtain a stormwater NPDES permit for any listed SIC code?

☒ YES (Answer question 3 below.) ☐ NO (Skip question 3.)

3. Is the facility applying for permit exemption under the No Exposure rule? (See Instructions)

☐ YES ☒ NO

4. General Description and Nature of Business.

Steam electric generation

5. List all NPDES and WQM Permits issued by DEP for this facility.

Permit Type	Permit Number	Date Issued
NPDES	PA0009920	2002
WQM Dredging	Permit No. 21275724	1976
WQM Part II - Sewage	Permit No. 2284408	1985
WQM Part II - Industrial	Permit Nos. 2277206, 2276209	1978, 1977

6. ATTACH TOPOGRAPHIC MAP (See Instructions)

7. NUMBER OF OUTFALLS

a. Industrial Wastewater Only	4	Complete Module 1 and associated Modules.
b. Combined Industrial Wastewater and Stormwater	1	Complete Module 1, associated Modules and Module 12 or Module 14 (if required).
c. Stormwater Only	4	Complete Module 12 or Module 14.

8. OUTFALL LOCATION: Using the same Locational Data supplied on the General Information Form under Facility Information, list the latitude and longitude of the location to the nearest ten-thousandth of a second and the name of the receiving water of each outfall. Where available, the receiving stream width and depth should also be provided using actual measurements or topographic map and navigational charts.

OUTFALL NUMBER (list)	LATITUDE			LONGITUDE			RECEIVING WATER (Name)	LOW FLOW STREAM	
	Deg	Min	Sec	Deg	Min	Sec		Width (ft)	Depth (ft)
DSN 001	40	09	08	76	43	40	Susquehanna River	N/A	N/A
DSN 003	40	09	10	76	43	40	Susquehanna River	N/A	N/A
DSN 004	40	09	09	76	43	18	Susquehanna River	N/A	N/A
DSN 005	40	09	06	76	43	18	Susquehanna River	N/A	N/A
DSN 006	40	09	16	76	43	41	Susquehanna River	N/A	N/A
SWRO-1	40	08	58	76	43	19	Susquehanna River	N/A	N/A
SWRO-2	40	08	53	76	43	19	Susquehanna River	N/A	N/A
SWRO-3	40	08	45	76	43	21	Susquehanna River	N/A	N/A
SWRO-4	40	08	15	76	43	41	Susquehanna River	N/A	N/A

9. Name of Nearest Downstream Potable Water Intake Wrightsville Water Company Distance 13 miles

10. WHOLE EFFLUENT TOXICITY (WET) TEST RESULTS

Is there known or reason to believe that WET testing was conducted in the last 3 years on any of the facility's discharges, or on a receiving water in relation to a discharge? ☐ YES ☒ NO

If "YES," attach any information available on the purpose and nature of such testing, and the test results.

If "NO," all dischargers are still encouraged to perform WET testing. The DEP regional office may be contacted for appropriate protocols.

11. CONTRACTED ANALYTICAL ASSISTANCE

Did a contract laboratory or consulting firm perform any of the analysis required by this application?

☐ NO ☒ YES (Provide information below.)

Name	Analytical Laboratory Services, Inc.	Types of Analysis Performed:
Address	Attn: Sue Baer 34 Dogwood Lane Middletown, PA 17057	See Modules 4-9 and 13.
Phone	(717) 944-5541	

Name	*Not Applicable*	Types of Analysis Performed:
Address		
Phone	( )	

12. ADDITIONAL INFORMATION: (OPTIONAL)

Additional information may be attached to expand upon any response to any questions or call attention to any other information felt should be considered in establishing permit limitations for the proposed or existing facility. Check if additional sheets are attached.

☒ YES ☐ NO

COMPLIANCE HISTORY REVIEW

Is the facility owner or operator in violation of any DEP regulation, permit, order or schedule of compliance at this or any other facility? ☐ YES ☒ NO

If "YES," list each permit, order and schedule of compliance and provide compliance status. Use additional sheets to provide information on all permits. *Section Not Applicable*

Permit Program	Permit No.
Brief Description of Noncompliance	

Steps Taken to Achieve Compliance	Date(s) Compliance Achieved

Current Compliance Status ☒ In Compliance ☐ In Noncompliance

Applicant Name: AmerGen Energy

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (type or print legibly)	Official Title
Thomas J. Dougherty	Plant Manager, TMI Unit 1
Signature	Date

(Use corporate or professional seal as appropriate.) 4/2/07

Taken, sworn, and subscribed before me, this 2ND day of APRIL 20 07

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Debra S. Hockley, Notary Public
Londonderry Twp., Dauphin County
My Commission Expires July 4, 2010
Member, Pennsylvania Association of Notaries

Debra S. Hockley

Exelon.

AMERGEN ENERGY CO., LLC
2301 MARKET STREET
PHILADELPHIA, PA 19103

51015108

62-4 /311

	DATE	AMOUNT
PAY *Five hundred and No/100 Dollars*	02/27/2007	500.00

Void After 1 Year

TO THE ORDER OF
COMMONWEALTH OF PENNSYLVANIA
DEPT ENV PRO, CERT & LICENSING
P.O. BOX 8454
HARRISBURG PA 171058454

VOID

Michael Maguire

Mellon Bank, N.A., Philadelphia, PA (0310)

⑈51015108⑈ ⑆031100047⑆ 2⑈968 329⑈

AMERGEN ENERGY CO., LLC — ATTACHED IS OUR CHECK IN FULL PAYMENT OF ITEMS LISTED BELOW — CHECK NUMBER 5101510E

INVOICE NUMBER	DATE	VOUCHER NUMBER	GROSS AMOUNT	DISCOUNT	NET AMOUNT
TMI*NPDESPERMIT*2007	Feb 22, 2007	323651200000	500.00		500.00
Three Mile Island 2007	NPDES Permit Application				
		**** TOTALS ****	500.00		500.00

For future reference, to obtain the status of your invoice, please log on to https://www.exeloncorp.com/supply/apinquiry/

Proof of Public Notification

Dauphin County
and
Londonderry Township

Three Mile Island Nuclear Station
NPDES PA0009920

7006 2150 0003 4189 1085

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$ $0.39
Certified Fee	$2.40
Return Receipt Fee (Endorsement Required)	$1.85
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $4.64

MIDDLETOWN PA 17057
Postmark Here
FEB 14 2007
02/14/2007

Sent To: LONDONDERRY TWP BOS SUPERVISORS
Street, Apt. No.; or PO Box No.: 783 GEYERS CHURCH RD.
City, State, ZIP+4: MIDDLETOWN, PA 17057

PS Form 3800, August 2006 — See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

LONDONDERRY TOWNSHIP
BOARD of SUPERVISORS
783 GEYERS Church RD.
MIDDLETOWN, PA 17057

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Debra Graham ☐ Agent ☐ Addressee

B. Received by (Printed Name): D. GRAHAM
C. Date of Delivery: 2-15-07

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label): 7006 2150 0003 4189 1085

PS Form 3811, February 2004 — Domestic Return Receipt — 102595-02-M-1540

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

AmerGen℠
An Exelon Company

February 14, 2007
5532-2007-006

Londonderry Township
Board of Supervisors
783 South Geyer's Church Road
Middletown, Pennsylvania 17057

Dear Township Supervisors:

SUBJECT: PUBLIC NOTIFICATION – LONDONDERRY TOWNSHIP
ENVIRONMENTAL PERMIT RENEWAL
THREE MILE ISLAND (TMI)

Pursuant to Commonwealth of Pennsylvania Act 14, AmerGen Energy Company, LLC (AmerGen) is hereby providing notification of intent to renew an existing National Pollutant Discharge Elimination System (NPDES) permit. NPDES Permit PA0009920 covers the discharge of industrial wastewater from TMI into the Susquehanna River. The existing permit expires on October 1, 2007, and the permit renewal application must be submitted to the PA Department of Environmental Protection by March 31, 2007.

Should the Board of Supervisors have questions concerning this notification or require additional information please contact Scott Cogley, Environmental Chemist, at (717) 948-8881 or e-mail at *scott.cogley@exeloncorp.com.*

Sincerely,

T. J. Dougherty
Plant Manager

TJD/src

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

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MIDDLETOWN PA 17057
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Street, Apt. No.; or PO Box No.: 2 SOUTH FRONT STREET
City, State, ZIP+4: HARRISBURG, PA 17101

PS Form 3800, August 2006 — See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

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- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DAUPHIN COUNTY COMMISSIONERS
ADMINISTRATIVE OFFICES
2 SOUTH FRONT STREET
HARRISBURG, PA 17101

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name): Jena Wolgemuth
C. Date of Delivery: 2.16.07

D. Is delivery address different from Item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label): 7006 2150 0003 4189 1061

PS Form 3811, February 2004 — Domestic Return Receipt — 102595-02-M-1540

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

AmerGen℠

An Exelon Company

February 14, 2007
5532-2007-007

Dauphin County Commissioners
Administrative Offices
Two South Front Street
Harrisburg, Pennsylvania 17101

Dear Commissioners:

SUBJECT: PUBLIC NOTIFICATION - DAUPHIN COUNTY
ENVIRONMENTAL PERMIT RENEWAL
THREE MILE ISLAND (TMI)

Pursuant to Commonwealth of Pennsylvania Act 14, AmerGen Energy Company, LLC (AmerGen) is hereby providing notification of intent to renew an existing National Pollutant Discharge Elimination System (NPDES) permit. NPDES Permit PA0099920 covers the discharge of industrial wastewater from TMI into the Susquehanna River. The existing permit expires on October 1, 2007, and the permit renewal application must be submitted to the PA Department of Environmental Protection by March 31, 2007.

Should the County Commissioners have questions concerning this notification or require additional information please contact Scott Cogley, Environmental Chemist, at (717) 948-8881 or e-mail at *scott.cogley@exeloncorp.com.*

Sincerely,

T. J. Dougherty
Plant Manager

TJD/src

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

INDUSTRIAL WASTEWATER MODULE 1

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Energy Co, LLC Three Mile Island Nuclear Generating Station

1. Line Drawing. Attach a line drawing and water balance of flow through the facility. (See instructions)

2. OUTFALLS AND ASSOCIATED WASTEWATER TREATMENT TECHNOLOGIES

   Complete Module 2 identifying the treatment processes associated with each outfall.

3. SOURCES OF WASTEWATER

   Attach a separate Module 3 for every outfall.

   Indicate the number of Module 3s attached. 5

4. REQUIRED AND OPTIONAL ANALYSIS

   a. Summary of Required Analysis

Outfall Number	Discharge Contains (see Instructions)						Pollutants or Pollutant Groups which must be sampled for and analyzed	Required Number of Sample Events (see instructions)
	Process Waste	NCCW	Sanitary Waste	Misc. Waste	GW Cleanup	Stormwater		
DSN 001	☐	☒	☒	☒	☐	☐	1, 2, 3, 4, 5	3
DSN 003 & 004	☐	☒	☐	☐	☐	☐		0
DSN 005	☐	☒	☐	☒	☐	☒	Storm Water	1
DSN 006	☐	☒	☐	☐	☐	☐		0
Intake	☐	☐	☐	☐	☐	☐	1, 2, 3, 4, 5	1
	☐	☐	☐	☐	☐	☐		

   b. Complete the modules for the Pollutant(s) or Pollutant Group(s) identified above. A separate module must be submitted for each process wastewater and combined (process wastewater and stormwater) outfall identified in the application. List the number of modules for each Pollutant Group submitted with this application.

2	Module 4 - Pollutant Group 1
2	Module 5 - Pollutant Group 2 - Metals
2	Module 6 - Pollutant Group 3 - Volatile
2	Module 7 - Pollutant Group 4 - Acids
2	Module 8 - Pollutant Group 5 - Base/Neutral
N/A	Module 9 - Pollutant Group 6 - Pesticides

Applicant Name: AmerGen Energy Co, LLC

c. *Optional Site-Specific Data*

Additional modules may be attached to provide any of the optional site-specific information discussed in Appendix 2. *(The modules should be used to report intake water quality, upstream background or ambient water quality, and parameter-specific coefficient of effluent variability.* Space is provided at the top of the module to provide description of sampling points used.)

Optional data is attached to application. ☐ YES ☒ NO

5. PREPAREDNESS, PREVENTION, AND CONTINGENCY (PPC) PLANNING.

Does the facility have a PPC plan?

☒ YES ☐ NO

Does the facility have any other related plans, such as a Pollution Incident Prevention (PIP) Plan, Spill Prevention Control and Counter Measure (SPCC) Plan or BMP Plan?

☒ YES ☐ NO

If "YES," identify and indicate date(s) implemented.

Type of Plan	Date Implemented
Combined PPC and SPCC Plan	Current Revision - April 2003
Station Hazardous Material Response Procedure	*Current Revision - June 2006*

DEP may require the plan(s) be submitted with this application.

6. OTHER INFORMATION (OPTIONAL): Attach additional sheets describing any additional environmental pollution control programs which may affect the discharges which are underway or which are planned. Indicate whether each program is now underway or planned, and indicate the actual or planned schedules.

☐ MARK "X" IF DESCRIPTION OF ADDITIONAL INFORMATION IS ATTACHED

7. INFORMATION AND ANALYSIS OF EFFLUENT QUALITY FOR OTHER POTENTIALLY TOXIC POLLUTANTS

a. Information on Chemical Additives

(Read instructions carefully and use the tabular format to present the required information)

Outfall	Chemical Substance or Compound Trade Names or Specific Ingredients	Manufacturer Name and Address	Average & Maximum Usage Rate Lbs/day	Concentration			Lowest Possible Analytical Detection Level (µg/L)	Whole Product 96 Hr LC50 (mg/L) and species[1]	Whole Prod 48 Hr LC5 (mg/L) and species[1]
				In-system	Effluent	Units			
DSN001	Control IS104 (potassium sulfite)	GE Betz Inc; 4636 Somerton Rd., Trevose, PA 19053	400 to 800 lbs/day	10 to 20 mg/L (target concentration to neutralize sodium hypochlorite)	< 20	mg/L	Not Analyzed	Fathead Minnow LC50 = 1760 mg/L No effect level = 1,250 mg/L	Daphnia Magna LC = 2000 mg LC0 = 100 mg/L
DSN001	Spectrus NX 1106 (chloro-methyl-isothiazolin, magnesium nitrate)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	< 1 to 2 lbs/day (100 to 150 lbs/year)	1 to 150 mg/L (variable concentration based on biological activity)	< 1	mg/L	Not Analyzed	Rainbow Trout LC50 = 8.7 mg/L No effect level = 6.5 mg/L	Daphnia Magna LC = 2.9 mg/L LC10 = 0.6 mg/L
DSN001	AZ 8100 (Benzotriazole)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	< 1 to 2 lbs/day (50 to 100 lbs/year)	10 to 100 mg/L (target concentration)	<1	mg/L	1,000 µg/L as triazole	Bluegill Sunfish LC50 = 109.3 mg/L No effect level = 42 mg/L	Daphnia magna LC = 243 mg/ No effect level = 75 mg/L
DSN001	AZ 8103 (Benzotriazole)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	100 to 170 lbs/day (added once per week for one hour)	5 mg/L (target concentration per each batch addition approx. one hour per week)	< 5	mg/L	1,000 µg/L as triazole	Rainbow Trout LC50 = 28.1 mg/L No effect level = 21 mg/L	Daphnia magna LC = 66 mg/ No effect level = 28 mg/L

DSN001	Spectrus CT 1300 (alkyl dimethyl benzyl ammonium chloride, ethyl alcohol)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	4,500 to 5,500 lbs/year (added over a 2 day period.- 2 to 3 treatments per year for Asiatic clam control)	4 to 10 mg/L	< 0.1 (average) < 0.3 (daily maximum)	mg/L	50 µg/L	Mysid Shrimp LC50 = 0.16 mg/L No effect level = 0.03 mg/L	Daphnia Magna LC5[illegible] = 0.04 mg/L No effect level = 0.02 mg/L
DSN001	Spectrus DT 1400 (bentonite clay, acrylic acid slurry)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	90,000 to 100,000 lbs/year (added as deloxification agent for CT1300 during treatments)	150 to 450 mg/L	150 to 450 (varies - addition rate based on conservative calculation to delox CT1300)	mg/L	500 µg/L as TSS	Fathead Minnow 0% mortality 435 mg/l	Daphnia Magna 0% mortality 4[illegible] mg/l
DSN001	Cortrol OS5010	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	20 to 30 lbs/day (9,000 to 10,000 lbs/year) (200 to 300 lbs/day every 2 years OTSG layup)	0.02 to 1 mg/L during operation (75 to 500 mg/L - every 2 years plant outage OTSG layup)	< 0.010	mg/L	10 µg/L	No data in MSDS	No data in MSDS
DSN001	Depositrol PY5203	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	< 1 to 2 lbs/day (10 to 100 lbs/year)	2 to 5 mg/L	< 1	mg/L	1,000 µg/L	Fathead Minnow LC50 = 7500 mg/L No effect level = 2100 mg/L	Daphnia magna LC[illegible] = 1045 mg No effect level = 84[illegible] mg/L
DSN001	Depositrol PY5204	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	150 to 200 lbs/day (65,000 to 75,000 lbs/year)	4 to 6 mg/L	< 1	mg/L	1,000 µg/L	Fathead Minnow LC45 = 5000 mg/L No effect level = 2500 mg/L	Daphnia magna LC[illegible] = 1770 mg No effect level = 12[illegible] mg/L

DSN001	Depositrol PY5206	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	300 to 400 lbs/day (125,000 to 150,000 lbs/year)	2 to 6 mg/L	< 1	mg/L	1,000 µg/L	Fathead Minnow LC50 = 1680 mg/L No effect level = 1350 mg/L	Daphnia magna LC5 = 1635 mg/ No effect level = 870 mg/L
DSN001	Steamate PWR 0160 (methoxypropyl amine -MPA)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	4 to 8 lbs/day (1,500 to 2,500 lbs/year)	5 to 15 mg/L	<1	mg/L	170µg/L	No data in MSDS	No data i MSDS
DSN001	Steamate PWR 1440 (monoethanola mine - ETA))	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	10 to 15 lbs/day (3,000 to 4,500 lbs/year)	5 to 15 mg/L	<1	mg/L	140 µg/L	Bluegill Sunfish LC50 = 800 mg/l	Daphnia magna LC = 330 mg/l
DSN001	Ferric Sulfate	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	0 to 625 lbs/year	Feed rate varies. Not typically used. Could be used for a solids settling aid on an as-needed basis. Could be used to settle solids for on-site sedimentation basins or for water filtration aid.			Not Analyzed	No data in MSDS	No data i MSDS
DSN001	Boric Acid (Boron)	Varies (e.g. US Borax, Inc. 26877 Tiurney Rd., Valencia CA 91355)	5 to 10 lbs/day (use approx. 4000 to 7000 lbs/2 year plant operating cycle)	1 to 3000 mg/L as B (varies due to plant operating cycle)	< 1 as B	mg/L	100 µg/L	Rainbow trout LC50 = 150 mg/L	Daphnia magna LC = 133 mg/l
DSN001	Lithium Hydroxide (lithium)	Varies (e.g. Eagle-Pitcher Industries, Inc. 200 B.J. Tunnel Blvd. East Miami, OK 74354)	< 1 to 2 lbs/day (100 to 500 lbs/2 year plant cycle)	0.1 to 5.0 mg/L as Li	<1	mg/L	30 µg/L as Li	No data in MSDS	No data i MSDS
DSN001	Ammonium Hydroxide	Fisher Scientific 1 Reagent Lane Fair Lawn, NJ 07410	30 to 50 lbs per/2 year plant operating cycle (not used for daily operations)	5 to 30 mg/L	<1	mg/L	25 µg/L as NH_4	Fathead minnow LC50 = 8.2 mg/L	Bluegill Sunfish LC50 = 0.024 - 0. mg/L

DSN001	Sodium Hypochlorite (12.5%)	Univar USA Inc.; 6100 Carillon Point; Kirkland, WA 98033	3,000 to 4,500 lbs/day Circulating Water 400 to 1,000 lbs/day River Water 600 lbs/year back up chlorination Sewage Treatment Plant (STP)	0.2 to 1.0 mg/L Total Residual Oxidant (TRO) 0.2 to 2.0 mg/L Free Available Chlorine (FAC)	< 0.14 mg/L Daily Max TRO < 0.17 mg/L Inst. Max TRO < 0.2 mg/L Daily Max FAC < 0.5 mg/L Inst. Max FAC 0.2 to 2.0 mg/L FAC at STP	mg/L	10 µg/L	Fathead minnow LC50 = 5.9 mg/L	Rainbow trout LC50 0.07 mg/L
DSN001	Spectrus OX1201 (Sodium bromide)	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	125 to 200 lbs/day (50,000 to 75,000 lbs/year)	0.2 to 1.0 mg/L Total Residual Oxidant (TRO)	< 0.14 mg/L Daily Max TRO < 0.17 mg/L Inst. Max TRO	mg/L	10 µg/L	Sheephead minnow LC50 = 0.19 mg/L No Effect = 0.11 mg/L	Daphnia Magna LC50 = 0.71 mg/ No effect = 0.41 mg/L
DSN001	Hydrazine 35%	Arch Chemical; PO Box 5204; Norwalk, CT 06856	1 to 2 lbs/day (150 to 200 lbs/year)	50 mg/L (target concentration - use at Ecolochem RO unit for Oxygen removal)	< 0.010	mg/L	10 µg/L	Bluegill LC50 = 1.08 mg/L Rainbow trout LC50 = 4.3 mg/L	Daphnia Magna LC50 = 0.46 mg/
DSN001	Depositrol SF502	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	10 to 15 lbs/day (4,500 to 5,500 lbs/year)	50 to 100 mg/L	< 1	mg/L	Not Analyzed	Fathead minnow LC50 = 28 mg/L 20% mortality = 22 mg/L	Daphnia magna 40% mortality = 1200 mg/l. 0% mortality = 330 mg/
DSN001	Klaraid IC 1173 (aluminum chloride)	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	25 to 30 lbs/day (10,000 to 11,000 lbs/yr)	Variable (Feedrate adjusted to remove phosphorous and solids from Sewage Treatment Plant effluent)	< 1	mg/L	Not Analyzed	Fathead Minnow 100% mortality = 5000 mg/l, 0% mortality = 1000 mg/l	Daphnia magna 0% mortality = 5000 mg/l

DSN001	HPC19M	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	< 1 to 2 lbs/day (75 to 125 lbs/year)	160 to 1000 mg/L as MoO_4 (use in closed cooling water systems)	< 1 mg/L as MoO_4	mg/L	1,000 µg/L as MoO_4	Rainbow trout LC50 = 20970 mg/L No effect level = 9140 mg/L	Daphnia magna LC5 = 9200 mg/ No effect level = 514 mg/L
DSN001	Polyfloc AS1001	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	4 to 10 lbs/day (1500 to 2500 lbs/year)	Variable (feed rate adjusted to remove solids from Sewage Treatment Plant effluent)	< 1	mg/L	Not Analyzed	No data in MSDS	Daphnia magna 0 % mortali level = 100 mg/L
DSN001	Polyfloc AS1138	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	1 to 2 lbs/day (500 to 700 lbs/year)	Variable (feed rate adjusted to remove solids from IWTS wastewater effluent)	< 1	mg/L	Not Analyzed	Flathead minnow LC50 = 239 mg/L	Daphnia magna LC50 = 47 mg/L
DSN001	Chlorine gas	Univar Inc 6100 Carillon Point Kirkland, WA 98033	1 to 3 lbs/day (5 lbs/day maximum due to upset condition)	0.2 to 2.0 mg/L	< 0.2 mg/L Daily Max FAC < 0.5 mg/L Inst. Max FAC	mg/L	10 µg/L	Fathead minnow LC50 = 5.9 mg/L	Rainbow trout LC50 0.07 mg/L
DSN001	Sulfuric acid (concentrated)	Basic Chemical Solutions, Inc. 525 Seaport Blvd. Redwood City, CA 94063	4,000 to 5,500 lbs/day	Varies (feed rate adjusted to maintain Circ Water System at 7.5 to 8.5)	6.0 to 9.0 pH	Analyzed as pH	Analyzed as pH	Fathead Minnow 0% mortality = 5000 mg/l	Daphnia magna 30 mortality = 5000 mg/l 0% mortali = 2000mg
DSN001	Sulfuric acid (50%)	Basic Chemical Solutions, Inc. 525 Seaport Blvd. Redwood City, CA 94063	2 to 5 lbs/day (600 to 1000 lbs/year)	Varies (feed rate adjusted to Ecolochem water pH range 5 to 6)	6.0 to 9.0 pH	Analyzed as pH	Analyzed as pH	Fathead Minnow 0% mortality = 5000 mg/l	Daphnia magna 30 mortality = 5000 mg/l 0% mortali = 2000mg

DSN001	Sodium hydroxide	EMD Chemicals; PO Box 70; 480 Democrat Rd.; Gibbstown NJ 08027	80 to 100 lbs/day	Varies (feed rate adjusted to maintain Sewage Treat. Plant at 6.5 to 8.5 pH range)	6.0 to 9.0 pH	Analyzed as pH	Analyzed as pH	No data in MSDS	No data in MSDS
DSN001	Hydrogen peroxide	Degussa Corporation; Chemical Group; 65 Challenger Rd.; Ridgefield Park, NJ 07660	< 1 to 10 lbs/day (500 to 3,000 lbs/year)	Varies (use to neutralize hydrazine and react with organics as needed)	< 1	mg/L	10 µg/L	No data in MSDS	No data in MSDS
DSN 001	Wood flour (sawdust)	P.S. Murphy Forest Products Corp. P.O. Box 300, Montville, NJ 07045	Variable (Not typically used. May be used to block condenser tube leaks. PADEP has approved use up to 2500 lbs/week)	Variable (Not typically used. May be used to block condenser tube leaks. PADEP has approved use up to 2500 lbs/week)	Variable (may contribute to TSS loading if Circ Water System blowdown open)	mg/L	500 (monitored as TSS)	No data in MSDS	No data in MSDS
DSN001	SAG-2001	GE Silicones; 3500 South State Route 2; Friendly WV 26146	< 1 to 5 lbs/day (Not typically used. Use several lbs/year on an as needed as anti-foam agent in wastewater treatment)	Trace	< 1	mg/L	Not Analyzed	No data in MSDS	No data in MSDS

DSN001	Continuum AEC3107 (sodium hydroxide, 2,3-oxiranedicarboxylic acid, 2-propenoic acid polymer with 2-hydroxy-3-(2-propenyloxy)-1-propane sulfonic acid	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	15 to 20 lbs/day (6000 to 7500 lbs/year)	5 to 50 mg/L (use rate adjusted to control system scaling)	<1	mg/L	1000 µg/L	Fathead minnow 0% mortality = 2000 mg/L Rainbow trout LC50 = 2929 mg/L No effect level = 2000 mg/L	Daphnia magna LC5 = 1575 mg/ No effect level = 130 mg/L
DSN001	Aluminum sulfate	Delta Chemical; 2601 Cannery Ave.; Baltimore MD 21226	100 to 200 lbs/2 year plant operating cycle (Not typically used. Used to settle solids in water filtration every 2 years during plant outages)	Feed rate varies. Not typically used. Used as solids removal filtration aid on an as-needed basis. Could be used to settle solids for on-site sedimentation basins.			Not Analyzed	No data in MSDS	No data i MSDS
DSN001	Zinc Orthophos-phate (Calgon Corp. C-9L or equivalent)	Coyne Chemical, Inc. 3015 State Road, Croydon, PA 19021-6697	1 to 2 lbs/day (400 to 600 lbs/year)	2 to 6 mg/L as ortho-PO_4	< 1	mg/L	100 µg/L as ortho-PO_4	Bluegill sunfish LC50 = 2.86-3.78 mg/L as $ZnCl_2$	No data i MSDS
DSN001	Novus CE 2680 (Acrylamide isoparaffinic petroleum distillate, alcohols)	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	10 to 20 lbs/day (Not typically used. May be used in wastewater treatment as a solids settling aid)	Feed rate varies. Not typically used. Used as solids removal settling aid on an as-needed basis for wastewater treatment.			Not Analyzed	Fathead minnow LC50 = 5.1 mg/l	Daphnia magna LC = 2.4 mg/l Ceriodaph a LC50 = 0.09 mg/l
DSN001	Flogard MS 6208	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	100 to 150 lbs/day	0.2 to 1 mg/L (as Zn)	< 1	mg/L	1 µg/L as Zn	Fathead minnow LC50 = 6.2 mg/l No Effect = 1.56 mg/L	Daphnia magna LC = 7.4 mg/l No Effect 1.24 mg/L

DSN001	Flogard MS 6209 (zinc phosphate)	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	200 to 400 lbs/day	6 to 8 mg/L (as product)	< 1 mg/l as Zn < 2 mg/l as P	mg/L	1 µg/L as Zn 100 µg/ as ortho-p	Fathead minnow LC50 = 14 mg/l No Effect = 2.5 mg/L	Daphnia magna LC5 = 12 mg/L No Effect = 1.5 mg/L
DSN001	Zinc Acetate Dihydrate	Fisher Scientific 1 Reagent Lane; Fair Lawn, NJ 07410	< 1 to 1 lbs/day (30 to 65 lbs/year)	4 to 8 µg/L as Zn	< 1 µg/L	µg/L	1 µg/L as Zn	No data in MSDS	No data in MSDS
DSN005	Universal Gold Fire Fighting Foam	National Foam, Inc. 150 Gordon Dr., P.O. Box 270, Exton, PA 19341-1350	10 to 20 lbs/day (150 to 200 lbs/year)	Fire fighting foam is used during TMI on-site fire training classes. Run-off is contained in the immediate area of the training facility. There is no direct run-off to river during the training activities. The foam use has been previously approved by the PADEP.			Not analyzed.	Fathead minnow LC50 > 500 mg/L	No data in MSDS
DSN005	Continuum AEC3107	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	See Module 1 Outfall DSN001	Small quantities of Continuum AEC3107 could be present in roof run-off from the industrial coolers. The in-system concentration for treating the industrial coolers is listed as 5 to 50 mg/L. The Industrial Coolers have some leakage that can enter the station Yard Drainage System (see Module 3 – Outfall DSN005). Typical cooler operations do not cause a measurable flow in the Yard Drainage System.			1000 ug/L	Rainbow trout LC50 = 2929 mg/L No effect level = 2000 mg/L Fathead minnow 0% mortality = 2000 mg/L	Daphnia magna LC = 1575 mg No effect level = 13 mg/L
DSN005	Depositrol SF502	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	See Module 1 Outfall DSN001	Small quantities of Depositrol SF502 could be present in roof run-off from the industrial coolers. The in-system concentration for treating the industrial coolers is listed as 50 to 100 mg/L. The Industrial Coolers have some leakage that can enter the station Yard Drainage System (see Module 3 – Outfall DSN005). Typical cooler operations do not cause a measurable flow in the Yard Drainage System.			Not Analyzed	Fathead minnow LC50 = 28 mg/L 22% Mortality = 22mg/L	Daphnia magna LC = 1200 mg No effect level = 33 mg/L

DSN005	Aluminum sulfate	Delta Chemical; 2601 Cannery Ave.; Baltimore MD 21226	100 to 200 lbs/2 year cycle	Feed rate varies. May be used as needed to settle solids from desilting/dewatering activities associated with TMI Unit 1 NDCT. Discharge may be released via DSN005.	Not Analyzed	No data in MSDS	No data i MSDS
DSN005	Ferric Sulfate	GE Betz, 4636 Somerton Rd. Trevose, PA 19053	0 to 625 lbs/year	Feed rate varies. May be used as needed to settle solids from desilting/dewatering activities associated with TMI Unit 1 NDCT. Discharge may be released via DSN005.	Not Analyzed	No data in MSDS	No data i MSDS
DSN005	The following chemical additives listed in Module 1 for DSN001 could be present at trace concentrations if treated Circulating Water, River Water, Fire Service Water, or Domestic were discharged to the into the Yard Drainage System: Sulfuric acid, sodium hypochlorite, sodium hydroxide, sodium bromide, AZ8103, Spectrus CT1300, Spectrus DT1400, Depositrol PY5204, Depositrol PY5206, Depositrol SF502, Flogard MS6208, Flogard MS6209, wood flour and Zinc Orthophosphate. The primary usage information for these chemical additives are listed for each chemical under outfall DSN001.							
DSN006	Sodium Hypochlorite (12.5%)	Univar USA Inc.; 6100 Carillon Point; Kirkland, WA 98033	400 to 1,000 lbs/day River Water	0.2 to 2.0 mg/L Free Available Chlorine (FAC)	< 0.2 mg/L Daily Max FAC < 0.5 mg/L Inst. Max FAC	mg/L	10 µg/L	Fathead minnow LC50 = 5.9 mg/L	Rainbow tr LC50 = 0.7 mg/L
DSN006	AZ 8103 (benzotriazole)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	100 to 170 lbs/day (added once per week for one hour)	5 mg/L (target concentration per each batch addition approx. one hour per week)	< 5	mg/L	1,000 µg/L as triazole	Rainbow Trout LC50 = 28.1 mg/L No effect level = 21 mg/L	Daphnia magna LC5 = 66 mg/L No effect le = 28 mg/L
DSN006	Cortrol IS104 (potassium sulfite)	GE Betz Inc, 4636 Somerton Rd., Trevose, PA 19053	400 to 800 lbs/day	10 to 20 mg/L (target concentration to neutralize sodium hypochlorite)	< 20	mg/L	Not Analyzed	Fathead Minnow LC50 = 1760 mg/L No effect level = 1,250 mg/L	Daphnia Magna LC5 = 2000 mg LC0 = 100 mg/L
DSN006	A detailed description of the three above listed chemical additives in the TMI Unit 1 River Water System is included in an AmerGen Energy Co., LL letter to the PADEP, dated September 26, 2006 (letter no. 5532-2006-040). The PADEP approved the use of the additives by letter dated October 26, 2006. The new river water chemical addition system is scheduled to start-up in the Spring of 2007.							

DSN006	Any chemical used to treat the Circulating Water System could be potentially present in trace amounts at Outfall DSN006 if chemical additions were occurring simultaneously to Intake Structure Deicing operations. Deicing operations occur only during the winter months if needed. The concentratio of chemical additives would be highly diluted with intake river water. Examples of Circulating Water System chemical additives used during the winte months could include: sulfuric acid, sodium hypochlorite, sodium bromide, Depositrol PY5204, Depositrol PY5206, Flogard MS6208, Flogard MS6209, and wood-flour.
DSN006	The release of Spectrus CT1300 during the annual Asiatic clam biocide treatments is minimized by isolating the normal river water pump Kinney strainer backwash flows and by not operating the Screen Wash and Sluice Water System during the chemical addition period. There may be some minor valve leak-by to DSN006, however there is no significant DSN006 flow during the clam biocide treatments. The Screen Wash and Sluice Water System and the river water pump Kinney strainers would only be used during treatment if required due to elevated system delta pressure. Th PADEP has previously reviewed and approved the chemical treatments and the potential affects on Outfall DSN006.
Screen Intake Structure (Deicing & NDCT pump down)	The TMI Unit 1 Screen Intake Structure receives heated water from the TMI Unit 1 Circulating Water System or the Nuclear River Water System to prevent ice formation at the Intake Structure during the extreme cold winter months. Also, in an emergency condition it is possible that some cooling water could be diverted to the Screen Intake Structure to maintain water flow through the Nuclear River Water System during non-freezing weather conditions. Deicing water flow is controlled to minimize the ice formation at the TMI Unit 1 Intake Structure by maintaining the river water inlet temperature to a range of 35 °F to 40°F at the Intake Structure. Any chemical used to treat the Circulating Water System could be potentially prese in trace amounts in the Screen Intake Structure if chemical additions were occurring simultaneously to Intake Structure Deicing operations. The deicing water is highly diluted when it enters the Intake Structure area and there is no measurable affect on the river water entering the Screen Intal Structure or in the area directly in front of the Intake Structure. Water entering the Screen Intake Structure is used for cooling or other system make up and is discharged as a plant effluent at the Main Station Outfall DSN001. The TMI Unit 1 Screen Intake Structure receives some Circulating Water from the TMI Unit Natural Draft Cooling Towers during tower draining that occurs every 2 years for maintenance. Water entering the Screen Intake Structure is used for cooling or other system make-up and is discharged a a plant effluent at the Main Station Outfall DSN001

(1) If LC50 Data for whole product is not available, data for the individual active ingredients may be provided.

b. Specific Substances which must be identified if Known or Expected to be Present

(Read instructions carefully and use the tabular format and additional pages, where necessary, to present the required information)

Outfall	Chemical Substance or Compound	Reason for Presence in Discharge	Average Effluent Concentration (µg/L)	Analytical Detection Level (µg/L)
DSN001	Table 3 Substances	Some Table 3 substances are used on site and could be discharged through Outfall DSN001. These substances are used in small quantities for laboratory analyses and would be present in trace amounts only. Permit renewal application sampling and analyses effectively address these substances.	Not detectable (Trace)	Not Detectable (Trace)
DSN001	Table 4 Substances – Asbestos	The Natural Draft Cooling Tower (NDCT) fill sections contain asbestos cement boards. Trace amounts of asbestos could be present in the Circulating Water System blowdown discharge through Outfall DSN001. Asbestos cement boards are being replaced with non-asbestos boards on a phased schedule over the next several years.	Past analyses have identified no asbestos in Outfall DSN001 discharges	Not Detectable (Trace)
DSN005 DSN006 Screen Intake Structure Deicing and Draindown	Table 4 Substances – Asbestos	The NDCT fill sections contain asbestos cement boards. Trace amounts of asbestos could be present in the Circulating Water System blowdown discharge through Outfall DSN001. Circulating Water may be released via the listed outfalls through the use of de-icing water or during draindown of the NDCT for plant outages. Asbestos would not be expected to be discharged at detectable levels. Asbestos cement boards are being replaced with non-asbestos boards on a phased schedule over the next several years.	See Module 13 Stormwater Sampling Data Table for Outfall DSN005A (Asbestos sample results = 0 fibers detected)	Not Detectable (Trace

c. Are any Table 2 substances identified for which a spill reporting exemption is requested? ☐ YES ☒ NO

If "YES," complete the Hazardous Substance Table.

d. Any other toxic chemicals known or expected to be present in the discharge.

Report any additional significant detections in effluent samples on the Other Toxic Chemicals sheets.

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WASTEWATER TREATMENT TECHNOLOGIES
MODULE 2

APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)

Outfall Number	Treatment Unit Description (list in sequence)	Method for Handling and Disposal of Solid or Liquid Residue Resulting from Treatment (list in sequence)
001	TMI Unit 1 Non-contact Cooling Water: Circulating Water, Secondary River Water, Reactor Building Emergency Cooling Water, Decay Heat River Water, Nuclear River Water	
	- Evaporation/Cooling	There are no separate residues requiring treatment.
	- Detoxification of GE Betz CT1300 using GE Betz DT1400.	
	- Detoxification of free available chlorine (sodium hypochlorite) using potassium sulfite.	
	- Discharge to surface water via DSN001	
001	DSN101 - Sewage Treatment Plant	
	- Grinding/Screening	- Screenings are disposed of at permitted off-site facility.
	- Flow Equalization	- No separate residues generated.
	- Activated Sludge/Extended Aeration	- Sludge is aerobically digested and land-applied at agriculture utilization facility.
	- Chemical Precipitation (Phosphorus Control)	- Same as above.
	- Neutralization	- Same as above.
	- Flocculation	- Same as above.
	- Sedimentation (Solids Removal)	- Same as above.
	- Disinfection (Chlorination)	- No separate residues generated.
	- Discharge to Surface Water via DSN001	- No separate residues generated.
001	DSN401 - Industrial Waste Filter System – System Currently Out of Service	
	- Settling In Sump	- Liquid Decanted to IWTS. Solids would be disposed at a permitted off-site facility.
	- Mixing	- No separate residues generated.
	- Pressure Filtration (Filter Media Added)	- Solids would be disposed of at a permitted off-site facility.
	- Rapid Sand Filtration (Optional)	- Same as above.
	- Discharge to Surface Water via DSN001	- No separate residues generated.

Applicant Name: AmerGen Three Mile Island

001	DSN501 - Secondary Neutralizer Tank - Mixing - Neutralization - Evaporation/Cooling - Discharge to Surface Water via DSN001 The Secondary Neutralizer Tank is typically released directly to the Industrial Waste Treatment System (IWTS). The IWTS is discharged to the river via DSN701.	There are no separate residues requiring treatment.
001	DSN701- Industrial Waste Treatment System - Mixing - Neutralization - Coagulation - Flotation - Settling - Chemical Conditioning - Pressure Filter (Portable Unit) - Gravity Dewatering (Portable Unit) - Rapid Sand Filtration (Optional) - Discharge to Surface Water via DSN 001	 - No separate residues generated. - No separate residues generated. - No separate residues generated. - No separate residues generated. - Solids would be disposed of at a permitted off-site facility. - Solids would be disposed of at a permitted off-site facility. - Solids would be disposed of at a permitted off-site facility. - Solids would be disposed of at a permitted off-site facility. - Solids would be disposed of at a permitted off-site facility. - No separate residues generated.
001	TMI-1 Liquid Radioactive Waste Treatment (Regulated by US Nuclear Regualtory Commission (NRC) station operating license) - Mixing - Neutralization - Evaporation - Ion Exchange - Discharge to Surface Water via DSN 001	 - No separate residues generated - No separate residue generated. - Concentrated evaporator solids are disposed of at an off-site USNRC permitted facility. - Spent ion exchange resins are disposed of at an off-site USNRC permitted facility. - No separate residues generated.
003	This outfall is an emergency discharge for station effluent from the TMI Unit 1 Mechanical Draft Cooling Tower (MDCT). DSN003 would be used in the event that Outfall DSN001 became blocked. Water discharged from Outfall DSN003 would receive the same treatment as water discharged from Outfall DSN001.	

Applicant Name: AmerGen Three Mile Island

004	This outfall is an emergency bypass discharge which would be used in the event that the Unit 1 MDCT became blocked and could not be used. Water discharged from Outfall 004 would receive the same treatment as water discharged from Outfall DSN001 with following exception. There would be no chlorine detoxifcation with potassium sulfite. Chlorine addition rates would have to be adjusted to assure compliance with the free availabe chlorine effluent limitations. (Note: DSN003 and DSN004 could also receive effluent related to Mechanical Draft Cooling Tower and/or other system maintenance activities.)	
005	Stormwater Collection - Settling - Discharge to Surface Water via DSN005	- Solids can be disposed of at a permitted off-site facility or managed as safe fill. - No separate residues generated.
005	Dewatering/Desilting of TMI Unit 1 Natural Draft Cooling Towers (NDCT) and Desilting of the TMI Unit 1 Intake Structure - Settling - Discharge to Surface Water via DSN005	- Solids can be disposed of at a permitted off-site facility or managed as safe fill. - No separate residues generated.
005	Fire Brigade Training Facility Runoff and 200,000 Gallon Fuel Oil Storage Tank Off-Loading Area. - Oil and grease removal via oil/water separator - Settling - Discharge to Surface Water via DSN005	- Solids and oil/water residue are disposed of at an off-site permitted facility. - Solids are disposed of at an off-site permitted facility or are managed as safe fill if applicable. - No separate residues generated.
005	Other Discharges to the Yard Drainage System Examples: Industrial Cooler Maintenance and Leakage, Fire System Flushing, Emergency Diesel Generator Building Floor Drains, Air Conditioner Condensate, etc. - Settling - Discharge to Surface Water via DSN005	- Solids are disposed of at an off-site permitted facility or are managed as safe fill if applicable. - No separate residues generated.

Applicant Name: AmerGen Three Mile Island

006	Discharges from TMI Unit 1 Screen Intake Structure Discharges include Screenwash and Sluice System Water and River Water Kinney Strainers Backwash Water - Screening - Detoxifcation of free available chlorine by adding potassium sulfite. - Discharge to Surface Water via DSN006	- Screenings are disposed of at permitted off-site facility. - No separate residues generated. - No separate residues generated.

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)
OUTFALL NUMBER	DSN 001 - Main Station Discharge

1. Process Wastewater

a. Describe process and type of wastewater.

Main condenser non-contact cooling water blowdown from the TMI Unit 1 Natural Draft Cooling Towers.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months? All months - See Note Below

Cooling Tower blowdown occurs during all months. Blowdown is a continuous process to maintain tower chemistry. There is no blowdown when the cooling towers are removed from service during plant outages which occur every 2 years.

Report the discharge rate as:

The maximum daily discharge rate.	9	MGD
The monthly average discharge rate.	4	MGD
The long-term average discharge rate.	4	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

Process Wastewater

a. Describe process and type of wastewater.

DSN 401 Industrial Waste Filtration System (IWFS). See attached Simplified Water Flow Chart for contributing waste streams. IWFS is not currently in service. However, AmerGen requests that DSN 401 remain in the permit for future use, if required.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr.

During which months? System is currently out of service.

Report the discharge rate as:

The maximum daily discharge rate.	0	MGD

The monthly average discharge rate.	0	MGD
The long-term average discharge rate.	0	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

Process Wastewater

a. *Describe process and type of wastewater.*

DSN 501 Secondary Neutralizer Tank. Tank receives wastewater from the Ecolochem reverse osmosis water treatment system and the secondary chemistry laboratory. The tank is routinely released to DSN 701 via the TMI-1 Turbine Building Sump.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 100 to 200 days/yr; 12 months/yr.

During which months? 12 months/year

Report the discharge rate as:

The maximum daily discharge rate.	0.086	MGD
The monthly average discharge rate.	0.072	MGD
The long-term average discharge rate.	0.072	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

Process Wastewater

a. Describe process and type of wastewater.

DSN 701 Industrial Wastewater Treatment System (IWTS). IWTS receives wastewater from secondary plant sumps and drains, including leakage and drain down from cooling water systems and plant equipment. See attached Simplified Water Flow Chart for inputs to IWTS.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 1 to 7 days/wk; 250 to 300 days/yr; 12 months/yr.

During which months? 12 months/year

Report the discharge rate as:

The maximum daily discharge rate.	0.200	MGD
The monthly average discharge rate.	0.080	MGD

The long-term average discharge rate.	0.080	MGD
For batch discharges report: NOT APPLICABLE		
Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Non-Contact Cooling Water Systems (NCCWS)

b. Source(s). Chemically treated NCCW from Nuclear River (NR), Secondary River (SR), Decay Heat Removal River (DR), and Reactor Building Emergency Cooling (RR) Systems.

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months?

Various combinations of NR, SR, DR, and RR pumps are run 12 months per year. NR and SR pumps are typically run during normal plant operations. DR pumps are designed for use when the plant is shutdown for plant oputages every 2 years. RR pumps are intended for emergency use and aer typically operated several hours per month for testing.

Report the discharge rate as:		
The maximum daily discharge rate.	48	MGD
The monthly average discharge rate.	15	MGD
The long-term average discharge rate.	15	MGD
For batch discharges report: NOT APPLICABLE		
Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

DSN 101 Sewage Treatment Plant. Extended aeration biological treatment of station sanitary wastewater.

b. Source(s). Station sanitary wastewater.

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months? 12 months/year

Report the discharge rate as:		
The maximum daily discharge rate.	0.040	MGD
The monthly average discharge rate.	0.012	MGD
The long-term average discharge rate.	0.012	MGD
For batch discharges report: NOT APPLICABLE		
Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

TMI Unit 1 Liquid Radioactive Waste Treatment System (U.S. Nuclear Regulatory Commission Regulated Discharge)

b. Source(s). Discharge from the liquid radioactive waste treatment system. The treatment system receives wastewater containing radioactivity from the primary plant systems, sumps and drains.

c. Discharge Occurs. 0 to 22 hrs/day; 0 to 7 days/wk; 30 to 90 days/yr; 2 to 7 months/yr.

During which months? System can run any 12 months/year

Report the discharge rate as:

The maximum daily discharge rate.	0.050	MGD
The monthly average discharge rate.	0.032	MGD
The long-term average discharge rate.	0.032	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). Circulating cooling water blowdown, IWFS (DSN 401), Secondary neutralizer tank (DSN 501), IWTS (DSN 701), Non-contact cooling water, Sewage treatment plant (DSN 101) and Liquid radwaste treatment discharges.

b. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months? 12 months/year

Report the discharge rate as:

The maximum daily discharge rate.	48	MGD
The monthly average discharge rate.	19	MGD
The long-term average discharge rate.	19	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution. **See Attached Modules In Application.**

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.	
APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)
OUTFALL NUMBER	DSN 003 and 004 - Emergency Discharges In Place of DSN 001

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Mechanical Draft Cooling Tower Emergency Bypasses. These Outfalls are emergency outfalls in the event that Outfall DSN 001 becomes blocked and cannot be used. Water discharged from these outfalls would be the same water that is normally discharged at Outfall DSN 001. Also, the emergency outfalls could be used for flow diversion if maintenance activities required or for testing to assure system operability.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr.

During which months?

Maintenance or emergency use could cause dischares to occur during any month. These outfalls are not typically used during routine plant operations.

Report the discharge rate as:

The maximum daily discharge rate.	0	MGD
The maximum monthly production rate.	0	MGD
The long-term average discharge rate.	0	MGD

* Designed for emergency use only.

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater. NOT APPLICABLE

b. Source(s).

c. Discharge Occurs. ____ hrs/day; ____ days/wk; ____ days/yr; ____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	____	MGD
The monthly average discharge rate.	____	MGD

The long-term average discharge rate.		____ MGD
For batch discharges report:	NOT APPLICABLE	
Number of decant cycles.		____ Cycles/day
Length of each decant cycle.		____ MIN.
Average decant discharge rate.		____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). DSN 003 and 004 - Emergency Discharges In Place of DSN 001

b. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr.

During which months?

Maintenance or emergency use could cause dischares to occur during any month. These outfalls are not typically used during routine plant operations.

Report the discharge rate as:

The maximum daily discharge rate.	0	MGD
The monthly average discharge rate.	0	MGD
The long-term average discharge rate.	0	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution. See Attached Modules in Application

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SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)
OUTFALL NUMBER	DSN 005 – East Dike Settling Basin (EDSB)

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Natural Draft Cooling Tower (NDCT) Desilting and Dewatering. Discharge from NDCT dewatering settling basin to the Yard Drainage System during NDCT maintenance every two years. Desilting water is typically diverted from the Yard Drainage System to the out of service TMI Unit 2 NDCT basin for increased settling to meet NPDES permit discharge limitations. Settled wastewater is discharged to the EDSB for release via DSN 005.

b. Production Rate. **NOT APPLICABLE**

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 7 to 20 days/yr; 1 to 3 months/yr.

During which months? Typically during the fall months during plant outages that occur every 2 years.

Report the discharge rate as:

The maximum daily discharge rate.	0.3	MGD
The monthly average discharge rate.	0.1	MGD
The long-term average discharge rate.	0.1	MGD

For batch discharges report: **NOT APPLICABLE**

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Industrial Coolers Draining, Cleaning, and Equipment Leakage. Discharge from the Industrial Coolers to the Yard Drainage System during annual maintenance of equipment. Residues are removed from the coolers by water flushing. Some cleaning water may be discharged which then can flow to the Yard Drainage System. Equipment leakage travels to the Yard Drainage System. Activities do not cause DSN 005 discharges.

b. Production Rate. **NOT APPLICABLE**

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 100 to 365 days/yr; 12 months/yr.

During which months?

Industrial cooler cleaning and maintenance occurs annually in the spring for approximately 4 weeks. Water flushing could cause a discharge to the Yard Drainage System. The Industrial Coolers also have discharges associated with normal operations. Observed discharges include cooler water spray, drift, and equipment leakage. Combined discharges to the Yard Drainage System have been estimated at less than 100 gallons per day to 1,000 gallons per day. Leakage is minimized by reasonable maintenance methods. Cooler operating discharges can occur any month during the year.

Report the discharge rate as:

The maximum daily discharge rate.	0.005* MGD *Estimated cleaning flushes using approximately 20 gpm water for 4 hours.
The monthly average discharge rate.	0.001 MGD
The long-term average discharge rate.	0.001 MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Emergency Diesel Generator Building Floor Drains. Floor drains can be discharged to the Yard Drainage System if the building required water removal in an emergency. The floor drain discharge valve is controlled as locked closed. There are no routine discharges.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr.

During which months? There are no routine discharges.

Report the discharge rate as: NOT APPLICABLE

The maximum daily discharge rate.	0 MGD
The monthly average discharge rate.	0 MGD
The long-term average discharge rate.	
*Floor drain water is not normally discharged to the Yard Drainage System. Valve is normally locked closed. Discharges must be approved by plant management.	0 MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

TMI Unit 1 Screen Intake Structure Desilting

b. Source(s). River silt is periodically pumped from the Intake Structure to the Intake Structure Dewatering Settling Basin which can overflow to the Site Yard Drainage System. There are typically no observed discharges from the Settling Basin during Intake Structure desilting activities.

c. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr

During which months?

The TMI Unit 1 Screen Intake Structure is typically desilted annually during the spring. Desilting activities typically occur over a one month period. There are typically no observed discharges to Yard Drainage System during desilting.

Report the discharge rate as:

The maximum daily discharge rate.	0	MGD
The monthly average discharge rate.	0	MGD
The long-term average discharge rate.	0	MGD

For batch discharges report: **NOT APPLICABLE**

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

d. Describe the wastewater.

TMI Unit 1 Circulating Water System (CWS) Flume Screen Washing

e. Source(s). Typically the CWS Flume Screens are washed weekly to assure proper cooling water flow through the system. The screens are washed using CWS flume water. The wash water travels to the ground in the immediate cleaning area. There are typically no observed discharges into the Yard Drainage System during cleaning activities. Water use is estimated at approximately 5,000 gallons per day during a cleaning activity. Water use increases when TMI Unit 1 is restarted following plant outages that occur every 2 years. During a plant start-up the CWS screens may be cleaned daily for up to 2 to 3 weeks.

f. Discharge Occurs. 0 hrs/day; 0 days/wk; 0 days/yr; 0 months/yr

During which months?

The TMI Unit 1 CWS Flume Screens are washed 12 months /year when required. There are typically no discharges into the Yard Drainage System during screen washing activities.

Report the discharge rate as:

The maximum daily discharge rate.	0	MGD
The monthly average discharge rate.	0	MGD
The long-term average discharge rate.	0	MGD

For batch discharges report: **NOT APPLICABLE**

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Fire Training Facility Runoff – Oil/water separator discharge from the training facility.

b. Source(s). Fire service water used for fire training activities is discharged into the Yard Drainage System via a local oil/water separator. It is estimated that 2,000 gallons of fire service water are used for a training class.

c. Discharge Occurs. 0 to 8 hrs/day; 1 to 3 days/wk; 15 to 30 days/yr; 6 months/yr.

During which months? Typically during non-winter months.

Report the discharge rate as:

The maximum daily discharge rate.	0.003	MGD
The monthly average discharge rate.	0.002	MGD
The long-term average discharge rate.	0.002	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). TMI Unit 1 Natural Draft Cooling Tower Desilting, TMI Unit 1 Screen Intake Structure Desilting, TMI Unit 1 Industrial Cooler maintenance and leakage, TMI Unit 1 Emergency Diesel Generator Building Floor Drains, TMI Unit 1 Circulating Water System Flume Screen Washing, and TMI Unit 1 Fire Training Facility run-off . See attached Simplified Water Flow Chart for additional non-process flows into the Yard Drainage System.

b. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 7 to 20 days/yr; 1 to 3 months/yr

During which months?

Flows from above activities could occur during any month. All activities are intermittent and typically do not occur simultaneously. The frequency of flow is based upon the TMI Unit 1 Natural Draft Cooling Tower Desilting activities because the other listed activities do not cause flow to DSN 005 due to low volume and intermittent flow frequency.

Report the discharge rate as:

The maximum daily discharge rate.	0.3	MGD
The monthly average discharge rate.	0.1	MGD
The long-term average discharge rate.		
Typically, the only activity contributing to the Yard Drainage System that would cause a discharge at DSN 005 is the TMI Unit 1 Natural Draft Cooling Tower (NDCT) Desilting. The total listed discharge flows are associated with NDCT desilting activities.	0.1	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution. **See Attached Modules In Application.**

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)
OUTFALL NUMBER	DSN 006 - Outfall from the TMI Unit 1 Screen Intake Structure

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Screen Intake Structure Screen Wash and Sluice Water Discharge. Outfall recieves Screen Wash and Sluice Water, and River Water Pump Kinney Strainer backwash water. Starting in 2007, wastewater being discharged at DSN 006 will be treated with potassium sulfite to reduce the concentration of chlorine being discharged. PADEP has approved this process change.

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months?

12 months/year. Typically, Screen Wash and Sluice Water is actuated for 10 minutes every 4 hours at a maximum flow rate 1400 gpm. Screen Wash and Sluice Water may run continuously over several days during periods of high river water debris or due to high delta pressure across the Intake Structure Screens. River Water Pump Kinney Strainers are continuously backwashed when the River Water Pumps are running. The backwash is mixed with the Screen Wash Water and is discharged to the river via DSN 006. Kinney Strainer Backwash flow rates are estimated to be a maximum of 2% of the River Water Pump flow rates. The DSN 006 average flow rate is estimated assuming typical River Water Pump running combinations, and the maximum DSN 006 flow rate is estimated based on a maximum number of River Water Pumps running simultaneously. See attached Water Use Schematic.

Report the discharge rate as:

The maximum daily discharge rate.	6	MGD
The monthly average discharge rate.	3	MGD
The long-term average discharge rate.	3	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater. NOT APPLICABLE

b. Source(s). .

c. Discharge Occurs. _____ hrs/day; days/wk; _____ days/yr; _____ months/yr.
During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____ MGD
The monthly average discharge rate.	_____ MGD
The long-term average discharge rate.	_____ MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	_____ Cycles/day
Length of each decant cycle.	_____ MIN.
Average decant discharge rate.	_____ GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). TMI Unit 1 Screen Intake Structure Screen Wash and Sluice Water Discharge. Outfall recieves Screen Wash and Sluice Water, and River Water Pump Kinney Strainer backwash water.

b. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.
During which months? 12 months/year.

Report the discharge rate as:

The maximum daily discharge rate.	6	MGD
The monthly average discharge rate.	3	MGD
The long-term average discharge rate.	3	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution. See Attached Modules In Application

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)
OUTFALL NUMBER	Discharges into Ithe TMI Unit 1 Screen Intake Structure

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Screen Intake Structure De-icing. Intake Structure receives heated water from the TMI Unit 1 Circulating Water System or the Nuclear River Water System to prevent ice formation at the Intake Structure during the extreme cold winter months Also, in an emergency condition it is possible that some cooling water could be diverted to the Screen Intake Structure to maintain water flow through the Nuclear River Water System during non-freezing weather conditions.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 0 to 120 days/yr; 1 to 4 months/yr.

During which months?

Typically, winter months only to prevent ice formation at the TMI Unit 1 Screen Intake Structure. In an emergency condition it is possible that some cooling water could be diverted to the Screen Intake Structure to maintain water flow through the Nuclear River Water System during any month of the year. Water has not been diverted to the Intake Structure for emergency use.

Report the discharge rate as:

The maximum daily discharge rate.	***	MGD
The maximum monthly production rate.	***	MGD
The long-term average discharge rate.	***	MGD

*** Flow is not measured. The flow rate is controlled to minimize the ice formation at the TMI Unit 1 Intake Structure. The flow rate is restricted to maintain an administrative limit of 35 °F to 40°F at the Intake Structure.

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

1. Process Wastewater

a. Describe process and type of wastewater.

TMI Unit 1 Natural Draft Cooling Tower (NDCT) Dewatering activities discharge into the Intake Structure to lower cooling tower water level for periodic tower maintenance during plant refueling outages that occur every two years.

b. Production Rate. NOT APPLICABLE

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each

process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 0 to 7 days/yr; 0 to 2 month/year.

During which months?

Discharge occurs during TMI Unit 1 plant maintenance and refueling outages that occur once every two years. Outages are typically scheduled during the fall every two years.

Report the discharge rate as:

The maximum daily discharge rate.	1.0	MGD
The maximum monthly production rate.	0.5	MGD
The long-term average discharge rate.	0.5	MGD

Discharges to the Intake Structure typically occur during the refueling outages every two years. Flow rates are estimated based on approximately one million gallons of water being pumped from the TMI Unit 1 NDCTs over one to two days.

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater. NOT APPLICABLE

b. Source(s).

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	____	MGD
The monthly average discharge rate.	____	MGD
The long-term average discharge rate.	____	MGD

For batch discharges report: NOT APPLICABLE

Number of decant cycles.	____	Cycles/day
Length of each decant cycle.	____	MIN.
Average decant discharge rate.	____	GPM

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). TMI Unit 1 Screen Intake Structure De-icing; Nuclear River Water System cooling water flow during emergency conditions; and TMI Unit 1 NDCT Dewatering discharge.

b. Discharge Occurs. 0 to 24 hrs/day; 0 to 7 days/wk; 0 to 120 days/yr; 1 to 4 months/yr.

During which months?

Typically winter months only for de-icing operations. Emergency conditions could occur any month. NDCT draining occurs every 2 years during the fall months. The flow information listed below includes only the estimated flow from the NDCT draining. Other flow rates could not be reasonably estimated.

Report the discharge rate as:

The maximum daily discharge rate.	1.0	MGD

The monthly average discharge rate.	0.5	MGD
The long-term average discharge rate.	0.5	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution. See Attached Modules In Application.

River Intake Sampling Results

Module Nos. 4, 5, 6, 7 and 8

Three Mile Island Nuclear Station
NPDES PA0009920

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME | AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)

- ☐ **Outfall Number** (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Intake Structure)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT					2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	ND (2.0 mg/l)	N/A(1)	ND (2.0 mg/l)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Chemical Oxygen Demand, COD	ND (15 mg/L)	N/A(1)	ND (15 mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Hardness ($CaCO_3$)	120 (mg/L)	N/A(1)	120 (mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Total Suspended Solids, TSS	6 (mg/L)	N/A(1)	6 (mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Total Dissolved Solids, TDS	226 (mg/L)	N/A(1)	226 (mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Ammonia as N	ND (0.10 mg/L)	N/A(1)	ND (0.10 mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Nitrate-Nitrite (as N)	3.12 (mg/L)	N/A(1)	3.12 (mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Total Kjeldahl Nitrogen (TKN)	ND (1.0 mg/L)	N/A(1)	ND (1.0 mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Phosphorus (as P), Total	ND (0.10 mg/L)	N/A(1)	ND (0.10mg/L)	N/A(1)	1	mg/L	N/A(1)	N/A(1)
Temperature winter (10/01 to 03/31)	66 ° F.		44 ° F.		Cont. (2)	Deg Fahrenheit	N/A(1)	N/A(1)
Temperature summer (04/01 to 09/30)	87 ° F.		70 ° F.		Cont. (2)	Deg Fahrenheit	N/A(1)	N/A(1)
pH	Min. 8.1	Max. 8.1			1	Standard units	N/A(1)	N/A(1)

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.

1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

(2) Temperature and total residual chlorine data summarized from calendar year 2006 data. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coeff. of Effl. Variabil. (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐	5 CU	SM-2120 B	5	N/A(1)	5	N/A(1)	1	CU	N/A(1)	N/A
Fecal Coliform	☐	N/A	9222D	19	N/A(1)	12	N/A(1)	2	CFU/100ml	N/A(1)	N/A
Fluoride	☐	200	300.0	ND (200 µg/L)	N/A(1)	ND (200 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Oil and Grease	☐	2100	1664	ND (2100 µg/L)	N/A(1)	ND (2100 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Bromide	☐	600	300	ND (600µg/L)	N/A(1)	ND (600µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Chlorine, Total Residual (reported as Total Residual Oxidants - TRO)	☐	10	Orion Electrode	60	N/A(1)	10	N/A(1)	60	µg/L	N/A(1)	N/A
Sulfate	☐	2000	300.0	36,900	N/A(1)	36,900	N/A(1)	1	µg/L	N/A(1)	N/A
Sulfide	☐	1000	376.1	ND (1,000 µg/L)	N/A(1)	ND (1,000 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Sulfite	☐	2000	377.1	ND (2,000 µg/L)	N/A(1)	ND (2,000 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Surfactants	☐	25	SM-5540C	159	N/A(1)	159	N/A(1)	1	µg/L	N/A(1)	N/A
Aluminum, Total	☐	50	200.7	50	N/A(1)	50	N/A(1)	1	µg/L	N/A(1)	N/A
Barium, Total	☐	10	200.7	31	N/A(1)	31	N/A(1)	1	µg/L	N/A(1)	N/A
Boron, Total	☐	50	200.7	ND (50 µg/L)	N/A(1)	ND (50 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Cobalt, Total	☐	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Iron, Total	☐	30	200.7	180	N/A(1)	180	N/A(1)	1	µg/L	N/A(1)	N/A
Iron, Dissolved	☐	60	200.7	ND (60 µg/L)	N/A(1)	ND (60 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Manganese, Total	☐	3	200.7	50	N/A(1)	50	N/A(1)	1	µg/L	N/A(1)	N/A
Radioactivity (Total Alpha and Beta)	☐	Alpha 0.583 Beta 1.51	900.0	Alpha ND (0.583) Beta + 2.98	N/A(1)	Alpha ND (0.583) Beta + 2.98	N/A(1)	1	pCi/L	N/A(1)	N/A
Total Organic Carbon, TOC	☐	1,000	SM-5310B	1,200	N/A(1)	1,200	N/A(1)	1	µg/L	N/A(1)	N/A
Radium, Total	☐	0.237 pCi/l	900.1	ND (0.237)	N/A(1)	ND (0.237)	N/A(1)	1	pCi/L	N/A(1)	N/A
Magnesium	☐	50	200.7	8420	N/A(1)	842	N/A(1)	1	µg/L	N/A(1)	N/A
Molybdenum	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Tin, Total	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A
Titanium, Total	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake wat[illegible] background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing [illegible] number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 2
MODULE 5

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)

- ☐ Outfall Number ____ (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Intake Structure)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 2 Metals		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present				c. Number of Analysis	4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis					
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1M	Antimony, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
2M	Arsenic, Total	4	200.7	ND (4µg/L)	N/A(1)	ND (4µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
3M	Beryllium, Total	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
4M	Cadmium, Total	1	200.7	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
5M	Chromium III	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
5M	Chromium VI	10	SM-3500	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
6M	Copper, Total	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
7M	Lead, Total	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
8M	Mercury, Total	0.2	245.1	ND (0.2 µg/L)	N/A(1)	ND (0.2 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
9M	Nickel, Total	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
10M	Selenium, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
11M	Silver, Total	2	200.7	ND (2 µg/L)	N/A(1)	ND (2 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgro

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

POLLUTANT GROUP 2 Metals		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coeffic of Effluer Variabili (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
12M	Thallium, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
13M	Zinc, Total	5	200.7	5	N/A(1)	5	N/A(1)	1	µg/L	N/A(1)	N/A(1)
14M	Cyanide, Total	5	335.3	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
14M	Cyanide, Free	5	4500-CNI	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
15M	Phenols, Total	5	420.2	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island (NPDE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 3
MODULE 6

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME | AmerGen Three Mile Island (NPDES Permit 0009920)

- ☐ Outfall Number: ***** (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Intake Structure)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 3 Volitales		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present				c. Number of Analysis	4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis					
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1V	Acrolein	25	624	ND (25 µg/L)	N/A(1)	ND (25 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
2V	Acrylonitrile	5	624	ND (5µg/L)	N/A(1)	ND (5µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
3V	Benzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
5V	Bromoform	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
6V	Carbon Tetrachloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
7V	Chlorobenzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
8V	Chlorodibromomethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
9V	Chloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
10V	2-Chloroethylvinyl Ether	3	624	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

POLLUTANT GROUP 3 Volitales		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present				c. Number of Analysis	4. Units		5. Coefficie of Effluen Variability (CV)
				a. Max Daily Value		b. Average of Analysis					
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
11V	Chloroform	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
12V	Dichlorobromomethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
14V	1,1-Dichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
15V	1,2-Dichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
16V	1,1-Dichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
17V	1,2 Dichloropropane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
18V	1, 3-Dichloropropylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
19V	Ethylebenzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
20V	Methyl Bromide	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
21V	Methyl Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
22V	Methylene Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
23V	1,1,2,2-Tetrachloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
24V	Tetrachloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
25V	Toluene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
26V	1,2-Trans-dichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
27V	1,1,1-Trichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
28V	1,1,2-Trichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
29V	Trichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)
31V	Vinyl Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	1	ug/l	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 4
MODULE 7

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME | AmerGen Three Mile Island (NPDES Permit 0009920)

- ☐ Outfall Number ****** (Show location of sampling point on Line Drawing)
- ☒ Intake Sampling Results - Optional (Specify Source: Intake Structure)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 4 Acid Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1A	2-Chlorophenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
2A	2,4-Dichlorophenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
3A	2,4-Dimethylphenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
4A	4,6-Dinitro-o-cresol	15	625	ND (15 µg/L)	N/A (1)	ND (15 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
5A	2,4-Dinitrophenol	15	625	ND (15 µg/L)	N/A (1)	ND (15 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
6A	2-Nitrophenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
7A	4-Nitrophenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
8A	P-chloro-m-cresol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
9A	Pentachlorophenol	15	625	ND (15 µg/L)	N/A (1)	ND (15 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
10A	Phenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)
11A	2,4,6-Trichlorophenol	7.7	625	ND (7.7 µg/L)	N/A (1)	ND (7.7 µg/L)	N/A (1)	1	µg/L	N/A (1)	N/A (1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgrou
(1) Mass calculation not required per discussion with Mr. J. Miller, PADEP Permit Engineer
It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a larg
number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile I J

COMMONWEALTH OF PENNSYLVANIA
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ANALYSIS RESULTS TABLE POLLUTANT GROUP 5
MODULE 8

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: AmerGen Three Mile Island (NPDES Permit 0009920)

- ☐ Outfall Number: ******** (Show location of sampling point on Line Drawing)
- ☐ Water Supply Sampling Results - Optional (Specify Source: _____)
- ☒ Background Sampling Results - Optional (Specify Location: Intake)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Annual Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1B	Acenaphthene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
2B	Acenaphthylene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
3B	Anthracene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
4B	Benzidine	15	625	ND (15 µg/L)	N/A(1)	ND (15 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
5B	Benzo(*a*)anthracene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
6B	Benzo(a)pyrene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
7B	3,4-Benzofluoranthene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
8B	Benzo(*ghi*)perylene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
9B	Benzo(*k*)fluoranthene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
10B	Bis(2-*Chloro-ethoxy*)methane	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
11B	Bis(2-*Chloroethyl*)ether	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
12B	Bis(2-*Chloro-isopropyl*)ether	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
13B	Bis(2-*Ethylhexyl*)phthalate	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
14B	4-Bromophenyl Phenyl Ether	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
15B	Butylbenzyl Phthalate	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
16B	2-Chloronaphthalene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
17B	4-Chlorophenyl Phenyl Ether	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgro
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a larg number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Annual Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
18B	Chrysene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
19B	Dibenzo(a,*h*)anthracene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
20B	1,2-Dichlorobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
21B	1,3- Dichlorobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
22B	1,4- Dichlorobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
23B	3,3'-Dichlorobenzidine	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
24B	Diethyl Phthalate	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
25B	Dimethyl Phthalate	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
26B	Di-n-butyl Phthalate	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
27B	2,4-Dinitrotoluene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
28B	2,6-Dinitrotoluene	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
29B	Di-n-octyl Phthalate	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
30B	1,2-Diphenylhydrazine (as *Azobenzene)*	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
31B	Fluoranthene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
32B	Fluorene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
33B	Hexachlorobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
34B	Hexechlorobutadiene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
35B	Hexachlorocyclopentadiene	7.7	625	ND (7.7 µg/L)	N/A(1)	ND (7.7 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
36B	Hexachloroethane	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
37B	Indeno(*1,2,3-cd)*pyrene	1.9	625	ND (1.9 µg/L)	N/A(1)	ND (1.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
38B	Isophorone	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
39B	Naphthalene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
40B	Nitrobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
41B	N-Nitrosodimethylamine	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
42B	N-Nitrosodi-n-propylamine	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
43B	N-Nitrosodiphenylamine	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
44B	Phenanthrene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
45B	Pyrene	1.4	625	ND (1.4 µg/L)	N/A(1)	ND (1.4 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)
46B	1,2,4-Trichlorobenzene	2.9	625	ND (2.9 µg/L)	N/A(1)	ND (2.9 µg/L)	N/A(1)	1	µg/L	N/A(1)	N/A(1)

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgrou

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a larg number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Outfall DSN001 Sampling Results

Module Nos. 4, 5, 6, 7 and 8

Three Mile Island Nuclear Station
NPDES PA0009920

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 1
MODULE 4

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: AmerGen Three Mile Island Nuclear Station (NPDES Number PA 0009920)

- ☒ Outfall Number DSN 001, Main Station Discharge (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location of Sample: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 1	1. LEVEL PRESENT				2. UNITS		3. Coefficient of Effluent Variability (CV)
	a. Maximum Daily Value		b. Average of Analysis		c. No. of Analysis	a. Concentration	b. Mass	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				
Biochemical Oxygen Demand, BOD	ND (2,000 µg/L)	N/A(1)	ND (2,000 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A
Chemical Oxygen Demand, COD	18,000	N/A(1)	12,000	N/A(1)	3	µg/L	N/A(1)	N/A
Hardness ($CaCO_3$)	196,000	N/A(1)	152,000	N/A(1)	3	µg/L	N/A(1)	N/A
Total Suspended Solids, TSS	472,000	N/A(1)	46,000	N/A(1)	25	µg/L	N/A(1)	N/A
Total Dissolved Solids, TDS	340,000	N/A(1)	258,000	N/A(1)	3	µg/L	N/A(1)	N/A
Ammonia as N	470	N/A(1)	220	N/A(1)	3	µg/L	N/A(1)	N/A
Nitrate-Nitrite (as N)	4020	N/A(1)	2610	N/A(1)	3	µg/L	N/A(1)	N/A
Total Kjeldahl Nitrogen (TKN)	ND (1,000 µg/L)	N/A(1)	ND (1,000 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A
Phosphorus (as P), Total	130	N/A(1)	40	N/A(1)	3	µg/L	N/A(1)	N/A
Temperature winter (10/01 to 03/31)	86 ° F.		60 ° F.		Cont. (2)	Deg Fahrenheit	N/A(1)	N/A
Temperature summer (04/01 to 09/30)	100 ° F.		89 ° F.		Cont. (2)	Deg Fahrenheit	N/A(1)	N/A
pH	Min. 7.2	Max. 8.5			27	Standard units	N/A(1)	N/A

1.a. Maximum Daily Value - Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

1.b. Average of Analysis - The average of all values within the last year and report both the mass and concentration.

1.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

(2) Temperature, TSS, and Total Residual Chlorine data are summarized from calendar year 2006 NPDES DMRs. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island

POLLUTANT GROUP 1	Believed Absent	1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coeffi... of Effluen... Variabil... (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
Color	☐	5 CU	110.2	75	N/A(1)	35	N/A(1)	3	CU	N/A(1)	
Fecal Coliform	☐	N/A	SM20-9222D	136	N/A(1)	63	N/A	3	CFU/100ml	N/A(1)	
Fluoride	☐	100	300.0	ND (200 µg/L)	N/A(1)	ND (200 µg/L)	N/A	3	µg/L	N/A(1)	
Oil and Grease	☐	2,200	1664	ND (2,200 µg/L)	N/A(1)	ND (2,200 µg/L)	N/A	3	µg/L	N/A(1)	
Bromide	☐	600	300	ND (600 µg/L)	N/A(1)	ND (600 µg/L)	N/A	3	µg/L	N/A(1)	
Chlorine, Total Residual (reported as Total Residual Oxidants - TRO)	☐	10	Orion Electrode	120	N/A(1)	30	N/A	270	µg/L	N/A(1)	
Sulfate	☐	5000	300.0	102,000	N/A(1)	73,000	N/A	3	µg/L	N/A(1)	
Sulfide	☐	1000	376.1	ND (1,000 µg/L)	N/A(1)	ND (1,000 µg/L)	N/A	3	µg/L	N/A(1)	
Sulfite	☐	2000	377.1	ND (2,000 µg/L)	N/A(1)	ND (2,000 µg/L)	N/A	3	µg/L	N/A(1)	
Surfactants	☐	25	5540C	144	N/A(1)	109	N/A	3	µg/L	N/A(1)	
Aluminum, Total	☐	50	200.7	690	N/A(1)	317	N/A	3	µg/L	N/A(1)	
Barium, Total	☐	10	200.7	54	N/A(1)	46	N/A	3	µg/L	N/A(1)	
Boron, Total	☐	50	200.7	ND (50 µg/L)	N/A(1)	ND (50 µg/L)	N/A	3	µg/L	N/A(1)	
Cobalt, Total	☐	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A	3	µg/L	N/A(1)	
Iron, Total	☐	30	200.7	1,490	N/A(1)	810	N/A	3	µg/L	N/A(1)	
Iron, Dissolved	☐	30	200.7	130	N/A(1)	10	N/A	3	µg/L	N/A(1)	
Manganese, Total	☐	3	200.7	123	N/A(1)	96	N/A	3	µg/L	N/A(1)	
Radioactivity (Total Alpha and Beta)	☐	Alpha 1.99 Beta 4.63	900.0	Alpha ND (1.99) Beta + 6.07	N/A(1)	Alpha ND (1.99) Beta + 4.08	N/A	3	pCi/L	N/A(1)	
Total Organic Carbon, TOC	☐	1,000	SM20-5310B	3,300	N/A(1)	2,600	N/A	3	µg/L	N/A(1)	
Radium, Total	☐	0.538* pCi/l	903.0	+ 0.168 pCi/L	N/A(1)	+ 0.066	N/A	3	pCi/l	N/A(1)	
Magnesium	☐	30	200.7	14,500	N/A(1)	10,790	N/A	3	µg/L	N/A(1)	
Molybdenum	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A	3	µg/L	N/A(1)	
Tin, Total	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A	3	µg/L	N/A(1)	
Titanium, Total	☐	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A	3	µg/L	N/A(1)	

* The listed Radium & Beta MDL values reported may appear greater than the reported sample values because of statistical differences in the three separate sample analyses.

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake wa[illegible] background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing [illegible] number of effluent limits and/or monitoring requirements in the final NPDES permit.

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 2
MODULE 5

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME | AmerGen Three Mile Island (NPDES Permit 0009920)

- ☒ Outfall Number DSN 001, Main Station Discharge (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 2 Metals		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1M	Antimony, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
2M	Arsenic, Total	4	200.7	ND (4 µg/L)	N/A(1)	ND (4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
3M	Beryllium, Total	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
4M	Cadmium, Total	1	200.7	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
5M	Chromium III	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
5M	Chromium VI	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
6M	Copper, Total	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
7M	Lead, Total	3	200.7	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
8M	Mercury, Total	0.2	245.1	ND (0.2 µg/L)	N/A(1)	ND (0.2 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
9M	Nickel, Total	10	200.7	ND (10 µg/L)	N/A(1)	ND (10 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
10M	Selenium, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
11M	Silver, Total	2	200.7	ND (2 µg/L)	N/A(1)	ND (2 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgro...

It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a ... number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

POLLUTANT GROUP 2 Metals		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present				c. Number of Analysis	4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis					
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
12M	Thallium, Total	5	200.7	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
13M	Zinc, Total	5	200.7	16	N/A(1)	13	N/A(1)	3	µg/L	N/A(1)	N/A(1)
14M	Cyanide, Total	5	335.3	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
14M	Cyanide, Free	5	4500-I	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
15M	Phenols, Total	5	420.2	ND (5 µg/L)	N/A(1)	ND (5 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 3
MODULE 6

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)

- ☒ Outfall Number DSN 001, Main Station Discharge (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 3 Volitales		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1V	Acrolein	25	624	ND (25 µg/L)	N/A(1)	ND (25 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
2V	Acrylonitrile	5	624	ND (5µg/L)	N/A(1)	ND (5µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
3V	Benzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
5V	Bromoform	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
6V	Carbon Tetrachloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
7V	Chlorobenzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
8V	Chlorodibromomethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
9V	Chloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
10V	2-Chloroethylvinyl Ether	3	624	ND (3 µg/L)	N/A(1)	ND (3 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

POLLUTANT GROUP 3 Volitales		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficien of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
11V	Chloroform	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
12V	Dichlorobromomethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
14V	1,1-Dichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
15V	1,2-Dichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
16V	1,1-Dichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
17V	1,2 Dichloropropane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
18V	1, 3-Dichloropropylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
19V	Ethylebenzene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
20V	Methyl Bromide	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
21V	Methyl Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
22V	Methylene Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
23V	1,1,2,2-Tetrachloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
24V	Tetrachloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
25V	Toluene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
26V	1,2-Trans-dichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
27V	1,1,1-Trichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
28V	1,1,2-Trichloroethane	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
29V	Trichloroethylene	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)
31V	Vinyl Chloride	1	624	ND (1 µg/L)	N/A(1)	ND (1 µg/L)	N/A(1)	3	ug/l	N/A(1)	N/A(1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.

3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.

3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and background.

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or potential for establishing a large number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

ANALYSIS RESULTS TABLE POLLUTANT GROUP 4
MODULE 7

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME | AmerGen Three Mile Island (NPDES Permit 0009920)

- ☒ Outfall Number DSN 001, Main Station Discharge (Show location of sampling point on Line Drawing)
- ☐ Intake Sampling Results - Optional (Specify Source: _____)
- ☐ Upstream Background Sampling Results - Optional (Specify Location: _____)
- ☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
- ☐ New Discharge (Basis for Information: _____)
- ☐ Bypass or Sewer System Overflow (Describe: _____)

POLLUTANT GROUP 4 Acid Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficien of Effluent Variability (CV)
				a. Max Daily Value		b. Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1A	2-Chlorophenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
2A	2,4-Dichlorophenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
3A	2,4-Dimethylphenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
4A	4,6-Dinitro-o-cresol	17	625	ND (17 µg/L)	N/A (1)	ND (17 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
5A	2,4-Dinitrophenol	17	625	ND (17 µg/L)	N/A (1)	ND (17 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
6A	2-Nitrophenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
7A	4-Nitrophenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
8A	P-chloro-m-cresol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
9A	Pentachlorophenol	17	625	ND (17 µg/L)	N/A (1)	ND (17 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
10A	Phenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)
11A	2,4,6-Trichlorophenol	8.4	625	ND (8.4 µg/L)	N/A (1)	ND (8.4 µg/L)	N/A (1)	3	µg/L	N/A (1)	N/A (1)

3. If other data is available (i.e., DMR data, etc.), the past year of data may be used to determine 3a, 3b, 3c, and 5.
3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and backgrou (1) Mass calculation not required per discussion with Mr. J. Miller, PADEP Permit Engineer
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a larg number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module

Applicant Name: AmerGen Three Mile Island

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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ANALYSIS RESULTS TABLE POLLUTANT GROUP 5
MODULE 8

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)

☒ Outfall Number DSN 001, Main Station Discharge (Show location of sampling point on Line Drawing)
☐ Water Supply Sampling Results - Optional (Specify Source: _____)
☐ Background Sampling Results - Optional (Specify Location: _____)
☐ Treatment Facility Influent Sampling Results (Show location of sampling point on Line Drawing)
☐ New Discharge (Basis for Information: _____)

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coeffi... of Effl... Variab... (CV
				a. Max Daily Value		b. Annual Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
1B	Acenaphthene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
2B	Acenaphthylene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
3B	Anthracene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
4B	Benzidine	1.7	625	ND (1.7 µg/L)	N/A(1)	ND (1.7 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
5B	Benzo(a)anthracene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
6B	Benzo(a)pyrene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
7B	3,4-Benzofluoranthene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
8B	Benzo(*ghi*)perylene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
9B	Benzo(*k*)fluoranthene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
10B	Bis(2-*Chloro-ethoxy*)methane	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
11B	Bis(2-*Chloroethyl*)ether	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
12B	Bis(2-*Chloro-isopropyl*)ether	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
13B	Bis(2-*Ethylhexyl*)phthalate	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
14B	4-Bromophenyl Phenyl Ether	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
15B	Butylbenzyl Phthalate	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
16B	2-Chloronaphthalene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(
17B	4-Chlorophenyl Phenyl Ether	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and back... d.
* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a... number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass c...lation and CV data are not required per discussion with Mr. J. Miller, PADEP Perm... gineer. Note applies to all pages of this module.

POLLUTANT GROUP 5 Base Compounds		1. MDL Used* (µg/L)	2. EPA Method Number Used	3. Level Present					4. Units		5. Coefficient of Effluent Variability (CV)
				a. Max Daily Value		b. Annual Average of Analysis		c. Number of Analysis			
				Concentration	Mass	Concentration	Mass		Concentration	Mass	
18B	Chrysene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
19B	Dibenzo(*a,h*)anthracene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
20B	1,2-Dichlorobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
21B	1,3- Dichlorobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
22B	1,4- Dichlorobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
23B	3,3'-Dichlorobenzidine	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
24B	Diethyl Phthalate	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
25B	Dimethyl Phthalate	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
26B	Di-n-butyl Phthalate	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
27B	2,4-Dinitrotoluene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
28B	2,6-Dinitrotoluene	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
29B	Di-n-octyl Phthalate	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
30B	1,2-Diphenylhydrazine (as *Azobenzene*)	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
31B	Fluoranthene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
32B	Fluorene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
33B	Hexachlorobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
34B	Hexechlorobutadiene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
35B	Hexachlorocyclopentadiene	8.4	625	ND (8.4 µg/L)	N/A(1)	ND (8.4 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
36B	Hexachloroethane	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
37B	Indeno(*1,2,3-cd*)pyrene	2.1	625	ND (2.1 µg/L)	N/A(1)	ND (2.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
38B	Isophorone	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
39B	Naphthalene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
40B	Nitrobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
41B	N-Nitrosodimethylamine	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
42B	N-Nitrosodi-n-propylamine	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
43B	N-Nitrosodiphenylamine	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
44B	Phenanthrene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
45B	Pyrene	1.6	625	ND (1.6 µg/L)	N/A(1)	ND (1.6 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)
46B	1,2,4-Trichlorobenzene	3.1	625	ND (3.1 µg/L)	N/A(1)	ND (3.1 µg/L)	N/A(1)	3	µg/L	N/A(1)	N/A(1)

3.a. Maximum Daily Value – Report the highest daily value or daily average value from the last year of data. Report both mass and concentration.
3.b. Average of Analysis – Determine the average of all samples taken within the past year. Report both mass and concentration.
3.c. A minimum of 3 Sampling Events required for process wastewater discharges, and a minimum of 1 Sampling Event for all other discharges, treatment facility influent, intake water and back

* It is in the applicant's interest to achieve the lowest level of detection possible. This will minimize uncertainty and therefore the need for additional analysis or the potential for establishing a number of effluent limits and/or monitoring requirements in the final NPDES permit.

(1) Mass calculation and CV data are not required per discussion with Mr. J. Miller, PADEP Permit Engineer. Note applies to all pages of this module.

Applicant Name: AmerGen Energy Co, LLC Three Mile

COMMONWEALTH OF PENNSYLVANIA
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BUREAU OF WATER STANDARDS AND FACILITY REGULATION

HAZARDOUS SUBSTANCE TABLE
MODULE 10

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: AmerGen Energy Co, LLC Three Mile Island Nuclear Generating Station

1. Name of Table 3 Substance	2. Outfall	3. Amount Per Outfall			4. Origin and Source	5. Treatment Provided		
		Quantity lb/24 hrs	Frequency	Duration		a	b	c
Sulfuric Acid RQ = 1000 lbs/24 hr	DSN001	4,000 to 5,500 as acid product	Daily	As needed	Sulfuric acid is routinely used to treat the Circulating Water System. Treated Circ Water is released to the river via DSN001 via Circ Water blowdown. Circ Water discharges are not treated before release.	N/A	N/A	N/A
Chlorine RQ = 10 lbs/24 hr	DSN001	1 to 5 as chlorine	Daily	Con-tinuous	Chlorine is used in the station sewage treatment plant as a biocide for plant effluents. Greater than 10 lbs of chlorine could be added at the sewage treatment plant in an upset, overload, or by-pass condition occurred. There is no dechlorination of the sewage treatment plant effluent.	NA	N/A	N/A
Hydrazine RQ = 1 lb/24hr	DSN001	20 to 30 as hydrazine product	Daily	As needed	Hydrazine is added to the plant secondary water system to remove oxygen. Hydrazine discharges can be nuetralized with an oxidizer (e.g., hydrogen peroxide) to convert hydrazine to other compounds. Typically, there is no treatment required due to the low system chemical concen-trations.	☐	☐	☒

Hydrazine RQ = 1 lb/24hr	DSN001	175 to 250 lbs/day as hydrazine product	Every 2 years	Used over several days during refueling outages	Hydrazine is added to lay-up the steam generators every 2 years during refueling outage. Elevated hydrazine concentrations are treated with an oxidizer (e.g., hydrogen peroxide) if required before release to the river to meet NPDES permit requirements.	☐	☐	☒
Sodium Hypochlorite RQ = 100 lbs/24hr	DSN001	3,000 to 4,500 lbs/day as hypochlorite product (additional 400 to 1,000 lbs/day approved)	Daily	As needed	Sodium hypochlorite is currently used as a biocide in the TMI Unit 1 Circulating Water System. The chemical has been approved for use in the TMI Unit 1 River Water System (scheduled start-up Spring 2007). The PADEP has approved a new chlorine neutraliz-ation system that uses potassium sulfite (scheduled start-up Spring 2007).	☐	☐	☒
Sodium Hydroxide RQ = 1,000 lbs/24hr	DSN001	80 to 100 lbs/day as sodium hydroxide product	Daily	As needed	Routine use is not greater than 1,000 lbs/24hr, however could be used in greater quantities if needed to neutralize an acid overfeed condition in the Circ Water System or other plant systems. The chemical is routinely used at the Sewage Treatment Plant to adjust system pH.	N/A	N/A	N/A
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐

Applicant Name: AmerGen Energy Co, LLC Three Mile

Outfall: DSN001, DSN005, and DSN006

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OTHER TOXIC CHEMICALS
MODULE 11

Before completing this form, read the step-by-step instructions provided in Appendix 1.

Applicant Name	AmerGen Energy Co, LLC Three Mile Island Nuclear Generating Station
Outfall Number	DSN001, DSN005, and DSN006

1. GC/MS "Five Peaks" pollutants (see Appendix 1)

Group Number (3 - 6)	Chemical Substance or Compound Name	MDL (ug/L)	Average Effluent Concentration (µg/L)	Maximum Effluent Concentration (µg/L)	No. Samples Positive / No. analyzed
	Not applicable - no other toxic pollutants expected to be in DSN001, DSN005 or DSN006				/
					/
					/
					/
					/

Other Chemicals

Substance	Reason for Presence in Discharge	Average Concentration (µg/L)	Indicate if Presence is Known (K) or Suspected (S)
Not Applicable			

☐ If additional peaks were not available for one or more groups with the method used check here and attach an explanation of why the method was selected.

Applicant Name: AmerGen Energy Co, LLC Three Mile

Outfall: DSN001, DSN005, and DSN006

Provide additional sheets as necessary.

Stormwater
Module Nos. 12 & 13

Three Mile Island Nuclear Station
NPDES PA0009920

COMMONWEALTH OF PENNSYLVANIA
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STORMWATER
MODULE 12

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME: AmerGen Three Mile Island (NPDES Permit 0009920)

1. Site Plan and Stormwater Runoff. Attach a copy of your facility's site plan. (See instructions)

   DEP strongly recommends the separation of stormwater and other wastewaters.

2. Description of Potential Pollutant Sources and Controls

   a. For each stormwater outfall, provide an estimate of the area (include units) drained to the outfall, and a list of potential pollutant(s) and sources for the outfall.

Outfall Number	Total Area Drained (provide units)	Potential Pollutant(s) and Sources
DSN 005A	115.5	Oil and grease from station permanent & mobile equipment & containers; mobile equipment leakage - antifreeze, fuels, battery acids; surfactants from cleaning activities; metals from exposed plant equipment and material lay-down areas; sediments from parking lots and lay-down areas; herbicides and pesticide applications; hazardous chemicals (acids, caustic, biocides) and petroleum products used and stored at TMI Unit 1.
SWRO-1	16.5	Oil and grease from station permanent & mobile equipment & containers; mobile equipment leakage - antifreeze, fuels, battery acids; surfactants from cleaning activities; metals from exposed plant equipment and material lay-down areas; sediments from parking lots and lay-down areas; herbicides and pesticide applications; hazardous chemicals (acids, caustic, biocides) and petroleum products used and stored at TMI Unit 1.
SWRO-2	11.9	Oil and grease from station permanent & mobile equipment & containers; mobile equipment leakage - antifreeze, fuels, battery acids; surfactants from cleaning activities; metals from exposed plant equipment and material lay-down areas; sediments from parking lots and lay-down areas; herbicides and pesticide applications; hazardous chemicals (acids, caustic, biocides) and petroleum products used and stored at TMI Unit 1.
SWRO-3	21.5	Oil and grease from station permanent & mobile equipment & containers; mobile equipment leakage - antifreeze, fuels, battery acids; surfactants from cleaning activities; metals from exposed plant equipment and material lay-down areas; sediments from parking lots and lay-down areas.
SWRO-4	0.7	Oil and grease from station permanent & mobile equipment & containers; mobile equipment leakage - antifreeze, fuels, battery acids; surfactants from cleaning activities; metals from exposed plant equipment and material lay-down areas; sediments from parking lots and lay-down areas; hazardous chemicals (acids, caustic, biocides) and petroleum products used and stored at TMI Unit 1.

b. Describe Best Management Practices and nonstructural controls used to prevent potential pollutants in stormwater.

Station and Corporate procedures require that activities be conducted to minimize the discharge of pollutants to the environment including the station stormwater collection system. Hazardous materials and petroleum products are stored in closed containers and tanks. Permanent and portable secondary containment structures are used to minimize run-off from storage handling areas. Station and Corporate procedures require prompt reporting and clean-up of spills, discharges and releases of pollutants. Periodic employee training addresses pollution prevention and spill reporting responsibilities. On-site storage material piles such as road de-ice salt are minimized and kept covered when not in use. Temporary soil erosion control measures such as straw bales, silt fencing, and mulch are used when applicable. Roads are covered with macadam or stone to minimize sediment run-off. Station personnel routinely inspect storage tanks and container storage areas.

c. For each stormwater outfall, provide the location and description of existing structural control measures to reduce pollutants in stormwater runoff; and a description of the treatment the stormwater receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Control Measures
SWRO-1	No treatment. Annual Inspection. Discharge to surface water.
SWRO-2	No treatment. Annual Inspection. Discharge to wetland area.
SWRO-3	No treatment. Annual Inspection. Discharge to surface water.
SWRO-4	No treatment. Annual Inspection. Discharge to surface water. Permanent storage tanks in the runoff area have permanent secondary containment structures.
DSN 005A	Oil/Water Separator at Fire Training Facility area. Oil/Water Separator at 200,000 gallon fuel oil storage tank off-loading area. Final sedimentation basin and oil boom for all plant stormwater discharges before being discharged to the river at DSN 005 A. Oil/Water Separators are inspected quarterly. Annual inspections for stormwater collection system and final settling basin. Permanent storage tanks in the runoff area have permanent secondary containment structures.

3. Non-stormwater Discharges

a. All non-stormwater discharges from these outfall(s) are identified in the Industrial Wastewater section of this application for the outfall.

☒ YES ☐ NO

b. Provide a description of the method used, the date of any testing, and the on-site drainage points that were directly observed during a test.

Not applicable. Non-stormwater discharges that flow into the station stormwater collection system are identified and listed in the permit application.

4. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last 3 years, including the approximate date and location of the spill or leak, and the type and amount of material released.

Not applicable. There have been no significant leaks or spills into the stormwater system over the past 3 years.

5. PREPAREDNESS, PREVENTION, AND CONTINGENCY (PPC) PLANNING.

Does the facility have a PPC plan? ☒ YES ☐ NO

Does the facility have any other related plans, such as a Pollution Incident Prevention (PIP) Plan, Spill Prevention Control and Counter Measure (SPCC) Plan or Stormwater BMP Plan? ☒ YES ☐ NO

If "YES," identify and indicate date(s) implemented.

Type of Plan	Date Implemented
Combined PPC and SPCC Plan	Current Revision - April 2003
Station Hazardous Material Response Procedure	Current Revision - June 2006

DEP may require the plan(s) be submitted with this application.

6. Additional Stormwater Information Submission

a. Could all sampling be performed as required? ☐ YES ☒ NO

(Explain below)

There were no samples collected at SWRO-4. This outfall drains a small gravel area and there is typically no observable flow through the outfall except during very heavy rain over a short time period. There are no non-stormwater sources into SWRO-4.

b. Complete a Stormwater Sampling Data Table (Module 13) for each outfall containing stormwater. Indicate the total number of tables submitted.	5

Outfall: DSN005A

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STORMWATER SAMPLING DATA TABLE
MODULE 13

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)		
OUTFALL NUMBER		REPRESENTATIVE OUTFALL NUMBER(S)	DSN 005A

1. Provide the results of at least one analysis for every pollutant in this table. See Appendix 1.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Oil and Grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
Biological Oxygen Demand (BODS)		2.7 mg/l	2.7 mg/l	1	Environmental
Chemical Oxygen Demand (COD)		< 15 mg/l	< 15 mg/l	1	Environmental
Total Suspended Solids (TSS)		5 mg/l	5 mg/l	1	Soils and sediments
Total Kjeldahl Nitrogen		< 1.0 mg/l	< 1.0 mg/l	1	Environmental
Nitrate plus Nitrite Nitrogen		0.84 mg/l	0.84 mg/l	1	Environmental
Total Phosphorus		< 0.10 mg/l	< 0.10 mg/l	1	Environmental
pH (min./Max.)		7.9	7.9	1	Environmental

2. List each pollutant that is limited by an ELG which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). See the instructions for additional details and requirements.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
pH		7.9	7.9	1	Environmental
Oil and grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
TSS		5 mg/l	5 mg/l	1	Soils and sediments
Free Cl		N/A	N/A	1	Not expected to be present.
Total Cl		N/A	N/A	1	Not expected to be present.
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Iron		0.09	0.09	1	Environmental soils
Total Chromium		< 0.003 mg/l	< 0.003 mg/l	1	Not expected to be present.
Zinc		0.03 mg/l	0.03 mg/l	1	Environmental soils
PCB		N/A	N/A	1	Not expected to be present.
Hydrazine		N/A	N/A	1	Not expected to be present.
Spectrus CT1300		N/A	N/A	1	Not expected to be present.
Fecal Coliform		220 col/100 ml	220 col/100ml	1	Environmental soils
N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A

3. List each pollutant shown in Table 3 and Pollutant Groups 1-6 that is known or believed to be present. (See Appendix 1.)

Pollutant	CAS Number (If available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Aluminum		0.08 mg/l	0.08 mg/l	1	Environmental soils
Arsenic		< 0.004 mg/l	< 0.004 mg/l	1	Not expected to be present.
Cadmium		< 0.001 mg/l	< 0.001 mg/l	1	Environmental soils
Hex. Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Trivalent Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Lead		< 0.003 mg/l	< 0.003 mg/l	1	Environmental soils
Iron		0.09 mg/l	0.09 mg/l	1	Environmental soils
Manganese		0.018 mg/l	0.018 mg/l	1	Environmental soils
Zinc		0.03 mg/l	0.03 mg/l	1	Environmental soils
Dissolved Iron		0.10 mg/l	0.10 mg/l	1	Environmental soils
Fecal Coliform		220 col/100 ml	220 col/100ml	1	Environmental soils
Surfactant (MBAS)		0.072 mg/l	0.072 mg/l	1	N/A
pH (Field)		7.9	7.9	1	Environmental soils
Asbestos		0 fibers	0 fibers	1	Not expected to be present.

4. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable event	5. Maximum flow rate during rain event (gallons per minute or specify units)	6. Total flow from rain event (gallons or specify units	7. Season Sample Was taken	8. Form of Precipitation (rainfall, snowmelt)
Oct. 27 - Oct. 28, 2006	900 minutes	1.97 inches per USGS data summary	Approx. 100 hours. Last prior rain event on Oct. 23, 2006.	10,752 gpm (conservative calculation)	3,530,000 gallons (conservative calculation)	Fall 2006	Rain

5. Provide a description of the method of flow measurement or estimate.

Stormwater flow was estimated by using US Geological Survey (USGS) precipitation data collected from the USGS Susquehanna River at Harrisburg, PA gauge station (ID #01570500). Stormwater flows for the sampled rain event were calculated using the estimated pervious and impervious surface areas located within the stormwater drainage areas. A run-off coefficient of 0.9 was used for the impervious areas (parking lots, roof tops) and a run-off coefficient of 0.5 was used for the pervious areas (stone, dirt, gravel).

Outfall: SWRO-1

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

STORMWATER SAMPLING DATA TABLE
MODULE 13

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)		
OUTFALL NUMBER		REPRESENTATIVE OUTFALL NUMBER(S)	SWRO-1

1. Provide the results of at least one analysis for every pollutant in this table. See Appendix 1.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Oil and Grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
Biological Oxygen Demand (BODS)		4.7 mg/l	4.7 mg/l	1	Environmental
Chemical Oxygen Demand (COD)		< 15 mg/l	< 15 mg/l	1	Environmental
Total Suspended Solids (TSS)		70 mg/l	70 mg/l	1	Soils and sediments
Total Kjeldahl Nitrogen		1.1 mg/l	1.1 mg/l	1	Environmental
Nitrate plus Nitrite Nitrogen		1.0 mg/l	1.0 mg/l	1	Environmental
Total Phosphorus		0.17 mg/l	0.17 mg/l	1	Environmental
pH (min./Max.)		7.5	7.5	1	Environmental

2. List each pollutant that is limited by an ELG which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). See the instructions for additional details and requirements.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
pH		7.5	7.5	1	Environmental
Oil and grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
TSS		70 mg/l	70 mg/l	1	Soils and sediments
Free Cl		N/A	N/A	1	Not expected to be present.
Total Cl		N/A	N/A	1	Not expected to be present.
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Iron		1.37	1.37	1	Environmental soils
Total Chromium		< 0.003 mg/l	< 0.003 mg/l	1	Not expected to be present.
Zinc		0.04 mg/l	0.04 mg/l	1	Environmental soils
PCB		N/A	N/A	1	Not expected to be present.
Hydrazine		N/A	N/A	1	Not expected to be present.
pectrus CT1300		N/A	N/A	1	Not expected to be present.
Fecal Coliform		230 col/100 ml	230 col/100ml	1	Environmental soils
N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A

3. List each pollutant shown in Table 3 and Pollutant Groups 1-6 that is known or believed to be present. (See Appendix 1.)

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Aluminum		0.71 mg/l	0.71 mg/l	1	Environmental soils
Arsenic		< 0.004 mg/l	< 0.004 mg/l	1	Not expected to be present.
Cadmium		< 0.001 mg/l	< 0.001 mg/l	1	Environmental soils
Hex. Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Trivalent Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Lead		0.005 mg/l	0.005 mg/l	1	Environmental soils
Iron		1.37 mg/l	1.37 mg/l	1	Environmental soils
Manganese		0.125 mg/l	0.125 mg/l	1	Environmental soils
Zinc		0.04 mg/l	0.04 mg/l	1	Environmental soils
Dissolved Iron		0.47 mg/l	0.47 mg/l	1	Environmental soils
Fecal Coliform		230 col/100 ml	230 col/100ml	1	Environmental soils
Surfactant (MBAS)		N/A	N/A	1	Not expected to be present.
pH (Field)		7.5	7.5	1	Environmental soils

4. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable event	5. Maximum flow rate during rain event (gallons per minute or specify units)	6. Total flow from rain event (gallons or specify units	7. Season Sample Was taken	8. Form of Precipitation (rainfall, snowmelt)
Oct. 27 - Oct. 28, 2006	900 minutes	1.97 inches per USGS data summary	Approx. 100 hours. Last prior rain event on Oct. 23, 2006.	1,500 gpm (conservative calculation)	500,000 gallons (conservative calculation)	Fall 2006	Rain

5. Provide a description of the method of flow measurement or estimate.

Stormwater flow was estimated by using US Geological Survey (USGS) precipitation data collected from the USGS Susquehanna River at Harrisburg, PA gauge station (ID #01570500). Stormwater flows for the sampled rain event were calculated using the estimated pervious and impervious surface areas located within the stormwater drainage areas. A run-off coefficient of 0.9 was used for the impervious areas (parking lots, roof tops) and a run-off coefficient of 0.5 was used for the pervious areas (stone, dirt, gravel).

Applicant Name: AmerGen Three Mile Island (NPDES

Outfall: SWRO-1

Applicant Name: AmerGen Three Mile Island (NPDES

Outfall: SWRO-2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

STORMWATER SAMPLING DATA TABLE
MODULE 13

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009S20)
OUTFALL NUMBER	REPRESENTATIVE OUTFALL NUMBER(S) SWRO-2

1. Provide the results of at least one analysis for every pollutant in this table. See Appendix 1.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Oil and Grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
Biological Oxygen Demand (BODS)		3.3 mg/l	3.3 mg/l	1	Environmental
Chemical Oxygen Demand (COD)		< 15 mg/l	< 15 mg/l	1	Environmental
Total Suspended Solids (TSS)		7 mg/l	7 mg/l	1	Soils and sediments
Total Kjeldahl Nitrogen		< 1 mg/l	< 1 mg/l	1	Environmental
Nitrate plus Nitrite Nitrogen		1.6 mg/l	1.6 mg/l	1	Environmental
Total Phosphorus		0.5 mg/l	0.5 mg/l	1	Environmental
pH (min./Max.)		7.8	7.8	1	Environmental

2. List each pollutant that is limited by an ELG which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). See the instructions for additional details and requirements.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
pH		7.8	7.8	1	Environmental
Oil and grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
TSS		7 mg/l	7 mg/l	1	Soils and sediments
Free Cl		N/A	N/A	1	Not expected to be present.
Total Cl		N/A	N/A	1	Not expected to be present.
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Iron		0.14	0.14	1	Environmental soils
Total Chromium		< 0.003 mg/l	< 0.003 mg/l	1	Not expected to be present.
Zinc		0.04 mg/l	0.04 mg/l	1	Environmental soils
PCB		N/A	N/A	1	Not expected to be present.
Hydrazine		N/A	N/A	1	Not expected to be present.
pectrus CT1300		N/A	N/A	1	Not expected to be present.
al Coliform		340 col/100 ml	340 col/100ml	1	Environmental soils
N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A

3. List each pollutant shown in Table 3 and Pollutant Groups 1-6 that is known or believed to be present. (See Appendix 1.)

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Aluminum		0.1 mg/l	0.1 mg/l	1	Environmental soils
Arsenic		< 0.004 mg/l	< 0.004 mg/l	1	Not expected to be present.
Cadmium		< 0.001 mg/l	< 0.001 mg/l	1	Environmental soils
Hex. Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Trivalent Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Lead		< 0.003 mg/l	< 0.003 mg/l	1	Environmental soils
Iron		0.14 mg/l	0.14 mg/l	1	Environmental soils
Manganese		0.01 mg/l	0.01 mg/l	1	Environmental soils
Zinc		0.03 mg/l	0.03 mg/l	1	Environmental soils
Dissolved Iron		0.14 mg/l	0.14 mg/l	1	Environmental soils
Fecal Coliform		340 col/100 ml	340 col/100ml	1	Environmental soils
Surfactant (MBAS)		0.111	0.111	1	Transportation Building
pH (Field)		7.8	7.8	1	Environmental soils

4. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable event	5. Maximum flow rate during rain event (gallons per minute or specify units)	6. Total flow from rain event (gallons or specify units	7. Season Sample Was taken	8. Form of Precipitation (rainfall, snowmelt)
Oct. 27 - Oct. 28, 2006	900 minutes	1.97 inches per USGS data summary	Approx. 100 hours. Last prior rain event on Oct. 23, 2006.	1,100 gpm (conservative calculation)	370,000 gallons (conservative calculation)	Fall 2006	Rain

5. Provide a description of the method of flow measurement or estimate.

Stormwater flow was estimated by using US Geological Survey (USGS) precipitation data collected from the USGS Susquehanna River at Harrisburg, PA gauge station (ID #01570500). Stormwater flows for the sampled rain event were calculated using the estimated pervious and impervious surface areas located within the stormwater drainage areas. A run-off coefficient of 0.9 was used for the impervious areas (parking lots, roof tops) and a run-off coefficient of 0.5 was used for the pervious areas (stone, dirt, gravel).

Applicant Name: AmerGen Three Mile Island (NPDES

Outfall: SWRO-2

Applicant Name: AmerGen Three Mile Island (NPDES Permit 0009920)

Outfall: SWRO-3

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

STORMWATER SAMPLING DATA TABLE
MODULE 13

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	AmerGen Three Mile Island (NPDES Permit 0009920)		
OUTFALL NUMBER		REPRESENTATIVE OUTFALL NUMBER(S)	SWRO-3

1. Provide the results of at least one analysis for every pollutant in this table. See Appendix 1.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Oil and Grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
Biological Oxygen Demand (BODS)		3.9 mg/l	3.9 mg/l	1	Environmental
Chemical Oxygen Demand (COD)		< 15 mg/l	< 15 mg/l	1	Environmental
Total Suspended Solids (TSS)		16 mg/l	16 mg/l	1	Soils and sediments
Total Kjeldahl Nitrogen		< 1 mg/l	< 1 mg/l	1	Environmental
Nitrate plus Nitrite Nitrogen		0.64 mg/l	0.64 mg/l	1	Environmental
Total Phosphorus		0.24 mg/l	0.24 mg/l	1	Environmental
pH (min./Max.)		7.4	7.4	1	Environmental

2. List each pollutant that is limited by an ELG which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). See the instructions for additional details and requirements.

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
pH		7.4	7.4	1	Environmental
Oil and grease		< 2 mg/l	< 2 mg/l	1	Parking Lots, Equipment
TSS		16 mg/l	16 mg/l	1	Soils and sediments
Free Cl		N/A	N/A	1	Not expected to be present.
Total Cl		N/A	N/A	1	Not expected to be present.
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Iron		1.11	1.11	1	Environmental soils
Total Chromium		< 0.003 mg/l	< 0.003 mg/l	1	Not expected to be present.
Zinc		0.02 mg/l	0.02 mg/l	1	Environmental soils
PCB		N/A	N/A	1	Not expected to be present.
Hydrazine		N/A	N/A	1	Not expected to be present.
Spectrus CT1300		N/A	N/A	1	Not expected to be present.
Fecal Coliform		2800 col/100 ml	2800 col/100ml	1	Environmental soils
N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A

3. List each pollutant shown in Table 3 and Pollutant Groups 1-6 that is known or believed to be present. (See Appendix 1.)

Pollutant	CAS Number (if available)	Maximum Values (include units) Grab Sample Taken During First 30 Minutes	Average Values (include units) Grab Sample Taken During First 30 Minutes	Number of Storm Events Sampled	Sources of Pollutants
Aluminum		0.6 mg/l	0.6 mg/l	1	Environmental soils
Arsenic		< 0.004 mg/l	< 0.004 mg/l	1	Not expected to be present.
Cadmium		< 0.001 mg/l	< 0.001 mg/l	1	Environmental soils
Hex. Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Trivalent Chromium		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Copper		< 0.01 mg/l	< 0.01 mg/l	1	Environmental soils
Lead		0.004 mg/l	0.004 mg/l	1	Environmental soils
Iron		1.11 mg/l	1.11 mg/l	1	Environmental soils
Manganese		0.122 mg/l	0.122 mg/l	1	Environmental soils
Zinc		0.02 mg/l	0.02 mg/l	1	Environmental soils
Dissolved Iron		0.54 mg/l	0.54 mg/l	1	Environmental soils
Fecal Coliform		2800 col/100 ml	2800 col/100ml	1	Environmental soils
Surfactant (MBAS)		N/A	N/A	1	Not expected to be present.
pH (Field)		7.4	7.4	1	Environmental soils

4. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm (in minutes)	3. Total rainfall during storm event (in inches)	4. Number of hours between beginning of storm measured and end of previous measurable event	5. Maximum flow rate during rain event (gallons per minute or specify units)	6. Total flow from rain event (gallons or specify units	7. Season Sample Was taken	8. Form of Precipitation (rainfall, snowmelt)
Oct. 27 - Oct. 28, 2006	900 minutes	1.97 inches per USGS data summary	Approx. 100 hours. Last prior rain event on Oct. 23, 2006.	1,800 gpm (conservative calculation)	590,000 gallons (conservative calculation)	Fall 2006	Rain

5. Provide a description of the method of flow measurement or estimate.

Stormwater flow was estimated by using US Geological Survey (USGS) precipitation data collected from the USGS Susquehanna River at Harrisburg, PA gauge station (ID #01570500). Stormwater flows for the sampled rain event were calculated using the estimated pervious and impervious surface areas located within the stormwater drainage areas. A run-off coefficient of 0.9 was used for the impervious areas (parking lots, roof tops) and a run-off coefficient of 0.5 was used for the pervious areas (stone, dirt, gravel).

Applicant Name: AmerGen Three Mile Island (NPDES

Outfall: SWRO-3

National Pollutant Discharge Elimination System

NPDES Permit PA 0009920

Permit Renewal Application
April 2, 2007

Three Mile Island Unit-1
AmerGen Energy Company, LLC

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

THREE MILE ISLAND NUCLEAR STATION

Analysis of Three Mile Island Area Hydrographic Survey

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Project No. 53753307
Report No. 53753307-CE-DR-1
November, 2005

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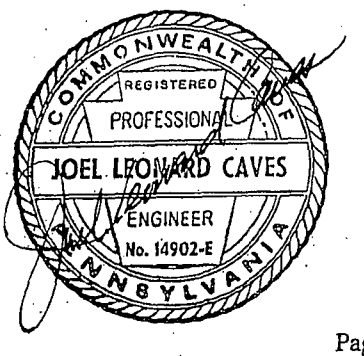

Analysis of Three Mile Island Area Hydrographic Survey Report

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SUMMARY

An updated analysis was performed to evaluate the effect of changes to the river bottom that have occurred since the last hydrographic survey and analysis. Although the most recent analysis was completed in 1998, many of the cross sections had not been surveyed since 1987. Consequently, the present study is the most thorough that has been performed for the TMINS in the past 18 years.

For Case 1, which is a design base condition for the intake structure, the predicted flow at the upstream end of the Middle Channel increased from 43% to 54% of the 1700 cfs river flow. However, the corresponding Middle Channel water level at the intake fell 0.25 ft from El. 272.21 to El. 271.96. This combination of conditions is most likely due to the lower bottom elevations that presently exist in the Middle Channel compared to those in the 1997-98 study.

For Case 6, which is a more conservative scenario than required by the NRC, the conclusions include:

- The predicted water surface elevation in the Middle Channel at the TMINS intake at 1700 cfs river flow was slightly lower in Case 6 than in Case 1 (El. 271.93 vs. El. 271.96) due to flow being diverted from the main part of the river to the East Channel
- With the East Channel Dam removed as well as the York Haven Dam, the percent of river flow in the East Channel increased from 6% at 1700 cfs river flow to 11% at 30,000 cfs river flow.
- Maintaining the elevation of the alluvial bed in the upper East Channel would be important relative to the water levels at the TMINS intake if the East Channel Dam would fail. If that occurs, the upper East Channel bed should be monitored and, if it is found that the bed is eroding, measures should be taken to retard the East Channel discharge or reinforce the river bed against erosion.

1. INTRODUCTION

The Susquehanna River provides the sole source of cooling water for the Three Mile Island Nuclear Station (TMINS) located about 10 miles southeast of Harrisburg, Pennsylvania. Three Mile Island is one of three large islands and numerous small islands in the wide reach of the river between the communities of Middletown and York Haven. The other large islands are Shelly Island, which is directly west of Three Mile Island, and Hill Island that is across the river from Middletown and north of Shelly Island (Figure 1).

From the southwestern side of Three Mile Island, the approximately ten-foot high (average) York Haven Dam extends about 5000 feet diagonally across the main river channel and meets a 3000-foot long headrace wall that directs flow to the York Haven Hydroelectric Station. These structures and the East Channel Dam (a.k.a. Red Hill Dam), an eight-foot high dam across the East Channel between Three Mile Island and the east shore, create Lake Frederick that extends upstream to Fall Island which is directly east of Hill Island.

During the design of the TMINS, extensive hydraulic analyses of river levels near Three Mile Island were made by Gilbert Associates, Inc. from 1967 to 1975 to provide assurance that the units can safely operate during extremely high and low, as well as normal, river conditions. In 1986 and 1987, GPU Nuclear Corporation (GPUN), the owner at that time, contracted Gilbert Commonwealth, Inc. to review and update the original low water analysis. Two reports were prepared. The first was a review of the bases of the original analysis (Reference 1) and the second (Reference 2) was a reevaluation of low river flow conditions taking into account changes to the alluvial river bed that had occurred since the original hydrographic survey in 1967.

Additional analyses were made in 1997-98 following aerial photogrammetry and hydrographic survey work done in 1995-96 as part of the York Haven Hydroelectric Station's fish passage project. The objective of the fish passage project was to provide a means for American Shad to migrate upriver in the spring past the dams near York Haven. In 1995, after the fish passage focus changed from designing a facility at the headrace of the main dam to providing a fishway at the East Channel Dam, new cross section data were obtained for stations at the river branch just upstream of Three Mile Island and Shelly Island, and stations in the East Channel and Conewago Rapids. Since both power stations were part of the GPU system, the new data were made available for updating the TMINS low river flow analysis in 1997. The analysis was expanded in 1998 to consider river flows up to 30,000 cfs which is roughly the mean annual flow in this area (Reference 3).

The present work updates the hydraulic analyses for two cases evaluated in the 1997-98 project. It uses new cross section data that were obtained in April 2005 in the West, Middle, and East Channels near Three Mile Island.

2. PURPOSE

The purpose of this study is to predict channel water levels at the TMINS intake structure and the flow distribution among the West Channel, Middle Channel, and East Channel for the two postulated scenarios described below. This information will assist AmerGen in determining the potential impacts of river bottom changes on the safe and economic operation of TMINS.

3. SCOPE OF WORK

The scope of work is in accordance with Spotts, Stevens and McCoy (SSM) proposals of 10/13/04 (Reference 4) and 7/21/05 (Reference 5). The scenarios for the analysis are as follows:

Case 1

- River flow of 1700 cfs, which is the minimum daily flow of record at Harrisburg
- TMINS intake flow of 130 cfs
- Postulated failure and complete removal of the York Haven Dam
- East Channel Dam intact but fish ladder not operating

Case 6

- River flows of 1700, 4000, 8000, 12000, 16000, 20000, 25000, and 30000 cfs
- TMINS intake flow of 130 cfs
- Postulated failure and complete removal of the York Haven Dam and the East Channel Dam

The present study is a continuation of, and consistent with, previous studies that were most recently documented in Parsons Calculation No. DC-53539000258-01 (Reference 6), and the corresponding report (Reference 3). Accordingly, these case numbers go back to 1997-98 and, with respect to Case 1, earlier.

The Case 1 scenario is the same as for Case 1 described in Reference 3 except that the plant flow was then 47 cfs. There has been one structural change to the river since the Reference 3 was issued. That is the York Haven Fish Passage which was constructed in the East Channel and put into operation in the spring of 2000. As described in Reference 7, the fish passage consists of a baffled fish ladder along the east side of Three Mile Island, at the west end of the East Channel Dam, and an attraction flow control facility.

Attraction flow control at the fish passage is provided by two weirs cut into the East Channel Dam and two 20-foot wide openings in a permanent cofferdam that extends diagonally in plan from the east bank of the island to the dam about 145 feet from Three Mile Island, east of the weirs. One weir is 67-feet long with a base crest level of El. 271.0[1]. The other is a gated, 7-foot long, weir with a base crest level of El. 273.0. Stoplogs are used to adjust the

[1] All elevations are in feet relative to the 1929 National Geodetic Vertical Datum (NGVD).

effective crest elevation of the longer weir. Each cofferdam opening has a stoplog bulkhead and a 20-foot wide vertical slide gate with an overhead access bridge.

Under a 1997 agreement, the fish passage is to operate each year in April - June when American Shad are migrating upstream and when river flows are 6000 to 150,000 cfs. Since the Case 1 river flow is 1700 cfs, the minimum daily flow of record at the Harrisburg USGS gage, the fish passage would not be in service due to the operating rule. Furthermore, from a hydrologic standpoint, it would be very unlikely that 1700 cfs would occur during the April - June period since very low flows typically occur in the summer or fall. Therefore, Case 1 in the present study is based on there being no opening at the East Channel Dam below the dam's crest which, according to a 1997 survey by Acres International Corp., varies from El. 278.4 to El. 279.13.

The Case 6 scenario was not addressed prior to the 1998 revision to the 1997 study because the Nuclear Regulatory Commission (NRC) Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants", does not require consideration of multiple failures of manmade structural features. It was added in 1998 at the request of GPU Nuclear, Inc., the plant owner at the time. The assumption in Case 6 that both dams have failed is therefore more conservative than required by the NRC.

As in previous studies, final results for the analyses are based on the most recent hydrographic survey data. For Case 6, supplemental results are also given to illustrate the effects of East Channel bottom changes; this aspect is explained in Section 4.3.

4. HYDRAULIC MODELING

4.1 Stations and Schematics

Figure 1 shows locations of stations used in the analysis. The channel west of Hill Island was neglected in both cases because its upstream end is effectively blocked by large boulders at low river flows. Several new stations were developed that were not used in the 1998 study. The new stations are 2A, 3A, 4A, 5A, 7A, 8A, 9A, 10A, 48A, 49A, 50A, and 51A[2] and they provide increased resolution for the shape of the river. Approximately midway between Stations 3A and 4 there is a dredged canal that will convey water from the thalweg of the Middle Channel to the TMINS intake structure, on the west side of Three Mile Island, at extremely low river flows.

As mentioned in Section 3, both cases assume York Haven Dam, the main dam connecting the York Haven Headrace Wall on the south and Three Mile Island on the north, has failed and been completely removed. That means flow from the Middle and West Channels will change from subcritical hydraulic conditions in the flatter reaches of the river, which are upstream of the area between the dam and Station 1, to supercritical conditions as flow approaches the failed dam location. Station 1 was, therefore, used to define a boundary

[2] See Section 4.2 for an explanation of station numbers used in the HEC-RAS model.

condition for the flow between Three Mile Island and the west shore of the river in both cases.

Case 1 and Case 6 differed regarding the existence of the East Channel Dam. With the presence of the East Channel Dam in Case 1 and the fact that the river level at the East Channel entrance will be lower than the dam's crest at the 1700 cfs river flow, there will be no flow in the East Channel. Therefore, it was not necessary to include the East Channel in the Case 1 model. For Case 6, however, the dam is assumed to be completely removed and, consequently, water levels at the TMINS intake may be affected by conditions in the lower East Channel and Conewago Rapids (Figure 2), depending on the river discharge. Thus, the Conewago Rapids and East Channel were included in the Case 6 analysis.

Hydraulic modeling was done with the U. S. Army Corps of Engineers Hydrologic Engineering Center's River Analysis System (HEC-RAS) software, Version 3.1.3 (Reference 8). Figure 3 is a schematic for the Case 1 model and Figures 4 and 5 are schematics for modeling Case 6. The overall river network was divided into six river reaches based on the locations where the main channel divides and rejoins. The river reaches are:

1. Upper – the mainstem of the Susquehanna River, upstream of the trifurcation at Three Mile Island. This reach includes only Station 12.[3]
2. West – the West Channel, from Station 11 to 1B.
3. Middle – the Middle Channel, from Station 53 to 1A.
4. East – the East Channel, from Station 52 to 29.
5. WestMiddle – a reach that connects the south ends of the West and Middle reaches. This reach has only Station 1.[4]
6. Conewago Rapids

Hydraulic calculations are presented in Reference 9.

HEC-RAS requires each reach to have a minimum of two cross sections. Therefore, a second cross section was added to the Upper and WestMiddle reaches. For the Upper reach, Station 12.05, a duplicate of cross section 12, was placed 1 foot upstream of Station 12. For the WestMiddle reach, Station 1.05, a duplicate of cross section 1, was placed 1 foot upstream of Station 1. These additional cross sections satisfy HEC-RAS's requirement for two cross sections but do not affect the hydraulic computations.

The six reaches split and rejoin at three model junctions. The Upper, West, Middle, and East reaches split at a junction named North; the West, Middle, and WestMiddle reaches meet at a junction named South1. Since the scenarios for Cases 1 and 6 assume the York Haven Dam has been removed, no water will go to the York Haven Hydroelectric Station. Consequently, all of the discharge of the WestMiddle Channel will meet flow from the East Channel at Station 29[4] and pass through Conewago Rapids. These junctions can be seen on the model schematics (Figures 4 and 5) for Case 6.

[3] Not including the extra station necessary to meet the HEC-RAS requirement to have at least two cross sections per channel as described in the next paragraph.

[4] Station 29 is the same as cross section 3029 in the 1997-98 analysis.

Regarding Conewago Rapids, conditions there will not affect Case 1 flows or water levels in the Middle Channel, where the TMINS intake is located, due to the presence of the East Channel Dam and the steep channel bed slope between Stations 1 and 29. In Case 6, though, the Middle Channel conditions may be affected at higher flows due to the assumed removal of the East Channel Dam. Therefore, to properly account for the flow in the rapids downstream of the East Channel confluence, a separate model of the Conewago Rapids was run in Case 6 to develop a rating curve at Station 29.

4.2 Cross Section Data

Ocean Surveys, Inc (OSI) of Old Saybrook, CT, was contracted by AmerGen to survey the Susquehanna River in the vicinity of Three Mile Island. The survey was done 4/22/05-4/24/05 by using a global positioning system (GPS) unit to track the location of the OSI survey boat as it covered the survey area measuring water depths and recording the bottom coordinates in three dimensions. OSI then created a terrain model and calculated bottom elevation versus cross-channel distance at pre-defined cross section locations.

OSI's report (Reference 10) is a set of 11-inch x 17-inch exhibits including an aerial photograph of the Three Mile Island area, the photograph overlaid with bottom contours (Figure 6) and with the 36 cross sections they surveyed (Figure 1), and plots of the cross sections looking upstream. A sample cross section from the OSI report is included as Figure 7. To be consistent with previous surveys of the area, the Pennsylvania State Plane Coordinates – South Zone were used by OSI for the cross section end points and the river channel.

OSI subsequently provided to SSM the elevation-distance data for each cross section in Excel format. Many of the cross sections had several thousand data points which exceeded the HEC-RAS limit of 500 data points per cross section. The original data were reduced to 500 or fewer data points using the following process:

1. The total number of data points was divided by 500 and rounded up to the nearest integer to determine the factor by which the original data would be reduced. For example, if 2100 data points were given, then 2100/500 = 4.2, which was rounded to 5. As a result, the original data were reduced by a factor of 5, giving a final total of 2100/5 = 420 data points.

2. The original data were grouped in sets of the reduction factor – in this example, in groups of 5.

3. The pivot table function in Microsoft Excel was used to average each set and produce an elevation-distance data set of 500 or fewer points. In this example, the final cross section input to HEC-RAS had 420 data points.

4. The final, reduced cross sections were plotted against the original cross section to confirm that the overall shape of the cross section was not altered by this data-reduction process.

5. The cross section endpoints and island shorelines were manually adjusted to match the original data.

As an example, Figure 7 shows the cross section at Station 1 as received from OSI. The overlay of the reduced and original cross sections in Figure 8 shows that the reduction procedure retained the cross section's characteristics. Since HEC-RAS's normal convention is to view cross sections looking downstream, the OSI cross sections were reversed in Excel before being input to HEC-RAS. An example of a reversed cross section is attached in Figure 9.

OSI's GPS-based survey methodology facilitated adding extra cross sections between those considered in previous surveys. All of the extra OSI cross sections were named with an "A" or "B" after the number – 1A, 1B, 5A, etc. For the HEC-RAS input, the cross sections were named in ascending numeric order progressing upstream by retaining the base number and assigning .1 to represent "A" or .2 to represent "B". For example, 1A was named 1.1 and 1B was named 1.2 in the model. However, the text description of each cross section in HEC-RAS notes the original cross section name using the "A" or "B".

The GPS methodology, though, prevented OSI from surveying the west end of the cross sections at three East Channel stations (Stations 45.1, 46, and 46.1) due to overhanging vegetation that obscured the satellites. The missing portion of the cross sections define a relatively narrow (approximately 200 foot width) sub-channel between Three Mile Island and the island downstream of the East Channel Dam. The channel had been surveyed by conventional land surveying methods in 1995.[5]

To conservatively assess the effect of using the 1995 data to supplement the OSI data that were obtained for the main part of the East Channel at the three stations, a sensitivity analysis was incorporated into the analysis. It involved making HEC-RAS runs for the Case 6 river flows to determine the Middle Channel water surface elevations at the intake using the 1995 data for the west end of the three stations and then repeating the runs with the bottom of the sub-channel 2.0 feet below the 1995 elevations. As indicated in Section 6, this procedure showed that the Case 6 water levels at the intake were not sensitive to a two-foot variation in the sub-channel bottom and, therefore, the 1995 data could be safely used for the missing data.

In contrast to the alluvial bottom at upstream locations, the streambed in the lower East channel and Conewago Rapids is very rocky and is highly resistant to erosion. This portion of the study area was not surveyed by OSI. Instead, 13 cross sections in the lower East

[5] In addition to the west end of these stations, the west portion of Station 46.18 also was not surveyed by OSI. Most likely it was due to the hazard of operating a survey boat in the vicinity of the fish passage attraction flow weir (two field personnel capsized and drowned in this area about 1994 while performing a fish survey). Since the station is at the tailwater of the East Channel Dam where the bed is generally scoured to bedrock, data from the Station 46.18 cross section in the 1998 analysis were used to complete the west portion of the cross section.

Channel and Conewago Rapids were imported to HEC-RAS from the HEC-2 model used for this portion of the river in the 1997-98 analysis.

As indicated by the dotted-pattern area of Figure 2, the cross sections are 45, 44.2, 44.1, and 44 in the lower East channel and 29, 24.3, 24.2, 24.1, 24, 23, 22, 21, and 20 in Conewago Rapids. These cross sections are defined in the 1998 HEC-2 input file which was Appendix L in the 1998 calculations (Reference 7). As mentioned in Sections 4.4 and 4.5, reach lengths and Manning friction factors were also imported from the same HEC-2 file. The "reverse cross section" feature in HEC-RAS was used to reverse the HEC-2 cross sections from looking upstream to looking downstream.[6] Coordinates for the endpoints of the lower East Channel and Conewago Rapids cross sections from 1997-98 were estimated using the color aerial photos provided by OSI. The coordinates were used for showing the river schematic (Figure 4) and not for the hydraulic computations.

Appendix 1 has plots of cross sections surveyed by OSI and those in the lower East Channel (Station 45 and downstream) that were from the 1995 survey used in the 1997-98 analysis. These are the cross sections used for Case 1 (excluding those in the East Channel) and Case 6. The west end of the cross sections at Stations 45.1, 46, and 46.1 in Appendix 1 are also from the 1995 survey as noted earlier in this section.

For comparison, Appendix 2 shows the cross sections at Stations 45.1, 46, and 46.1 with the channel at the west ends lowered 2.0 feet below the 1995 bottom. They are the cross sections that replaced the cross sections at those stations in Cases 6a and 6Ma as described in Section 6. Appendix 3 has plots of the Conewago Rapids cross sections for Stations 29 down to 20 that were used in developing the rating curve at Station 29.

4.3 Modified Cross Sections in Upper East Channel

The Modified Bottom scenario used in the Case 6 supplemental analyses (Cases 6M and 6Ma) assumes material is removed from the channel bed upstream of the East Channel Dam such that the cross sections are trapezoidal with thalweg elevations that vary linearly with distance between the rock bed at Station 46.18, just downstream of the dam, and the rock bed at the east end of Station 12 in the mainstem of the river.

The concept of the Modified Bottom came from the York Haven fish passage project in the mid-1990s and was used in the 1997-98 study for TMINS. The purpose is simply to illustrate the sensitivity of the TMINS intake water level and the distribution of flow among the three principal river channels to bottom elevations in the portion of the East Channel that has alluvial bed materials. It is important to note that the Modified Bottom is not based on quantitative analysis of the channel's sediment transport capability and is not meant to imply that substantial changes in the East Channel are expected if the dam is removed. The cross sections with a modified bottom in the upper East Channel used for simulations 6M and 6Ma are shown in Appendix 4.

[6] Since the original hydrographic survey in 1967, all cross sections have looked upstream until the present study.

4.4 Reach Lengths and Skew Angles

At normal discharges, river flow generally follows the channel centerline that is defined by the river banks. At extremely low flow rates, though, the effective river banks can be much different than the normal river banks. Because of this, a copy of the OSI river station ("Profile Locations") map was marked to show the location of the present thalweg, the low portions of the cross section at extremely low river flows (e.g., 2000 cfs ±), and the low portions at moderately low flows (e.g., 8000 cfs ±). Flow depths for this purpose were approximated using the results from the 1998 analysis.

The map in Figure 10 shows the line of flow at extremely low discharges will deviate considerably from the normal channel centerlines. At moderately low discharges, the flow lines will be closer to the normal centerlines. To account for the deviations, two sets of reach lengths between stations were used as indicated in Table 1.

Theoretically, cross sections should be perpendicular to the axis of flow. With different flow lines at low discharges, the ideal orientation of cross sections will vary. To approximate the changes, two sets of skew angles (Table 2) were specified in the HEC-RAS input; one set for extremely low flows and the other for moderately low flows. The skew angles, which are the angles between the surveyed cross section and the perpendicular to the flow line, can be seen on Figure 10.

4.5 Loss Coefficients

The Manning's "n" values used for Conewago Rapids and the portion of the East Channel downstream of the dam were the result of calibrating the model against river gaging data collected during December 1995 - August 1996 in the design of the York Haven fish passage. Because the data collection did not include flow measurements, East Channel flow rates for each day were estimated from measured headwater elevations at the East Channel Dam and a head vs. flow rating relationship for spillage at the dam. Corresponding flows west of Three Mile Island were computed as the difference between the river and East Channel flows.

Initially, the rating relationship was based on the weir equation and best estimates for the East Channel Dam crest elevation, effective crest length, and weir coefficient. Subsequently, from a scaled physical model, Alden Research Laboratories developed a rating curve for the dam that should be more accurate. Using channel flows based on the ARL curve, the Manning's "n" values in Table 3 were selected based on Reference 11, Page A-22. The values, which were used in the present analysis, have a slightly low coefficient (0.038 vs. 0.040) for Stations 47 – 51.1 that, if anything, should tend to overestimate the percentage of East Channel flow and underestimate the intake water level, which is conservative. Since the gaging points at bridges were on the upstream side, the coefficients implicitly include energy losses at the north and south bridges.

For the West and Middle Channels, the likely representative n values are between 0.025 and 0.050. Recognizing the uncertainty in selecting values, HEC-RAS cases were run with 0.025, 0.035, and 0.050. The run that gave the lowest water surface level at the TMINS intake location was then selected.

4.6 Analysis Procedure

For Cases 1 and 6, a boundary condition was specified at Station 1 to define the water level vs. flow relationship that would exist after failure of the main dam. In reality, the flow condition that would result after removal of the main dam would be highly dependent on the river bed and dam remnants that remained in place, which, of course, would vary with location along the present dam location.

At locations somewhere between the dam and Station 1, the bed of the river will change from a hydraulically mild slope at Station 1 to a steep slope at the dam site. Therefore, with the dam removed, critical depth will exist. Since the location of critical depth cannot be accurately predicted, a range of water levels was considered for the boundary condition at Station 1 to assess the effect on the Middle Channel water surface elevation at the TMINS intake. The Station 1 conditions corresponded to critical depth (Dc), 1.5*Dc, and 2.0*Dc. The run that gave the lowest Middle Channel water level at the TMINS intake was then chosen as the most critical.

For Case 6 it was also necessary to specify a hydraulic control boundary condition at the downstream end of the Conewago Rapids, Station 20, since the water surface profile in the rapids can affect East Channel flow rates and levels (and, hence, conditions at the TMINS intake) at higher river discharges. A 1986 GPU rating curve from Appendices 2 and 3 for the tailwater at the York Haven station was utilized for the boundary condition at Station 20. In Case 1, with the East Channel Dam in place and upstream water levels below the minimum dam crest level (El. 278.4), there is no flow in the East Channel and, hence, it was not necessary to model the Conewago Rapids.

5. CASE 1 ANALYSIS

Nine simulations were run for Case 1 to test the model sensitivity to Manning's n and the downstream boundary conditions. Manning's n is specified in the HEC-RAS geometry file; three geometry files were made with different n values of 0.025, 0.035, and 0.050.

Three downstream boundary conditions were specified in HEC-RAS flow files: critical depth (Dc), 1.5*Dc, and 2.0*Dc. The thalweg at Station 1 is 267.70 ft and critical depth for 1700 cfs is 1.05 ft corresponding to El. 268.75. The boundary condition for critical depth was specified directly in the first flow file. Fixed water surface elevations of 269.30 ft and 269.80 ft, corresponding to 1.5*Dc and 2.0*Dc, were then used as the boundary condition for the second and third flow files.

The combination of three geometry files and three flow files results in nine separate sensitivity runs, labeled 1-1 through 1-9. Table 4 summarizes the nine runs with the calculated flow distribution between the Middle and West Channels and the resulting water level elevations at the TMINS intake. Table 5 gives results for additional stations.

In the 1998 results for this case, the river level at the TMINS intake was 272.21 ft, with 43% of flow in the Middle Channel and 57% of flow in the West Channel.

As can be seen from Table 4, the present results proved to be insensitive to the choice of downstream boundary condition, producing identical results for Station 1 boundary conditions of Dc, 1.5*Dc, and 2.0*Dc. The minimum water elevation at the intake was computed with an n value of 0.025, so Case 1-1 with n = 0.025 and a boundary condition of critical depth was chosen as the most conservative case. The river elevation at Station 4 (just upstream of the TMINS intake) was El. 272.01 ft, and the elevation at Station 3A (just downstream of the TMINS intake) was El. 271.91 ft. Averaging, the river elevation at the TMINS intake, which is located approximately halfway between the stations, was 271.96 ft. The flow entering the Middle Channel was 914 cfs (54% of the total 1700 cfs), and the flow in the West Channel was 786 cfs (46% of the total 1700 cfs). This flow distribution is nearly the reverse of the distribution determined in 1998. The difference is probably due to river bed changes described in the following paragraphs.

Table 5 gives the water elevation, minimum channel elevation, flow, percent flow, channel velocity, and Froude number for selected stations in the study area. Bottom and water surface profiles along the Middle and West Channels are shown on Figures 11 and 12, respectively.

The calculated Middle Channel level at the TMINS intake, El. 271.96, is 0.25 feet lower than the El. 272.21 computed in the 1997-98 study. Prior to that, the level was El. 272.3 in the 1987-88 study. The most likely cause of the lower level in the present analysis is that the bottom elevations in the Middle Channel are generally lower than they were for the 1997-98 study whereas the West Channel's bottom elevations, particularly the upstream part of the West Channel, are about the same as before. This can be seen in Figures 13 and 14 that compare the present and 1997-98 bottom and water surface profiles for the two channels.

As noted in the 1998 report, the 1997-98 study was made with cross sections at Stations 12, 53, and 52 at the head of Three Mile Island that were surveyed in 1995 and at the other West and Middle Channel stations that were surveyed in 1987. In the approximately 18 years since the previous complete survey of the West and Middle Channels, it appears bed changes have altered the flow distribution and slightly lowered the channel water level at the intake.

6. CASE 6 ANALYSIS

The Case 6 analysis addresses the postulated failure and complete removal of the York Haven Dam and the East Channel Dam. The intake flow at TMINS was assumed to be 130 cfs. River flows of 1700, 4000, 8000, 12000, 16000, 20000, 25000, and 30000 cfs were

simulated with HEC-RAS to estimate the resulting water level elevations at the TMINS intake.

6.1 Case 6 Variations

In addition to eight different river flow rates, Case 6 encompasses variations based on five variables:

1. *Manning's n*
   As in Case 1, Manning's n values of 0.025, 0.035, and 0.050 were used in the West and Middle Channels. Values of Manning's n in the East Channel were as indicated in Section 4.5.

2. *Downstream boundary condition at Station 1*
   As in Case 1, three flow depth alternatives (Dc, 1.5*Dc, and 2.0*Dc) were used for the Station 1 boundary condition.

3. *Reach lengths and skew angles*
   As noted in Section 4.4, different reach lengths and cross section skew angles were used for extremely low (1700 and 4000 cfs) river flows and moderately low (8000 – 30000 cfs) river flows.

4. *Sensitivity to cross sections at Stations 45.1, 46, and 46.1*
   Due to missing data in the 2005 hydrographic survey for defining the narrow channel west of the island at these three stations, data from the 1995 survey were used as described in Section 4.2. To assess the sensitivity of the water level at the TMINS intake to the geometry of this sub-channel, a second set of model runs were made (Cases 6a and 6Ma) by lowering the 1995 bottom elevations in the sub-channel by two feet.

5. *Sensitivity to cross sections in the upper East Channel*
   The purpose of the Modified Bottom scenario is simply to illustrate the sensitivity of the TMINS intake water level and the distribution of flow among the three principal river channels to bottom elevations in the upper East Channel where there are alluvial bed materials. Section 4.3 describes the cross section modifications.

The combination of these five variables resulted in a total of 72 HEC-RAS model runs (3 Manning's n values, 3 boundary conditions at Station 1; 2 sets of reach lengths and skew angles; 2 cross sections for the west end of Stations 45.1, 46, and 46.1; and 2 cross section profiles for the upper East Channel), each with eight river flow rates.

HEC-RAS allows plan files to be assigned long identification (ID) names and short ID names. The ID names assigned in this project reflect the five variables previously mentioned. Although all 72 model runs are considered Case 6, an "a" was used to indicate that the cross section data used for the channel at the west end of Stations 45.1, 46, 46.1 is

the 1995 survey data except the bottom is lowered 2.0 feet and an "M" was used to indicate the Modified Bottom sub-cases. The plan with the long ID name of "C6Ma n50 lowq 20cd 72", for example, represents Case 6 with a modified upper East Channel bottom, lowered elevations at the west end of Stations 45.1, 46, and 46.1, n = 0.050, reach lengths and skew angles for extremely low flows, and a boundary condition of 2.0*Dc at Station 1. Short ID names are limited to 12 characters. Therefore they are abbreviated versions of the long ID names. Each plan was also numbered from 1 to 72, which appears as the last number in the name; this number quickly facilitates matching a plan in the tables with the corresponding input/output files on the CD that accompanies this calculation.

6.2 Calculation Methodology

Three rating curves were developed for the water surface elevation at Station 1 as a function of flow at Station 1. Rating points corresponding to critical depth (Dc) occurring at Station 1 were computed by running the same model as for Case 1 but with river flows from 1000 to 30,000 cfs. Results from that run were used to compute rating points for Station 1 depths of 1.5*Dc and 2.0*Dc as shown in Table 6.

Because the York Haven Hydroelectric Station cannot operate if the main dam has failed, the flow in Conewago Rapids will be equal to the river flow less the 130 cfs withdrawn by TMINS. To compute the water level at the downstream boundary of the East Channel, HEC-RAS was run with a model of the rapids between Stations 20 and 29; results are shown in Table 7.

HEC-RAS was run for Cases 6, 6a, 6M, and 6Ma with 18 sub-cases for each. A summary of the results are shown in Tables 8, 9, 10, and 11. These tables include the flow split among the three channels and the water levels near the TMINS intake.

6.3 Calculation Results

Comparison of Case 6 and 6a results on Tables 8 and 9 indicates the 2.0 ft vertical variation of the 1995 cross section for the west end of Stations 45.1, 46, and 46.1 does not affect the Middle Channel water level at the intake. Therefore, it is concluded the 1995 cross sections are satisfactory substitutes for the portions of those stations that could not be surveyed by OSI. Comparison of results on Tables 10 and 11 for the Modified Bottom cases (6M and 6Ma) shows the water level at the intake would be a little lower (less than 0.10 ft) if the bottom elevations at the west end of the three stations is 2.0 ft lower than in the 1995 survey. In light of the Modified Bottom hypothesis, though, this difference is not significant.

Over the range of river flows from 1700 to 30,000 cfs, the minimum Middle Channel water level at the TMINS intake occurred with n = 0.025 for the channels west of Three Mile Island and 1.5*Dc for the depth at Station 1. The effect of the different Station 1 boundary conditions on the intake water level was very small (less than 0.10 ft) and considerably less than the effect of the 0.025 to 0.050 range in Manning's n values.

The water surface elevation in the Middle Channel at the TMINS intake at 1700 cfs river flow was slightly lower in Cases 6 and 6a (El. 271.93 from Tables 8 and 9) than in Case 1 (El. 271.96) indicating that the combined removal of the both dams would slightly lower the water level at the intake compared to the loss of York Haven Dam alone. This was the result of some flow being diverted from the main part of the river to the East Channel due to the absence of the East Channel Dam in Case 6. The percent of river flow in the East Channel in Cases 6 and 6a increased from 6% at 1700 cfs river flow to 11% at 30,000 cfs river flow.

It can be seen from Tables 8 and 10 that the Modified Bottom substantially increased the percentage of flow in the East Channel to 73% of the river flow at 1700 cfs and 22% at 30,000 cfs river flow. It also significantly lowered the Middle Channel water level at the intake with 1700 cfs river flow from El. 271.93 in Case 6 to 271.11 in Case 6M. This clearly indicates that measures should be taken to retard the East Channel discharge if the East Channel Dam would fail and upstream bed erosion would occur. At very low river flows, this might be done by bulldozing material into the upper East Channel. At higher river flows, riprap could be dumped from the north bridge to reduce the East Channel discharge and erosion. In either situation, it would, of course, be necessary to obtain appropriate approvals and permits.

7. CONCLUSIONS

This updated analysis was performed to evaluate the effect of changes to the river bottom that have occurred since the last hydrographic survey and analysis. Although the most recent analysis was completed in 1998, many of the cross sections had not been surveyed since 1987. Consequently, the present study is the most thorough that has been performed for the TMINS in the past 18 years ago.

For Case 1, which is a design base condition for the intake structure, the predicted flow at the upstream end of the Middle Channel increased from 43% to 54% of the 1700 cfs river flow. However, the corresponding prediction of the Middle Channel water level at the intake fell by 0.25 ft from El. 272.21 to El. 271.96. This combination of conditions is most likely due to the lower bottom elevations that presently exist in the Middle Channel compared to those in the 1997-98 study.

For Case 6, which is a more conservative scenario than required by the NRC, the conclusions are:

- The 1995 cross sections are satisfactory substitutes for the west portions of the Station 45.1, 46, and 46.1 cross sections that could not be surveyed by OSI.
- Over the range of river flows from 1700 to 30,000 cfs, the minimum Middle Channel water level at the TMINS intake occurred with n = 0.025 for the channels west of Three Mile Island and 1.5*Dc for the depth at Station 1.
- The predicted water surface elevation in the Middle Channel at the TMINS intake at 1700 cfs river flow was slightly lower in Case 6 than in Case 1 (El. 271.93 vs. El. 271.96) due to flow being diverted from the main part of the river to the East Channel.

- With the East Channel Dam removed as well as the York Haven Dam, the percent of river flow in the East Channel increased from 6% at 1700 cfs river flow to 11% at 30,000 cfs river flow.
- Maintaining the elevation of the alluvial bed in the upper East Channel would be important relative to the water levels at the TMINS intake if the East Channel Dam would fail. If that occurs, the upper East Channel bed should be monitored and, if it is found that the bed is eroding, measures should be taken to retard the East Channel discharge.

REFERENCES

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4. Spotts, Stevens and McCoy, Inc., "Analytical Work for Three Mile Island Area Hydrographic Survey, Proposal Revision 1," October 13, 2004. [3]
5. Spotts, Stevens and McCoy, Inc., "Analytical Work for Three Mile Island Area Hydrographic Survey, Proposal for Scope Change 1," July 21, 2005. [3]
6. Parsons Power Group, Inc., "Three Mile Island Nuclear Station, Susquehanna River Hydraulic Study," Calculation No. DC-53539000258-01, Rev. 1, 6/22/98. [3]
7. Parsons Energy and Chemicals Group, Inc., "York Haven Hydrostation Fish Passage Project, Susquehanna River Hydraulic Analysis, Phase 4, Final Report," June, 1999 (see Appendix 3). [3]
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9. Spotts, Stevens and McCoy, Inc., Parsons E&C, "Analysis of Three Mile Island Area Hydrographic Survey," Calculation No. 53753307-CE-DC-2, November 22, 2005. [4]
10. Ocean Surveys, Inc., "TMI Emergency Canal Depth Certification and Area Hydrographic Survey, Three Mile Island, Susquehanna River, Pennsylvania," Report #05ES011, May 31 2005. [4.2]
11. Appendix MC (1998 Model Recalibrations Using ARL's Rating Curve for Existing East Channel Dam (Task 4-9)) and Addendum MCA (Recalibration of Conewago Rapids- East Channel HEC-2 Model with ARL's Rating Curve for Existing East Channel Dam (Task 4-9.1)) from York Haven Fish Passage Project (see Appendix 10). [4.5]

Table 1
Reach Lengths

Reach	Length, Feet	
	Extremely Low River Flows (a)	Low-Moderate River Flows (b)
1 - 1A	1605	1650
1A - 2	1340	1335
2 - 2A	1300	1390
2A - 3	2040	1720
3 - 3A	1200	1200
3A - 4	1255	1250
4 - 4A	665	670
4A - 5	755	715
5 - 5A	990	950
5A - 53	1095	1050
53 - 12	1760	1770
1 - 1B	2450	1880
1B - 7	1450	1460
7 - 7A	1880	1885
7A - 8	2500	1800
8 - 8A	1675	1635
8A - 9	2550	2190
9 - 9A	800	775
9A - 10	810	795
10 - 10A	1390	1380
10A - 11	1210	1200
11 - 12	660	750
45 - 45.1	920	920
45.1 - 46	520	520
46 - 46.1	710	710
46.1 - 46.18	1085	1085
46.18 - 47	400	400
47 - 48	690	690
48 - 48A	770	770
48A - 49	1330	1330
49 - 49A	1150	1150
49A - 50	725	725
50 - 50A	690	690
50A - 51	985	985
51 - 51A	1010	1010
51A - 52	960	960
52 - 12	1510	1510

Notes:

(a) For example, Q_R=1700 cfs, the minimum daily flow of record at Harrisburg.

(b) Based on Q_R=8000 cfs but should apply for 8000 <= Q_R <= 30000 cfs.

Table 2
Cross Section Skew Angles

CrossSection	Skew Angle, Degrees	
	Extremely Low River Flows (a)	Low-Moderate River Flows (b)
1	0	0
1A	0	0
2	11	4
2A	0	0
3	0	6
3A	0	0
4	0	0
4A	9	9
5	18	12
5A	0	0
53	0	0
1B	0	6
7	0	5
7A	0	6
8	16	14
8A	0	0
9	0	7
9A	10	0
10	6	6
10A	8	0
11	18	15
12	0	0
45.1	0	0
46	0	0
46.1	0	0
46.18	0	0
47	0	0
48	7	7
48A	0	0
49	0	0
49A	5	5
50	5	5
50A	7	7
51	4	4
51A	0	0
52	0	0

Notes:
(a) For example, Q_R=1700 cfs, the minimum daily flow of record at Harrisburg.
(b) Based on Q_R=8000 cfs but should apply for 8000 <= Q_R <= 30000 cfs.

Table 3
Manning Roughness Coefficients

Channel	Station(s)	Manning's "n"
Conewago Rapids	20 - 29	0.039
East Channel	44 - 45	0.039
East Channel	45.1 - 46.18	0.03
East Channel	47 - 51.1	0.038
East Channel	52	0.03
WestMiddle Channel	1	0.025, 0.035, 0.050
Middle Channel	1.1 - 53	0.025, 0.035, 0.050
West Channel	11-Jul	0.025, 0.035, 0.050
Upper Channel	12	0.025, 0.035, 0.050

Table 4

Summary Results for TMINS Case 1

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows				Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS (3)	Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent(2)	cfs	percent(2)			
1-1 (4)	tmi.g05	tmi.f03	tmi.p01	tmi.r01	tmi.o01	0.025	Dc	1.05	268.8	1700	130	914	54%	786	46%	272.01	271.91	271.96
1-2	tmi.g05	tmi.f01	tmi.p02	tmi.r02	tmi.o02	0.025	1.5*Dc	1.58	269.3	1700	130	914	54%	786	46%	272.01	271.91	271.96
1-3	tmi.g05	tmi.f04	tmi.p03	tmi.r03	tmi.o03	0.025	2.0*Dc	2.10	269.8	1700	130	914	54%	786	46%	272.01	271.91	271.96
1-4	tmi.g02	tmi.f03	tmi.p04	tmi.r04	tmi.o04	0.035	Dc	1.05	268.8	1700	130	900	53%	800	47%	272.27	272.15	272.21
1-5	tmi.g02	tmi.f01	tmi.p06	tmi.r06	tmi.o06	0.035	1.5*Dc	1.58	269.3	1700	130	900	53%	800	47%	272.27	272.15	272.21
1-6	tmi.g02	tmi.f04	tmi.p07	tmi.r07	tmi.o07	0.035	2.0*Dc	2.10	269.8	1700	130	900	53%	800	47%	272.27	272.15	272.21
1-7	tmi.g04	tmi.f03	tmi.p05	tmi.r05	tmi.o05	0.050	Dc	1.05	268.8	1700	130	893	53%	807	47%	272.59	272.43	272.51
1-8	tmi.g04	tmi.f01	tmi.p08	tmi.r08	tmi.o08	0.050	1.5*Dc	1.58	269.3	1700	130	893	53%	807	47%	272.58	272.43	272.51
1-9	tmi.g04	tmi.f04	tmi.p09	tmi.r09	tmi.o09	0.050	2.0*Dc	2.10	269.8	1700	130	893	53%	807	47%	272.58	272.43	272.51

Notes:
(1) Cases are referred to by the "Short ID" as specified in HEC-RAS.
(2) Percent flow is the percent of specified river flow (1700 cfs).
(3) 130 cfs is withdrawn for the TMINS intake between river stations 4 and 3A in the Middle Channel.
(4) Case 1-1 was selected as most conservative for comparison.

Table 5
Selected Results for TMINS Case 1

Plan (1,3)	Reach	River Sta	Q (cfs)	Q (%)(2)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Froude #
Case 1-1	Upper	12.05	1700	100%	270.50	274.10	0.45	0.07
Case 1-1	Upper	12	1700	100%	270.50	274.10	0.45	0.07
Case 1-1	Middle	53	914	54%	271.70	274.02	1.31	0.25
Case 1-1	Middle	4	914	54%	269.40	272.01	0.96	0.14
Case 1-1	Middle	3.1	784	46%	268.50	271.91	0.56	0.08
Case 1-1	Middle	2	784	46%	268.50	271.19	0.91	0.19
Case 1-1	Middle	1.1	784	46%	269.00	270.84	0.72	0.15
Case 1-1	West	11	786	46%	271.00	274.06	0.60	0.10
Case 1-1	West	7	786	46%	268.20	269.86	2.21	0.54
Case 1-1	West	1.2	786	46%	265.70	269.72	0.54	0.07
Case 1-1	WestMiddle	1.05	1570	92%	267.70	268.81	3.78	0.88
Case 1-1	WestMiddle	1	1570	92%	267.70	268.75	4.26	1.01
Case 1-2	Upper	12.05	1700	100%	270.50	274.10	0.45	0.07
Case 1-2	Upper	12	1700	100%	270.50	274.10	0.45	0.07
Case 1-2	Middle	53	914	54%	271.70	274.02	1.31	0.25
Case 1-2	Middle	4	914	54%	269.40	272.01	0.96	0.14
Case 1-2	Middle	3.1	784	46%	268.50	271.91	0.56	0.08
Case 1-2	Middle	2	784	46%	268.50	271.19	0.91	0.19
Case 1-2	Middle	1.1	784	46%	269.00	270.68	0.90	0.20
Case 1-2	West	11	786	46%	271.00	274.06	0.60	0.10
Case 1-2	West	7	786	46%	268.20	269.92	1.99	0.48
Case 1-2	West	1.2	786	46%	265.70	269.79	0.52	0.07
Case 1-2	WestMiddle	1.05	1570	92%	267.70	269.30	1.87	0.37
Case 1-2	WestMiddle	1	1570	92%	267.70	269.30	1.87	0.37
Case 1-3	Upper	12.05	1700	100%	270.50	274.10	0.45	0.07
Case 1-3	Upper	12	1700	100%	270.50	274.10	0.45	0.07
Case 1-3	Middle	53	914	54%	271.70	274.02	1.31	0.25
Case 1-3	Middle	4	914	54%	269.40	272.01	0.96	0.14
Case 1-3	Middle	3.1	784	46%	268.50	271.91	0.56	0.08
Case 1-3	Middle	2	784	46%	268.50	271.21	0.89	0.18
Case 1-3	Middle	1.1	784	46%	269.00	270.47	1.29	0.31
Case 1-3	West	11	786	46%	271.00	274.06	0.60	0.10
Case 1-3	West	7	786	46%	268.20	270.12	1.41	0.31
Case 1-3	West	1.2	786	46%	265.70	270.03	0.46	0.06
Case 1-3	WestMiddle	1.05	1570	92%	267.70	269.80	1.11	0.18
Case 1-3	WestMiddle	1	1570	92%	267.70	269.80	1.11	0.18

Table 5
Selected Results for TMINS Case 1

Plan (1,3)	Reach	River Sta	Q (cfs)	Q (%)(2)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Froude #
Case 1-4	Upper	12.05	1700	100%	270.50	274.33	0.38	0.05
Case 1-4	Upper	12	1700	100%	270.50	274.33	0.38	0.05
Case 1-4	Middle	53	900	53%	271.70	274.27	0.99	0.18
Case 1-4	Middle	4	900	53%	269.40	272.27	0.79	0.11
Case 1-4	Middle	3.1	770	45%	268.50	272.15	0.48	0.06
Case 1-4	Middle	2	770	45%	268.50	271.36	0.73	0.14
Case 1-4	Middle	1.1	770	45%	269.00	271.01	0.57	0.11
Case 1-4	West	11	800	47%	271.00	274.29	0.50	0.08
Case 1-4	West	7	800	47%	268.20	270.18	1.30	0.28
Case 1-4	West	1.2	800	47%	265.70	269.98	0.48	0.06
Case 1-4	WestMiddle	1.05	1570	92%	267.70	268.86	3.50	0.80
Case 1-4	WestMiddle	1	1570	92%	267.70	268.75	4.26	1.01
Case 1-5	Upper	12.05	1700	100%	270.50	274.33	0.38	0.05
Case 1-5	Upper	12	1700	100%	270.50	274.33	0.38	0.05
Case 1-5	Middle	53	900	53%	271.70	274.27	0.99	0.18
Case 1-5	Middle	4	900	53%	269.40	272.27	0.79	0.11
Case 1-5	Middle	3.1	770	45%	268.50	272.15	0.48	0.06
Case 1-5	Middle	2	770	45%	268.50	271.35	0.74	0.14
Case 1-5	Middle	1.1	770	45%	269.00	270.91	0.65	0.13
Case 1-5	West	11	800	47%	271.00	274.29	0.50	0.08
Case 1-5	West	7	800	47%	268.20	270.21	1.25	0.27
Case 1-5	West	1.2	800	47%	265.70	270.02	0.47	0.06
Case 1-5	WestMiddle	1.05	1570	92%	267.70	269.30	1.87	0.37
Case 1-5	WestMiddle	1	1570	92%	267.70	269.30	1.87	0.37
Case 1-6	Upper	12.05	1700	100%	270.50	274.33	0.38	0.05
Case 1-6	Upper	12	1700	100%	270.50	274.33	0.38	0.05
Case 1-6	Middle	53	900	53%	271.70	274.27	0.99	0.18
Case 1-6	Middle	4	900	53%	269.40	272.27	0.79	0.11
Case 1-6	Middle	3.1	770	45%	268.50	272.15	0.48	0.06
Case 1-6	Middle	2	770	45%	268.50	271.35	0.73	0.14
Case 1-6	Middle	1.1	770	45%	269.00	270.75	0.80	0.17
Case 1-6	West	11	800	47%	271.00	274.29	0.50	0.08
Case 1-6	West	7	800	47%	268.20	270.34	1.04	0.21
Case 1-6	West	1.2	800	47%	265.70	270.19	0.43	0.05
Case 1-6	WestMiddle	1.05	1570	92%	267.70	269.80	1.10	0.18
Case 1-6	WestMiddle	1	1570	92%	267.70	269.80	1.11	0.18

Table 5
Selected Results for TMINS Case 1

Plan (1,3)	Reach	River Sta	Q (cfs)	Q (%)(2)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Froude #
Case 1-7	Upper	12.05	1700	100%	270.50	274.60	0.32	0.04
Case 1-7	Upper	12	1700	100%	270.50	274.60	0.32	0.04
Case 1-7	Middle	53	893	53%	271.70	274.53	0.76	0.13
Case 1-7	Middle	4	893	53%	269.40	272.59	0.66	0.09
Case 1-7	Middle	3.1	763	45%	268.50	272.43	0.41	0.05
Case 1-7	Middle	2	763	45%	268.50	271.58	0.58	0.10
Case 1-7	Middle	1.1	763	45%	269.00	271.23	0.46	0.08
Case 1-7	West	11	807	47%	271.00	274.56	0.41	0.06
Case 1-7	West	7	807	47%	268.20	270.55	0.80	0.15
Case 1-7	West	1.2	807	47%	265.70	270.31	0.41	0.05
Case 1-7	WestMiddle	1.05	1570	92%	267.70	268.90	3.27	0.74
Case 1-7	WestMiddle	1	1570	92%	267.70	268.75	4.26	1.01
Case 1-8	Upper	12.05	1700	100%	270.50	274.60	0.32	0.04
Case 1-8	Upper	12	1700	100%	270.50	274.60	0.32	0.04
Case 1-8	Middle	53	893	53%	271.70	274.53	0.76	0.13
Case 1-8	Middle	4	893	53%	269.40	272.58	0.66	0.09
Case 1-8	Middle	3.1	763	45%	268.50	272.43	0.41	0.05
Case 1-8	Middle	2	763	45%	268.50	271.56	0.59	0.10
Case 1-8	Middle	1.1	763	45%	269.00	271.16	0.49	0.08
Case 1-8	West	11	807	47%	271.00	274.56	0.41	0.06
Case 1-8	West	7	807	47%	268.20	270.57	0.79	0.15
Case 1-8	West	1.2	807	47%	265.70	270.33	0.40	0.05
Case 1-8	WestMiddle	1.05	1570	92%	267.70	269.31	1.86	0.37
Case 1-8	WestMiddle	1	1570	92%	267.70	269.30	1.87	0.37
Case 1-9	Upper	12.05	1700	100%	270.50	274.60	0.32	0.04
Case 1-9	Upper	12	1700	100%	270.50	274.60	0.32	0.04
Case 1-9	Middle	53	893	53%	271.70	274.53	0.76	0.13
Case 1-9	Middle	4	893	53%	269.40	272.58	0.66	0.09
Case 1-9	Middle	3.1	763	45%	268.50	272.43	0.41	0.05
Case 1-9	Middle	2	763	45%	268.50	271.54	0.60	0.10
Case 1-9	Middle	1.1	763	45%	269.00	271.04	0.55	0.10
Case 1-9	West	11	807	47%	271.00	274.56	0.41	0.06
Case 1-9	West	7	807	47%	268.20	270.63	0.73	0.14
Case 1-9	West	1.2	807	47%	265.70	270.43	0.39	0.05
Case 1-9	WestMiddle	1.05	1570	92%	267.70	269.80	1.10	0.18
Case 1-9	WestMiddle	1	1570	92%	267.70	269.80	1.11	0.18

Notes:

(1) Cases are referred to by the "Short ID" as specified in HEC-RAS.

(2) Percent flow is the percent of specified river flow (1700 cfs); note that 130 cfs is withdrawn for the TMINS intake between river stations 4 and 3A in the Middle Channel.

(3) Case 1-1 was selected as most conservative for comparison.

Table 6
Boundary Conditions for Station 1

Flow (cfs)	Dc (ft)	W.S. Elev (ft)	1.5*Dc (ft)	W.S. Elev (ft)	2.0*Dc (ft)	W.S. Elev (ft)
1000	0.81	268.51	1.22	268.92	1.62	269.32
1700	1.05	268.75	1.58	269.28	2.10	269.80
4000	1.52	269.22	2.28	269.98	3.04	270.74
8000	2.02	269.72	3.03	270.73	4.04	271.74
12000	2.44	270.14	3.66	271.36	4.88	272.58
16000	2.77	270.47	4.16	271.86	5.54	273.24
20000	3.01	270.71	4.51	272.22	6.02	273.72
25000	3.37	271.07	5.06	272.76	6.74	274.44
30000	3.60	271.30	5.40	273.10	7.20	274.90

Table 7
Results from Conewago Rapids Model

River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Froude #
29	1570	260.0	262.59	3.01	0.52
29	3870	260.0	263.63	3.14	0.46
29	7870	260.0	264.65	3.73	0.42
29	11870	260.0	265.35	4.34	0.44
29	15870	260.0	265.97	4.71	0.48
29	19870	260.0	266.52	4.94	0.48
29	24870	260.0	267.09	5.25	0.48
29	29870	260.0	267.60	5.52	0.49
24.3	1570	257.0	259.49	3.61	0.65
24.3	3870	257.0	260.26	4.81	0.68
24.3	7870	257.0	261.17	6.05	0.71
24.3	11870	257.0	261.87	6.88	0.73
24.3	15870	257.0	262.49	7.45	0.74
24.3	19870	257.0	263.02	7.96	0.75
24.3	24870	257.0	263.66	8.38	0.75
24.3	29870	257.0	264.28	8.62	0.74
24.2	1570	251.8	255.12	4.35	0.61
24.2	3870	251.8	256.42	4.75	0.62
24.2	7870	251.8	257.52	5.86	0.63
24.2	11870	251.8	258.39	6.61	0.64
24.2	15870	251.8	259.12	7.23	0.64
24.2	19870	251.8	259.79	7.72	0.64
24.2	24870	251.8	260.55	8.26	0.64
24.2	29870	251.8	261.21	8.74	0.68
24.1	1570	250.0	252.81	3.57	0.43
24.1	3870	250.0	254.24	5.01	0.51
24.1	7870	250.0	256.12	5.22	0.53
24.1	11870	250.0	257.33	5.51	0.50
24.1	15870	250.0	258.18	5.98	0.52
24.1	19870	250.0	258.91	6.31	0.52
24.1	24870	250.0	259.68	6.72	0.53
24.1	29870	250.0	260.31	7.17	0.54
24	1570	250.0	252.45	1.48	0.17
24	3870	250.0	253.80	2.29	0.21
24	7870	250.0	255.45	3.10	0.26
24	11870	250.0	256.65	3.63	0.29
24	15870	250.0	257.47	4.11	0.32
24	19870	250.0	258.16	4.51	0.35
24	24870	250.0	258.87	4.94	0.37
24	29870	250.0	259.45	5.34	0.39

Table 7
Results from Conewago Rapids Model

River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Froude #
23	1570	250.0	252.13	1.35	0.17
23	3870	250.0	253.41	1.97	0.20
23	7870	250.0	254.99	2.58	0.22
23	11870	250.0	256.07	2.94	0.26
23	15870	250.0	256.78	3.32	0.28
23	19870	250.0	257.39	3.64	0.29
23	24870	250.0	258.05	4.01	0.31
23	29870	250.0	258.58	4.38	0.32
22	1570	248.0	251.48	1.48	0.16
22	3870	248.0	252.47	2.57	0.27
22	7870	248.0	253.69	3.44	0.39
22	11870	248.0	254.57	3.69	0.38
22	15870	248.0	255.23	4.00	0.39
22	19870	248.0	255.81	4.23	0.40
22	24870	248.0	256.44	4.47	0.39
22	29870	248.0	256.81	4.92	0.41
21	1570	248.0	251.31	0.83	0.09
21	3870	248.0	252.01	1.58	0.17
21	7870	248.0	252.87	2.42	0.23
21	11870	248.0	253.52	3.06	0.28
21	15870	248.0	254.12	3.51	0.30
21	19870	248.0	254.70	3.84	0.32
21	24870	248.0	255.34	4.18	0.33
21	29870	248.0	255.48	4.88	0.39
20	1570	242.0	251.30	0.15	0.01
20	3870	242.0	251.96	0.34	0.02
20	7870	242.0	252.77	0.62	0.04
20	11870	242.0	253.36	0.87	0.05
20	15870	242.0	253.90	1.10	0.06
20	19870	242.0	254.43	1.30	0.07
20	24870	242.0	255.01	1.54	0.09
20	29870	242.0	255.00	1.85	0.10

National Pollutant Discharge Elimination System

NPDES Permit PA 0009920

Permit Renewal Application
April 2, 2007

Three Mile Island Unit-1
AmerGen Energy Company, LLC

National Pollutant Discharge Elimination System

NPDES Permit PA 0009920

Permit Renewal Application
April 2, 2007

Three Mile Island Unit-1
AmerGen Energy Company, LLC

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 23-APR-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

CORTROL IS104

PRODUCT APPLICATION AREA:

OXYGEN SCAVENGER.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
10117-38-1	SULFUROUS ACID,DIPOTASSIUM SALT Transient irritant; potential sensitizer (skin and respiratory)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

WARNING

May cause moderate irritation to the skin. Potential skin sensitizer. May cause moderate irritation to the eyes. May cause irritation to mucous membranes. Repeated exposure may result in respiratory sensitization.

DOT hazard is not applicable
Emergency Response Guide is not applicable

Odor: Slight; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause moderate irritation to the skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;May cause irritation to mucous membranes. Repeated exposure may result in respiratory sensitization.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
Prolonged or repeated exposures may cause primary irritant dermatitis and/or allergic respiratory reactions.

MEDICAL CONDITIONS AGGRAVATED:
Asthma.

SYMPTOMS OF EXPOSURE:
May cause local irritation or a sensitization reaction upon direct contact with skin or respiratory tract.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Protect from freezing. Preferably stored between 40-100F (5-40C).

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SULFUROUS ACID,DIPOTASSIUM SALT
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:
adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.462	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	7	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless To Light Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		9.7
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>1,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen
50% Mortality= 2000; 0% Mortality= 1000 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 1760; No Effect Level= 1250 mg/L

BIODEGRADATION
Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:
ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES

MSDS status:	14-FEB-1997		** NEW **
	23-APR-1997	15	14-FEB-1997
	11-JUL-1997	15	23-APR-1997
	23-APR-2001	4	11-JUL-1997

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 17-MAY-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

---

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS NX1106

PRODUCT APPLICATION AREA:

WATER-BASED MICROBIAL CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
10377-60-3	MAGNESIUM NITRATE Oxidizer; irritant (eyes and skin)
26172-55-4	5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE Corrosive; toxic (by ingestion and skin absorption); sensitizer (skin)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Skin sensitizer with delayed onset of symptoms. Corrosive to the eyes. Mists/aerosols cause irritation to the upper

respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #153
Odor: Slight; Appearance: Light Yellow To Green, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin. Skin sensitizer with delayed onset of symptoms.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis and/or skin sensitization.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Direct contact with skin will cause severe delayed skin reactions or burns if not washed off immediately- follow first aid instructions.

FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

MISCELLANEOUS:

Corrosive to skin

UN3265;Emergency Response Guide #153

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Do not add decontaminant solution to waste drum containing biocide or adsorbent. Decontaminate floor residual with 10% metabisulfite solution. Use 10 volumes of solution to one volume of spill.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 HANDLING & STORAGE

HANDLING:

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Corrosive to skin and/or eyes.

STORAGE:

Keep containers closed when not in use. Store between 20-100F for no more than 6 months. Store upright in original vented containers. Product evolves CO2 slowly. Store samples in plastic bottles due to pressure build-up. < 1.00

3 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

MAGNESIUM NITRATE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED
MISC: Note-mfg. sugg. exp. limit:0.1 mg/m3 TWA;0.3mg/m3 STEL total isothiazoline).

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor/acid gas cartridges and dust/mist prefilters.

SKIN PROTECTION:
gauntlet-type butyl gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.033	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F,21C)	8	% Solubility (water)	100.0

Odor	Slight
Appearance	Light Yellow To Green
Physical State	Liquid
Flash Point P-M(CC)	> 200F > 93C
pH As Is (approx.)	3.0
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>5,000 mg/kg
Teratology :	NEGATIVE
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	
Skin Sensitization HUMAN:	POSITIVE
Non-Ames Mutagenicity :	NEGATIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay
LC50= 12.1; No Effect Level= 6.5 mg/L

Daphnia magna 48 Hour Flow-Thru Bioassay
LC50= 2.9; 10% Mortality= .6 mg/L

Fathead Minnow 36 Day Early Life Stage Test
LOEC= 4; No Effect Level= 1.3 mg/L

Fathead Minnow 96 Hour Flow-Thru Bioassay
LC50= 6.6; No Effect Level= 2.5 mg/L

Rainbow Trout 14 Day Chronic Bioassay
LC50= 4.6; No Effect Level= 3.3 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 8.7; No Effect Level= 6.5 mg/L

Sheepshead Minnow 96 Hour Static Acute Bioassay
LC50= 20; No Effect Level= 12 mg/L

BIODEGRADATION

BOD-28 (mg/g): 0
BOD-5 (mg/g): 0
COD (mg/g): 17
TOC (mg/g): 6

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN3265
DOT EMERGENCY RESPONSE GUIDE #:	153

15 REGULATORY INFORMATION

TSCA:

This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

FIFRA REGISTRATION NUMBER:

3876- 143

FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 176.300.

USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:

SEC.G7

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
10377-60-3	MAGNESIUM NITRATE	2.0-5.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	03-OCT-1997		** NEW **
	02-DEC-1997	15	03-OCT-1997
	23-DEC-1997	15	02-DEC-1997
	01-MAY-1998	15;EDIT:9	23-DEC-1997
	08-APR-1999	;EDIT:9	01-MAY-1998
	17-MAY-2001	4,16	08-APR-1999

Corporate_Logo

ISSUE DATE: 03-MAY-2000

MATERIAL SAFETY DATA SHEET

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 3
FLAMMABILITY: 1
REACTIVITY: 0

---

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

INHIBITOR AZ8100

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
64665-57-2	BENZOTRIAZOLE,METHYL,SODIUM SALT (SODIUM TOLYLTRIAZOLE),(TTA) Corrosive (eyes and skin); toxic (by ingestion)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #154
Odor: Mild; Appearance: Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of the gastrointestinal tract.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes redness or itching of skin, possibly leading to burns (dependent on the length of exposure).

4 FIRST AID MEASURES

SKIN CONTACT:
Remove clothing. Wash area with large amounts of soap solution or water for 15 min. Immediately contact physician.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
Remove to fresh air. Apply necessary first aid treatment. Immediately contact a physician.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C SETA(CC)
MISCELLANEOUS:
Corrosive to skin
UN1719;Emergency Response Guide #154

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

BENZOTRIAZOLE,METHYL,SODIUM SALT (SODIUM TOLYLTRIAZOLE),(TTA)
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:
adequate ventilation
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.
SKIN PROTECTION:
gauntlet-type neoprene gloves, chemical resistant apron--

Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.215	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	-25	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-32		
Viscosity(cps 70F,21C)	190	% Solubility (water)	100.0

Odor		Mild
Appearance		Amber
Physical State		Liquid
Flash Point	SETA(CC)	> 200F > 93C
pH As Is (approx.)		13.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with acids.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	1,150 mg/kg
Dermal LD50 RABBIT:	>2,000 mg/kg

NOTE - Estimated value

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay

pH of test solutions was adjusted to a level of 6-9.

LC50: 243 mg/L
No Effect Level: 75 mg/L

Bluegill Sunfish 96 Hour Static Acute Bioassay

LC50: 109.3 mg/L
No Effect Level: 42 mg/L

Mysid Shrimp 48 Hour Static Acute Bioassay

LC50: 166 mg/L
No Effect Level: 10 mg/L

Sheepshead Minnow 48 Hour Static Acute Bioassay

LC50: 475 mg/L
No Effect Level: 370 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 105 mg/L
No Effect Level: 75 mg/L

Rainbow Trout 96 Hour Static Renewal Bioassay

LC50: 34 mg/L
No Effect Level: 15 mg/L

Ceriodaphnia 48 Hour Static Renewal Bioassay

LC50: 147 mg/L
No Effect Level: 37 mg/L

BIODEGRADATION

COD (mg/gm):	810
TOC (mg/gm):	280
BOD-5 (mg/gm):	4
BOD-28 (mg/gm):	22

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN1719
DOT EMERGENCY RESPONSE GUIDE #:	154

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC *ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:*

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	19-FEB-1997	12	28-JAN-1997
	03-OCT-1997	8	19-FEB-1997
	29-MAY-1998	12	03-OCT-1997
	08-FEB-1999	3,5,14	29-MAY-1998
	15-JUN-1999	12	08-FEB-1999
	30-AUG-1999	4;EDIT:9	15-JUN-1999
	03-MAY-2000	12	30-AUG-1999

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 16-NOV-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS CT1300

PRODUCT APPLICATION AREA:

WATER-BASED MICROBIAL CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
68424-85-1	(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE Corrosive (eyes and skin);toxic (by ingestion)
64-17-5	ETHYL ALCOHOL (ETHANOL) Flammable liquid; irritant (eyes); potential liver and kidney toxin; may cause CNS depression

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at Pennsylvania thresholds for carcinogens.

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Potential skin sensitizer. Corrosive to the eyes. Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to skin, Flammable
Emergency Response Guide #132
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide or foam--Avoid water if possible.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
Toxic;
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause CNS depression, tissue narcroses, skin sensitization, and/or txicity to the liver and kidney.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation of vapors/mists/aerosols may cause eye, nose, throat and lung irritation. Skin contact may cause severe irritation or burns.

4 FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Dilute contents of stomach. Induce vomiting by one of the standard methods. Immediately contact a physician.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide or foam--Avoid water if possible.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
130F 54C P-M(CC)

MISCELLANEOUS:
Corrosive to skin, Flammable
2920 ;Emergency Response Guide #132

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 HANDLING & STORAGE

HANDLING:
Combustible. Corrosive to skin and/or eyes.

STORAGE:
Keep containers closed when not in use. Keep away from flames or sparks. Bond containers during filling or discharge when performed at temperatures at or above the product flash point.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

CHEMICAL NAME **EXPOSURE LIMITS**

(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ETHYL ALCOHOL (ETHANOL)
PEL (OSHA): 1,000 PPM
TLV (ACGIH): 1,000 PPM

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges and dust/mist prefilters.

SKIN PROTECTION:
gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	0.965	Vapor Pressure (mmHG)	44.0
Freeze Point (F)	-7	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-22		
Viscosity(cps 70F,21C)	73	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	130F 54C
pH As Is (approx.)		8.9
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	445 mg/kg
Dermal LD50 RABBIT:	>1,800 mg/kg
Skin Sensitization G.PIG:	NEGATIVE

NOTE - Active component was neither a photoallergen nor a skin sensitizer

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Annelida(Lumbriculus variegatus) 96 Hour Acute Toxicity
LC50= 1.47; LC10= .37 mg/L

Benthic Crustacean(Gammerus pseutolimnaeus) 96 Hour Acute Toxicity
LC50= .07 mg/L

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= .35; No Effect Level= .15 mg/L

Channel Catfish 96 Hour Acute Toxicity
LC50= .86; No Effect Level= .54 mg/L

Daphnia magna 48 Hour Flow-Thru Bioassay
LC50= .04; No Effect Level= .026 mg/L

Daphnia magna 48 Hour Static Acute Bioassay
LC50= .11; No Effect Level= .06 mg/L

Daphnia pulex 48 Hour Static Renewal Bioassay
LC50= .05; No Effect Level= .031 mg/L

Fathead Minnow 96 Hour Flow-Thru Bioassay
LC50= .72; No Effect Level= .41 mg/L

Freshwater Snail(Physa sp.) 96 Hour Acute Toxicity
LC50= .46; No Effect Level= .36 mg/L

Menidia beryllina (Silversides) 96 Hour Flow-Thru Bioassay
LC50= .62; No Effect Level= .35 mg/L

Midge larvae (Chironomus tentans) 96 Hour Acute Toxicity
LC50= .5; No Effect Level= .13 mg/L

Mysid Shrimp 96 Hour Flow-Thru Bioassay
LC50= .16; No Effect Level= .03 mg/L

Rainbow Trout 96 Hour Flow-Thru Bioassay
LC50= 2; No Effect Level= 1.2 mg/L

Sheepshead Minnow 96 Hour Flow-Thru Bioassay
LC50= 1.76; No Effect Level= 1 mg/L

BIODEGRADATION

BOD-28 (mg/g): 156
BOD-5 (mg/g): 43
COD (mg/g): 1470
TOC (mg/g): 380

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D001=Ignitable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin, Flammable
UN / NA NUMBER:	2920
DOT EMERGENCY RESPONSE GUIDE #:	132

15 REGULATORY INFORMATION

TSCA:
This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FIFRA REGISTRATION NUMBER:
3876- 149

POTABLE WATER APPROVAL:
NSF Certified. Maximum use for disinfection and oxidation 3.5mg/L. Maximum use for reverse osmosis and distillation 10 mg/L.

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.300 (slimicides for wet end use)
When used in this specified application, all ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a)(4).

USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:
SEC.G5,G7

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic);Fire

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	2	Moderate Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	12-NOV-1998		** NEW **

03-MAY-2000	12	12-NOV-1998
05-JUL-2001	12	03-MAY-2000
24-SEP-2001	3,4,5,7,8,14,16	05-JUL-2001
16-NOV-2001	12	24-SEP-2001

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 17-MAY-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS DT1400

PRODUCT APPLICATION AREA:

A DETOXIFYING AGENT

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
14464-46-1	RESPIRABLE CRISTOBALITE (CRYSTALLINE SILICA) Irritant (respiratory); probable human carcinogen (IARC=2A; NTP=anticipated); may cause long term lung disease (silicosis)
14808-60-7	RESPIRABLE QUARTZ (CRYSTALLINE SILICA) Irritant (respiratory); probable human carcinogen (IARC=2A; NTP=anticipated); may cause long term lung disease (silicosis)
15468-32-3	RESPIRABLE TRIDYMITE (CRYSTALLINE SILICA) Irritant (respiratory); probable human carcinogen (IARC=2A; NTP=anticipated); may cause long term lung disease (silicosis)

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER
9003-01-4	ACRYLIC ACID,HOMOPOLYMER
1302-78-9	BENTONITE

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Green-Brown, Dispersion

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, headache, dizziness, unconsciousness and injury to the kidneys and liver. Small amounts aspirated during ingestion/vomiting may cause lung injury, possibly death.

TARGET ORGANS:
Prolonged or repeated exposures may cause toxicity to the liver and/or kidney.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive

victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

RESPIRABLE CRISTOBALITE (CRYSTALLINE SILICA)
PEL (OSHA): 0.05 MG/M3
TLV (ACGIH): 0.05 MG/M3

RESPIRABLE QUARTZ (CRYSTALLINE SILICA)
PEL (OSHA): 0.1 MG/M3
TLV (ACGIH): 0.05 MG/M3 RESPERABLE FRACTION

RESPIRABLE TRIDYMITE (CRYSTALLINE SILICA)
PEL (OSHA): 0.05 MG/M3
TLV (ACGIH): 0.05 MG/M3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:

rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.186	Vapor Pressure (mmHG)	- 18.0
Freeze Point (F)	32	Vapor Density (air=1)	< 1.00
Freeze Point (C)	0		
Viscosity(cps 70F,21C)	2900	% Solubility (water)	0.0

Odor		Slight
Appearance		Green-Brown
Physical State		Dispersion
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		7.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen
0% Mortality= 435 mg/L
Fathead Minnow 96 Hour Static Screen
0% Mortality= 435 mg/L

BIODEGRADATION

BOD-28 (mg/g): 2
BOD-5 (mg/g): 0
COD (mg/g): 64
TOC (mg/g): 26

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

Treat as oil spill

SARA SECTION 312 HAZARD CLASS:

Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

This product contains these chemicals known to the state of California to cause cancer or reproductive toxicity:

CAS#	CHEMICAL NAME
14464-46-1	RESPIRABLE CRISTOBALITE (CRYSTALLINE SILICA)
14808-60-7	RESPIRABLE QUARTZ (CRYSTALLINE SILICA)
15468-32-3	RESPIRABLE TRIDYMITE (CRYSTALLINE SILICA)

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	18-MAY-1998		** NEW **
	17-MAY-2001	8	18-MAY-1998

Corporate_Logo

ISSUE DATE: 15-AUG-2000

MATERIAL SAFETY DATA SHEET

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 1
FLAMMABILITY: 1
REACTIVITY: 0

---

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

DEPOSITROL PY5203

PRODUCT APPLICATION AREA:

WATER-BASED DEPOSIT CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
No adverse effects expected. If more than several mouthfuls are swallowed, abdominal discomfort, nausea, diarrhea and weakness may occur.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation may cause irritation of the respiratory tract. Skin contact may cause itching and/or redness.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.
STORAGE:
Keep containers closed when not in use. Protect from freezing. Do not store at elevated temperatures. Use proper containers.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges.
SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.203	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F,21C)	490	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		2.4
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	15,380 mg/kg
Dermal LD50 RABBIT:	2,025 mg/kg
Skin Irritation Score RABBIT:	0
Eye Irritation Score RABBIT:	0

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Fathead Minnow 96 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9. Low water solubility resulted in precipitation.

LC50: 7500 mg/L
No Effect Level: 2100 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay
Low water solubility resulted in precipitation.

LC50: 7500 mg/L
No Effect Level: 2100 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9. Low water solubility resulted in precipitation.

LC50: 1045 mg/L
No Effect Level: 845 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay
Low water solubility resulted in precipitation.

LC50: 1045 mg/L
No Effect Level: 845 mg/L

Mysid Shrimp 48 Hour Static Acute Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 3250 mg/L
No Effect Level: 1000 mg/L

Mysid Shrimp 48 Hour Static Acute Bioassay

LC50: 3250 mg/L
No Effect Level: 1000 mg/L

Sheepshead Minnow 96 Hour Static Acute Bioassay
pH of test solutions was adjusted to a level of 6-9.

0% Mortality: 16000 mg/L

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY (continued)

Sheepshead Minnow 96 Hour Static Acute Bioassay

0% Mortality: 16000 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 582 mg/L
No Effect Level: 360 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay

LC50: 582 mg/L
No Effect Level: 360 mg/L

Ceriodaphnia 48 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 640 mg/L
No Effect Level: 87 mg/L

Ceriodaphnia 48 Hour Static Renewal Bioassay

LC50: 640 mg/L
No Effect Level: 87 mg/L

BIODEGRADATION

COD (mg/gm):	637
TOC (mg/gm):	291
BOD-5 (mg/gm):	6
BOD-28 (mg/gm):	24

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
FOOD AND DRUG ADMINISTRATION:
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)
SARA SECTION 312 HAZARD CLASS:
Product is non-hazardous under Section 311/312
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	15-AUG-1997	15	28-JAN-1997
	25-SEP-1997	15	15-AUG-1997
	21-OCT-1999	12	25-SEP-1997
	03-MAY-2000	12	21-OCT-1999
	15-AUG-2000	4,7	03-MAY-2000

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 08-JUN-2005

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

INHIBITOR AZ8103

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) Corrosive; toxic (by ingestion)
118685-34-0	BUTYL BENZOTRIAZOLE,SODIUM SALT Corrosive (eyes and skin); sensitizer (skin)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Skin sensitizer. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #154

Odor: Mild; Appearance: Dark Brown, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin. Skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis, primary irritant dermatitis, and/or skin sensitization.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

4 FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

MISCELLANEOUS:
Corrosive to skin
UN1824;Emergency Response Guide #154

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.

STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SODIUM HYDROXIDE (CAUSTIC SODA)
PEL (OSHA): 2 MG/M3
TLV (ACGIH): 2 MG/M3(CEILING)

BUTYL BENZOTRIAZOLE,SODIUM SALT
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:

gauntlet-type rubber gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.184	Vapor Pressure (mmHG)	= 22.0
Freeze Point (F)	-4	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-20		
Viscosity(cps 70F,21C)	37	% Solubility (water)	100.0

Odor		Mild
Appearance		Dark Brown
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		13.5
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with acids.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	945 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Acute Bioassay (pH adjusted)
LC50= 66; No Effect Level= 28 mg/L

Fathead Minnow 96 Hour Static Acute Bioassay (pH adjusted)
LC50= 39.4; No Effect Level= 28 mg/L

Menidia beryllina (Silversides) 96 Hour Static Acute Bioassay
LC50= 20.5; 5% Mortality= 6.25 mg/L

Mysid Shrimp 96 Hour Static Acute Bioassay
LC50= 17.2; No Effect Level= 6.25 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 28.1; No Effect Level= 21 mg/L

BIODEGRADATION

BOD-28 (mg/g): 7
BOD-5 (mg/g): 7
COD (mg/g): 271
TOC (mg/g): 67

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN1824
DOT EMERGENCY RESPONSE GUIDE #:	154

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
741 gallons due to SODIUM HYDROXIDE (CAUSTIC SODA);
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:
No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

EFFECTIVE

	DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	13-FEB-1998	12	28-JAN-1997
	22-AUG-2001	15	13-FEB-1998
	08-JUN-2005	4	22-AUG-2001

Corporate_Logo

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 21-DEC-2000

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 3
FLAMMABILITY: 2
REACTIVITY: 0

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1 PRODUCT IDENTIFICATION

PRODUCT NAME:

STEAMATE PWR0160

PRODUCT APPLICATION AREA:

WATER BASED INTERNAL BOILER TREATMENT CHEMICAL.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
5332-73-0	METHOXYPROPYLAMINE, 3- Flammable liquid; corrosive

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Potential skin sensitizer. Corrosive to the

eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin, Combustible
Emergency Response Guide #153
Odor: Strong; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation may cause irritation of mucous membranes and respiratory tract. Skin contact causes severe irritation or burns.

4 FIRST AID MEASURES

SKIN CONTACT:
Remove clothing. Wash area with large amounts of soap solution or water for 15 min. Immediately contact physician.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area. Apply necessary first aid treatment. Immediately contact a physician.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
154F 68C P-M(CC)
MISCELLANEOUS:
Corrosive to skin, Combustible
UN2735;Emergency Response Guide #153

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Keep away from flames or sparks. Bond containers during filling or discharge when performed at temperatures at or above the product flash point.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS
CHEMICAL NAME

METHOXYPROPYLAMINE,3-
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:
adequate ventilation
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a

respirator with organic vapor cartridges.
SKIN PROTECTION:
gauntlet-type rubber gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	0.968	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	> 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	18	% Solubility (water)	100.0

Odor		Strong
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	154F 67C
pH As Is (approx.)		13.5
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >1,000 mg/kg
NOTE - Estimated value based on neat material rat oral LD50: 690-750 mg/kg
Dermal LD50 RABBIT: >4,000 mg/kg
NOTE - Estimated value based on neat material rabbit dermal LD50: >2,500 mg/kg
Skin Irritation Score RABBIT: CORROSIVE
NOTE - EPA corrosive; DOT HM181- Packing Group III (corrosive in 240 min. not 60 min.)
Eye Irritation Score RABBIT: CORROSIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION

BOD-28 (mg/g): 47
BOD-5 (mg/g): 1
COD (mg/g): 1116
TOC (mg/g): 300

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin, Combustible
UN / NA NUMBER:	UN2735
DOT EMERGENCY RESPONSE GUIDE #:	153

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic);Fire

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	2	Moderate Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment

recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	21-DEC-2000	12	29-JAN-1997

Corporate_Logo

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 19-APR-2001

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 3
FLAMMABILITY: 1
REACTIVITY: 0

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

STEAMATE PWR1440

PRODUCT APPLICATION AREA:

NEUTRALIZING AMINE

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
141-43-5	MONOETHANOLAMINE (ETHANOLAMINE) Combustible; corrosive; irritant; may cause liver and kidney toxicity

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive. Absorbed by skin. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #60
Odor: Amine; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive. Absorbed by skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis and/or toxicity to the liver and kidney.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation may cause irritation of mucous membranes and respiratory tract. Skin contact causes severe irritation or burns.

4 FIRST AID MEASURES

SKIN CONTACT:
Remove clothing. Wash area with large amounts of soap solution or water for 15 min. Immediately contact physician.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area. Apply necessary first aid treatment. Immediately contact a physician.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)
MISCELLANEOUS:
Corrosive to skin
UN2491;Emergency Response Guide #60

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS
CHEMICAL NAME

MONOETHANOLAMINE (ETHANOLAMINE)
PEL (OSHA): 3 PPM(6PPM-STEL)
TLV (ACGIH): 3 PPM(6PPM-STEL)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED

WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges.

SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron--Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.017	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	-9	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-23		
Viscosity(cps 70F,21C)	20	% Solubility (water)	100.0

Odor		Amine
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		12.7
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with acids.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>5,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	
Skin Irritation Score RABBIT:	CORROSIVE
NOTE - Based on similar product: EPA category I; DOT HM181 packing group III (240 min.)	
Eye Irritation Score RABBIT:	CORROSIVE
NOTE - Estimated value	
Non-Ames Mutagenicity BACTERIA:	NEGATIVE
NOTE - Based on testing of 100% active	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay
LC50= 800 mg/L
Daphnia magna 48 Hour Flow-Thru Bioassay
LC50= 330; No Effect Level= 70.5 mg/L
Fathead Minnow 96 Hour Flow-Thru Bioassay
0% Mortality= 1250; 10% Mortality= 2500 mg/L
Fathead Minnow 96 Hour Static Acute Bioassay
LC50= 500; No Effect Level= 300 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 370 mg/L

BIODEGRADATION

BOD-28 (mg/g): 250
BOD-5 (mg/g): 252
COD (mg/g): 560
TOC (mg/g): 152

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN2491
DOT EMERGENCY RESPONSE GUIDE #:	60

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	07-MAY-1998	2	29-JAN-1997
	21-DEC-2000	12	07-MAY-1998
	19-APR-2001	12	21-DEC-2000

GE BETZ, INC.
MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 28-NOV-2000
PRINTED DATE: 14-NOV-2002

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1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : FERRIC SULFATE-LQCMD

PRODUCT APPLICATION AREA: COMMODITY CHEMICAL

COMPANY ADDRESS:
GE Betz, Inc.
4636 Somerton Road, Trevose, Pa. 19053
Information phone number: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

2) COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
10028-22-5	FERRIC SULFATE Irritant (eyes)
7664-93-9	SULFURIC ACID Corrosive

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

3) HAZARDS IDENTIFICATION

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EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel
Emergency Response Guide #154
Odor: None; Appearance: Dark Brown, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of the gastrointestinal tract.

TARGET ORGANS:
Prolonged or repeated exposures may cause primary irritant dermatitis and/or tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

4) FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5) FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C SETA(CC)

MISCELLANEOUS:
Corrosive to skin/steel
UN3264;Emergency Response Guide #154

6) ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

7) HANDLING AND STORAGE

HANDLING:
Acidic. Corrosive(Skin/eyes). Do not mix with alkaline material.
STORAGE:
Keep containers closed when not in use. Reasonable and safe chemical storage. Protect from freezing.

8) EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

FERRIC SULFATE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): 1 MG/M3(AS Fe)

SULFURIC ACID
PEL (OSHA): 1 MG/M3
TLV (ACGIH): 1 MG/M3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.
SKIN PROTECTION:
gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles, face shield

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.502	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	45	% Solubility (water)	100.0

Odor		None
Appearance		Dark Brown
Physical State		Liquid
Flash Point	SETA(CC)	> 200F > 93C
pH As Is (approx.)		< 1.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10) STABILITY AND REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with bases or strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"C"

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,500 mg/kg
NOTE - FHSA procedure	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - FHSA procedure	
Skin Irritation Score RABBIT:	0.0
NOTE - 24/72 hour, FHSA procedure; score: 0.3 per alternate source	
Eye Irritation Score RABBIT:	63.4
NOTE - DAY 7- irreversible; FHSA procedure	

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION
No Data Available.

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

13) DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002 = Corrosive(pH, steel).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14) TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin/steel
UN / NA NUMBER:	UN3264
DOT EMERGENCY RESPONSE GUIDE #:	154

15) REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
163 gallons due to FERRIC SULFATE;7,994 gallons due to SULFURIC ACID;

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

CAS#	CHEMICAL NAME
7664-93-9	SULFURIC ACID

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
7664-93-9	SULFURIC ACID	1.0-1.5%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

PRODUCT NAME : FERRIC SULFATE-LQCMD
EFFECTIVE DATE: 28-NOV-2000

16) OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-NOV-2000		** NEW **

20 MULE TEAM®

Optibor® Boric Acids

Material Safety Data She
DATE OF ISSUE May 2000
Supersedes November 1999 Version

1 Chemical product and company identification

Product name:	*Optibor*
Grade:	Technical, NF, S.Q.
Product use:	Industrial manufacturing
Chemical formula:	H_3BO_3
Chemical name/synonyms:	Boric acid, orthoboric acid, boracic acid
Chemical family:	Inorganic borates
CAS registry number:	10043-35-3 (11113-50-1)

(Refer to Section 15 for TSCA/DSL chemical inventory listing)

MANUFACTURER:
U.S. Borax Inc.
26877 Tourney Road
Valencia, CA 91355-1847

EMERGENCY PHONE NUMBERS:
24 Hr. Medical Info. Service ... (661) 284-5200
Chemtrec (Spills): ..... (800) 424-9300

2 Composition/information on ingredients

This product contains greater than 99 percent (%) boric acid (H_3BO_3), which is hazardous under the OSHA Hazard Communication Standard and under the Canadian Controlled Products Regulations of the Hazardous Products Act (WHMIS), based on animal chronic toxicity studies. Refer to Sections 3 and 11 for details on hazards.

3 Hazard identification

Emergency overview

Optibor is a white, odorless, powder substance that is not flammable, combustible, or explosive and has low acute oral and dermal toxicity.

Potential ecological effects

Large amounts of *Optibor* can be harmful to plants and other species. Therefore, releases to the environment should be minimized.

Potential health effects

Routes of exposure: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because *Optibor* is poorly absorbed through intact skin.

Inhalation: Occasional mild irritation effects to the nose and throat may occur from inhalation of *Optibor* dust at levels greater than 10 mg/m^3.

Eye contact: *Optibor* is non-irritating to the eyes in normal industrial use.

Skin contact: *Optibor* does not cause irritation to intact skin.

Ingestion: Products containing *Optibor* are <u>not</u> intended for ingestion. *Optibor* has a low acute toxicity. Small amounts (e.g. a teaspoon) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.

Cancer: *Optibor* is not a known carcinogen.

Reproductive/developmental: Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects. A human study of occupational exposure to borate dust showed no adverse effect on reproduction.

Target organs: No target organ has been identified in humans. High dose animal ingestion studies indicate the testes are the target organs in male animals.

Signs and symptoms of exposure: Symptoms of accidental over-exposure to *Optibor* have been associated with ingestion or absorption through large areas of damaged skin. These may include nausea, vomiting and diarrhea, with delayed effects of skin redness and peeling.

Refer to Section 11 for details on Toxicological data.

4 First aid measures

Inhalation: If symptoms such as nose or throat irritation are observed, remove person to fresh air.

Eye contact: Use eye wash fountain or fresh water to cleanse the eye. If irritation persists for more than 30 minutes, seek medical attention.

Skin contact: No treatment necessary because non-irritating.

Ingestion: Swallowing small quantities (one teaspoon) will cause no harm to healthy adults. If larger amounts are swallowed, give two glasses of water to drink and seek medical attention.

Note to physicians: Observation only is required for adult ingestion in the range of 4-8 grams of *Optibor*. For ingestion of larger amounts, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only. Hemodialysis should be reserved for massive acute ingestion or patients with renal failure. Boron analyses of urine or blood are only useful for documenting exposure and should not be used to evaluate severity of poisoning or to guide treatment[1]. Refer to Section 11 for details.

5 Firefighting measures

General hazard: None, because *Optibor* is not flammable, combustible or explosive. The product is itself a flame retardant.

Extinguishing media: Any fire extinguishing media may be used on nearby fires.
Flammability classification (29 CFR 1910.1200): Non-flammable solid.

6 Accidental release measures

General: *Optibor* is a water-soluble white powder that may, at high concentrations, cause damage to trees or vegetation by root absorption. (Refer to Ecological information, Section 12, for specific information.)

Land spill: Vacuum, shovel or sweep up *Optibor* and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during cleanup and disposal. Personal protective equipment is not needed to cleanup land spills.

Spillage into water: Where possible, remove any intact containers from the water. Advise local water authority that none of the affected water should be used for irrigation or for the abstraction of potable water until natural dilution returns the boron value to its normal environmental background level. (Refer to Sections 12, 13 and 15 for additional information.) *Optibor* is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261). (Refer to Regulatory information, Section 15, for additional references.)

7 Handling and storage

General: No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity and to minimize caking of the product, bags should be handled on a first-in, first-out basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

Storage temperature:	Ambient
Storage pressure:	Atmospheric
Special sensitivity:	Moisture (caking)

8 Exposure controls/personal protection

Engineering controls: Use local exhaust ventilation to keep airborne concentrations of *Optibor* dust below permissible exposure levels.
Personal protection: Where airborne concentrations are expected to exceed exposure limits, NIOSH/MSHA certified respirators should be used. Eye goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

Occupational exposure limits: *Optibor* is treated by OSHA, Cal OSHA and ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust".

ACGIH/TLV:	10 mg/m^3
Cal OSHA/PEL:	10 mg/m^3
OSHA/PEL (total dust):	15 mg/m^3
OSHA/PEL (respirable dust):	5 mg/m^3

9 Physical and chemical properties

Appearance:	White, odorless, crystalline solid	**Melting point:**	170.9°C (340°F) (heated in closed space)
Specific gravity:	1.51	**pH @ 20°C:**	6.1 (0.1% solution); 5.1 (1.0% solution); 3.7 (4.7% solution)
Vapor pressure:	*Negligible @ 20°C*		
Solubility in water:	4.7% @ 20°C; 27.5% @ 100°C	**Molecular weight:**	61.84

10 Stability and reactivity

General: *Optibor* is a stable product, but when heated it loses water, first forming metaboric acid (HBO_2), and on further heating it is converted into boric oxide (B_2O_3).

Incompatible materials and conditions to avoid: *Optibor* reacts as a weak acid which may cause corrosion of base metals. Reaction with strong reducing agents, such as metal hydrides or alkali metals, will generate hydrogen gas, which could create an explosive hazard.

Hazardous decomposition: None.

11 Toxicological information

Acute toxicity

Ingestion: Low acute oral toxicity; LD_{50} in rats is 3,500 to 4,100 mg/kg of body weight.
Skin/dermal: Low acute dermal toxicity; LD_{50} in rabbits is greater than 2,000 mg/kg of body weight. *Optibor* is poorly absorbed through intact skin.
Inhalation: Low acute inhalation toxicity; LC_{50} in rats is greater than 2.0 mg/L (or g/m^3).
Skin irritation: Non-irritant.
Eye irritation: Draize test in rabbits produced mild eye irritation effects. Fifty years of occupational exposure to *Optibor* indicates no adverse effects on human eye. Therefore, *Optibor* is not considered to be a human eye irritant in normal industrial use.
Sensitization: ***Optibor* is not a skin sensitizer.**

Other

Reproductive/developmental toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes[2]. Boric acid studies in rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations[3, 4]. The doses administered were many times in excess of those to which humans would normally be exposed[5].
Carcinogenicity/mutagenicity: No evidence of carcinogenicity in mice[6]. No mutagenic activity was observed for boric acid in a battery of short-term mutagenicity assays.
Human data: Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility[7].

12 Ecological information

Ecotoxicity data

General: Boron (B) is the element in boric acid (*Optibor*) which is used by convention to report borate product ecological effects. It occurs naturally in sea-water at an average concentration of 5 mg B/L and generally occurs in fresh water at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert boric acid into equivalent boron (B) content, multiply by 0.1748.
Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants; however, it can be harmful to boron sensitive plants in high quantities. Care should be taken to minimize the amount of *Optibor* released to the environment.
Algal toxicity:
Green algae, *Scenedesmus subspicatus*
96-hr EC_{10} = 24 mg B/L†
Invertebrate toxicity[8]:
Daphnids, *Daphnia magna straus*
48-hr LC_{50} = 133 mg B/L‡
21-day NOEC-LOEC = 6-13 mg B/L‡

Test substance: † sodium tetraborate
‡ boric acid

Fish toxicity:
Sea-water[9]:
Dab, *Limanda limanda*
96-hr LC_{50} = 74 mg B/L†
Fresh water[10]:
Rainbow trout, *S. gairdneri* (embryo-larval stage)
24-day LC_{50} = 150 mg B/L‡
32-day LC_{50} = 100 mg B/L‡
Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC_{50} = 46 mg B/L‡
3-day LC_{50} = 178 mg B/L‡

Environmental fate data

Persistence/degradation: Boron is naturally occurring and ubiquitous in the environment. *Optibor* decomposes in the environment to natural borate.
Octanol/water partition coefficient: Log P_{ow}: -0.7570 at 25°C.
Soil mobility: *Optibor* is soluble in water and is leachable through normal soil.

13 Disposal considerations

Disposal guidance: Small quantities of *Optibor* can usually be disposed of at landfill sites. No special disposal treatment is required, but local authorities should be consulted about any specific local requirements. Tonnage quantities of product should, if possible, be used for an appropriate application.

RCRA (40 CFR 261): *Optibor* is not listed under any sections of the Federal Resource Conservation and Recovery Act (RCRA).
NPRI (Canada): *Optibor* is not listed on the Canadian National Pollutant Release Inventory.
Refer to Section 15 for additional regulatory information.

14 Transport information

DOT hazardous classification: *Optibor* is not regulated by the U.S. Department of Transportation (DOT) and is therefore not considered a hazardous material/substance.
TDG Canadian transportation: Boric acid (*Optibor*)is not regulated under Transportation of Dangerous Goods (TDG).

International transportation: Boric acid *(Optibor)* has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

15 Regulatory information

OSHA/Cal OSHA: This MSDS document meets the requirements of both OSHA (29 CFR 1910.1200) and Cal OSHA (Title 8 CCR 5194 (g)) hazard communication standards. Refer to Section 8 for regulatory exposure limits.
WHMIS classification: Boric acid (*Optibor*) is classified as Class D- Division 2A under Canadian WHMIS guidelines.
Chemical inventory listing: Boric acid (*Optibor*) (10043-35-3) appears on several chemical inventory lists (including the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI, Australian and Korean lists) under the CAS No. representing the anhydrous form of this inorganic salt.

U.S. EPA TSCA Inventory	10043-35-3
Canadian DSL	10043-35-3
EINECS	233-139-2
South Korea	1-439
Japanese MITI	(1)-63

RCRA: Boric acid (*Optibor*) is not listed as a hazardous waste under any sections of the Resource Conservation and Recovery Act (RCRA) or regulations (40 CFR 261 *et seq*).
Superfund: CERCLA/SARA. Boric acid (*Optibor*) is not listed under CERCLA (Comprehensive Environmental Response Compensation and Liability Act) or its 1986 amendments, SARA (Superfund Amendments and Reauthorization Act), including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023, 40 CFR 372.65, Section 302 of SARA, Extremely Hazardous Substances, 42 USC 11002, 40 CFR 355, or the CERCLA Hazardous Substances list, 42 USC 9604, 40 CFR 302.
Safe Drinking Water Act (SDWA): Boric acid (*Optibor*) is not regulated under the SDWA, 42 USC 300g-1, 40 CFR 141 *et seq*. Consult state and local regulations for possible water quality advisories regarding boron compounds.
Clean Water Act (CWA) (Federal Water Pollution Control Act): 33 USC 1251 *et seq*.

a) Boric acid (*Optibor*) is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.
b) It is not on the Section 307 List of Priority Pollutants, 33 USC 1317, 40 CFR 129.
c) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.

Canadian drinking water guideline: An "Interim Maximum Acceptable Concentration" (IMAC) for boron is currently set at 5 mg B/L.
IARC: The International Agency for Research on Cancer (IARC) (a unit of the World Health Organization) does not list or categorize boric acid as a carcinogen.
NTP Biennial Report on Carcinogens: Boric acid is not listed.
OSHA carcinogen: Boric acid is not listed.
California Proposition 65: Boric acid (*Optibor*) is not listed on the Proposition 65 list of carcinogens or reproductive toxicants.
Federal Food, Drug and Cosmetic Act: Pursuant to 21 CFR 175.105, 176.180 and 181.30, *Optibor* is approved by the FDA for use in adhesive components of packaging materials, as a component of paper coatings on such materials, or for use in the manufacture thereof, which materials are expected to come in contact with dry food products.
Clean Air Act (Montreal Protocol): *Optibor* was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

16 Other information

References

1. Litovitz T L, Norman S A, Veltri J C, Annual Report of the American Association of Poison Control Centers Data Collection System. Am. J. Emerg. Med. **4**: 427-458 (1986).
2. Weir R J, Fisher R S, Toxicol. Appl. Pharmacol. **23**: 351-364 (1972).
3. Fail *et al.*, Fund. Appl. Toxicol. **17**: 225-239 (1991).
4. Price *et al.*, J. Am. Coll. Toxicol. **14**: (2), 173 (Abst. P-17) (1995).
5. Murray F J, Regul. Toxicol. Pharmacol. (Dec. 1995).
6. National Toxicology Program (NTP)–Toxicology and carcinogenesis studies of boric acid in $B6C3F_1$ mice, Tech. Report Ser. No. 324, U.S. Dept. of Health and Human Services. NIH Publ. No. 88-2580 (1987).
7. Whorton *et al.*, Occup. Environ. Med. **51**: 761-767 (1994).
8. Schöberl *et al.*, Tenside Surfactants Detergents **25**: 99-107 (1988).
9. Hugman S J, Mance G, Water Research Centre Report 616-M (1983).
10. Butterwick L, de Oude N, Raymond K, Ecotoxicol. Environ. Safety **17**: 339-371 (1989).

For general information on the toxicology of inorganic borates, see Patty's Industrial Hygiene and Toxicology, 4th Ed. Vol. II, (1994), Chap. 42, Boron; ECETOC Tech. Report No. 63 (1995).

Product label text hazard information*:
Do not ingest.
Ingestion may cause reproductive harm or birth defects based on animal data.
Avoid contamination of food or feed.
Not for use in food, drug, or pesticides+.
Refer to MSDS.
KEEP OUT OF REACH OF CHILDREN.
*The WHMIS panel format is used for Canadian product.
+Except for NF (pharmaceutical grade) products.

National Fire Protection Assoc. (NFPA) Classification:

Health	0
Flammability	0
Reactivity	0

Hazardous Materials Information Systems (HMIS):

Red: (Flammability)	0
Yellow: (Reactivity)	0
Blue: (Acute Health)	1*

*Chronic Effects

For further information contact:
U.S. Borax Inc.
Occupational Health & Product Safety Department
(661) 287-6050

1100-379

boron isotopes
EAGLE PICHER

Lithium Hydroxide Monohydrate
[$^7Li(OH)\bullet H_2O$]

Material Safety Data Sheet

Section 1. Manufacturer/Chemical Identity

MSDS CREATION DATE: February 19, 2001	REVISED: Original
MANUFACTURER'S NAME:	Eagle Picher Technologies, LLC
	Boron Department
ADDRESS:	P.O. Box 798
	Quapaw, OK 74363-0798
EMERGENCY TELEPHONE NUMBER:	1-800-535-5053 (24 Hours)
INFORMATION TELEPHONE NUMBER:	918-673-2201
FAX NUMBER:	918-673-1052
CHEMICAL NAME AND SYNONYMS:	Mixture of Lithium Hydroxide and Water
	Lithium Hydroxide; Lithium Hydroxide Monohydrate
CAS#:	72255-97-1 & 7732-28-5
FORMULA:	$^7Li(OH)\bullet H_2O$
CHEMICAL FAMILY:	Alkali Metal Hydroxide

Section 2. Composition / Information on Ingredients

COMPONENTS	CAS#	TLV	PEL	%(optional)
Lithium Hydroxide	72255-97-1	N/A	N/A	
Water	7732-28-5	N/A	N/A	

Section 3. Hazardous Identification

EMERGENCY OVERVIEW

Corrosive. Hygroscopic. May cause kidney damage. May cause central nervous system effects. May cause cardiac disturbances. Causes eye and skin burns. Causes digestive and respiratory tract burns.

TARGET ORGANS: Kidneys, central nervous system, cardiovascular system.

POTENTIAL HEALTH EFFECTS

SKIN: Causes skin burns. Chronic ingestion may cause dizziness, ringing in the ears, visual disturbances, Tremors, and mental confusion. Prolonged absorption may affect electrolyte balance and impair Kidney function. Dehydration, weight loss, skin effects, and thyroid disturbances have been reported.

EYES: Causes eye burns.

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Lithium Hydroxide Monohydrate
[$^7Li(OH)\cdot H_2O$]

Material Safety Data Sheet

INHALATION: Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.

INGESTION: May cause circulatory system failure. May cause cardiac disturbances. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May cause tremors and convulsions.

CHRONIC: Chronic ingestion may cause dizziness, ringing in the ears, visual disturbances, tremors, and mental confusion. Prolonged absorption may affect electrolyte balance and impair kidney function. Dehydration, weight loss, skin effects, and thyroid disturbances have been reported.

Section 4. First Aid Measures

If inhaled, contact physician immediately. Remove to fresh air immediately. If difficulty breathing, give oxygen. If not breathing, give artificial respiration.

In case of contact with eyes, contact physician. Immediately flush eyes with water for 20-30 minutes by the clock, while holding the eyelid open. *DO NOT INTERRUPT FLUSHING.* Neutral saline solution may be used as soon as it is available.

In case of contact with skin, Remove contaminated clothing, shoes and leather goods (*i.e. belts, watchbands*). Immediately flush skin with water for at least 20 – 30 minutes, by the clock. *DO NOT INTERRUPT FLUSHING.*

In case of ingestion, DO NOT INDUCE VOMITING, allow victim to rinse mouth thoroughly and then drink *8 – 10* ounces of water if conscious. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. SEEK MEDICAL ATTENTION IN ALL CASES.

ADVICE TO PHYSICIAN: Treat symptomatically and supportatively.

Section 5. Fire and Explosion Hazard Data

Flash Point: *Noncombustible*
Flammable Limits: **UEL:** Not Applicable **LEL:** Not Applicable

Fire Extinguishing Media: Use dry chemical, CO_2, alcohol or polymer foam.
Special Fire Fighting Precautions: None Nonflammable
Unusual Fire and Explosion Hazards: *Corrosive aerosols of lithium hydroxide and lithium* carbonate may be produced during combustion and thermal decomposition.

Section 6. Accidental Release Measures

PRECAUTIONS:

Restrict access to area until completion of clean up. Ensure clean up is conducted by trained personnel only. Wear adequate personal protective equipment.

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Lithium Hydroxide Monohydrate
[$^7Li(OH)\bullet H_2O$]

Material Safety Data Sheet

SPILLS/LEAKS:

Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7: Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not get on skin or in eyes.

STORAGE: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substance. Corrosives area.

Section 8: Exposure Control/Personal Protection

ENGINEERING CONTROLS: Use adequate general and local exhaust ventilation to keep airborne concentration below the permissible exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection: Wear appropriate protective gloves to prevent skin exposure.

Eye Protection: Wear appropriate protective eyeglasses or chemical safety goggles.

Respirators: Wear a NIOSH/MSHA approved dust or particle mask or approved respirator if necessary to avoid exposure.

Additional Recommendations: Safety showers and eyewash stations convenient to work area.

EXPOSURE GUIDELINES

Threshold Limit Values - (American Conference of Governmental Industrial Hygienists)(ACGIH)

TIME-WEIGHTED AVERAGE (TLV-TWA): Not Established

American Industrial Hygiene Association (AIHA)

CEILING LIMIT: 1 mg/m^3 (lithium hydroxide)

Permissible Exposure Limits - U.S. Occupational Safety and Health Administration (OSHA)

Time Weighted Average (PEL-TWA): Not Established

Section 9. Physical and Chemical Properties

Physical State:	Solid
Appearance:	White to Off-white crystals
Odor:	No apparent odor
Molecular Weight:	41.95
Molecular Formula:	$^7LiOH·H_2O$
Vapor Pressure:	Not Applicable
Vapor Density (air =1.0):	Not Applicable
Evaporation Rate:	Not Applicable
Boiling Point:	924° C (anhydrous form)
Melting Point:	471° C (anhydrous form)
Solubility in Water (weight %):	100%
Specific Gravity/Density:	1.51

Section 10. Stability and Reactivity

CHEMICAL STABILITY: Stable.

CONDITIONS TO AVOID: Reacts with CO_2 in air to form Li_2CO_3 (Lithium Carbonate)

INCOMPATIBILITIES: Strong mineral acids, steam, generates heat when dissolved in water

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur

Section 11. Toxicological Information

LD50/LC50: Not available.

Carcinogenicity: Lithium Hydroxide Monohydrate, not listed by ACGIH, IARC, NIOSH NTP, or OSHA

Teratogenicity: No Data Available

Reproductive Effects: No Data Available

Neurotoxicity: No Data Available

OTHER DATA: None

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EAGLE PICHER

Lithium Hydroxide Monohydrate
[$Li(OH)•H_2O$]

Material Safety Data Sheet

Section 12. Ecological Information

Ecotoxicity:
No data available.

Section 13. Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14. Transport Information

US DOT:

Proper Shipping Name:	Lithium Hydroxide Monohydrate
Hazard Class:	Class 8
Labels:	Corrosive (class 8)
Packing Group:	II
UN or ID NUMBER:	UN 2680
Emergency Response Guide #	154
Reportable Quantity:	None listed

IMO:

Shipping Name:	Lithium Hydroxide Monohydrate
Hazard Class:	8
UN Number:	UN 2680
Packing Group:	II

IATA:

Shipping Name:	Lithium Hydroxide
Hazard Class:	8
UN Number:	UN 2680
Packing Group:	II
Packaging Instruction:	816
Emergency Response Guide:	154

Section 15. Regulatory Information

SARA: Section 302 (RQ); this chemical does not have a listed RQ.
(TPQ); this chemical does not have a listed TPQ.
Section 313: not reportable under section 313.

OSHA: Not considered highly hazardous by OSHA.

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Lithium Hydroxide Monohydrate
[$^7Li(OH) \cdot H_2O$]

Material Safety Data Sheet

Clean Air Act: Does not contain any Hazardous Air Pollutants (HAPS)
Does not contain any Class 1 Ozone depletors
Does not contain any Class 2 Ozone depletors

Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA
None of the chemicals in this product are listed as Priority Pollutants under the CWA
None of the chemicals in this product are listed as Toxic Pollutants under the CWA

States:
LITHIUM HYDROXIDE MONOHYDRATE can be found on the following state right to know lists: New Jersey, Minnesota.
CALIFORNIA NO SIGNIFICANT RISK LEVEL: None of the chemicals in this product are listed.

Section 16. Other Information

The data given are those of the corresponding natural product unless specifically indicated otherwise. Safety data for isotopically altered compounds are generally unavailable but the hazards and properties are assumed to be similar or identical to those of the natural compounds. While the information set forth is believed to be accurate, Eagle Picher Technologies, LLC extends no warranties with respect hereto and disclaims all liabilities from reliance thereon. All judgements as to the suitability of the data presented with respect to the use of this product are the responsibility of the purchaser and intended user.

Material Safety Data Sheet

Ammonium hydroxide water solution, >14N NH4OH (>25% as ammonia, NH3)

ACC# 00211

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium hydroxide water solution, >14N NH4OH (>25% as ammonia, NH3)
Catalog Numbers: AC205840000, AC205840010, AC205840025, AC205840050, AC255210000, AC255210025, AC423300000, AC423300025, AC423300250, AC423305000, S70665, S70665MF, S75029, S93119, S93120, S93120A, A667-212, A669-212, A669-385LB, A669-500, A669-500LC, A669-612GAL, A669C-212, A669C-212LC, A669J-500, A669P-500, A669S-212, A669S-212E, A669S-212LC, A669S-500, A669S212EA, FLA669S-212EA, SCH1143, 58018A
Synonyms: Ammonium hydrate; Ammonia solution; Ammonia water; Aqueous ammonia; Aqua ammonia.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7664-41-7	Ammonia	>25-30	231-635-3
7732-18-5	Water	Balance	231-791-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid.
Danger! Causes eye and skin burns. Causes digestive and respiratory tract burns. Harmful if inhaled or swallowed.
Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects

Eye: Contact with liquid or vapor causes severe burns and possible irreversible eye damage. Lachrymator (substance which increases the flow of tears).

Skin: Causes severe skin irritation. Causes skin burns. May cause deep, penetrating ulcers of the skin. Contact with the skin may cause staining, inflammation, and thickening of the skin.

Ingestion: Harmful if swallowed. May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. Causes throat constriction, vomiting, convulsions, and shock.

Inhalation: Effects may be delayed. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.

Chronic: Prolonged inhalation may cause respiratory tract inflammation and lung damage. Prolonged or repeated exposure may cause corneal damage and the development of cataracts and glaucoma.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid immediately.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Ammonium hydroxide itself is non-combustible. However concentrated ammonia solutions may give off ammonia vapours. Ammonia gas is generally not

considered a serious fire or explosion hazard because ammonia/air mixtures are difficult to ignite. A relatively high concentration of ammonia gas must be present in order for ignition to occur. However, a large and intense energy source may cause ignition an explosion in a confined space.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not available.
Autoignition Temperature: 651 deg C (1,203.80 deg F)
Explosion Limits, Lower:15%
Upper: 28%
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Neutralize spill with a weak acid such as vinegar or acetic acid. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Discard contaminated shoes. Do not breathe vapor. Use only with adequate ventilation.
Storage: Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Isolate from oxidizing materials and acids. Walls, floors, shelving, fittings, lighting and ventilation systems in storage area should be made from carbon steel or stainless steel which do not react with ammonium hydroxide.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonia	25 ppm TWA; 35 ppm STEL	25 ppm TWA; 18 mg/m3 TWA 300 ppm IDLH	50 ppm TWA; 35 mg/m3 TWA
Ammonium hydroxide	none listed	none listed	none listed
Water	1 mg/m3 TWA (as W) (listed under Tungsten, soluble compounds).3 mg/m3 STEL (as W) (listed under Tungsten, soluble compounds).	3 mg/m3 TWA (as W) (listed under Tungsten, soluble compounds).	none listed

OSHA Vacated PELs: Ammonia: No OSHA Vacated PELs are listed for this chemical. Ammonium hydroxide: No OSHA Vacated PELs are listed for this chemical. Water: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles and face shield.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approvec respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: colorless

Odor: strong odor - ammonia-like

pH: 13.6

Vapor Pressure: 557 mm Hg @ 21 deg C

Vapor Density: 0.59 (air=1)

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 27 deg C

Freezing/Melting Point:-69 deg C

Decomposition Temperature: Not available.

Solubility: Soluble.

Specific Gravity/Density:0.89

Molecular Formula:NH4OH

Molecular Weight:35.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Ammonium hydroxide is actually a solution of ammonia in water. Therefore the flammable properties of ammonia apply.
Conditions to Avoid: High temperatures, confined spaces, Ammonia solutions are corrosive to copper, zinc, aluminum and their alloys..
Incompatibilities with Other Materials: Strong oxidizing agents, acids, acrolein, halogens, mercury, hypochlorite, silver nitrate, acrylic acid, dimethyl sulfate, silver oxide
Hazardous Decomposition Products: Nitrogen oxides (NOx) and ammonia (NH3).
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7664-41-7: BO0875000
CAS# 1336-21-6: BQ9625000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 7664-41-7:
Inhalation, mouse: LC50 = 4230 ppm/1H;
Inhalation, mouse: LC50 = 4600 mg/m3/2H;
Inhalation, rabbit: LC50 = 7 gm/m3/1H;
Inhalation, rat: LC50 = 2000 ppm/4H;
Inhalation, rat: LC50 = 18600 mg/m3/5M;
Inhalation, rat: LC50 = 7040 mg/m3/30M;
Skin, rat: LD50 = 112000 mg/m3/15M;
Skin, rat: LD50 = 71900 mg/m3/30M;
Skin, rat: LD50 = 4840 mg/m3/60M;
CAS# 1336-21-6:
Draize test, rabbit, eye: 250 ug Severe;
Draize test, rabbit, eye: 44 ug Severe;
Oral, rat: LD50 = 350 mg/kg;
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
Carcinogenicity:
CAS# 7664-41-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 1336-21-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found.
Teratogenicity: No information found.
Reproductive Effects: No information found.
Mutagenicity: No information found.
Neurotoxicity: No information found.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.008 mg/L; 24 Hr.; Unspecified
Fish: Fathead Minnow: LC50 = 8.2 mg/L; 96 Hr.; Unspecified
Fish: Bluegill/Sunfish: LC50 = 0.024-0.093 mg/L; 48 Hr.; Unspecified
Water flea Daphnia: EC50 =0.66 mg/L; 48 Hr.; 22 degrees C

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	AMMONIA SOLUTIONS	AMMONIA SOLUTION
Hazard Class:	8	8
UN Number:	UN2672	UN2672
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7664-41-7 is listed on the TSCA inventory.
CAS# 1336-21-6 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7664-41-7: 100 lb final RQ; 45.4 kg final RQ CAS# 1336-21-6: 1000 l .ia RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 7664-41-7: 500 lb TPQ

SARA Codes

CAS # 1336-21-6: acute, chronic.

Section 313

This material contains Ammonia (CAS# 7664-41-7, >25-30%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Water (listed as Water Dissociable Nitrate Compounds), Balanc %, (CAS# 7732-18-5) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7664-41-7 is listed as a Hazardous Substance under the CWA. CAS# 1336-21-6 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CW

OSHA:

CAS# 7664-41-7 is considered highly hazardous by OSHA.

STATE

CAS# 7664-41-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 1336-21-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C N

Risk Phrases:

R 34 Causes burns.

R 50 Very toxic to aquatic organisms.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of

water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 7664-41-7: 2
CAS# 1336-21-6: 2
CAS# 7732-18-5: No information available.

Canada - DSL/NDSL

CAS# 7664-41-7 is listed on Canada's DSL List.
CAS# 1336-21-6 is listed on Canada's DSL List.
CAS# 7732-18-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, E.

Canadian Ingredient Disclosure List

CAS# 7664-41-7 is listed on the Canadian Ingredient Disclosure List.
CAS# 1336-21-6 is listed on the Canadian Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/22/1999
Revision #12 Date: 7/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 01-APR-2004

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

POLYFLOC AP1138

PRODUCT APPLICATION AREA:

FLOCCULANT

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Dusts may cause irritation to the upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: None; Appearance: White, Powder

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Dusts may cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Do not expose to moisture.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
airtight chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Density	43.120 lb/cu.	Vapor Pressure (mmHG)	< 0.1
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	1.0

Odor	None
Appearance	White
Physical State	Powder
Flash Point P-M(CC)	> 200F > 93C
pH 0.5% Sol. (approx.)	8.0
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 MOUSE:	>2,000 mg/kg
NOTE - Supplier estimate; Rat oral LD50: >5,000 mg/kg per alternate supplier	
Carcinogenicity RAT/DOG:	NEGATIVE
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	
Skin Irritation Score RABBIT:	NONIRRITANT
Eye Irritation Score RABBIT:	SLIGHT
Skin Sensitization G.PIG:	NEGATIVE

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Bluegill Sunfish 48 Hour Static Screen
0% Mortality= 100 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 470; No Effect Level= 178 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 239; No Effect Level= 45 mg/L

BIODEGRADATION

BOD-28 (mg/g): 0
BOD-5 (mg/g): 0
COD (mg/g): 775
TOC (mg/g): 349

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 173.5 and 21 CFR 573.120

SARA SECTION 312 HAZARD CLASS:

Product is non-hazardous under Section 311/312

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

While we believe this product is non-hazardous, this product contains trace amounts of these chemicals known to the state of California to cause cancer and/or reproductive toxicity:

CAS#	CHEMICAL NAME
79-06-1	ACRYLAMIDE

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	01-MAY-1998	8;EDIT:9	28-JAN-1997
	10-JUN-1998	15	01-MAY-1998
	01-JUN-1999	15	10-JUN-1998
	13-SEP-2000	4	01-JUN-1999
	11-DEC-2000	15	13-SEP-2000
	01-APR-2004	15	11-DEC-2000

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 01-APR-2004

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

POLYFLOC AS1001

PRODUCT APPLICATION AREA:

FLOCCULANT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

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EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause slight irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: None; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause slight irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.010	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	32	Vapor Density (air=1)	< 1.00
Freeze Point (C)	0		
Viscosity(cps 70F,21C)	2000	% Solubility (water)	100.0

Odor		None
Appearance		Colorless
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		5.2
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Bluegill Sunfish 48 Hour Static Screen
0% Mortality= 300 mg/L
Daphnia magna 48 Hour Static Screen
0% Mortality= 1000 mg/L
Rainbow Trout 48 Hour Static Screen
0% Mortality= 1000 mg/L

BIODEGRADATION
BOD-28 (mg/g): 1
BOD-5 (mg/g): 0
COD (mg/g): 38
TOC (mg/g): 13

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.110 (acrylamide - acrylic acid resins)
All ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a) (4).

USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:
SEC.L1

SARA SECTION 312 HAZARD CLASS:
Product is non-hazardous under Section 311/312

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

While we believe this product is non-hazardous, this product contains trace amounts of these chemicals known to the state of California to cause cancer and/or reproductive toxicity:

CAS#	CHEMICAL NAME
79-06-1	ACRYLAMIDE

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	27-MAY-1999	15	28-JAN-1997
	13-JUL-1999	15	27-MAY-1999
	16-APR-2002	4,16	13-JUL-1999
	01-APR-2004	15	16-APR-2002

Table 8: Summary Results for TMINS Case 6

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6n25lqcd4	tmi.g22	tmi.f13	tmi.p54	tmi.r54	tmi.o54	0.025	Dc	1.52	269.22	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6n25lq15cd5	tmi.g22	tmi.f15	tmi.p55	tmi.r55	tmi.o55	0.025	1.5*Dc	2.28	269.98	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6n25lq20cd6	tmi.g22	tmi.f17	tmi.p56	tmi.r56	tmi.o56	0.025	2.0*Dc	3.04	270.74	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6n35lqcd10	tmi.g24	tmi.f13	tmi.p60	tmi.r60	tmi.o60	0.035	Dc	1.52	269.22	4000	130	448	11%	1864	47%	1688	42%	273.08	272.89	272.99
C6n35lq15c11	tmi.g24	tmi.f15	tmi.p61	tmi.r61	tmi.o61	0.035	1.5*Dc	2.28	269.98	4000	130	448	11%	1864	47%	1688	42%	273.08	272.88	272.98
C6n35lq20c12	tmi.g24	tmi.f17	tmi.p62	tmi.r62	tmi.o62	0.035	2.0*Dc	3.04	270.74	4000	130	448	11%	1865	47%	1688	42%	273.07	272.88	272.98
C6n50lqcd16	tmi.g28	tmi.f13	tmi.p66	tmi.r66	tmi.o66	0.050	Dc	1.52	269.22	4000	130	639	16%	1759	44%	1602	40%	273.46	273.23	273.35
C6n50lq15c17	tmi.g28	tmi.f15	tmi.p67	tmi.r67	tmi.o67	0.050	1.5*Dc	2.28	269.98	4000	130	639	16%	1759	44%	1602	40%	273.45	273.22	273.34
C6n50lq20c18	tmi.g28	tmi.f17	tmi.p68	tmi.r68	tmi.o68	0.050	2.0*Dc	3.04	270.74	4000	130	639	16%	1759	44%	1602	40%	273.45	273.22	273.34
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	2.02	269.72	8000	130	717	9%	3798	47%	3485	44%	273.58	273.34	273.46
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	3.03	270.73	8000	130	717	9%	3798	47%	3485	44%	273.57	273.33	273.45
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	4.04	271.74	8000	130	717	9%	3798	47%	3485	44%	273.58	273.35	273.47
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	2.02	269.72	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.75	273.89
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	3.03	270.73	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.74	273.88
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	4.04	271.74	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.74	273.88
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	2.02	269.72	8000	130	1366	17%	3384	42%	3250	41%	274.46	274.15	274.31
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	3.03	270.73	8000	130	1369	17%	3403	43%	3228	40%	274.46	274.15	274.31
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	4.04	271.74	8000	130	1369	17%	3403	43%	3228	40%	274.46	274.15	274.31
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	2.44	270.14	12000	130	1124	9%	5618	47%	5258	44%	274.17	273.90	274.04
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	3.66	271.36	12000	130	1124	9%	5619	47%	5257	44%	274.17	273.89	274.03
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	4.88	272.58	12000	130	1124	9%	5616	47%	5260	44%	274.19	273.92	274.06
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	2.44	270.14	12000	130	1572	13%	5259	44%	5169	43%	274.62	274.32	274.47
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	3.66	271.36	12000	130	1571	13%	5261	44%	5167	43%	274.62	274.31	274.47
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	4.88	272.58	12000	130	1572	13%	5261	44%	5167	43%	274.62	274.31	274.47
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	2.44	270.14	12000	130	2162	18%	4850	40%	4988	42%	275.14	274.80	274.97
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	3.66	271.36	12000	130	2162	18%	4856	40%	4983	42%	275.13	274.79	274.96
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	4.88	272.58	12000	130	2160	18%	4861	41%	4978	41%	275.12	274.77	274.95

Table 8: Summary Results for TMINS Case 6

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	2.77	270.47	16000	130	1589	10%	7242	45%	7169	45%	274.60	274.31	274.46
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	4.16	271.86	16000	130	1588	10%	7246	45%	7166	45%	274.59	274.29	274.44
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	5.54	273.24	16000	130	1583	10%	7239	45%	7178	45%	274.65	274.37	274.51
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	2.77	270.47	16000	130	2160	14%	6818	43%	7022	44%	275.12	274.79	274.96
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	4.16	271.86	16000	130	2158	13%	6826	43%	7016	44%	275.11	274.77	274.94
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	5.54	273.24	16000	130	2162	14%	6818	43%	7019	44%	275.13	274.80	274.97
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	2.77	270.47	16000	130	2977	19%	6250	39%	6773	42%	275.68	275.32	275.50
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	4.16	271.86	16000	130	2972	19%	6263	39%	6765	42%	275.66	275.29	275.48
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	5.54	273.24	16000	130	2972	19%	6272	39%	6756	42%	275.65	275.28	275.47
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	3.01	270.71	20000	130	2026	10%	8911	45%	9063	45%	274.99	274.68	274.84
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	4.51	272.22	20000	130	2024	10%	8923	45%	9053	45%	274.97	274.65	274.81
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	6.02	273.72	20000	130	2055	10%	8851	44%	9095	45%	275.07	274.78	274.93
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	3.01	270.71	20000	130	2765	14%	8304	42%	8931	45%	275.53	275.18	275.36
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	4.51	272.22	20000	130	2758	14%	8326	42%	8916	45%	275.50	275.14	275.32
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	6.02	273.72	20000	130	2775	14%	8304	42%	8921	45%	275.55	275.21	275.38
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	3.01	270.71	20000	130	3808	19%	7632	38%	8560	43%	276.15	275.77	275.96
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	4.51	272.22	20000	130	3795	19%	7663	38%	8542	43%	276.12	275.73	275.93
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	6.02	273.72	20000	130	3803	19%	7666	38%	8531	43%	276.13	275.74	275.94
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	3.37	271.07	25000	130	2610	10%	10897	44%	11494	46%	275.40	275.06	275.23
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	5.06	272.76	25000	130	2615	10%	10866	43%	11519	46%	275.36	275.01	275.19
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	6.74	274.44	25000	130	2653	11%	10830	43%	11517	46%	275.54	275.26	275.40
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	3.37	271.07	25000	130	3524	14%	10182	41%	11294	45%	275.99	275.63	275.81
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	5.06	272.76	25000	130	3509	14%	10229	41%	11262	45%	275.95	275.57	275.76
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	6.74	274.44	25000	130	3554	14%	10179	41%	11268	45%	276.04	275.69	275.87
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	3.37	271.07	25000	130	4891	20%	9300	37%	10808	43%	276.67	276.27	276.47
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	5.06	272.76	25000	130	4863	19%	9360	37%	10777	43%	276.61	276.20	276.41
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	6.74	274.44	25000	130	4889	20%	9354	37%	10757	43%	276.64	276.24	276.44
C6n25hqcd1	tmi.g23	tmi.f14	tmi.p51	tmi.r51	tmi.o51	0.025	Dc	3.60	271.30	30000	130	3221	11%	12745	42%	14035	47%	275.73	275.39	275.56
C6n25hq15cd2	tmi.g23	tmi.f16	tmi.p52	tmi.r52	tmi.o52	0.025	1.5*Dc	5.40	273.10	30000	130	3214	11%	12778	43%	14008	47%	275.70	275.35	275.53
C6n25hq20cd3	tmi.g23	tmi.f18	tmi.p53	tmi.r53	tmi.o53	0.025	2.0*Dc	7.20	274.90	30000	130	3326	11%	12614	42%	14061	47%	275.96	275.69	275.83
C6n35hqcd7	tmi.g25	tmi.f14	tmi.p57	tmi.r57	tmi.o57	0.035	Dc	3.60	271.30	30000	130	4346	14%	11940	40%	13713	46%	276.39	276.01	276.20
C6n35hq15cd8	tmi.g25	tmi.f16	tmi.p58	tmi.r58	tmi.o58	0.035	1.5*Dc	5.40	273.10	30000	130	4324	14%	12008	40%	13668	46%	276.33	275.94	276.14
C6n35hq20cd9	tmi.g25	tmi.f18	tmi.p59	tmi.r59	tmi.o59	0.035	2.0*Dc	7.20	274.90	30000	130	4402	15%	11915	40%	13683	46%	276.48	276.14	276.31
C6n50hqcd13	tmi.g29	tmi.f14	tmi.p63	tmi.r63	tmi.o63	0.050	Dc	3.60	271.30	30000	130	5915	20%	10976	37%	13109	44%	277.13	276.73	276.93
C6n50hq15c14	tmi.g29	tmi.f16	tmi.p64	tmi.r64	tmi.o64	0.050	1.5*Dc	5.40	273.10	30000	130	5872	20%	11067	37%	13060	44%	277.07	276.63	276.85
C6n50hq20c15	tmi.g29	tmi.f18	tmi.p65	tmi.r65	tmi.o65	0.050	2.0*Dc	7.20	274.90	30000	130	5946	20%	11043	37%	13012	43%	277.13	276.71	276.92

Notes:
(1) This is the 12-character "short ID" as used in HEC-RAS.
(2) Percent flow is percent of specified river flow.
(3) The shaded cells indicate the most conservative case, at Q=1700 cfs and n=0.025.

Table 9: Summary Results for TMINS Case 6a

Case	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent	cfs	percent	cfs	percent			
C6a25lqcd22	tmi.g30	tmi.f13	tmi.p72	tmi.r72	tmi.o72	0.025	Dc	1.05	268.75	1700	130	103	6%	882	52%	715	42%	271.98	271.88	271.93
C6a25lq15c23	tmi.g30	tmi.f15	tmi.p73	tmi.r73	tmi.o73	0.025	1.5*Dc	1.58	269.28	1700	130	103	6%	882	52%	715	42%	271.98	271.88	271.93
C6a25lq20c24	tmi.g30	tmi.f17	tmi.p74	tmi.r74	tmi.o74	0.025	2.0*Dc	2.10	269.80	1700	130	103	6%	882	52%	715	42%	271.98	271.88	271.93
C6a35lqcd28	tmi.g32	tmi.f13	tmi.p78	tmi.r78	tmi.o78	0.035	Dc	1.05	268.75	1700	130	153	9%	822	48%	725	43%	272.18	272.07	272.13
C6a35lq15c29	tmi.g32	tmi.f15	tmi.p79	tmi.r79	tmi.o79	0.035	1.5*Dc	1.58	269.28	1700	130	153	9%	822	48%	725	43%	272.18	272.06	272.12
C6a35lq20c30	tmi.g32	tmi.f17	tmi.p80	tmi.r80	tmi.o80	0.035	2.0*Dc	2.10	269.80	1700	130	153	9%	822	48%	725	43%	272.18	272.07	272.13
C6a50lqcd34	tmi.g34	tmi.f13	tmi.p84	tmi.r84	tmi.o84	0.050	Dc	1.05	268.75	1700	130	230	14%	776	46%	694	41%	272.43	272.29	272.36
C6a50lq15c35	tmi.g34	tmi.f15	tmi.p85	tmi.r85	tmi.o85	0.050	1.5*Dc	1.58	269.28	1700	130	230	14%	776	46%	694	41%	272.43	272.29	272.36
C6a50lq20c36	tmi.g34	tmi.f17	tmi.p86	tmi.r86	tmi.o86	0.050	2.0*Dc	2.10	269.80	1700	130	230	14%	776	46%	694	41%	272.43	272.29	272.36
C6a25lqcd22	tmi.g30	tmi.f13	tmi.p72	tmi.r72	tmi.o72	0.025	Dc	1.52	269.22	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6a25lq15c23	tmi.g30	tmi.f15	tmi.p73	tmi.r73	tmi.o73	0.025	1.5*Dc	2.28	269.98	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6a25lq20c24	tmi.g30	tmi.f17	tmi.p74	tmi.r74	tmi.o74	0.025	2.0*Dc	3.04	270.74	4000	130	319	8%	1931	48%	1750	44%	272.74	272.59	272.67
C6a35lqcd28	tmi.g32	tmi.f13	tmi.p78	tmi.r78	tmi.o78	0.035	Dc	1.52	269.22	4000	130	448	11%	1864	47%	1688	42%	273.08	272.89	272.99
C6a35lq15c29	tmi.g32	tmi.f15	tmi.p79	tmi.r79	tmi.o79	0.035	1.5*Dc	2.28	269.98	4000	130	448	11%	1864	47%	1688	42%	273.08	272.88	272.98
C6a35lq20c30	tmi.g32	tmi.f17	tmi.p80	tmi.r80	tmi.o80	0.035	2.0*Dc	3.04	270.74	4000	130	448	11%	1865	47%	1687	42%	273.07	272.88	272.98
C6a50lqcd34	tmi.g34	tmi.f13	tmi.p84	tmi.r84	tmi.o84	0.050	Dc	1.52	269.22	4000	130	639	16%	1759	44%	1602	40%	273.46	273.23	273.35
C6a50lq15c35	tmi.g34	tmi.f15	tmi.p85	tmi.r85	tmi.o85	0.050	1.5*Dc	2.28	269.98	4000	130	639	16%	1759	44%	1602	40%	273.45	273.22	273.34
C6a50lq20c36	tmi.g34	tmi.f17	tmi.p86	tmi.r86	tmi.o86	0.050	2.0*Dc	3.04	270.74	4000	130	639	16%	1759	44%	1602	40%	273.45	273.22	273.34
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	2.02	269.72	8000	130	717	9%	3798	47%	3485	44%	273.58	273.34	273.46
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	3.03	270.73	8000	130	717	9%	3798	47%	3485	44%	273.57	273.33	273.45
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	4.04	271.74	8000	130	717	9%	3798	47%	3485	44%	273.58	273.35	273.47
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	2.02	269.72	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.75	273.89
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	3.03	270.73	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.74	273.88
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	4.04	271.74	8000	130	1000	13%	3673	46%	3327	42%	274.02	273.74	273.88
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	2.02	269.72	8000	130	1366	17%	3384	42%	3250	41%	274.46	274.15	274.31
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	3.03	270.73	8000	130	1369	17%	3403	43%	3228	40%	274.46	274.15	274.31
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	4.04	271.74	8000	130	1369	17%	3403	43%	3228	40%	274.46	274.15	274.31
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	2.44	270.14	12000	130	1124	9%	5618	47%	5258	44%	274.17	273.90	274.04
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	3.66	271.36	12000	130	1124	9%	5619	47%	5257	44%	274.17	273.89	274.03
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	4.88	272.58	12000	130	1124	9%	5616	47%	5260	44%	274.19	273.92	274.06
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	2.44	270.14	12000	130	1572	13%	5259	44%	5169	43%	274.62	274.32	274.47
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	3.66	271.36	12000	130	1571	13%	5261	44%	5167	43%	274.62	274.31	274.47
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	4.88	272.58	12000	130	1572	13%	5261	44%	5167	43%	274.62	274.31	274.47
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	2.44	270.14	12000	130	2163	18%	4849	40%	4988	42%	275.14	274.80	274.97
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	3.66	271.36	12000	130	2162	18%	4855	40%	4982	42%	275.13	274.79	274.96
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	4.88	272.58	12000	130	2161	18%	4861	41%	4978	41%	275.12	274.77	274.95

Table 9: Summary Results for TMINS Case 6a

Case	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent	cfs	percent	cfs	percent			
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	2.77	270.47	16000	130	1589	10%	7242	45%	7169	45%	274.60	274.31	274.46
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	4.16	271.86	16000	130	1588	10%	7246	45%	7165	45%	274.59	274.29	274.44
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	5.54	273.24	16000	130	1583	10%	7239	45%	7178	45%	274.65	274.37	274.51
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	2.77	270.47	16000	130	2162	14%	6817	43%	7022	44%	275.12	274.79	274.96
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	4.16	271.86	16000	130	2159	13%	6826	43%	7015	44%	275.11	274.77	274.94
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	5.54	273.24	16000	130	2163	14%	6818	43%	7019	44%	275.13	274.80	274.97
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	2.77	270.47	16000	130	2979	19%	6249	39%	6771	42%	275.68	275.32	275.50
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	4.16	271.86	16000	130	2974	19%	6262	39%	6763	42%	275.66	275.29	275.48
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	5.54	273.24	16000	130	2974	19%	6271	39%	6755	42%	275.65	275.28	275.47
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	3.01	270.71	20000	130	2026	10%	8911	45%	9063	45%	274.99	274.68	274.84
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	4.51	272.22	20000	130	2024	10%	8923	45%	9053	45%	274.97	274.65	274.81
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	6.02	273.72	20000	130	2056	10%	8850	44%	9094	45%	275.07	274.78	274.93
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	3.01	270.71	20000	130	2767	14%	8303	42%	8930	45%	275.53	275.18	275.36
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	4.51	272.22	20000	130	2759	14%	8325	42%	8916	45%	275.50	275.14	275.32
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	6.02	273.72	20000	130	2777	14%	8303	42%	8920	45%	275.55	275.21	275.38
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	3.01	270.71	20000	130	3812	19%	7630	38%	8557	43%	276.15	275.77	275.96
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	4.51	272.22	20000	130	3800	19%	7661	38%	8539	43%	276.12	275.73	275.93
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	6.02	273.72	20000	130	3808	19%	7663	38%	8529	43%	276.12	275.74	275.93
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	3.37	271.07	25000	130	2611	10%	10896	44%	11493	46%	275.39	275.06	275.23
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	5.06	272.76	25000	130	2616	10%	10865	43%	11519	46%	275.36	275.01	275.19
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	6.74	274.44	25000	130	2654	11%	10829	43%	11517	46%	275.54	275.26	275.40
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	3.37	271.07	25000	130	3528	14%	10180	41%	11292	45%	275.99	275.63	275.81
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	5.06	272.76	25000	130	3512	14%	10228	41%	11260	45%	275.95	275.57	275.76
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	6.74	274.44	25000	130	3557	14%	10177	41%	11266	45%	276.04	275.69	275.87
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	3.37	271.07	25000	130	4898	20%	9298	37%	10804	43%	276.67	276.27	276.47
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	5.06	272.76	25000	130	4869	19%	9358	37%	10773	43%	276.61	276.20	276.41
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	6.74	274.44	25000	130	4896	20%	9352	37%	10753	43%	276.64	276.23	276.44
C6an25hqcd19	tmi.g31	tmi.f14	tmi.p69	tmi.r69	tmi.o69	0.025	Dc	3.60	271.30	30000	130	3223	11%	12744	42%	14033	47%	275.73	275.39	275.56
C6a25hq15c20	tmi.g31	tmi.f16	tmi.p70	tmi.r70	tmi.o70	0.025	1.5*Dc	5.40	273.10	30000	130	3217	11%	12776	43%	14007	47%	275.70	275.35	275.53
C6a25hq20c21	tmi.g31	tmi.f18	tmi.p72	tmi.r72	tmi.o72	0.025	2.0*Dc	7.20	274.90	30000	130	3329	11%	12612	42%	14059	47%	275.96	275.69	275.83
C6an35hqcd25	tmi.g33	tmi.f14	tmi.p75	tmi.r75	tmi.o75	0.035	Dc	3.60	271.30	30000	130	4353	15%	11936	40%	13711	46%	276.39	276.01	276.20
C6a35hq15c26	tmi.g33	tmi.f16	tmi.p76	tmi.r76	tmi.o76	0.035	1.5*Dc	5.40	273.10	30000	130	4330	14%	12006	40%	13665	46%	276.33	275.94	276.14
C6a35hq20c27	tmi.g33	tmi.f18	tmi.p77	tmi.r77	tmi.o77	0.035	2.0*Dc	7.20	274.90	30000	130	4408	15%	11913	40%	13680	46%	276.48	276.14	276.31
C6a50hqcd31	tmi.g35	tmi.f14	tmi.p81	tmi.r81	tmi.o81	0.050	Dc	3.60	271.30	30000	130	5927	20%	10972	37%	13101	44%	277.13	276.73	276.93
C6a50hq15c32	tmi.g35	tmi.f16	tmi.p82	tmi.r82	tmi.o82	0.050	1.5*Dc	5.40	273.10	30000	130	5884	20%	11063	37%	13052	44%	277.06	276.63	276.85
C6a50hq20c33	tmi.g35	tmi.f18	tmi.p83	tmi.r83	tmi.o83	0.050	2.0*Dc	7.20	274.90	30000	130	5957	20%	11039	37%	13004	43%	277.13	276.71	276.92

Notes:
(1) This is the 12-character "short ID" as used in HEC-RAS.
(2) Percent flow is percent of specified river flow.

Table 10: Summary Results for TMINS Case 6M

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6M25lqcd40	tmi.g36	tmi.f13	tmi.p90	tmi.r90	tmi.o90	0.025	Dc	1.05	268.75	1700	130	1241	73%	322	19%	138	8%	271.13	271.08	271.11
C6M25lq15c41	tmi.g36	tmi.f15	tmi.p91	tmi.r91	tmi.o91	0.025	1.5*Dc	1.58	269.28	1700	130	1241	73%	322	19%	138	8%	271.13	271.08	271.11
C6M25lq20c42	tmi.g36	tmi.f17	tmi.p92	tmi.r92	tmi.o92	0.025	2.0*Dc	2.10	269.80	1700	130	1241	73%	322	19%	138	8%	271.13	271.08	271.11
C6M35lqcd46	tmi.g38	tmi.f13	tmi.p96	tmi.r96	tmi.o96	0.035	Dc	1.05	268.75	1700	130	1314	77%	265	16%	121	7%	271.14	271.07	271.11
C6M35lq15c47	tmi.g38	tmi.f15	tmi.p97	tmi.r97	tmi.o97	0.035	1.5*Dc	1.58	269.28	1700	130	1314	77%	265	16%	121	7%	271.14	271.07	271.11
C6M35lq20c48	tmi.g38	tmi.f17	tmi.p98	tmi.r98	tmi.o98	0.035	2.0*Dc	2.10	269.80	1700	130	1314	77%	265	16%	121	7%	271.14	271.07	271.11
C6M50lqcd52	tmi.g26	tmi.f13	tmi.p12	tmi.r12	tmi.o12	0.050	Dc	1.05	268.75	1700	130	1390	82%	210	12%	100	6%	271.09	271.00	271.05
C6M50lq15c53	tmi.g26	tmi.f15	tmi.p13	tmi.r13	tmi.o13	0.050	1.5*Dc	1.58	269.28	1700	130	1390	82%	210	12%	100	6%	271.09	271.00	271.05
C6M50lq20c54	tmi.g26	tmi.f17	tmi.p14	tmi.r14	tmi.o14	0.050	2.0*Dc	2.10	269.80	1700	130	1390	82%	210	12%	100	6%	271.09	271.00	271.05
C6M25lqcd40	tmi.g36	tmi.f13	tmi.p90	tmi.r90	tmi.o90	0.025	Dc	1.52	269.22	4000	130	2223	56%	955	24%	822	21%	272.05	271.95	272.00
C6M25lq15c41	tmi.g36	tmi.f15	tmi.p91	tmi.r91	tmi.o91	0.025	1.5*Dc	2.28	269.98	4000	130	2223	56%	955	24%	822	21%	272.05	271.95	272.00
C6M25lq20c42	tmi.g36	tmi.f17	tmi.p92	tmi.r92	tmi.o92	0.025	2.0*Dc	3.04	270.74	4000	130	2223	56%	955	24%	822	21%	272.05	271.95	272.00
C6M35lqcd46	tmi.g38	tmi.f13	tmi.p96	tmi.r96	tmi.o96	0.035	Dc	1.52	269.22	4000	130	2391	60%	853	21%	756	19%	272.22	272.10	272.16
C6M35lq15c47	tmi.g38	tmi.f15	tmi.p97	tmi.r97	tmi.o97	0.035	1.5*Dc	2.28	269.98	4000	130	2391	60%	853	21%	756	19%	272.22	272.10	272.16
C6M35lq20c48	tmi.g38	tmi.f17	tmi.p98	tmi.r98	tmi.o98	0.035	2.0*Dc	3.04	270.74	4000	130	2391	60%	853	21%	756	19%	272.21	272.10	272.16
C6M50lqcd52	tmi.g26	tmi.f13	tmi.p12	tmi.r12	tmi.o12	0.050	Dc	1.52	269.22	4000	130	2601	65%	749	19%	650	16%	272.40	272.26	272.33
C6M50lq15c53	tmi.g26	tmi.f15	tmi.p13	tmi.r13	tmi.o13	0.050	1.5*Dc	2.28	269.98	4000	130	2601	65%	749	19%	650	16%	272.40	272.26	272.33
C6M50lq20c54	tmi.g26	tmi.f17	tmi.p14	tmi.r14	tmi.o14	0.050	2.0*Dc	3.04	270.74	4000	130	2601	65%	749	19%	650	16%	272.40	272.26	272.33
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	2.02	269.72	8000	130	3186	40%	2512	31%	2302	29%	273.03	272.84	272.94
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	3.03	270.73	8000	130	3186	40%	2513	31%	2302	29%	273.02	272.83	272.93
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	4.04	271.74	8000	130	3186	40%	2512	31%	2302	29%	273.02	272.83	272.93
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	2.02	269.72	8000	130	3530	44%	2325	29%	2146	27%	273.34	273.12	273.23
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	3.03	270.73	8000	130	3530	44%	2325	29%	2145	27%	273.34	273.11	273.23
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	4.04	271.74	8000	130	3530	44%	2325	29%	2145	27%	273.34	273.11	273.23
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	2.02	269.72	8000	130	3905	49%	2159	27%	1937	24%	273.73	273.47	273.60
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	3.03	270.73	8000	130	3905	49%	2159	27%	1936	24%	273.72	273.46	273.59
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	4.04	271.74	8000	130	3905	49%	2159	27%	1936	24%	273.72	273.46	273.59
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	2.44	270.14	12000	130	3945	33%	4188	35%	3868	32%	273.72	273.47	273.60
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	3.66	271.36	12000	130	3945	33%	4188	35%	3867	32%	273.71	273.46	273.59
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	4.88	272.58	12000	130	3945	33%	4187	35%	3869	32%	273.72	273.48	273.60
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	2.44	270.14	12000	130	4395	37%	3920	33%	3684	31%	274.13	273.84	273.99
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	3.66	271.36	12000	130	4395	37%	3921	33%	3684	31%	274.12	273.83	273.98
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	4.88	272.58	12000	130	4395	37%	3921	33%	3684	31%	274.12	273.84	273.98
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	2.44	270.14	12000	130	4962	41%	3564	30%	3475	29%	274.55	274.24	274.40
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	3.66	271.36	12000	130	4961	41%	3565	30%	3474	29%	274.54	274.23	274.39
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	4.88	272.58	12000	130	4961	41%	3566	30%	3473	29%	274.54	274.23	274.39

Table 10: Summary Results for TMINS Case 6M

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	2.77	270.47	16000	130	4571	29%	5848	37%	5581	35%	274.24	273.96	274.10
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	4.16	271.86	16000	130	4571	29%	5849	37%	5580	35%	274.23	273.95	274.09
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	5.54	273.24	16000	130	4572	29%	5844	37%	5584	35%	274.26	273.99	274.13
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	2.77	270.47	16000	130	5165	32%	5447	34%	5388	34%	274.69	274.38	274.54
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	4.16	271.86	16000	130	5164	32%	5450	34%	5386	34%	274.68	274.37	274.53
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	5.54	273.24	16000	130	5165	32%	5450	34%	5386	34%	274.68	274.37	274.53
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	2.77	270.47	16000	130	5935	37%	4953	31%	5112	32%	275.18	274.84	275.01
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	4.16	271.86	16000	130	5934	37%	4957	31%	5109	32%	275.17	274.83	275.00
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	5.54	273.24	16000	130	5932	37%	4963	31%	5105	32%	275.16	274.81	274.99
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	3.01	270.71	20000	130	5154	26%	7497	37%	7348	37%	274.66	274.36	274.51
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	4.51	272.22	20000	130	5154	26%	7502	38%	7344	37%	274.65	274.34	274.50
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	6.02	273.72	20000	130	5161	26%	7481	37%	7358	37%	274.72	274.43	274.58
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	3.01	270.71	20000	130	5910	30%	6931	35%	7159	36%	275.16	274.82	274.99
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	4.51	272.22	20000	130	5907	30%	6941	35%	7152	36%	275.14	274.80	274.97
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	6.02	273.72	20000	130	5912	30%	6933	35%	7155	36%	275.16	274.83	275.00
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	3.01	270.71	20000	130	6850	34%	6335	32%	6814	34%	275.71	275.35	275.53
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	4.51	272.22	20000	130	6846	34%	6347	32%	6807	34%	275.69	275.32	275.51
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	6.02	273.72	20000	130	6846	34%	6356	32%	6798	34%	275.68	275.31	275.50
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	3.37	271.07	25000	130	5892	24%	9384	38%	9724	39%	275.10	274.78	274.94
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	5.06	272.76	25000	130	5889	24%	9400	38%	9712	39%	275.07	274.74	274.91
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	6.74	274.44	25000	130	5912	24%	9347	37%	9741	39%	275.18	274.90	275.04
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	3.37	271.07	25000	130	6801	27%	8755	35%	9444	38%	275.64	275.29	275.47
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	5.06	272.76	25000	130	6792	27%	8783	35%	9425	38%	275.61	275.25	275.43
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	6.74	274.44	25000	130	6813	27%	8758	35%	9429	38%	275.67	275.33	275.50
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	3.37	271.07	25000	130	7964	32%	8022	32%	9014	36%	276.27	275.89	276.08
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	5.06	272.76	25000	130	7948	32%	8058	32%	8994	36%	276.24	275.84	276.04
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	6.74	274.44	25000	130	7959	32%	8059	32%	8982	36%	276.25	275.86	276.06
C6M25hqcd37	tmi.g37	tmi.f14	tmi.p87	tmi.r87	tmi.o87	0.025	Dc	3.60	271.30	30000	130	6528	22%	11335	38%	12137	40%	275.48	275.15	275.32
C6M25h15c38	tmi.g37	tmi.f16	tmi.p88	tmi.r88	tmi.o88	0.025	1.5*Dc	5.40	273.10	30000	130	6523	22%	11361	38%	12116	40%	275.45	275.10	275.28
C6M25h20c39	tmi.g37	tmi.f18	tmi.p89	tmi.r89	tmi.o89	0.025	2.0*Dc	7.20	274.90	30000	130	6637	22%	11250	38%	12113	40%	275.64	275.36	275.50
C6M35hqcd43	tmi.g39	tmi.f14	tmi.p93	tmi.r93	tmi.o93	0.035	Dc	3.60	271.30	30000	130	7661	26%	10585	35%	11754	39%	276.09	275.72	275.91
C6M35hq15c44	tmi.g39	tmi.f16	tmi.p94	tmi.r94	tmi.o94	0.035	1.5*Dc	5.40	273.10	30000	130	7644	25%	10635	35%	11720	39%	276.04	275.65	275.85
C6M35hq20c45	tmi.g39	tmi.f18	tmi.p95	tmi.r95	tmi.o95	0.035	2.0*Dc	7.20	274.90	30000	130	7696	26%	10579	35%	11725	39%	276.14	275.79	275.97
C6M50hqcd49	tmi.g27	tmi.f14	tmi.p99	tmi.r99	tmi.o99	0.050	Dc	3.60	271.30	30000	130	9124	30%	9670	32%	11206	37%	276.77	276.38	276.58
C6M50hq15c50	tmi.g27	tmi.f16	tmi.p10	tmi.r10	tmi.o10	0.050	1.5*Dc	5.40	273.10	30000	130	9096	30%	9733	32%	11171	37%	276.71	276.29	276.50
C6M50hq20c51	tmi.g27	tmi.f18	tmi.p11	tmi.r11	tmi.o11	0.050	2.0*Dc	7.20	274.90	30000	130	9122	30%	9725	32%	11153	37%	276.75	276.34	276.55

Notes:
(1) This is the 12-character "short ID" as used in HEC-RAS.
(2) Percent flow is percent of specified river flow.

Table 11: Summary Results for TMINS Case 6Ma

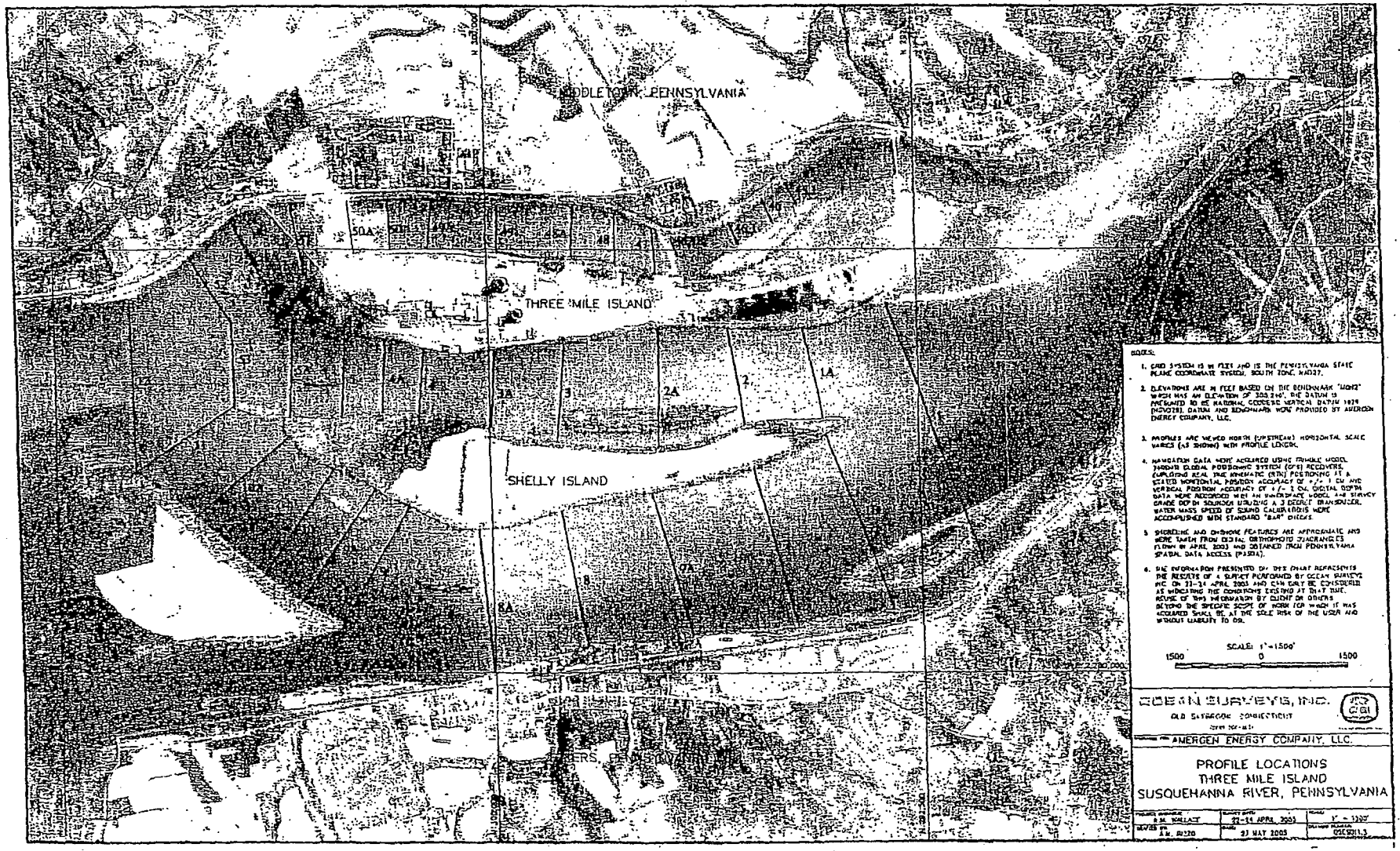
Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6Ma25lcd58	tmi.g40	tmi.f13	tmi.p20	tmi.r20	tmi.o20	0.025	Dc	1.05	268.75	1700	130	1262	74%	308.14	18%	130	8%	271.10	271.05	271.08
C6Ma25l15c59	tmi.g40	tmi.f15	tmi.p23	tmi.r23	tmi.o23	0.025	1.5*Dc	1.58	269.28	1700	130	1262	74%	308	18%	130	8%	271.10	271.05	271.08
C6Ma25l20c60	tmi.g40	tmi.f17	tmi.p24	tmi.r24	tmi.o24	0.025	2.0*Dc	2.10	269.80	1700	130	1262	74%	308	18%	130	8%	271.10	271.05	271.08
C6Ma35lcd64	tmi.g42	tmi.f13	tmi.p28	tmi.r28	tmi.o28	0.035	Dc	1.05	268.75	1700	130	1333	78%	253	15%	114	7%	271.10	271.04	271.07
C6Ma35l15c65	tmi.g42	tmi.f15	tmi.p29	tmi.r29	tmi.o29	0.035	1.5*Dc	1.58	269.28	1700	130	1333	78%	253	15%	114	7%	271.10	271.04	271.07
C6Ma35l20c66	tmi.g42	tmi.f17	tmi.p30	tmi.r30	tmi.o30	0.035	2.0*Dc	2.10	269.80	1700	130	1333	78%	253	15%	114	7%	271.10	271.04	271.07
C6Ma50lcd70	tmi.g44	tmi.f13	tmi.p36	tmi.r36	tmi.o36	0.050	Dc	1.05	268.75	1700	130	1408	83%	198	12%	94	6%	271.01	270.92	270.97
C6Ma50l15c71	tmi.g44	tmi.f15	tmi.p37	tmi.r37	tmi.o37	0.050	1.5*Dc	1.58	269.28	1700	130	1408	83%	198	12%	94	6%	271.01	270.92	270.97
C6Ma50l20c72	tmi.g44	tmi.f17	tmi.p38	tmi.r38	tmi.o38	0.050	2.0*Dc	2.10	269.80	1700	130	1408	83%	198	12%	94	6%	271.01	270.92	270.97
C6Ma25lcd58	tmi.g40	tmi.f13	tmi.p20	tmi.r20	tmi.o20	0.025	Dc	1.52	269.22	4000	130	2263	57%	935	23%	802	20%	272.03	271.93	271.98
C6Ma25l15c59	tmi.g40	tmi.f15	tmi.p23	tmi.r23	tmi.o23	0.025	1.5*Dc	2.28	269.98	4000	130	2263	57%	935	23%	802	20%	272.03	271.93	271.98
C6Ma25l20c60	tmi.g40	tmi.f17	tmi.p24	tmi.r24	tmi.o24	0.025	2.0*Dc	3.04	270.74	4000	130	2263	57%	935	23%	802	20%	272.03	271.93	271.98
C6Ma35lcd64	tmi.g42	tmi.f13	tmi.p28	tmi.r28	tmi.o28	0.035	Dc	1.52	269.22	4000	130	2429	61%	834	21%	737	18%	272.19	272.08	272.14
C6Ma35l15c65	tmi.g42	tmi.f15	tmi.p29	tmi.r29	tmi.o29	0.035	1.5*Dc	2.28	269.98	4000	130	2429	61%	834	21%	737	18%	272.19	272.08	272.14
C6Ma35l20c66	tmi.g42	tmi.f17	tmi.p30	tmi.r30	tmi.o30	0.035	2.0*Dc	3.04	270.74	4000	130	2429	61%	834	21%	737	18%	272.19	272.08	272.14
C6Ma50lcd70	tmi.g44	tmi.f13	tmi.p36	tmi.r36	tmi.o36	0.050	Dc	1.52	269.22	4000	130	2631	66%	734	18%	635	16%	272.38	272.24	272.31
C6Ma50l15c71	tmi.g44	tmi.f15	tmi.p37	tmi.r37	tmi.o37	0.050	1.5*Dc	2.28	269.98	4000	130	2631	66%	734	18%	635	16%	272.37	272.24	272.31
C6Ma50l20c72	tmi.g44	tmi.f17	tmi.p38	tmi.r38	tmi.o38	0.050	2.0*Dc	3.04	270.74	4000	130	2631	66%	734	18%	635	16%	272.37	272.24	272.31
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	2.02	269.72	8000	130	3222	40%	2495	31%	2283	29%	273.02	272.83	272.93
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	3.03	270.73	8000	130	3222	40%	2495	31%	2283	29%	273.01	272.82	272.92
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	4.04	271.74	8000	130	3222	40%	2495	31%	2283	29%	273.01	272.83	272.92
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	2.02	269.72	8000	130	3585	45%	2296	29%	2120	26%	273.33	273.10	273.22
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	3.03	270.73	8000	130	3585	45%	2296	29%	2120	26%	273.32	273.10	273.21
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	4.04	271.74	8000	130	3585	45%	2296	29%	2120	26%	273.32	273.09	273.21
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	2.02	269.72	8000	130	3962	50%	2118	26%	1921	24%	273.70	273.44	273.57
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	3.03	270.73	8000	130	3960	50%	2116	26%	1924	24%	273.69	273.43	273.56
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	4.04	271.74	8000	130	3960	50%	2116	26%	1924	24%	273.69	273.43	273.56
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	2.44	270.14	12000	130	3987	33%	4164	35%	3849	32%	273.71	273.46	273.59
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	3.66	271.36	12000	130	3987	33%	4165	35%	3848	32%	273.70	273.46	273.58
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	4.88	272.58	12000	130	3986	33%	4164	35%	3850	32%	273.71	273.47	273.59
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	2.44	270.14	12000	130	4447	37%	3894	32%	3658	30%	274.12	273.83	273.98
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	3.66	271.36	12000	130	4447	37%	3897	32%	3656	30%	274.11	273.82	273.97
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	4.88	272.58	12000	130	4447	37%	3897	32%	3656	30%	274.11	273.83	273.97
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	2.44	270.14	12000	130	5021	42%	3537	29%	3442	29%	274.54	274.23	274.39
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	3.66	271.36	12000	130	5021	42%	3539	29%	3441	29%	274.53	274.22	274.38
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	4.88	272.58	12000	130	5021	42%	3539	29%	3440	29%	274.53	274.22	274.38

Table 11: Summary Results for TMINS Case 6Ma

Case (1)	File Name					n	Station 1 Boundary Condition			Specified Flows (cfs)		Calculated Channel Flows						Calculated Water Levels (ft NGVD)		
	Geometry	Flow	Plan	Run	Output		Description	Depth	WL Elev	River	TMINS	East		Middle		West		Stn 4	Stn 3A	Intake
												cfs	percent (2)	cfs	percent (2)	cfs	percent (2)			
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	2.77	270.47	16000	130	4619	29%	5824	36%	5556	35%	274.23	273.95	274.09
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	4.16	271.86	16000	130	4619	29%	5827	36%	5555	35%	274.22	273.94	274.08
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	5.54	273.24	16000	130	4620	29%	5821	36%	5559	35%	274.25	273.98	274.12
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	2.77	270.47	16000	130	5233	33%	5419	34%	5349	33%	274.68	274.37	274.53
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	4.16	271.86	16000	130	5232	33%	5422	34%	5347	33%	274.67	274.36	274.52
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	5.54	273.24	16000	130	5232	33%	5421	34%	5347	33%	274.67	274.36	274.52
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	2.77	270.47	16000	130	5989	37%	4933	31%	5078	32%	275.18	274.83	275.01
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	4.16	271.86	16000	130	5988	37%	4937	31%	5075	32%	275.17	274.82	275.00
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	5.54	273.24	16000	130	5985	37%	4943	31%	5071	32%	275.15	274.80	274.98
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	3.01	270.71	20000	130	5201	26%	7480	37%	7319	37%	274.67	274.37	274.52
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	4.51	272.22	20000	130	5200	26%	7485	37%	7315	37%	274.64	274.34	274.49
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	6.02	273.72	20000	130	5208	26%	7464	37%	7328	37%	274.71	274.43	274.57
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	3.01	270.71	20000	130	5976	30%	6905	35%	7119	36%	275.15	274.81	274.98
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	4.51	272.22	20000	130	5973	30%	6914	35%	7112	36%	275.13	274.79	274.96
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	6.02	273.72	20000	130	5979	30%	6907	35%	7115	36%	275.15	274.82	274.99
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	3.01	270.71	20000	130	6922	35%	6310	32%	6768	34%	275.70	275.34	275.52
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	4.51	272.22	20000	130	6915	35%	6322	32%	6764	34%	275.68	275.31	275.50
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	6.02	273.72	20000	130	6917	35%	6330	32%	6753	34%	275.67	275.30	275.49
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	3.37	271.07	25000	130	5939	24%	9361	37%	9700	39%	275.10	274.78	274.94
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	5.06	272.76	25000	130	5932	24%	9386	38%	9683	39%	275.07	274.74	274.91
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	6.74	274.44	25000	130	5958	24%	9327	37%	9715	39%	275.18	274.89	275.04
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	3.37	271.07	25000	130	6873	27%	8725	35%	9402	38%	275.64	275.29	275.47
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	5.06	272.76	25000	130	6864	27%	8753	35%	9383	38%	275.60	275.24	275.42
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	6.74	274.44	25000	130	6885	28%	8726	35%	9387	38%	275.66	275.32	275.49
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	3.37	271.07	25000	130	8082	32%	7953	32%	8966	36%	276.25	275.88	276.07
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	5.06	272.76	25000	130	8068	32%	7986	32%	8946	36%	276.22	275.82	276.02
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	6.74	274.44	25000	130	8076	32%	7990	32%	8934	36%	276.23	275.84	276.04
C6Ma25hcd55	tmi.g41	tmi.f14	tmi.p15	tmi.r15	tmi.o15	0.025	Dc	3.60	271.30	30000	130	6625	22%	11317	38%	12058	40%	275.48	275.14	275.31
C6Ma25h15c56	tmi.g41	tmi.f16	tmi.p16	tmi.r16	tmi.o16	0.025	1.5*Dc	5.40	273.10	30000	130	6617	22%	11349	38%	12034	40%	275.45	275.10	275.28
C6Ma25h20c57	tmi.g41	tmi.f18	tmi.p19	tmi.r19	tmi.o19	0.025	2.0*Dc	7.20	274.90	30000	130	6675	22%	11241	37%	12084	40%	275.64	275.36	275.50
C6Ma35hcd61	tmi.g43	tmi.f14	tmi.p25	tmi.r25	tmi.o25	0.035	Dc	3.60	271.30	30000	130	7731	26%	10563	35%	11706	39%	276.08	275.72	275.90
C6Ma35h15c62	tmi.g43	tmi.f16	tmi.p26	tmi.r26	tmi.o26	0.035	1.5*Dc	5.40	273.10	30000	130	7714	26%	10614	35%	11672	39%	276.03	275.65	275.84
C6Ma35h20c63	tmi.g43	tmi.f18	tmi.p27	tmi.r27	tmi.o27	0.035	2.0*Dc	7.20	274.90	30000	130	7765	26%	10559	35%	11676	39%	276.14	275.79	275.97
C6Ma50hcd67	tmi.g45	tmi.f14	tmi.p31	tmi.r31	tmi.o31	0.050	Dc	3.60	271.30	30000	130	9191	31%	9639	32%	11170	37%	276.76	276.37	276.57
C6Ma50h15c68	tmi.g45	tmi.f16	tmi.p34	tmi.r34	tmi.o34	0.050	1.5*Dc	5.40	273.10	30000	130	9163	31%	9703	32%	11134	37%	276.71	276.29	276.50
C6Ma50h20c69	tmi.g45	tmi.f18	tmi.p35	tmi.r35	tmi.o35	0.050	2.0*Dc	7.20	274.90	30000	130	9188	31%	9696	32%	11117	37%	276.74	276.33	276.54

Notes:
(1) This is the 12-character "short ID" as used in HEC-RAS.
(2) Percent flow is percent of specified river flow.

Fig 1
River Stations
Ocean Surveys, Inc.
2005



Note (10/2005): This figure has been altered to show where HEC-2 data from 1997-98 study were used in 2005 study (.....)

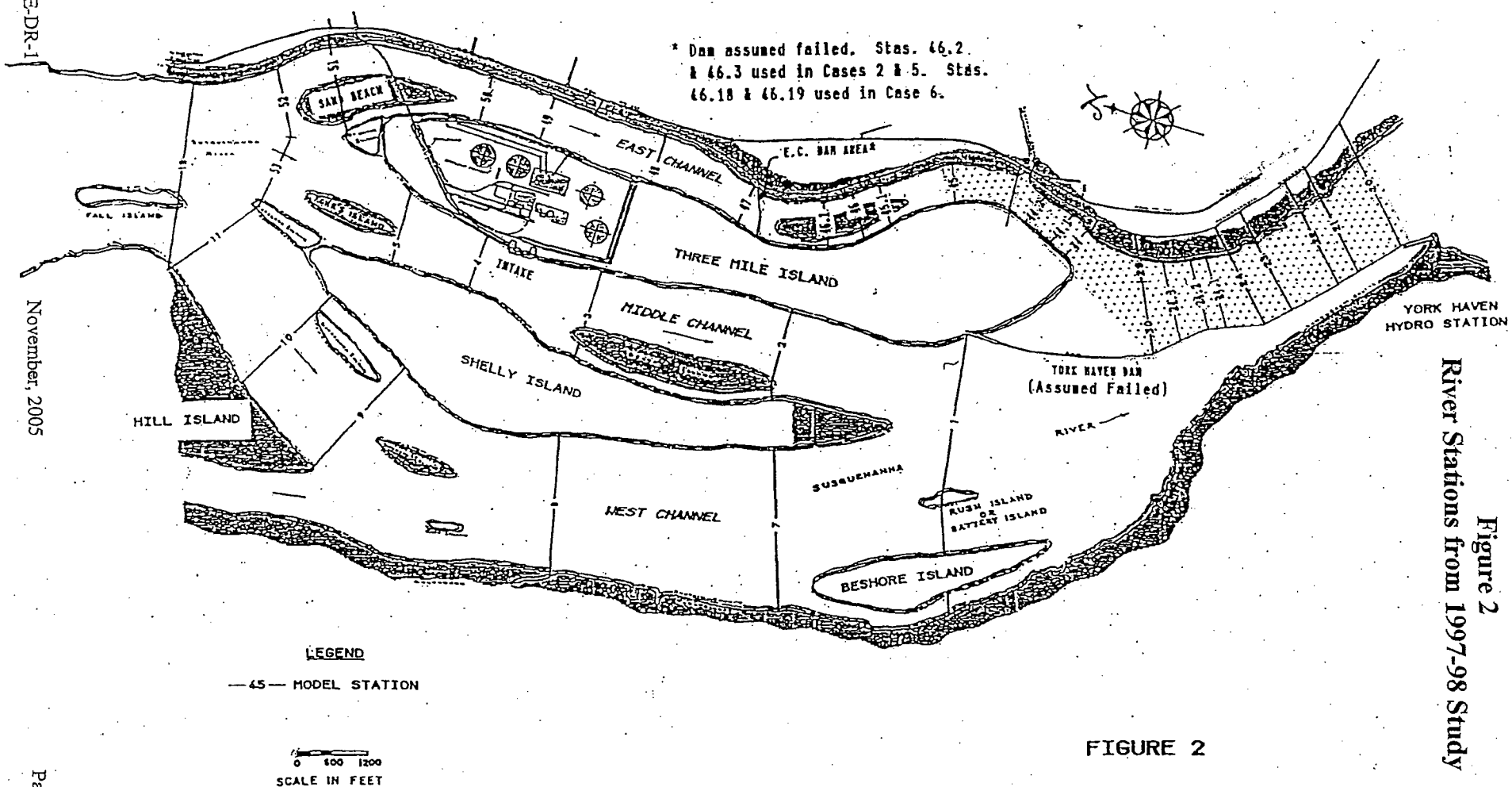


FIGURE 2

STATIONS FOR TMINS CASES 2, 5 & 6 ANALYSES

Figure 2
River Stations from 1997-98 Study

Figure 3
HEC-RAS Model Schematic
Case 1

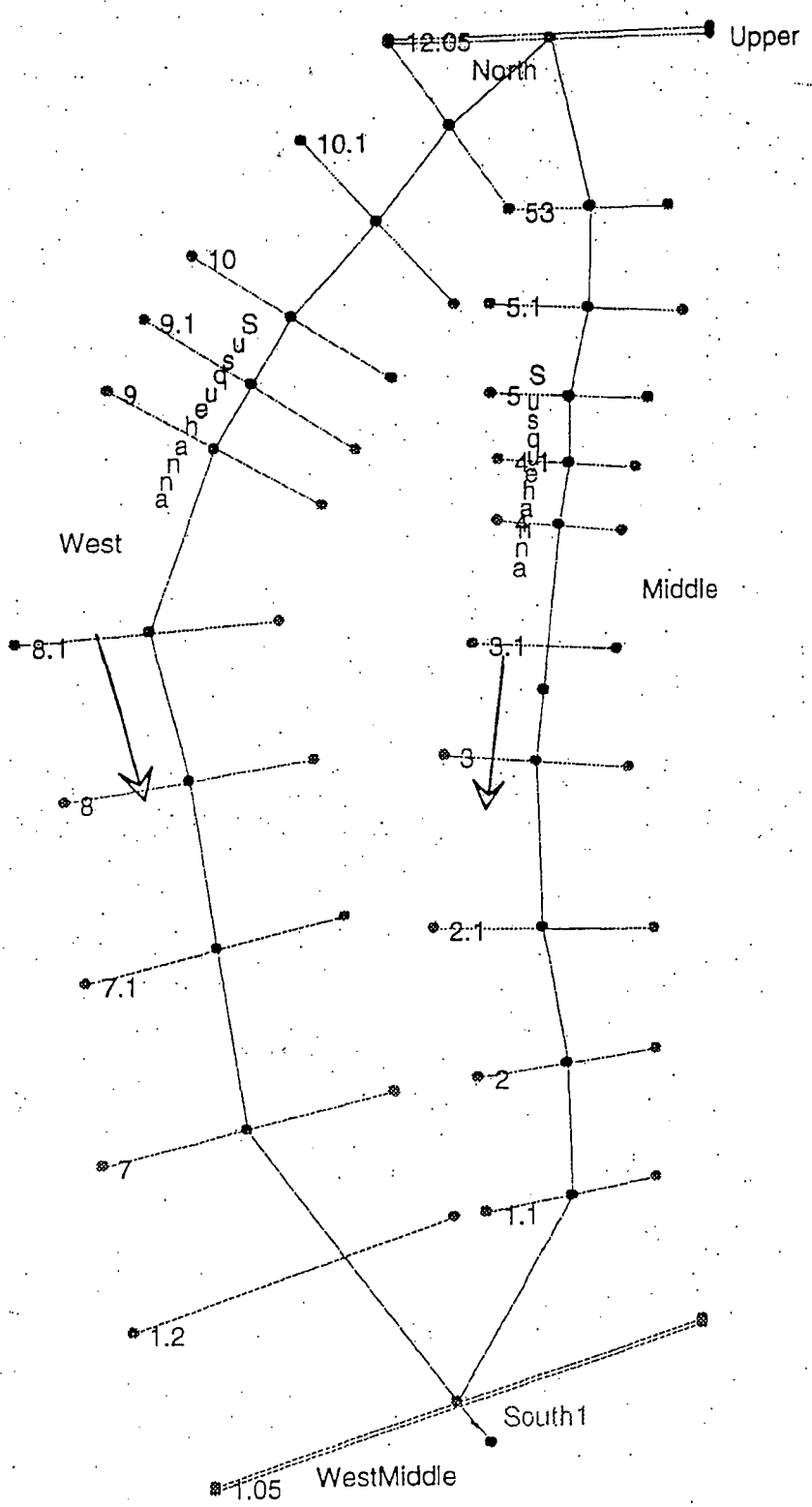


Figure 4
HEC-RAS Model Schematic
Case 6

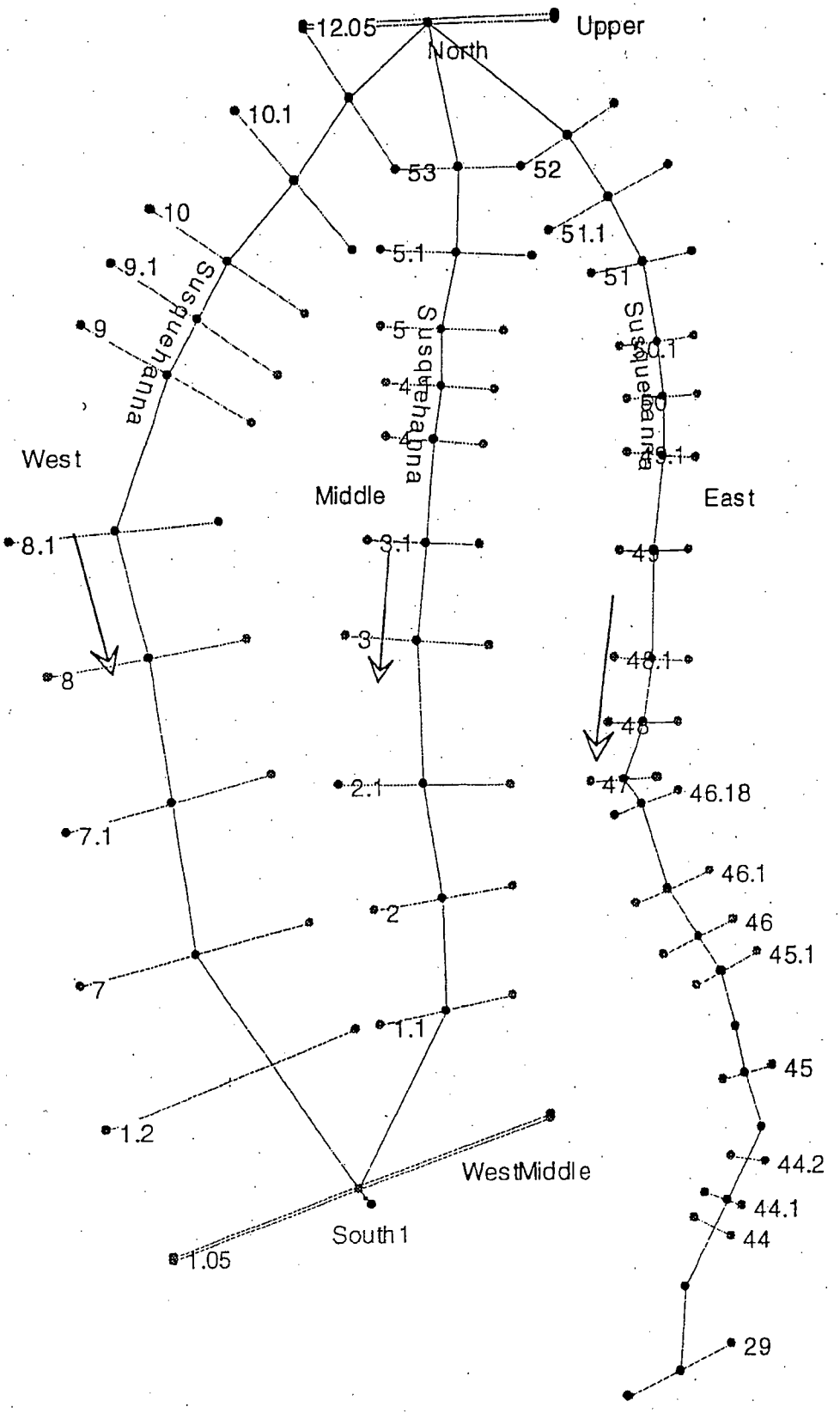
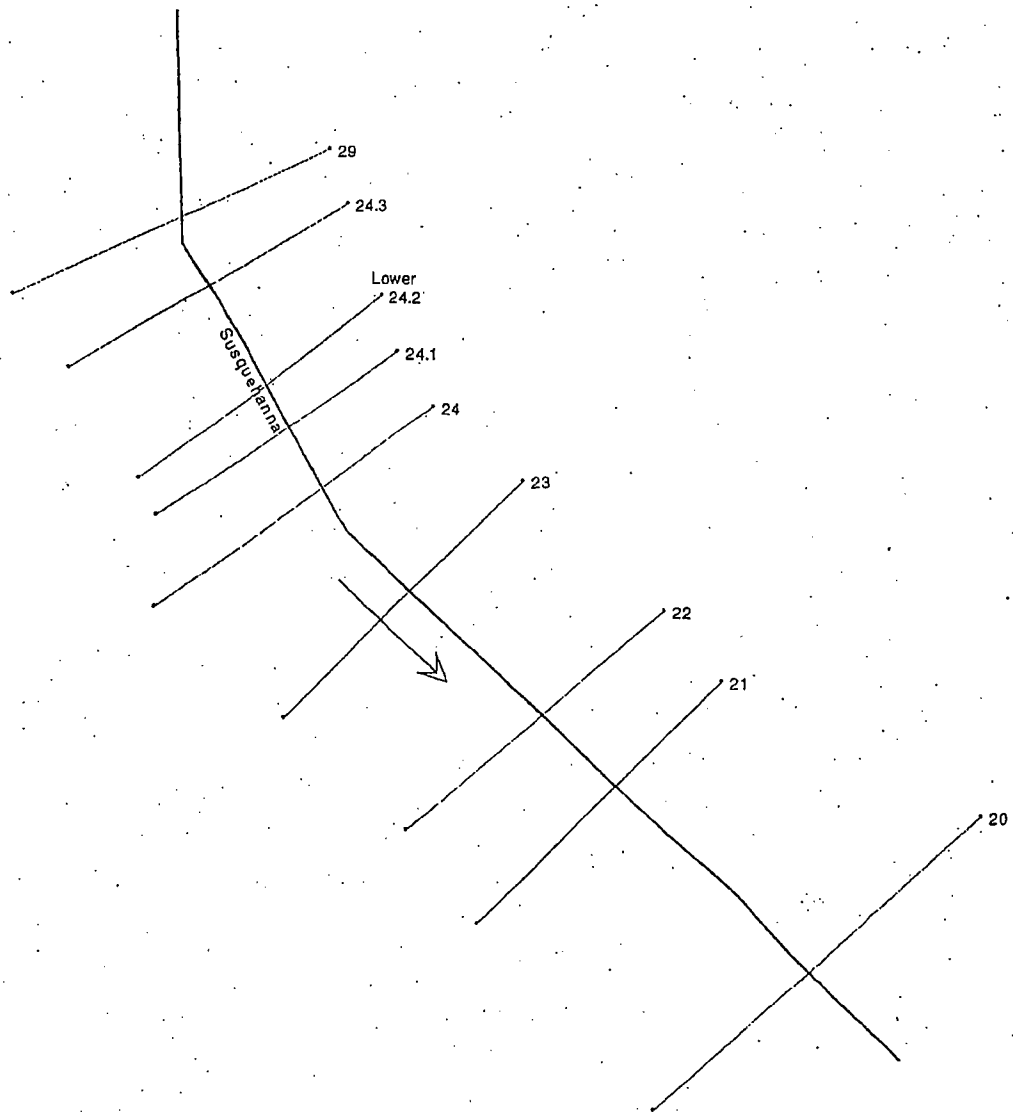


Figure 5
HEC-RAS Model Schematic
Conewago Rapids



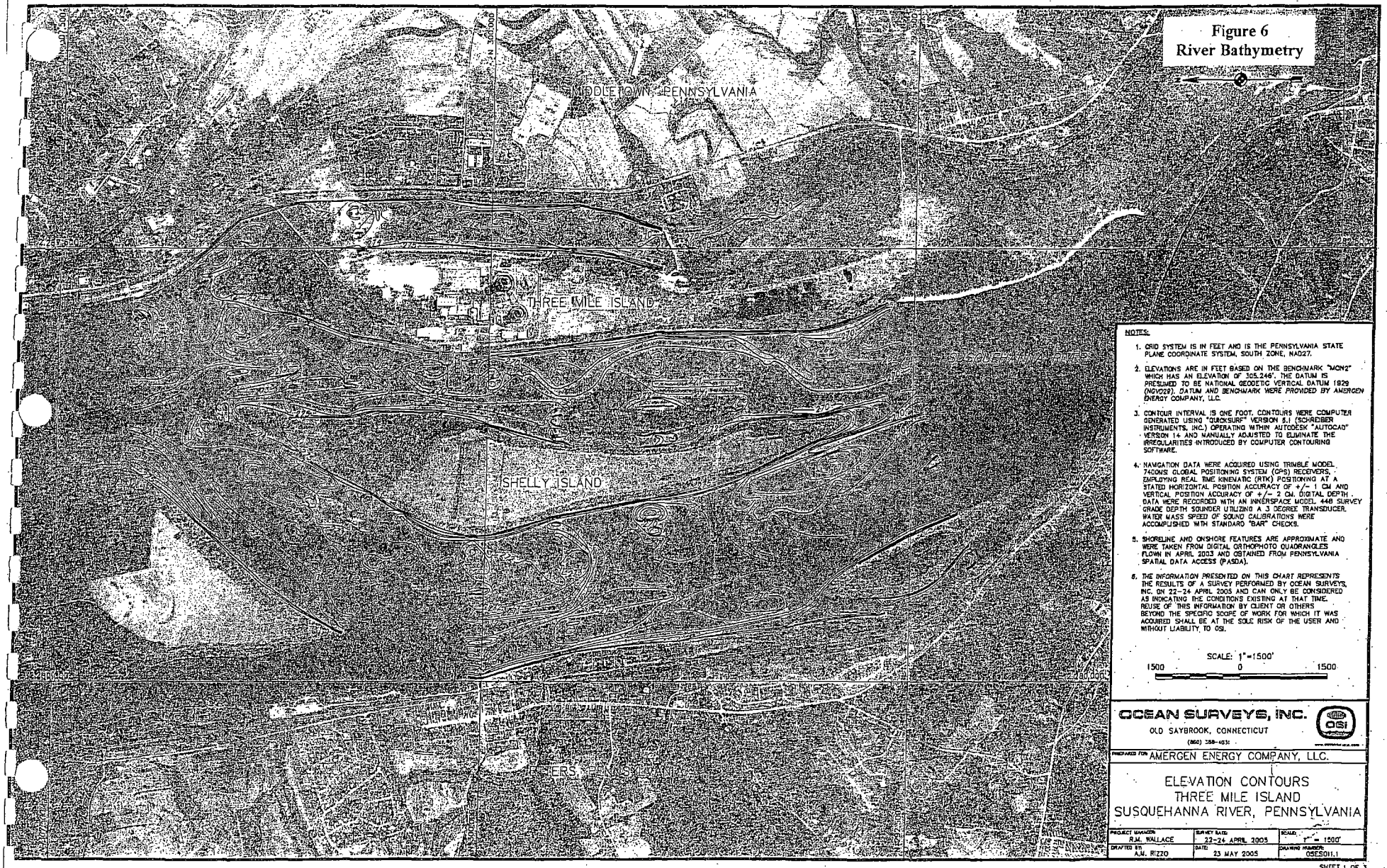
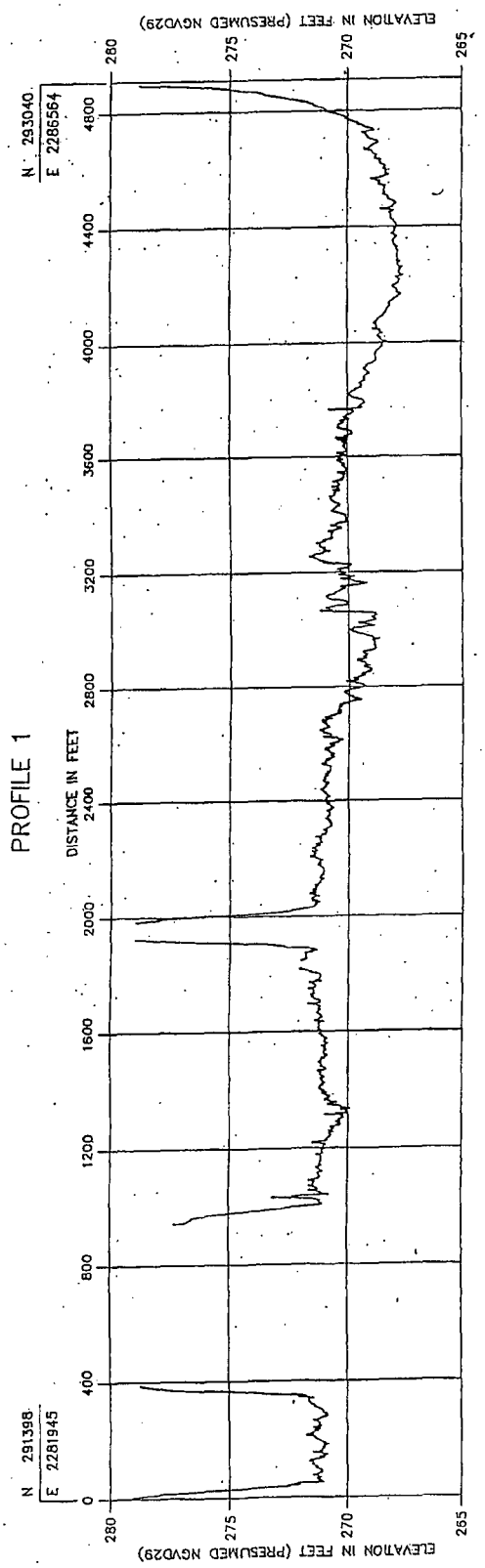


Figure 6
River Bathymetry

Figure 7
Example of Cross Section Plot



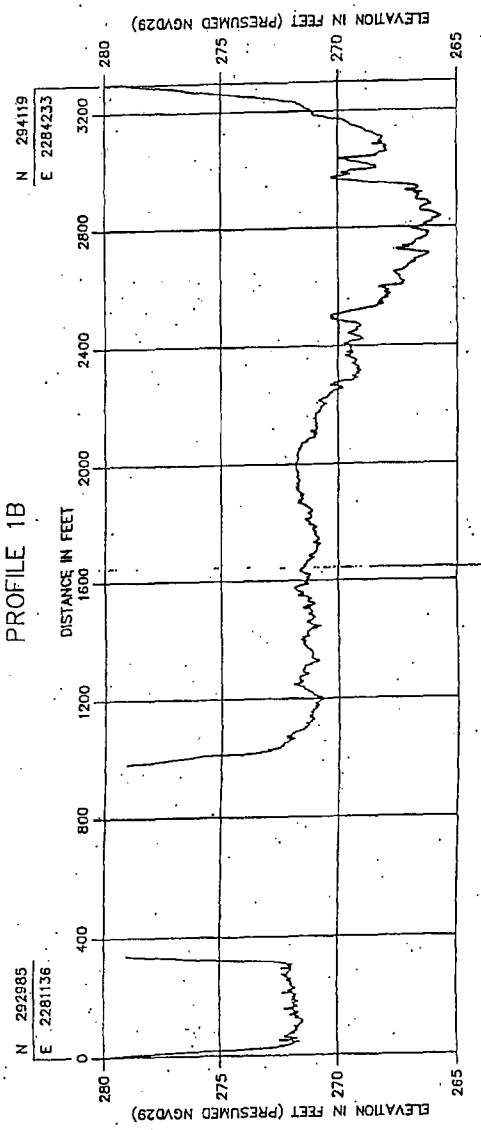


Figure 8
Example of Reduced Cross Section

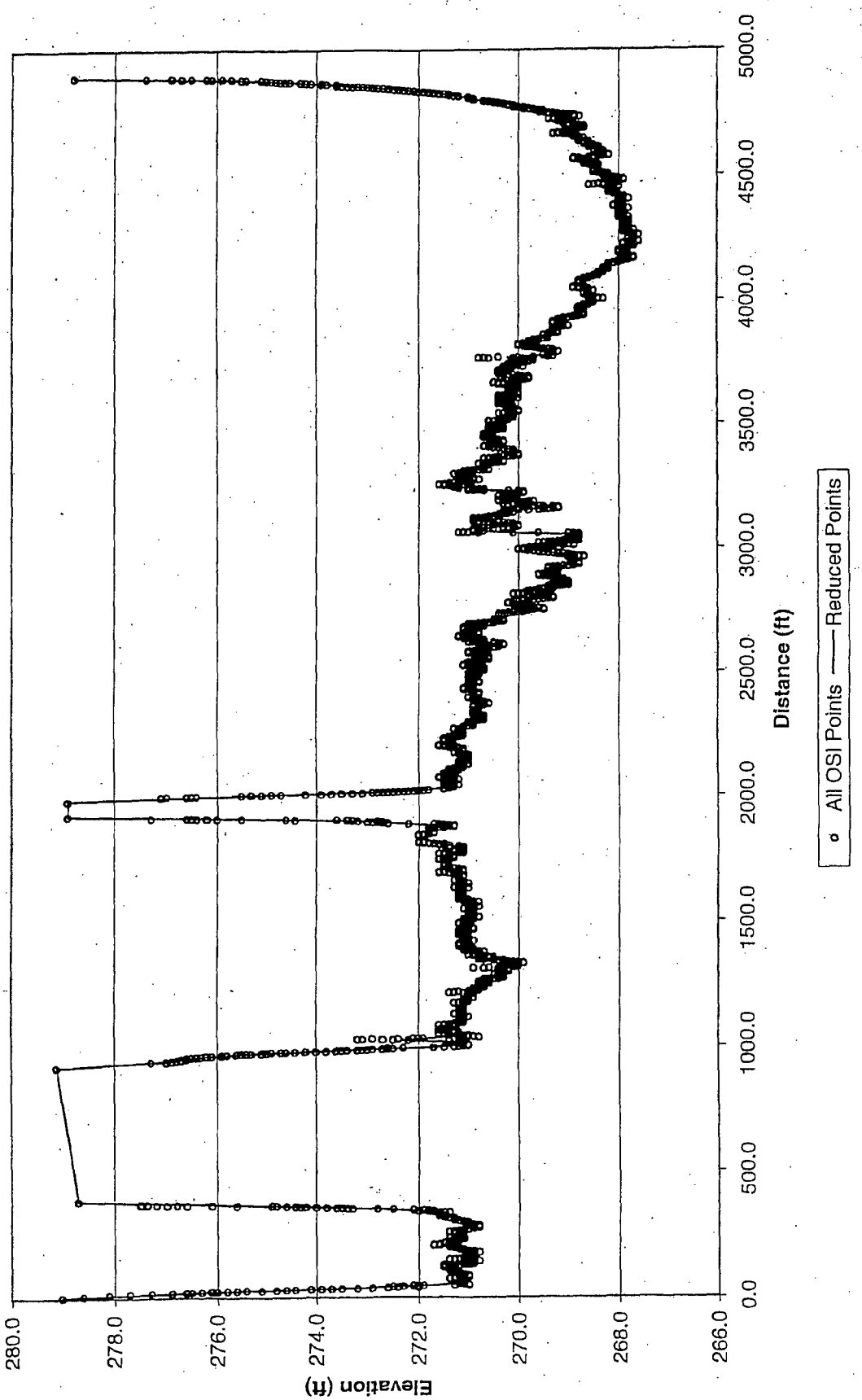


Figure 9
Example of Reversed Cross Section

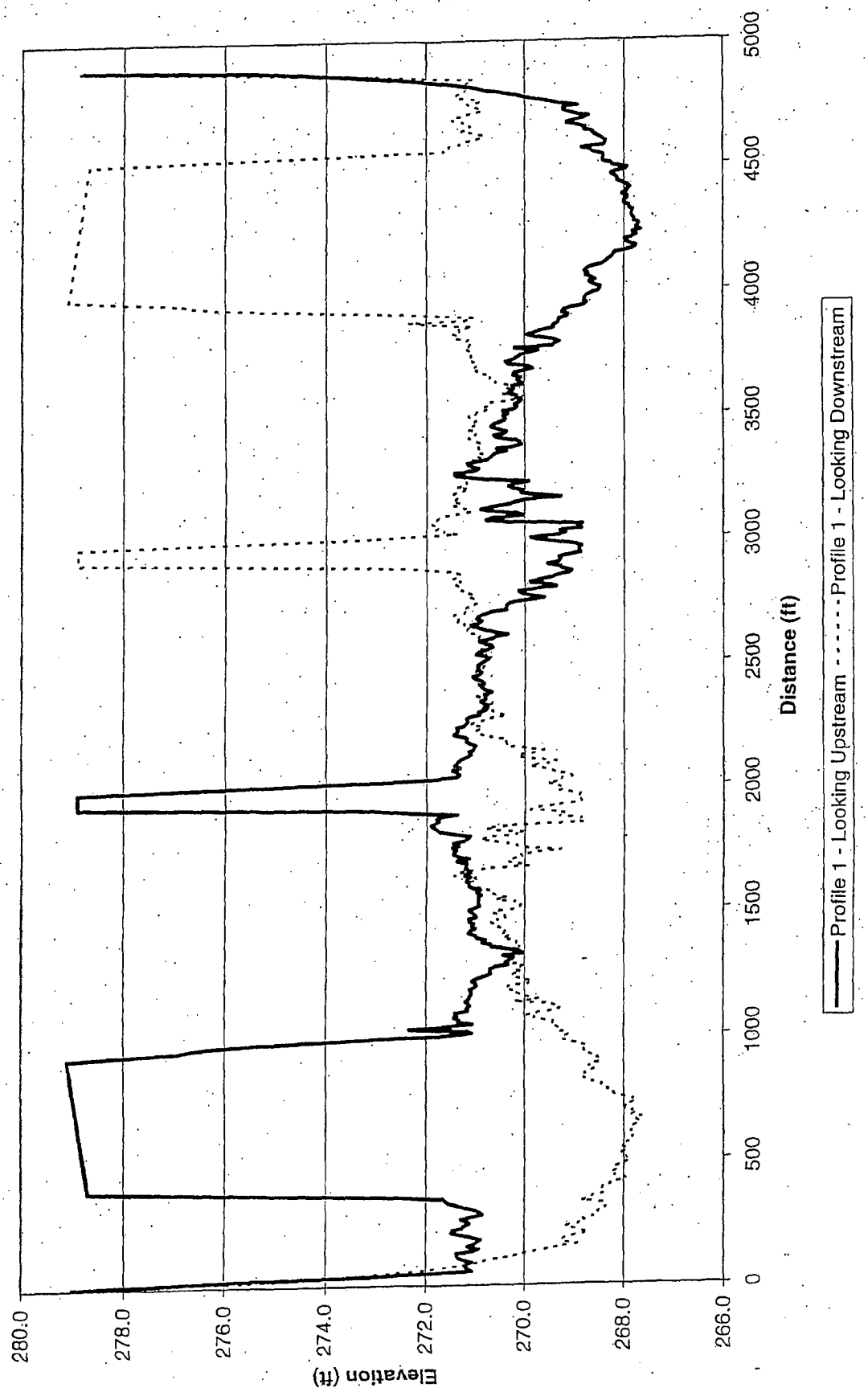


Figure 10
Flow Line and Cross Section Skew Angle Map

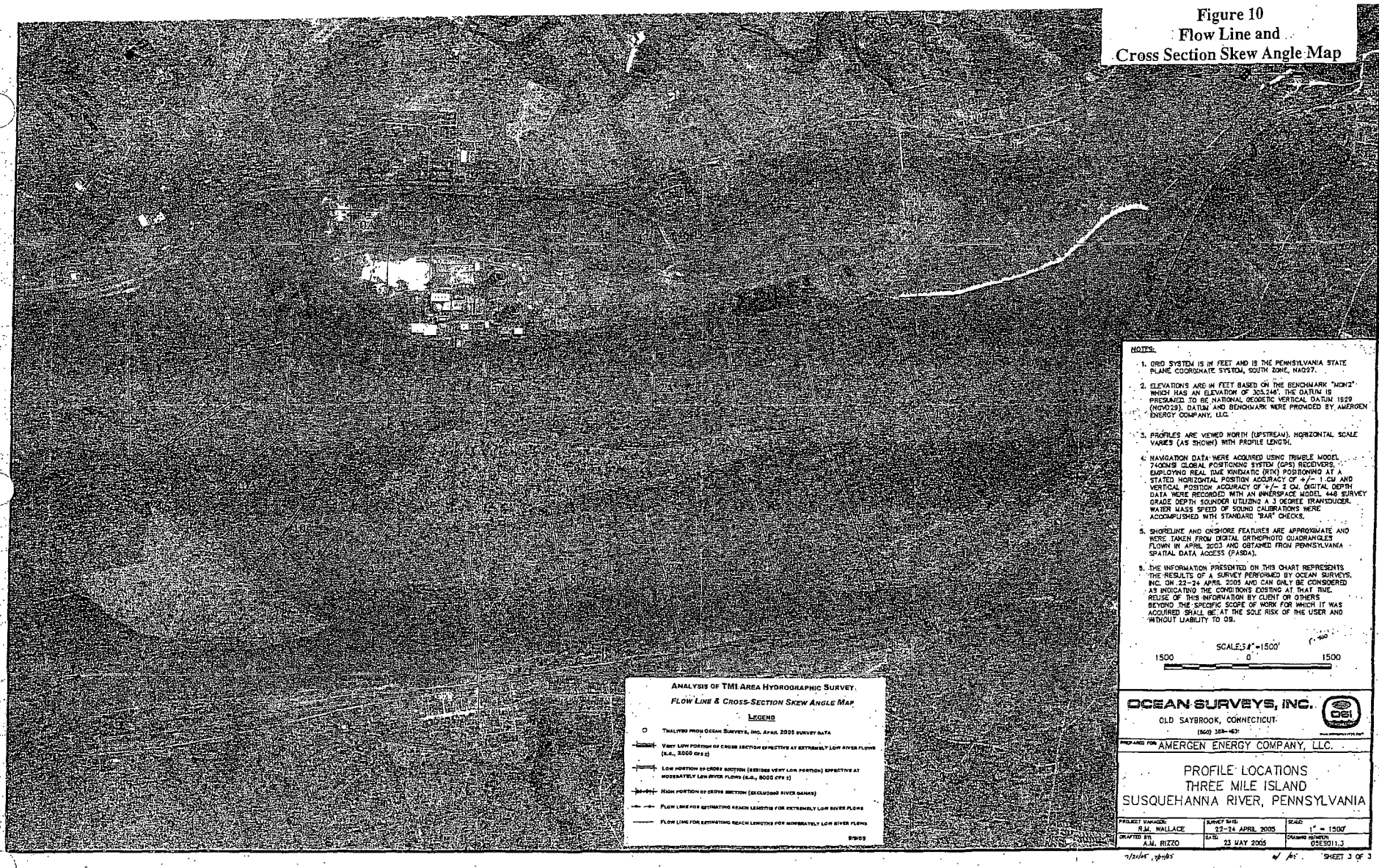


Figure 11 – Water Level Profile – Case 1, Middle Channel

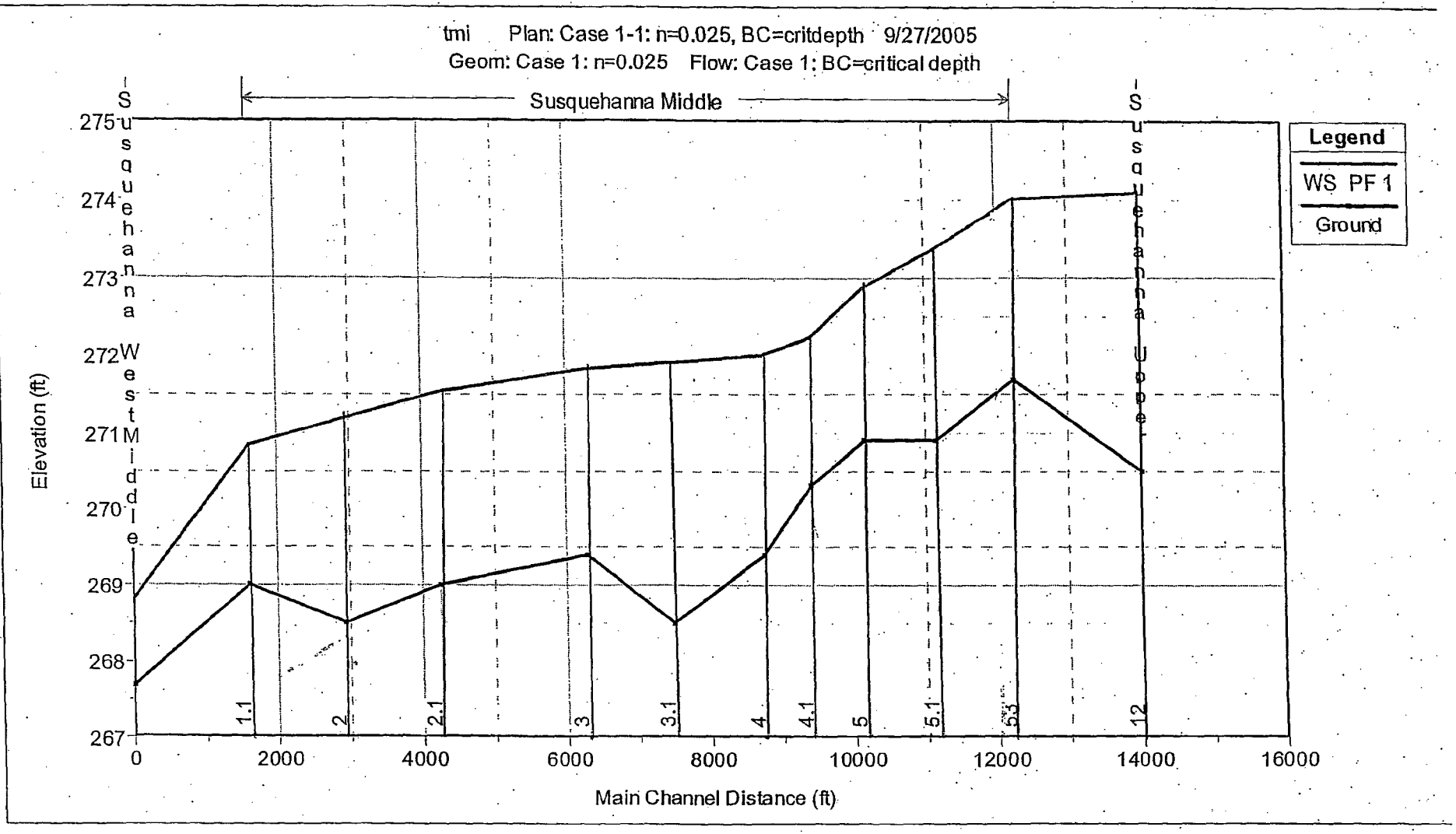


Figure 12 – Water Level Profile – Case 1, West Channel

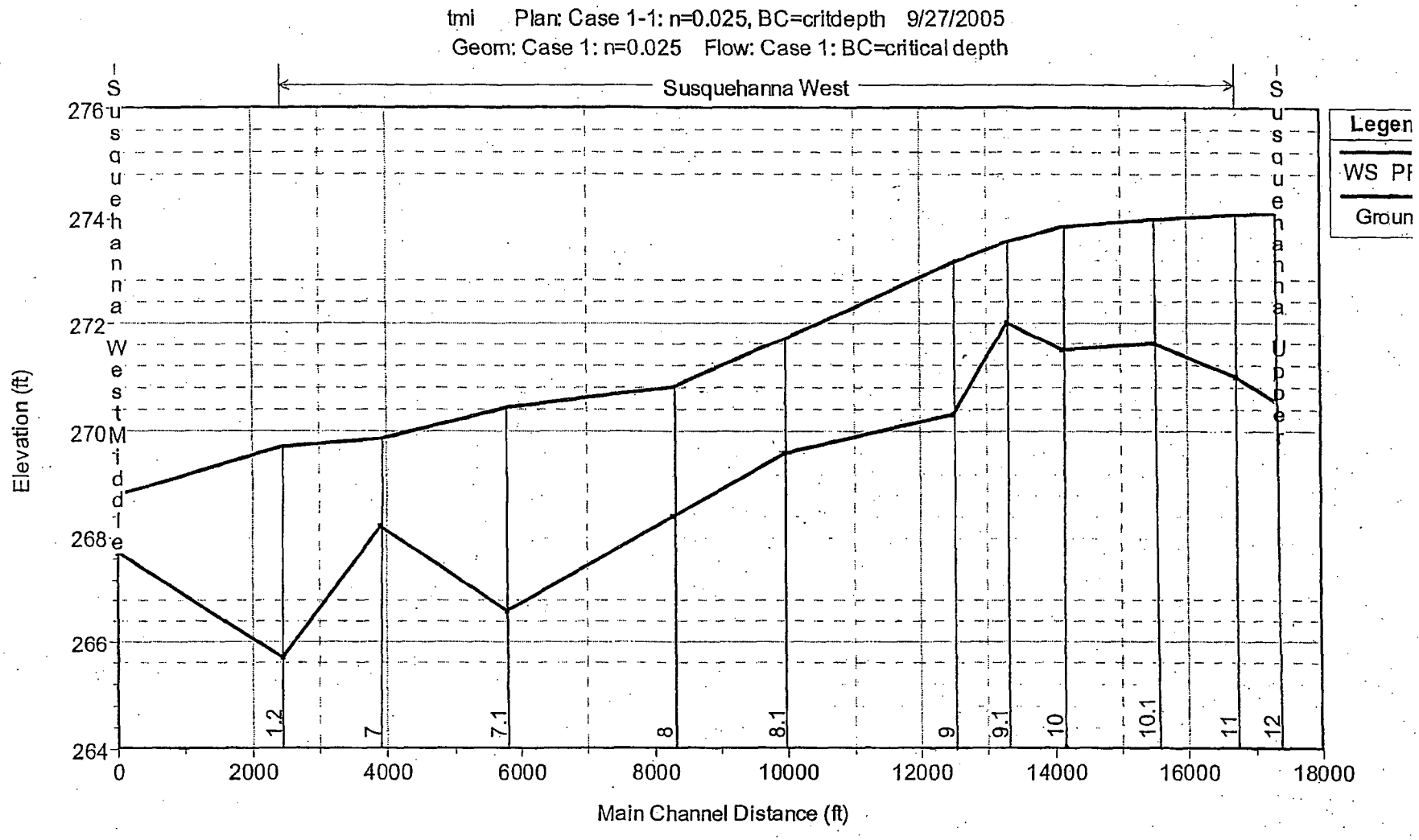


Figure 13: Comparison of 1998 and 2005 Simulation Results - Case 1, Middle Channel

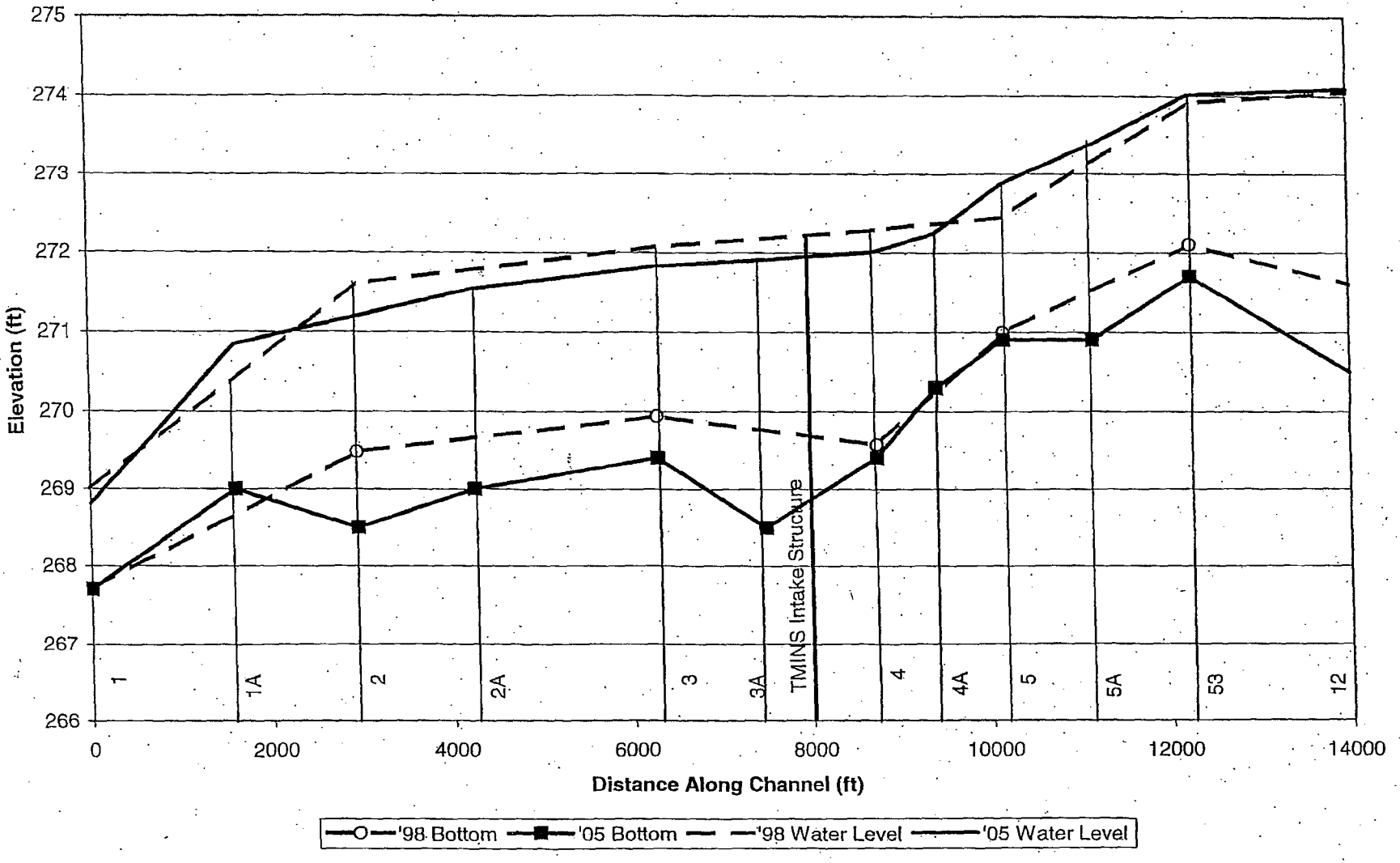
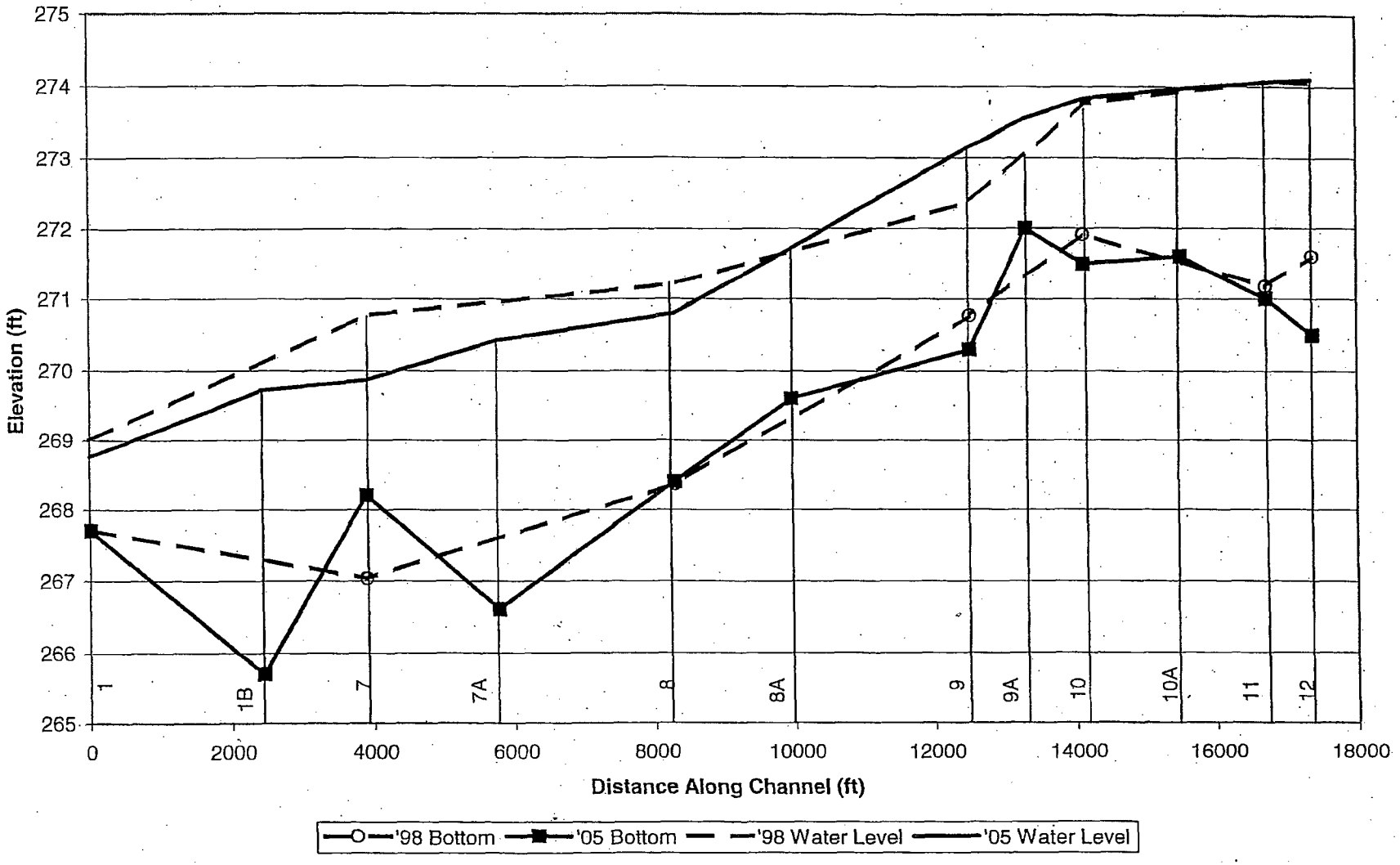
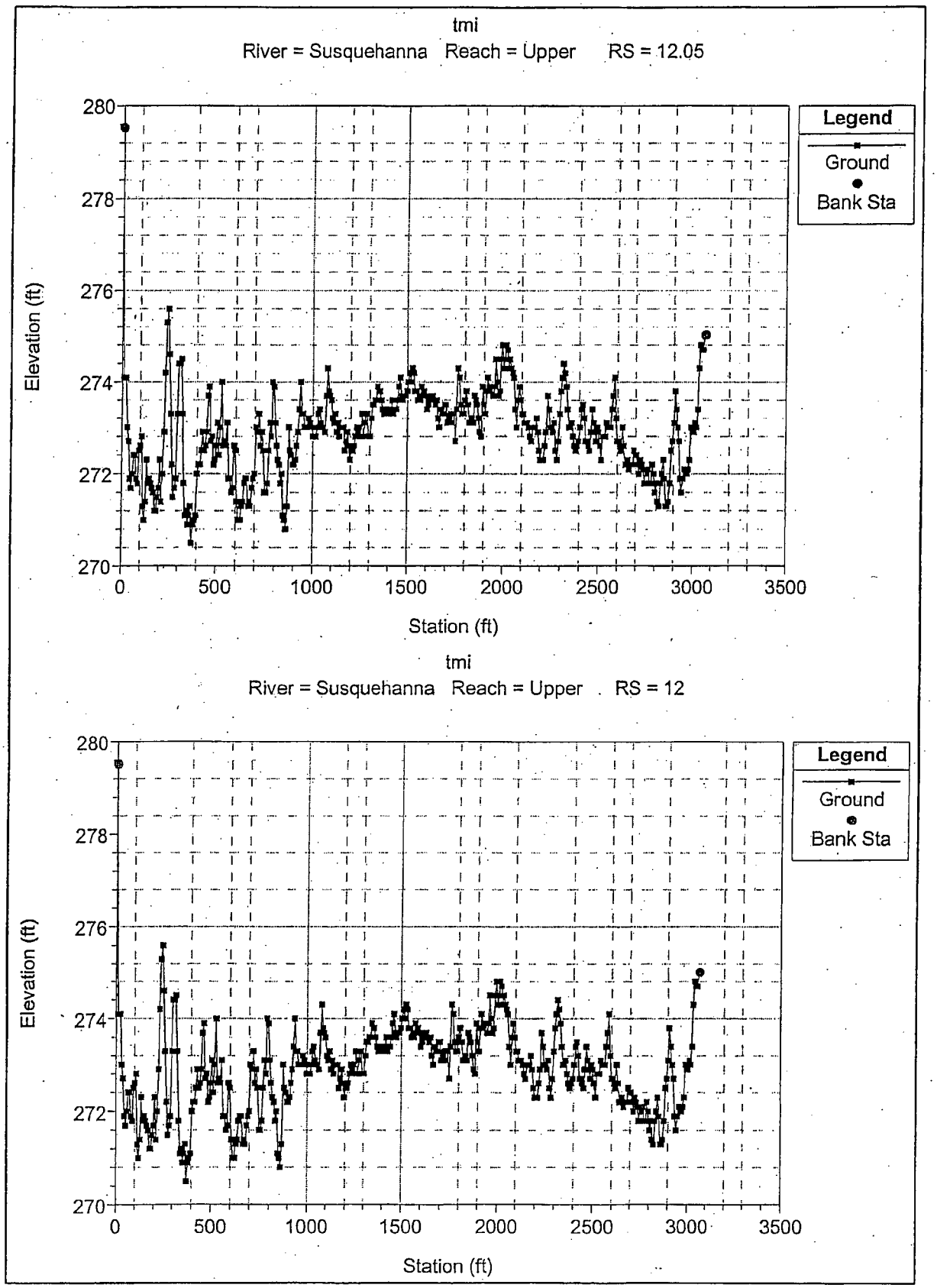


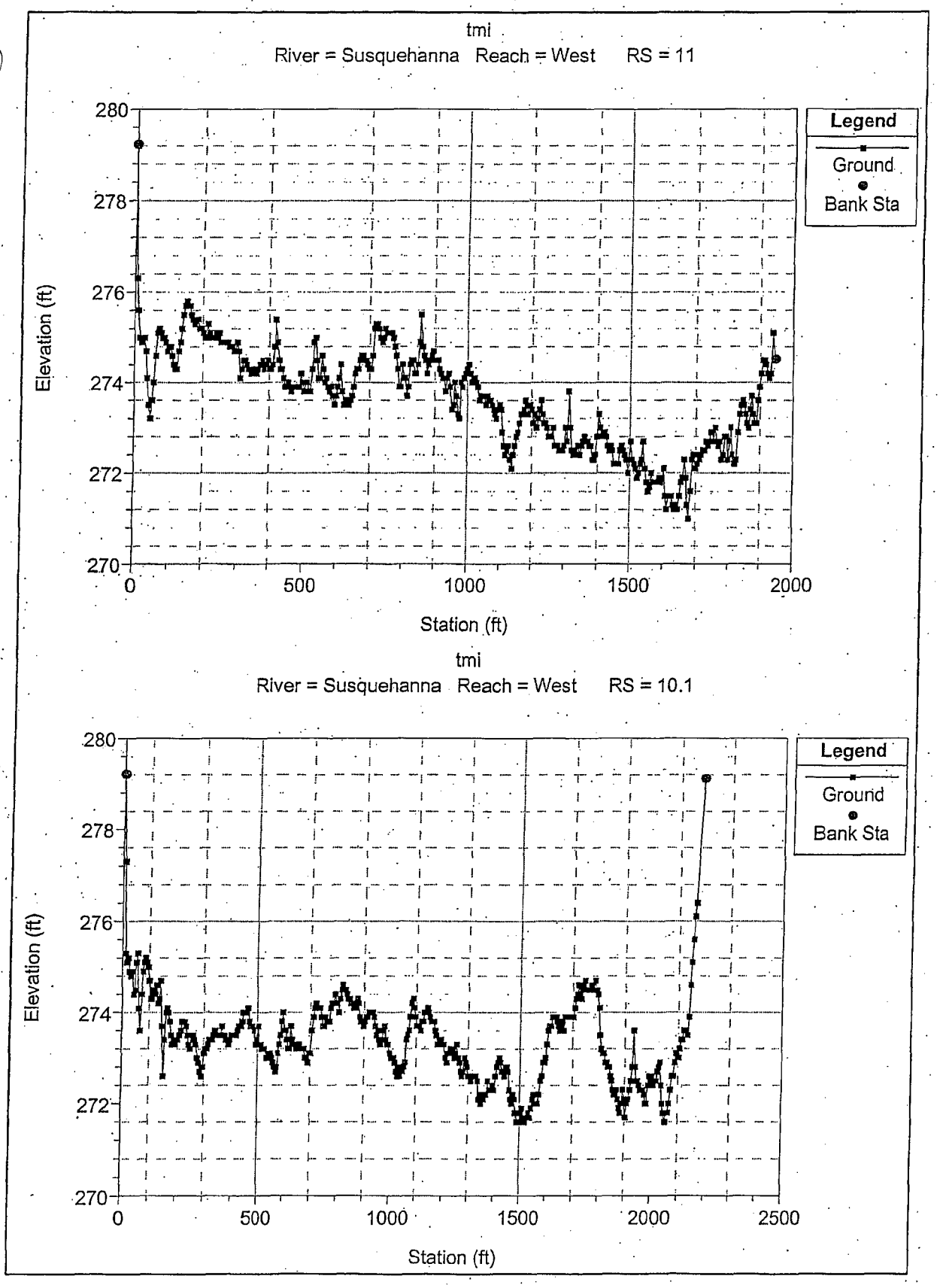
Figure 14: Comparison of 1998 and 2005 Simulation Results - Case 1, West Channel

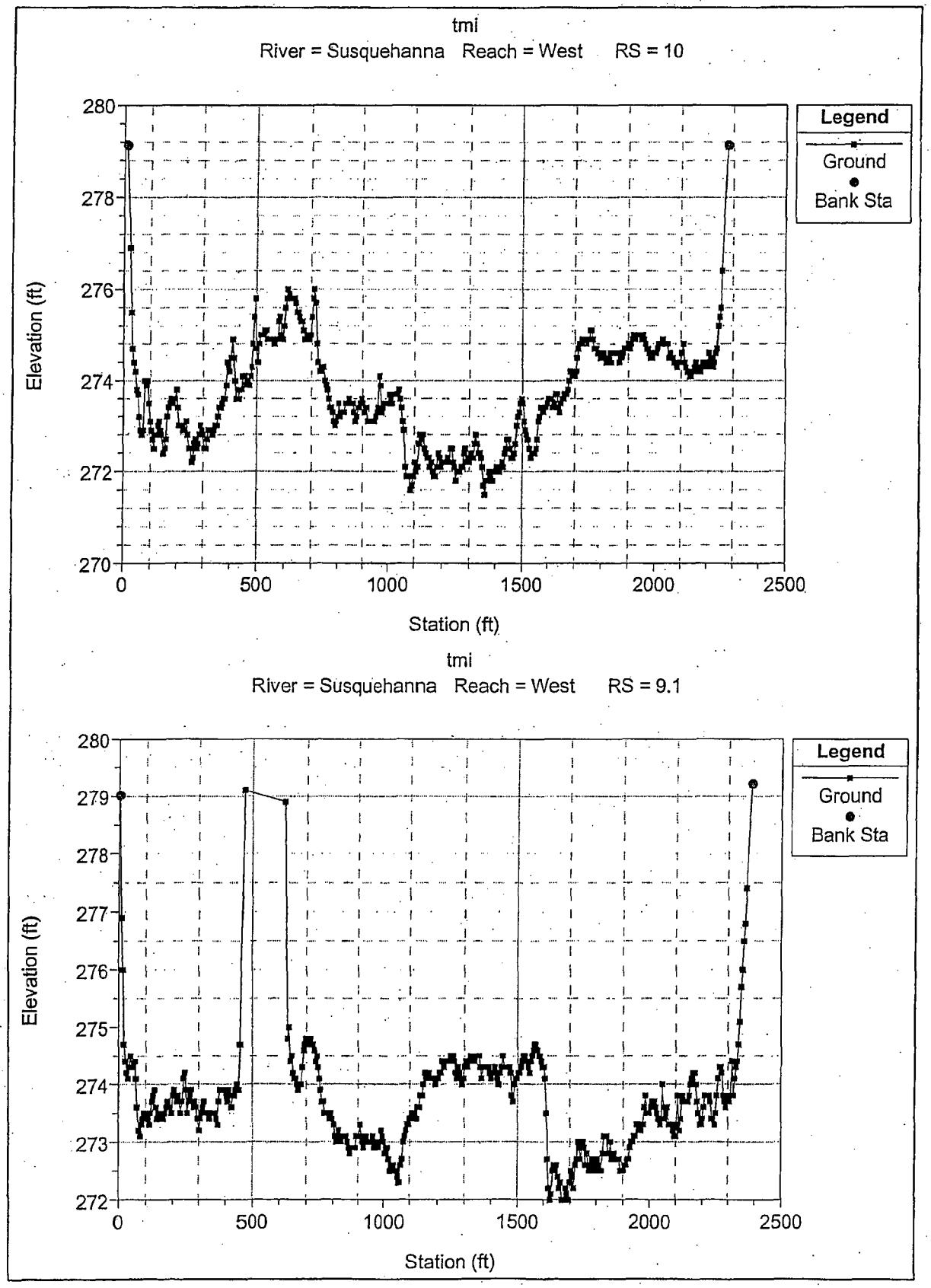


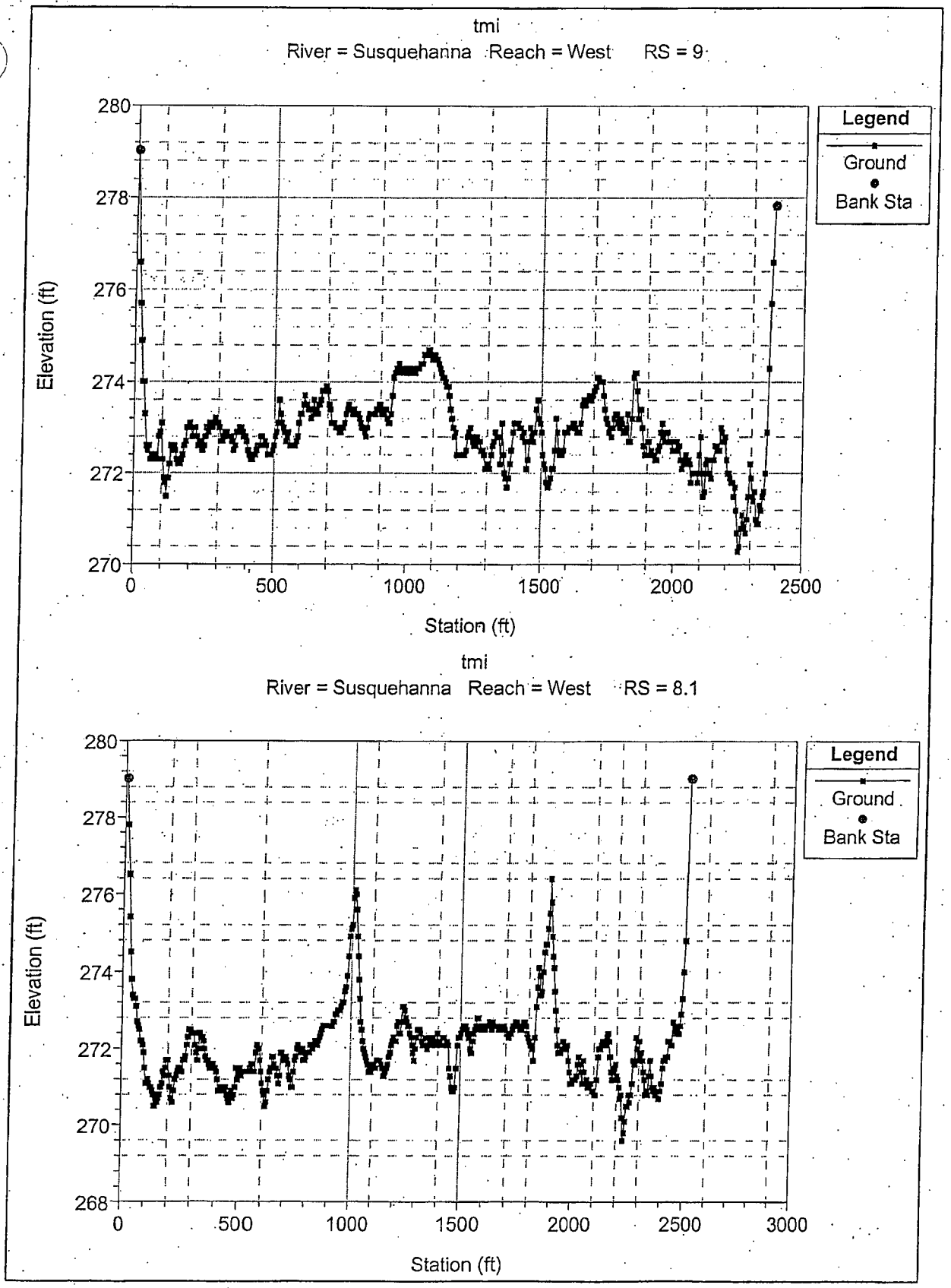
Appendix 1
Cross Sections for Case 1 and Case 6

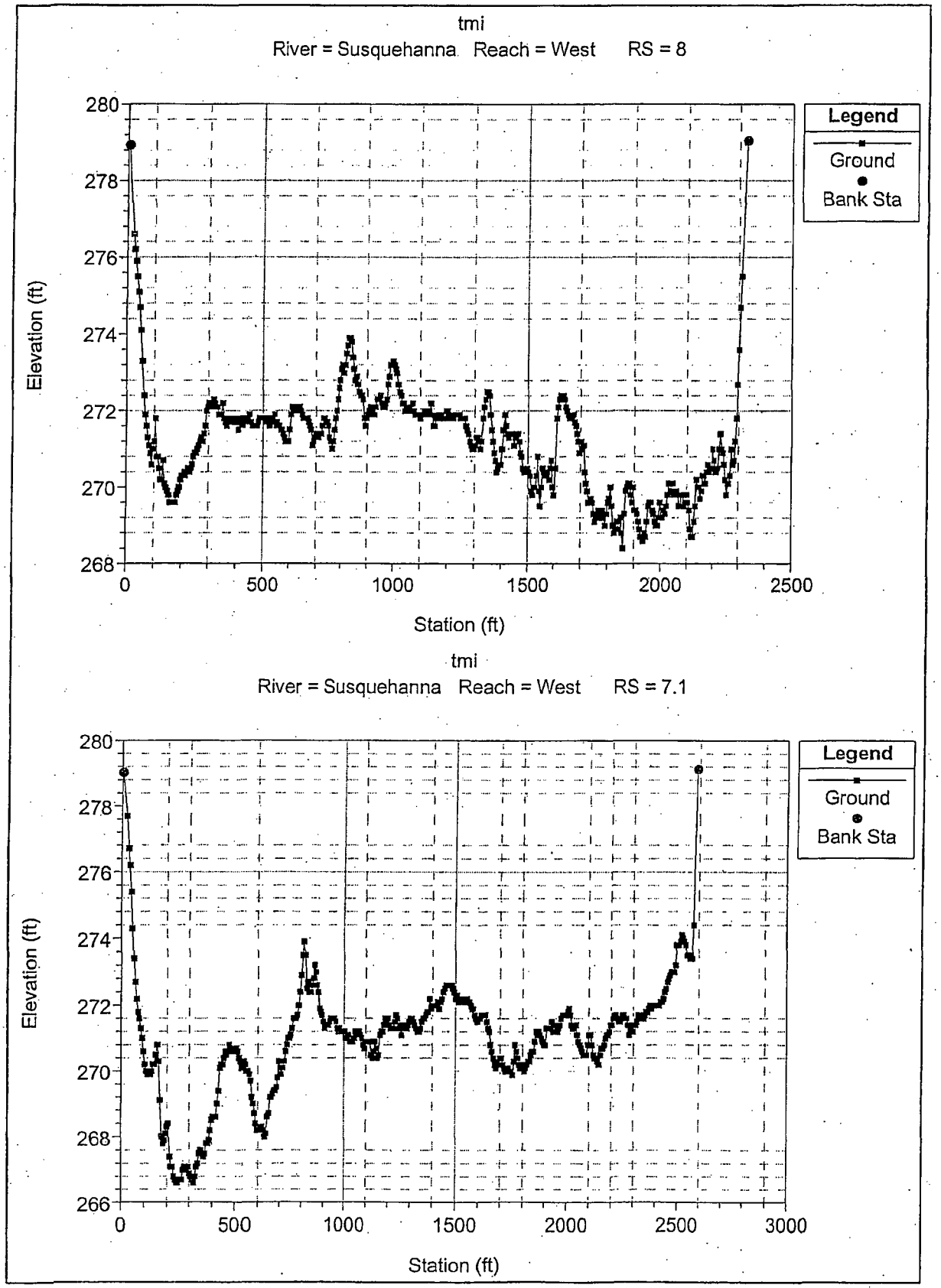
Cross-section	River Reach	Case 1	Case 6
12.05	Upper	X	X
12	Upper	X	X
11	West	X	X
10.1	West	X	X
10	West	X	X
9.1	West	X	X
9	West	X	X
8.1	West	X	X
8	West	X	X
7.1	West	X	X
7	West	X	X
1.2	West	X	X
53	Middle	X	X
5.1	Middle	X	X
5	Middle	X	X
4.1	Middle	X	X
4	Middle	X	X
3.1	Middle	X	X
3	Middle	X	X
2.1	Middle	X	X
2	Middle	X	X
1.1	Middle	X	X
1.05	WestMiddle	X	X
1	WestMiddle	X	X
52	East		X
51.1	East		X
51	East		X
50.1	East		X
50	East		X
49.1	East		X
49	East		X
48.1	East		X
48	East		X
47	East		X
46.18	East		X
46.1	East		X
46	East		X
45.1	East		X
45	East		X
44.2	East		X
44.1	East		X
44	East		X
29	East		X

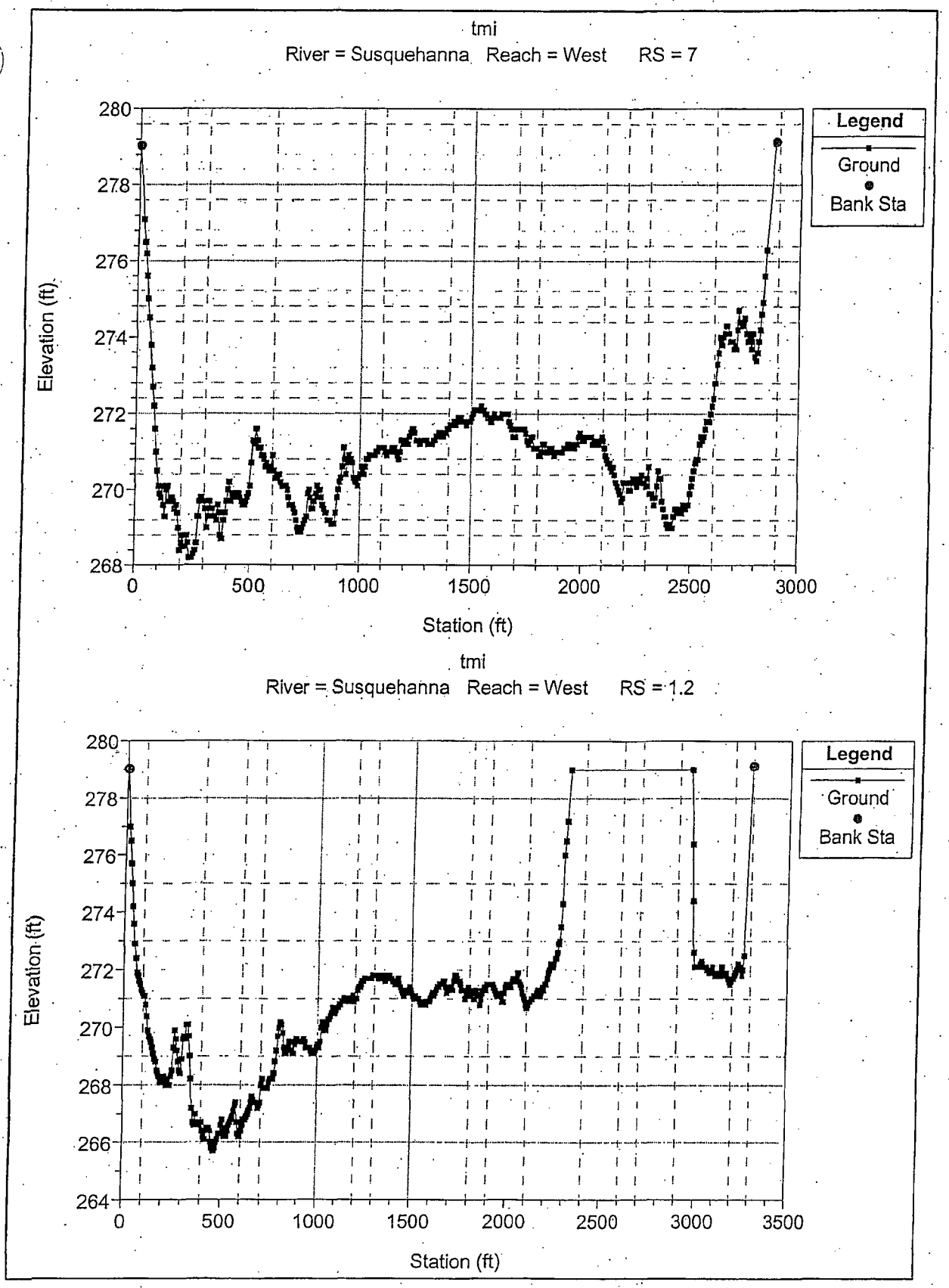

tmi
River = Susquehanna Reach = Upper RS = 12.05
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
tmi
River = Susquehanna Reach = Upper RS = 12
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
2500
3000
3500
Station (ft)

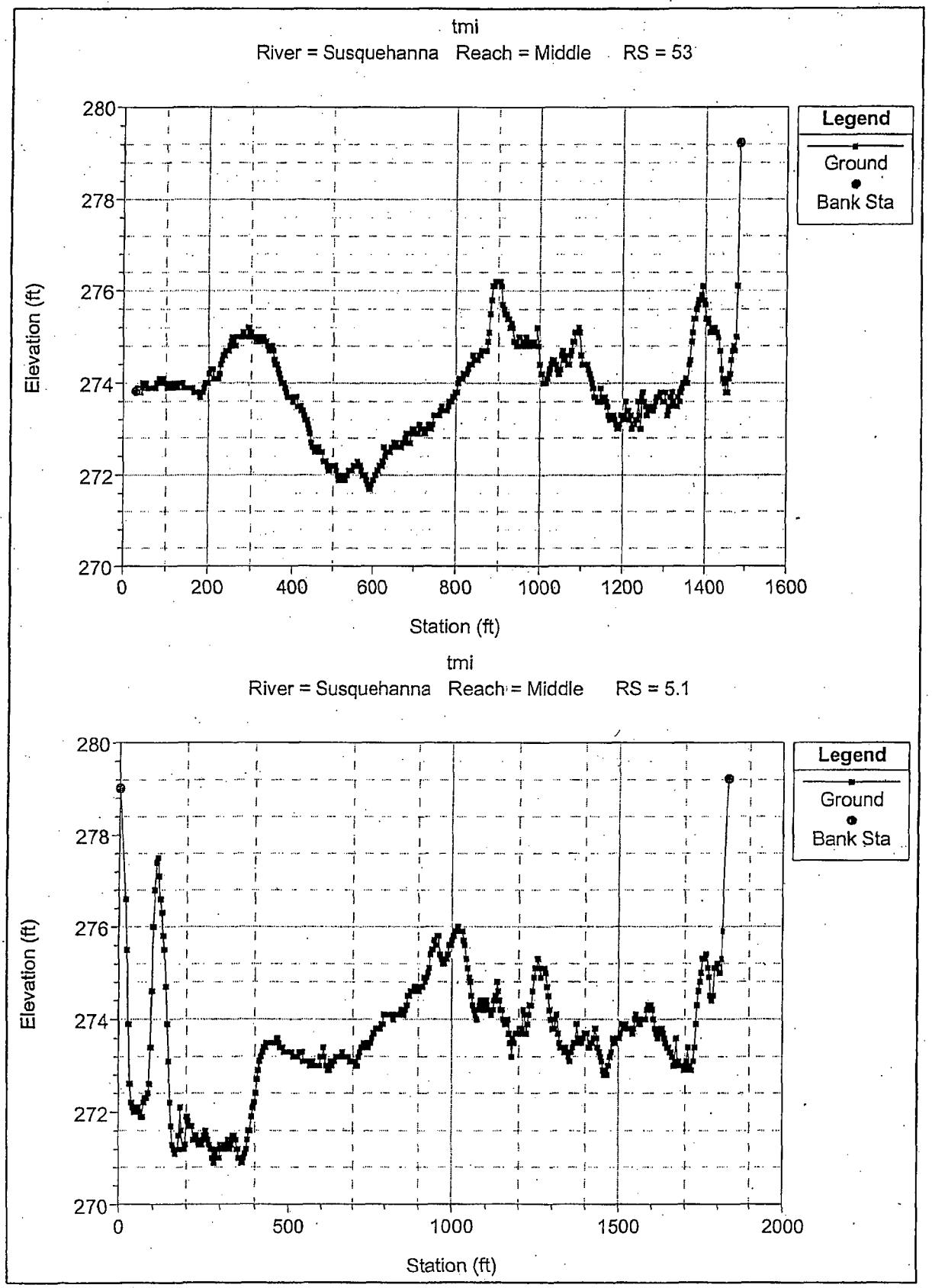

tmi
River = Susquehanna Reach = West RS = 11
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
Station (ft)
tmi
River = Susquehanna Reach = West RS = 10.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
2500
Station (ft)

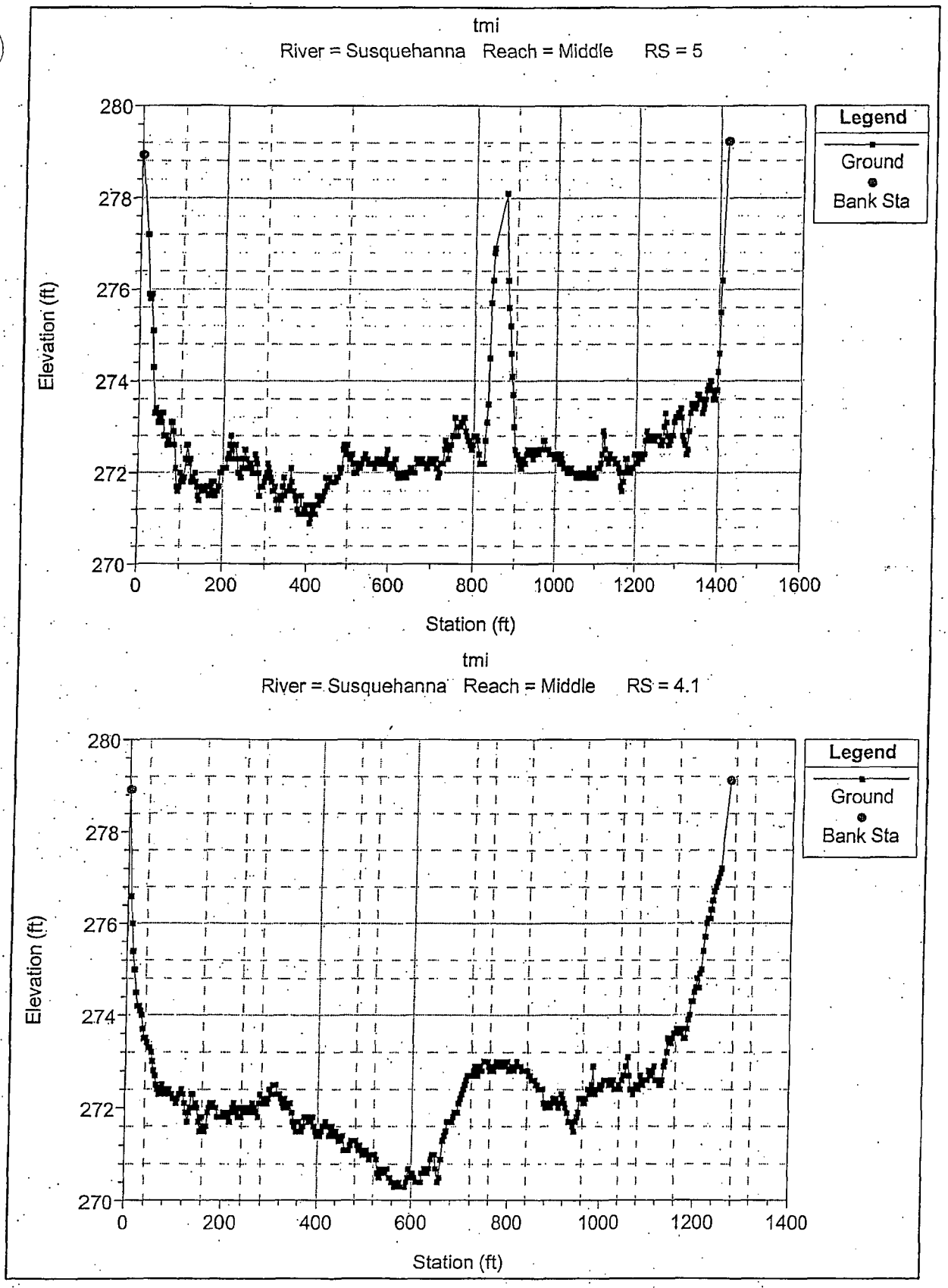

tmi
River = Susquehanna Reach = West RS = 10
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
2500
tmi
River = Susquehanna Reach = West RS = 9.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
279
278
277
276
275
274
273
272
0
500
1000
1500
2000
2500

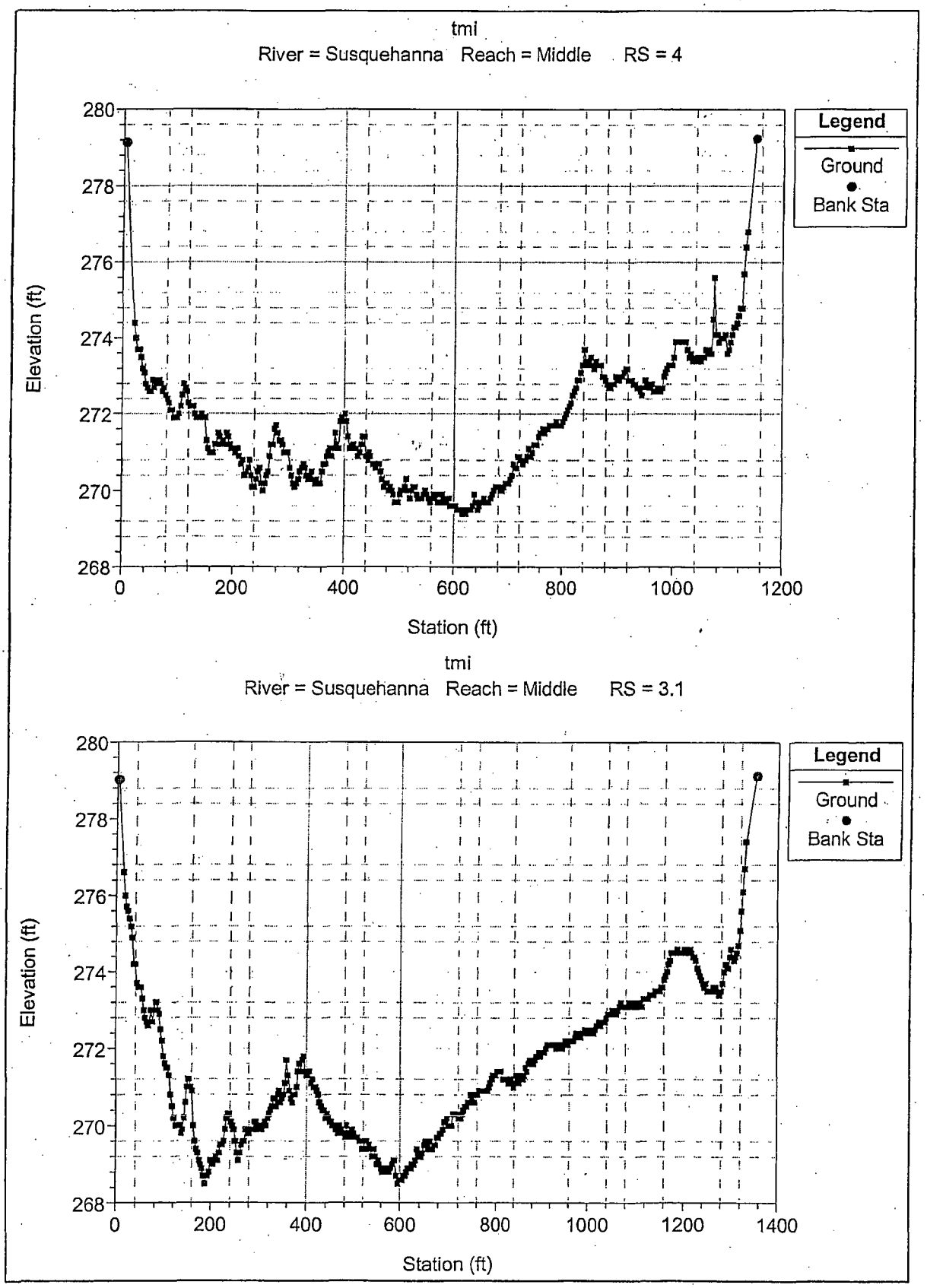

tmi
River = Susquehanna Reach = West RS = 9
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
2500
Station (ft)
tmi
River = Susquehanna Reach = West RS = 8.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
500
1000
1500
2000
2500
3000
Station (ft)

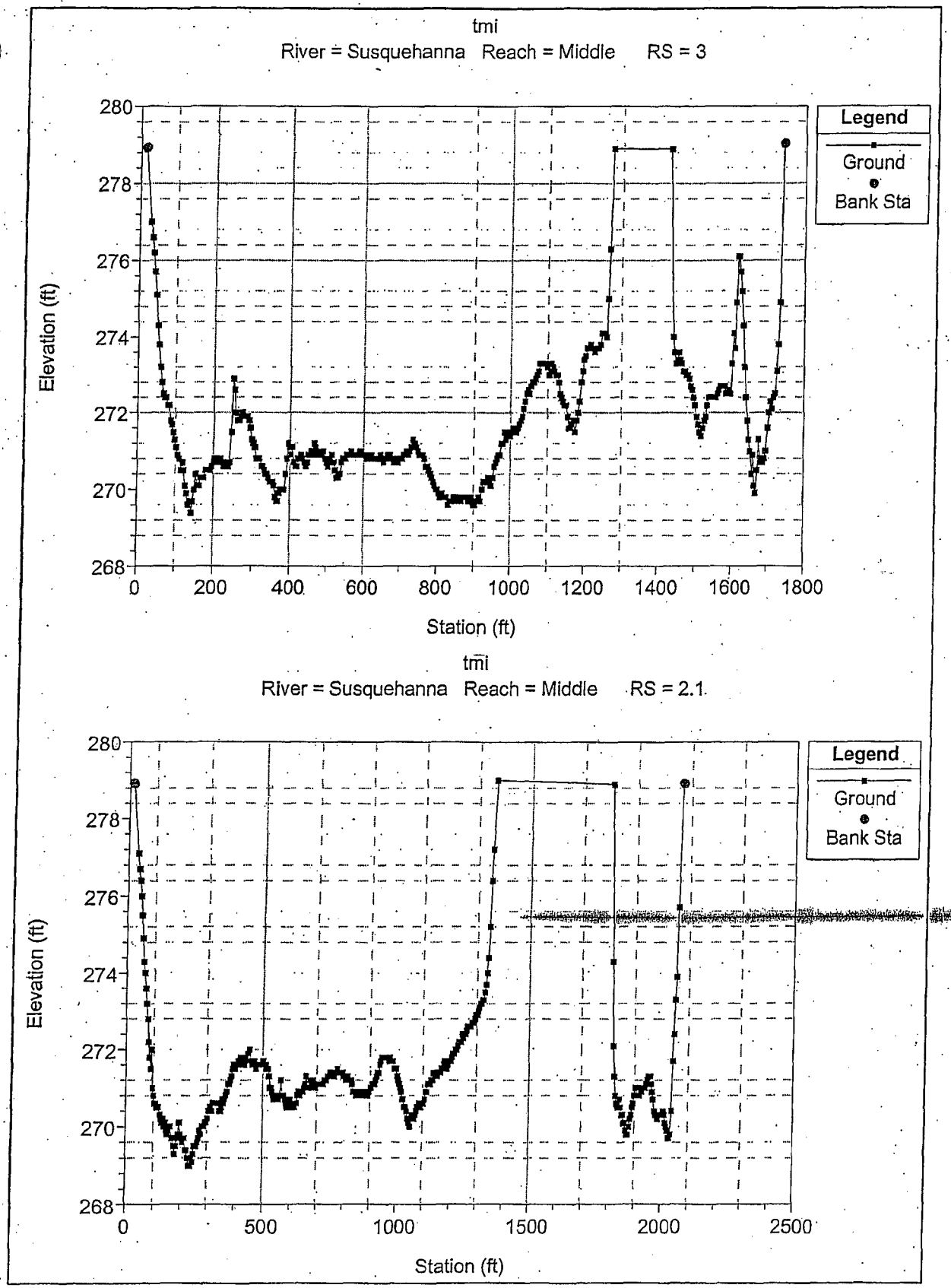

tmi
River = Susquehanna Reach = West RS = 8
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
0
500
1000
1500
2000
2500
tmi
River = Susquehanna Reach = West RS = 7.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
266
0
500
1000
1500
2000
2500
3000

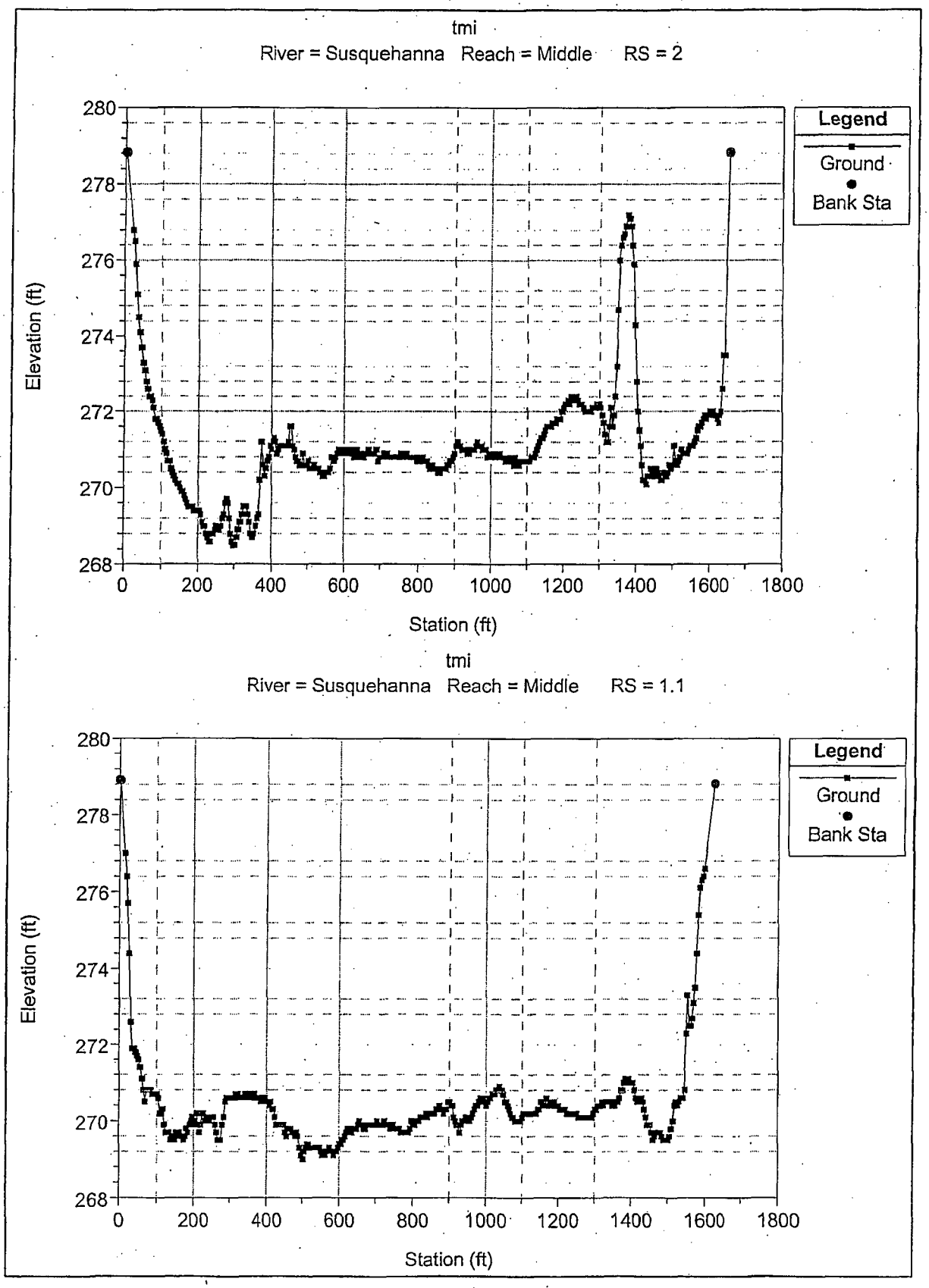

tmi
River = Susquehanna Reach = West RS = 7
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
0
500
1000
1500
2000
2500
3000
tmi
River = Susquehanna Reach = West RS = 1.2
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
266
264
0
500
1000
1500
2000
2500
3000
3500

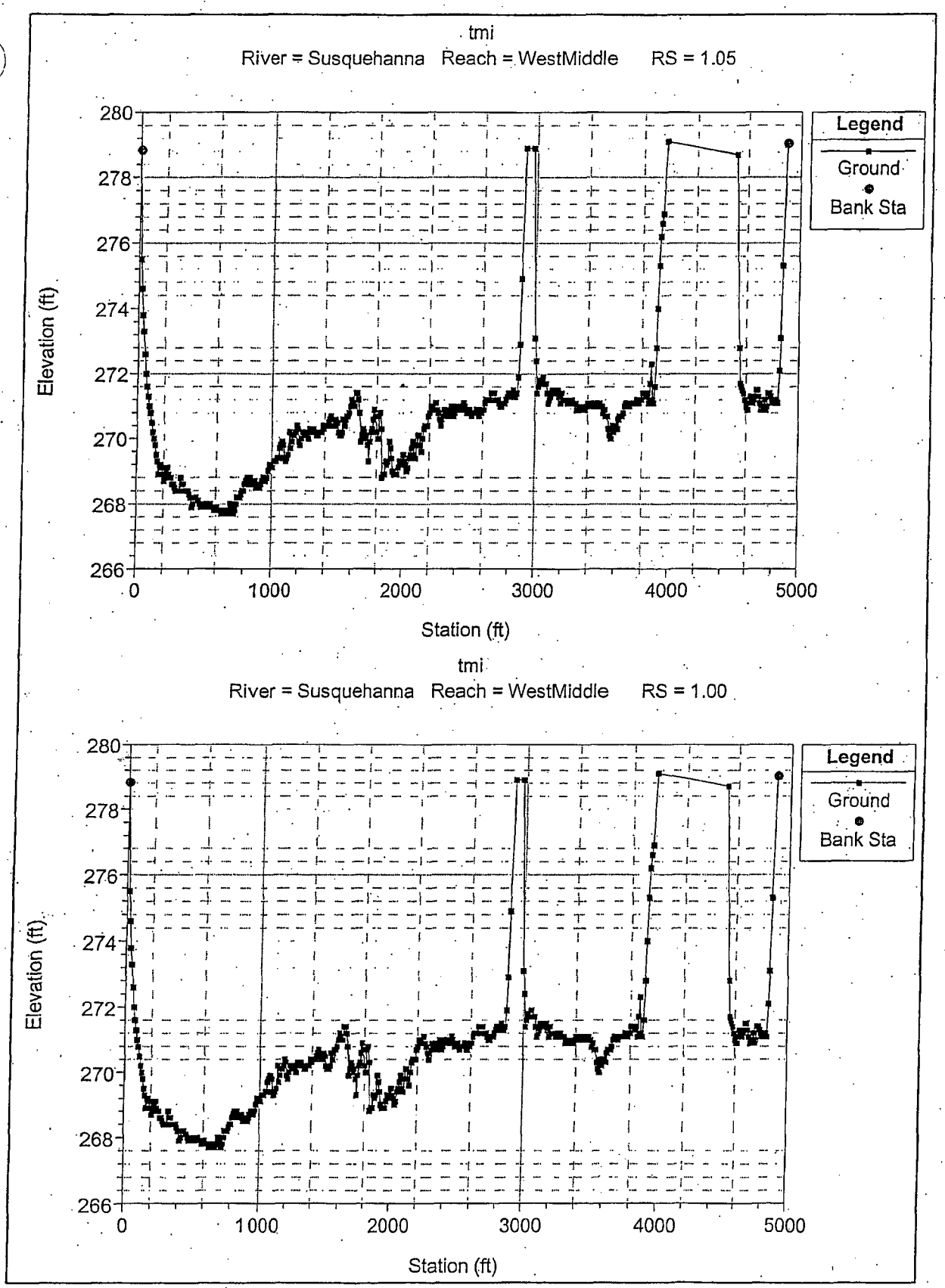

tmi
River = Susquehanna Reach = Middle RS = 53
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
1600
Station (ft)
tmi
River = Susquehanna Reach = Middle RS = 5.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
500
1000
1500
2000
Station (ft)

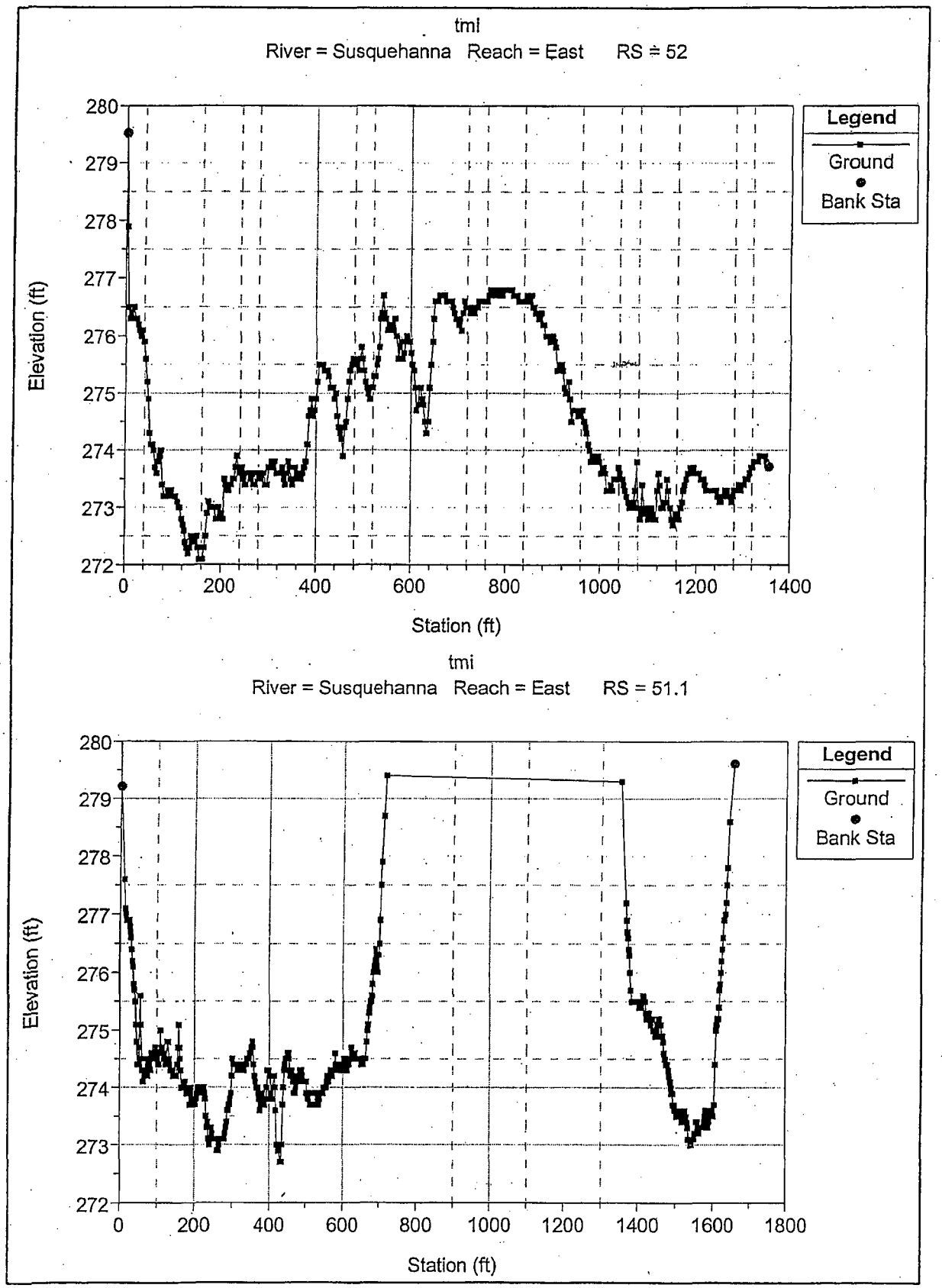

tmi
River = Susquehanna Reach = Middle RS = 5
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
1600
Station (ft)
Legend
Ground
Bank Sta
tmi
River = Susquehanna Reach = Middle RS = 4.1
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
Station (ft)
Legend
Ground
Bank Sta

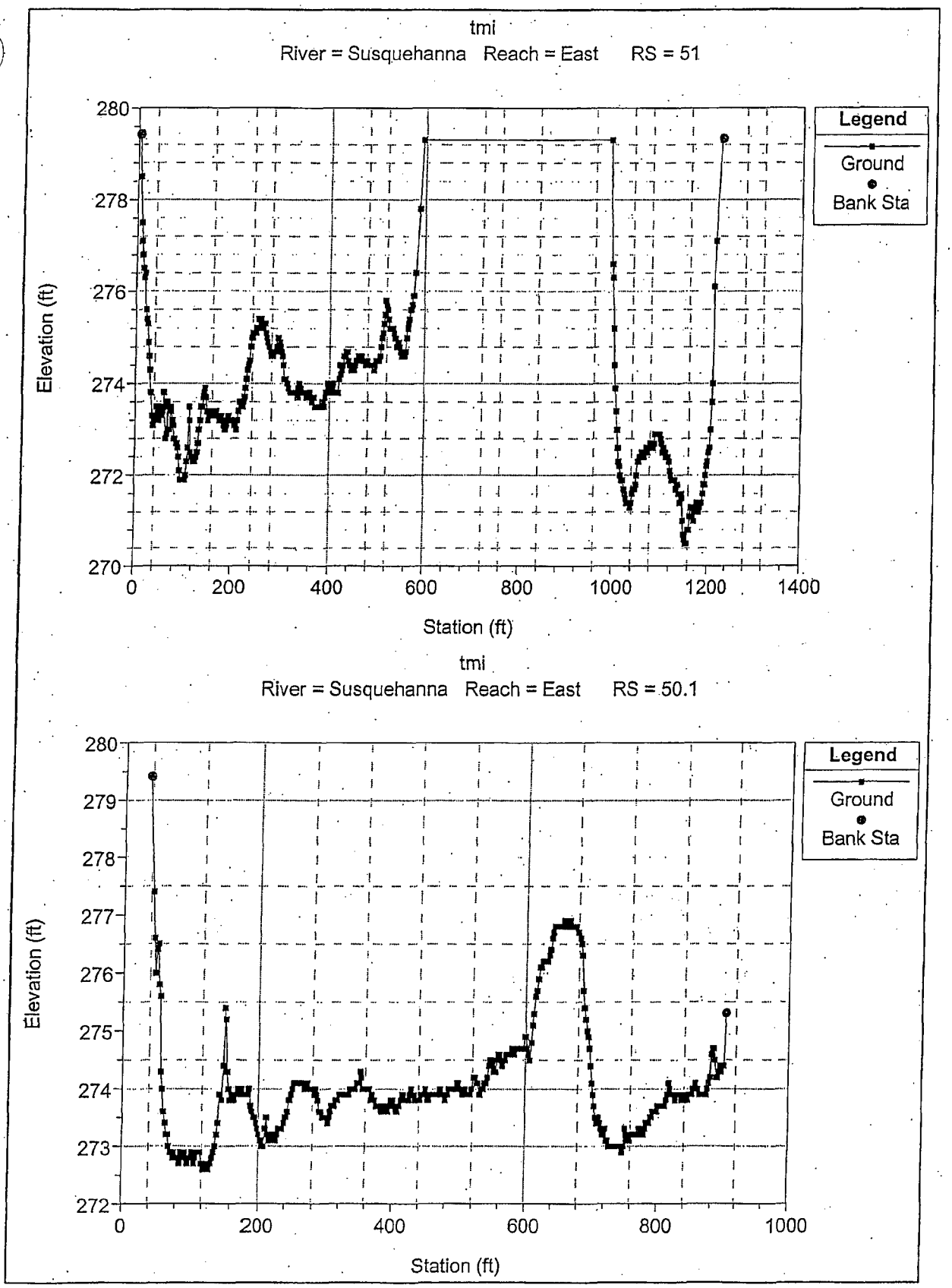

tmi
River = Susquehanna Reach = Middle RS = 4
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
1200
tmi
River = Susquehanna Reach = Middle RS = 3.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
1200
1400

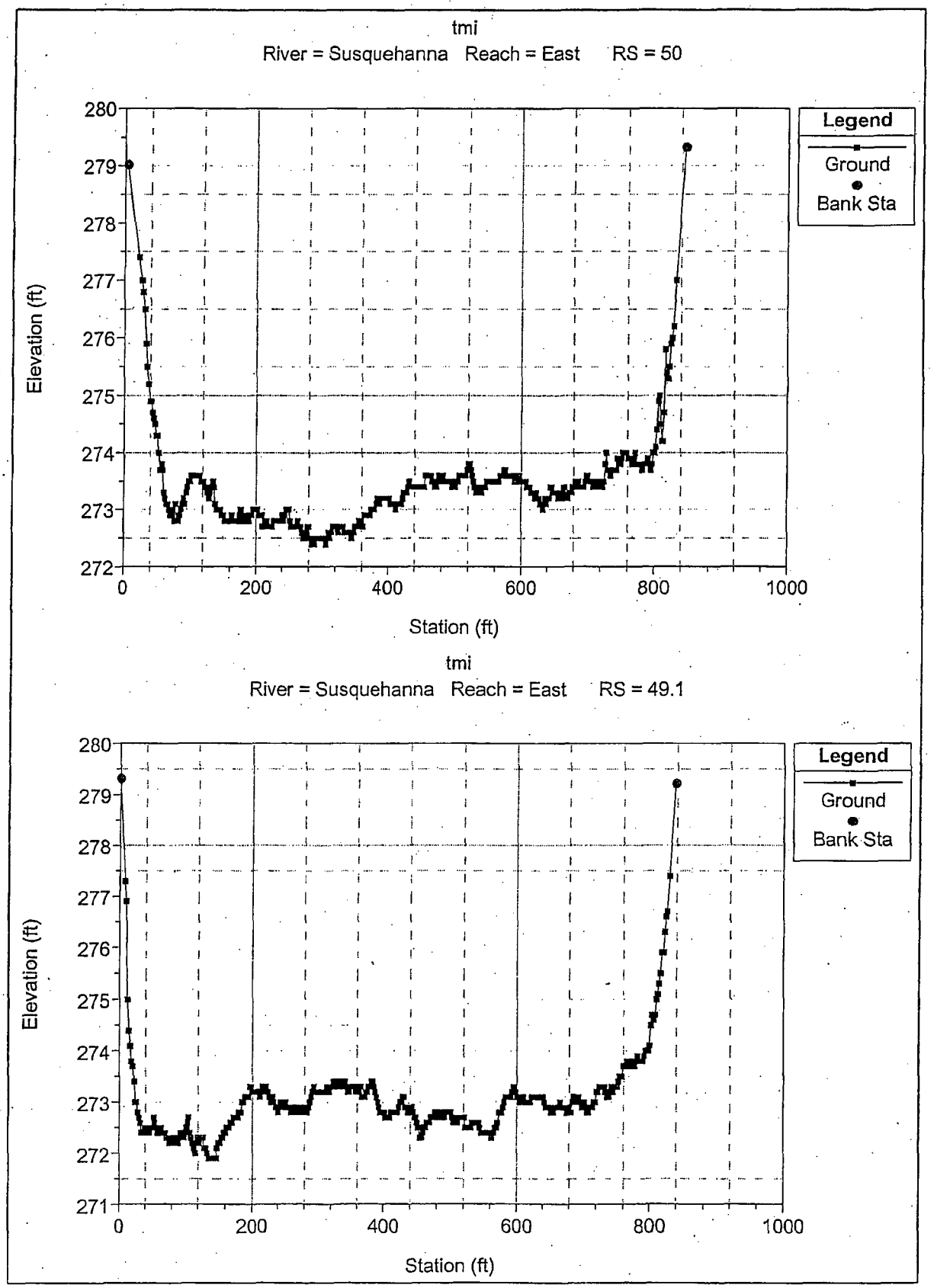

tmi
River = Susquehanna Reach = Middle RS = 3
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)
tmi
River = Susquehanna Reach = Middle RS = 2.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
500
1000
1500
2000
2500
Station (ft)

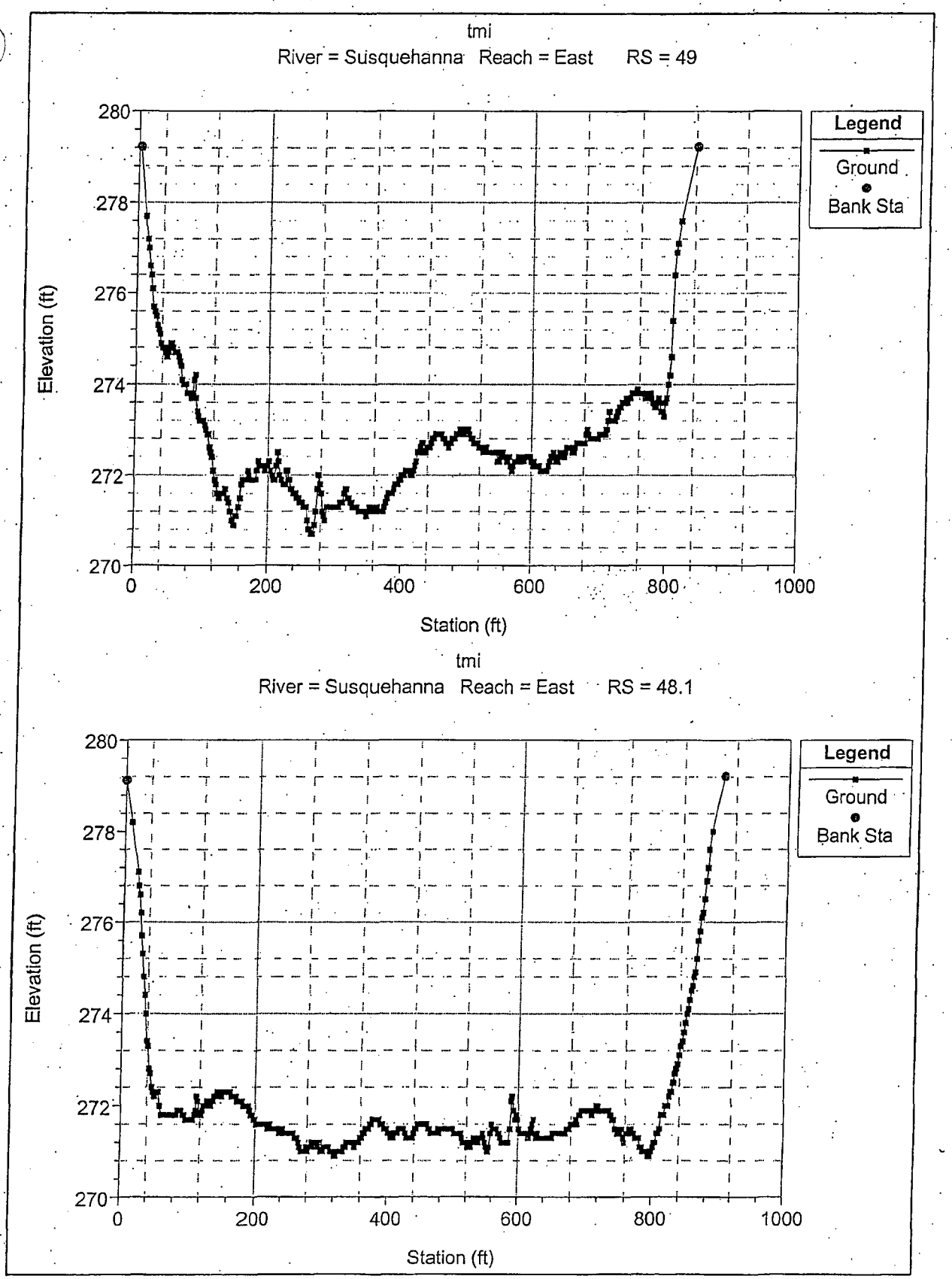

tmi
River = Susquehanna Reach = Middle RS = 2
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)
tmi
River = Susquehanna Reach = Middle RS = 1.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)

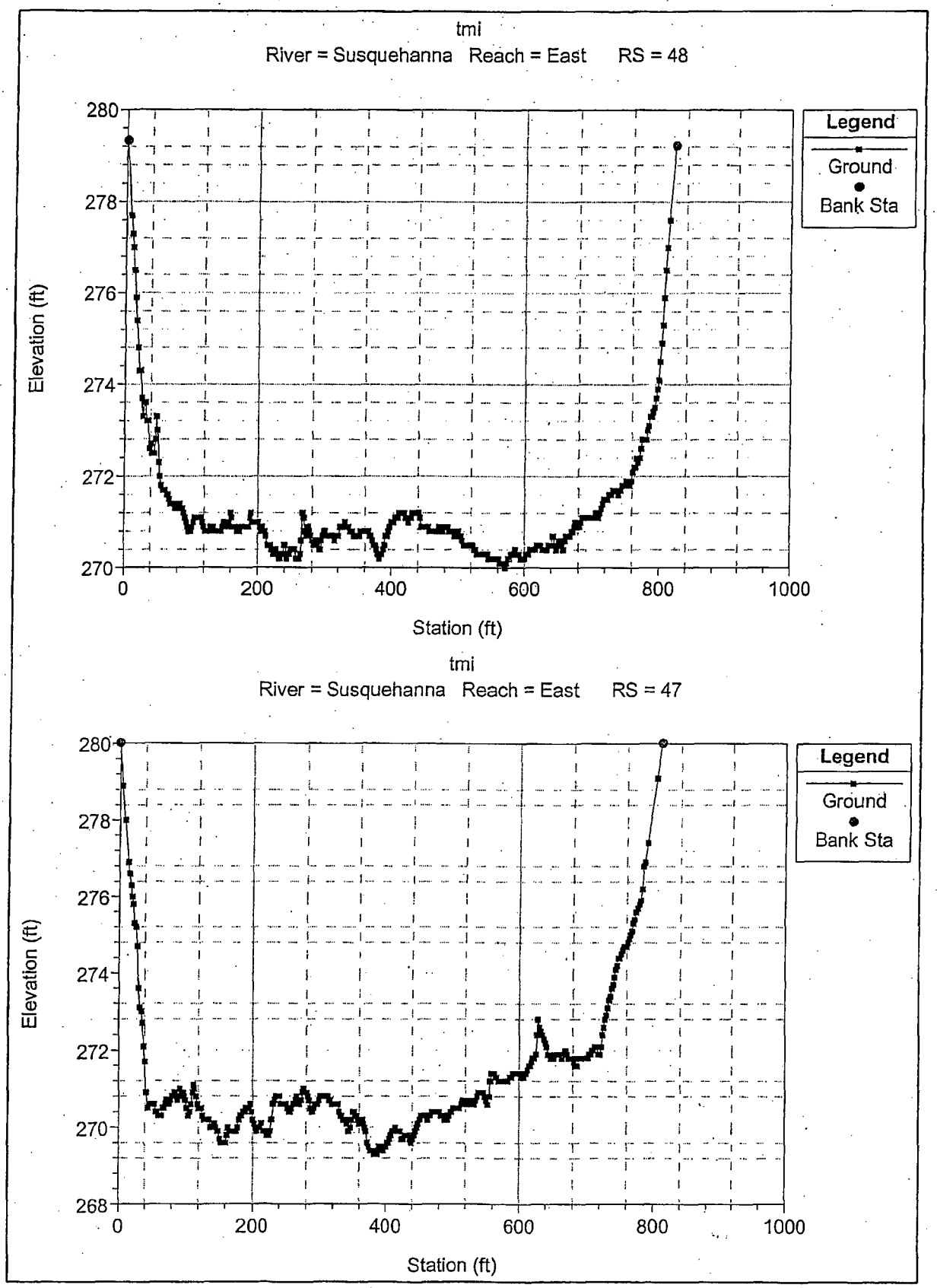

tmi
River = Susquehanna Reach = WestMiddle RS = 1.05
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
268
266
0
1000
2000
3000
4000
5000
tmi
River = Susquehanna Reach = WestMiddle RS = 1.00
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)

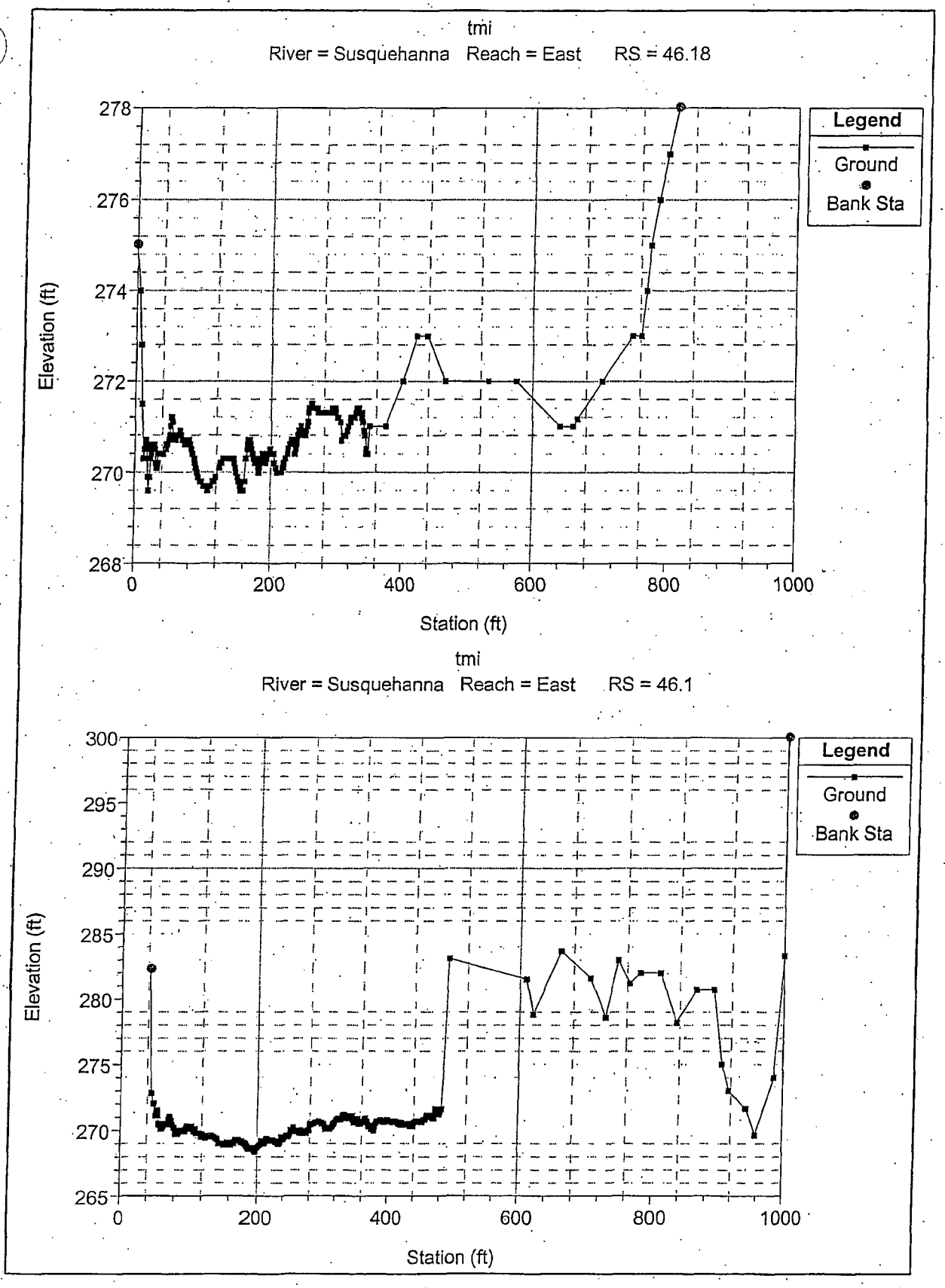

tmi
River = Susquehanna Reach = East RS = 52
Legend
Ground
Bank Sta
Elevation (ft)
280
279
278
277
276
275
274
273
272
0
200
400
600
800
1000
1200
1400
Station (ft)
tmi
River = Susquehanna Reach = East RS = 51.1
Legend
Ground
Bank Sta
Elevation (ft)
280
279
278
277
276
275
274
273
272
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)

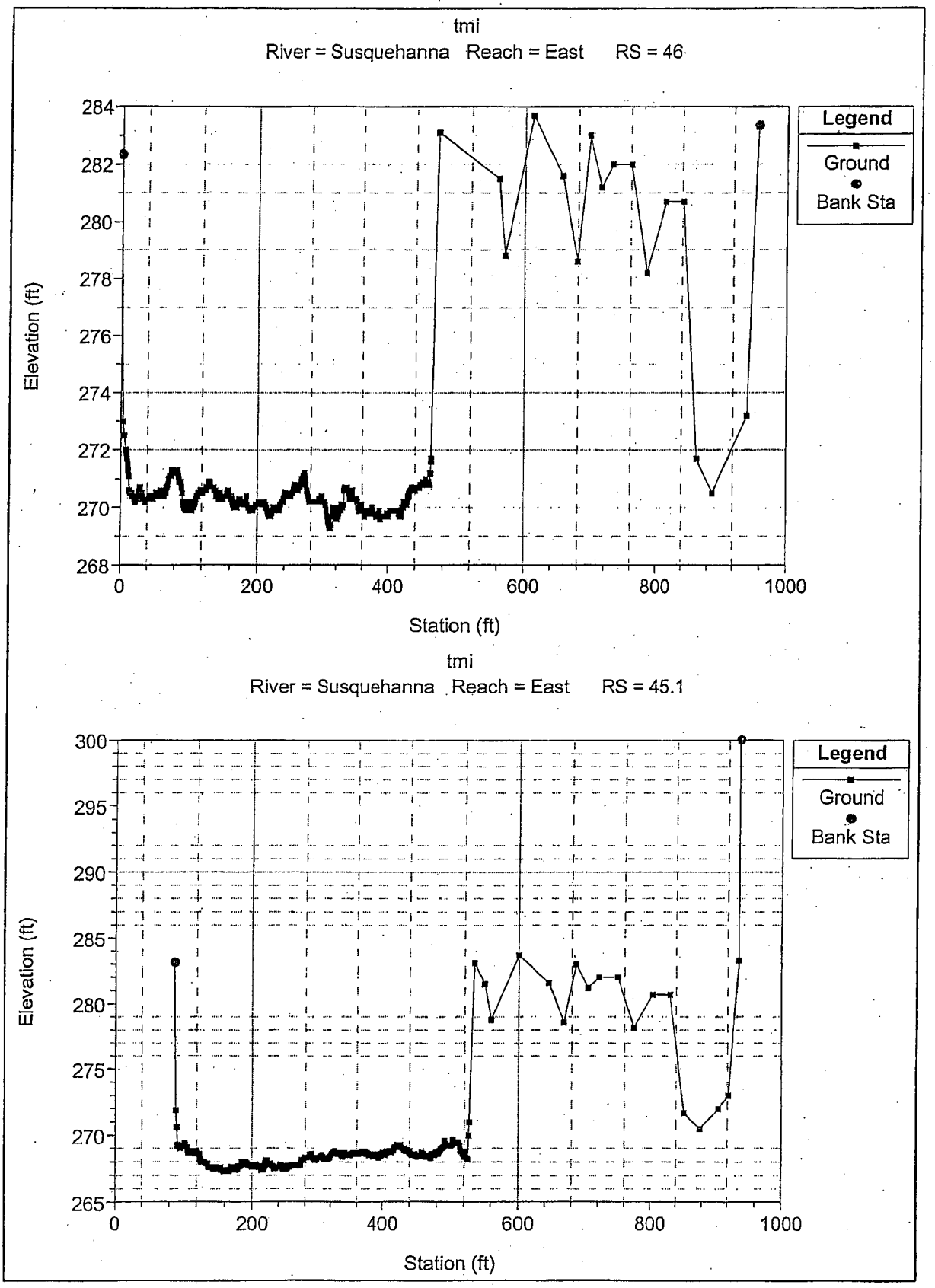

tmi
River = Susquehanna Reach = East RS = 51
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
Station (ft)
tmi
River = Susquehanna Reach = East RS = 50.1
Legend
Ground
Bank Sta
Elevation (ft)
280
279
278
277
276
275
274
273
272
0
200
400
600
800
1000
Station (ft)

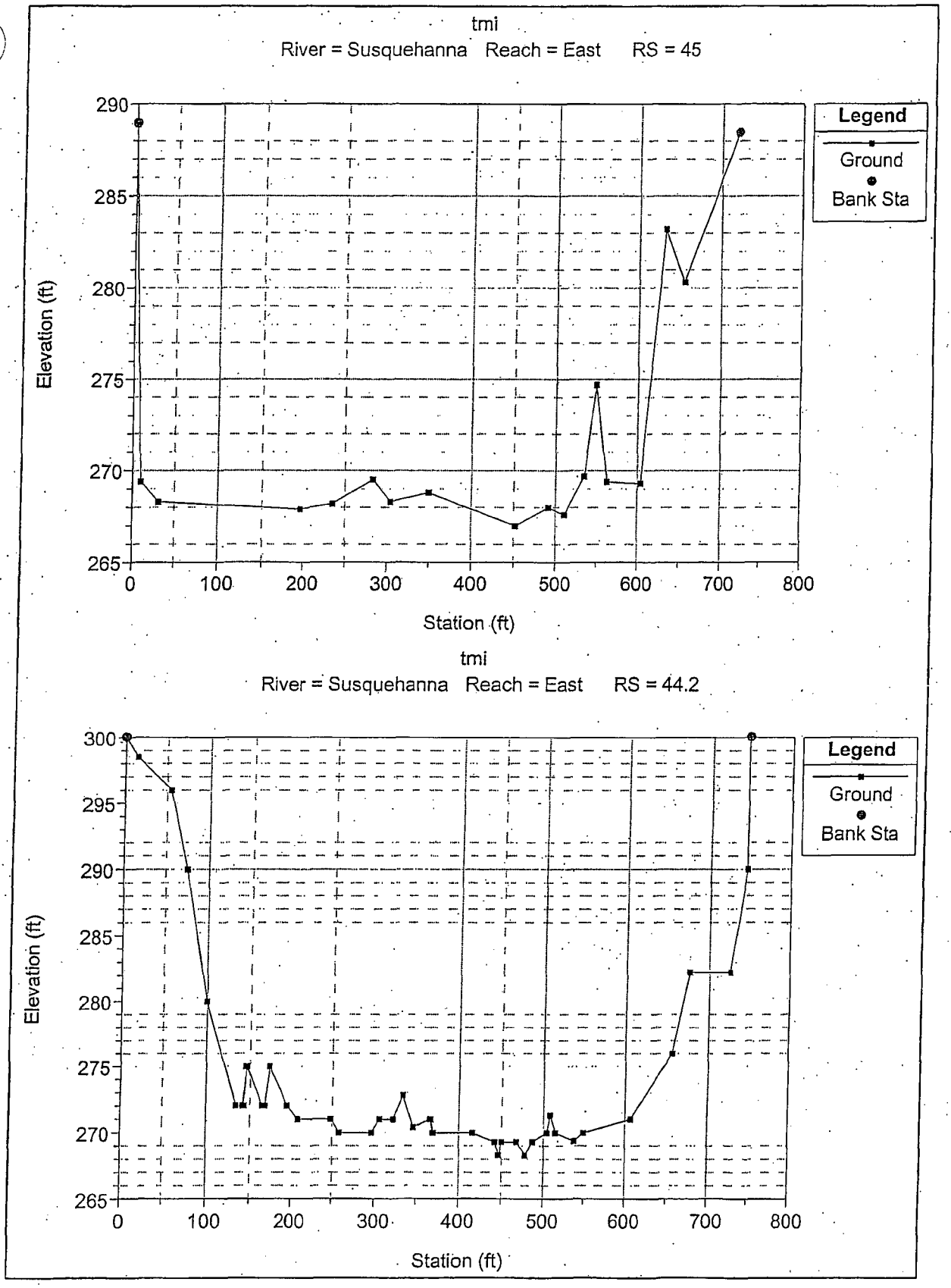

tmi
River = Susquehanna Reach = East RS = 50
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
279
278
277
276
275
274
273
272
0
200
400
600
800
1000
tmi
River = Susquehanna Reach = East RS = 49.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
279
278
277
276
275
274
273
272
271
0
200
400
600
800
1000

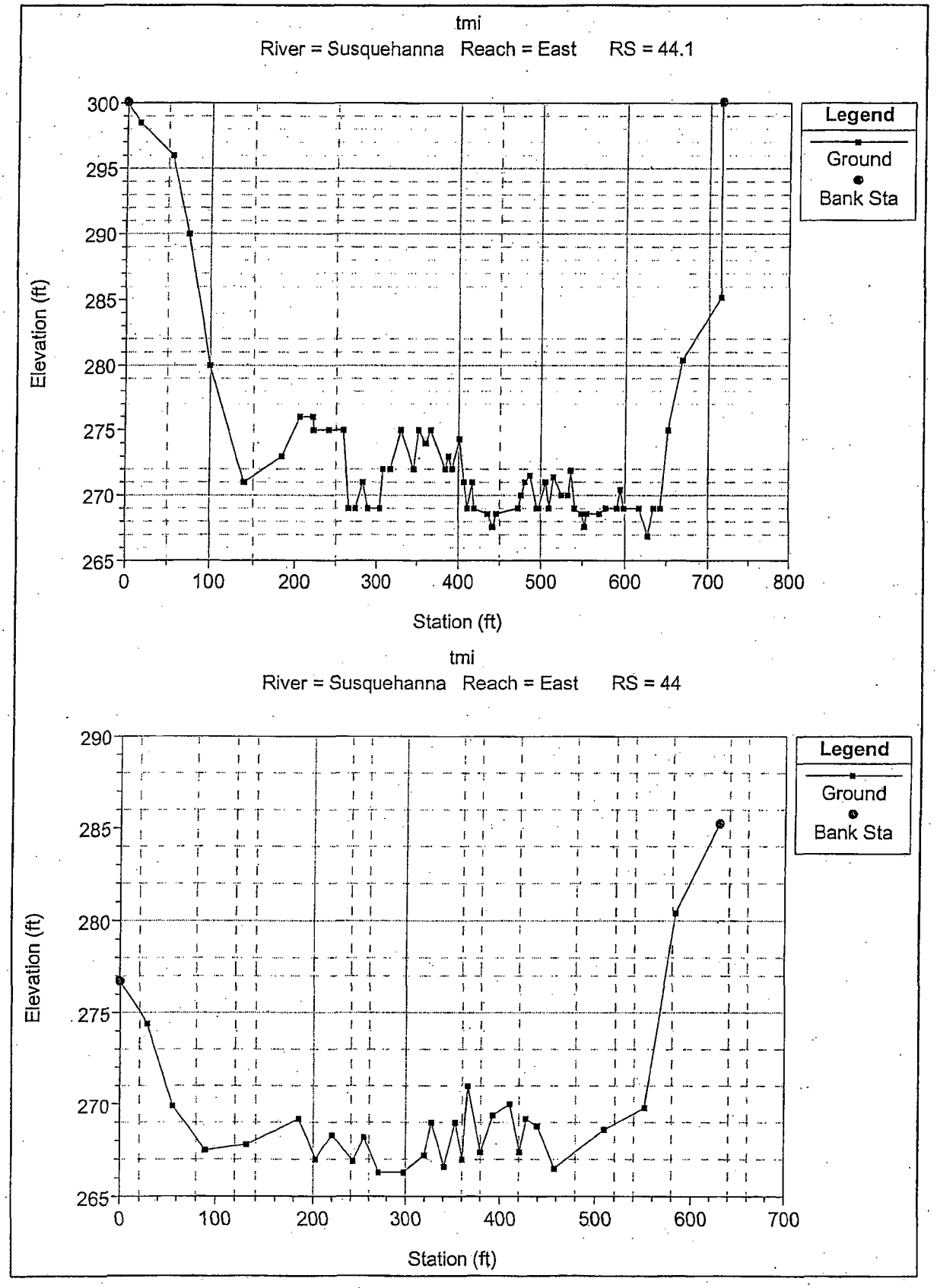

tmi
River = Susquehanna Reach = East RS = 49
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 48.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
Station (ft)

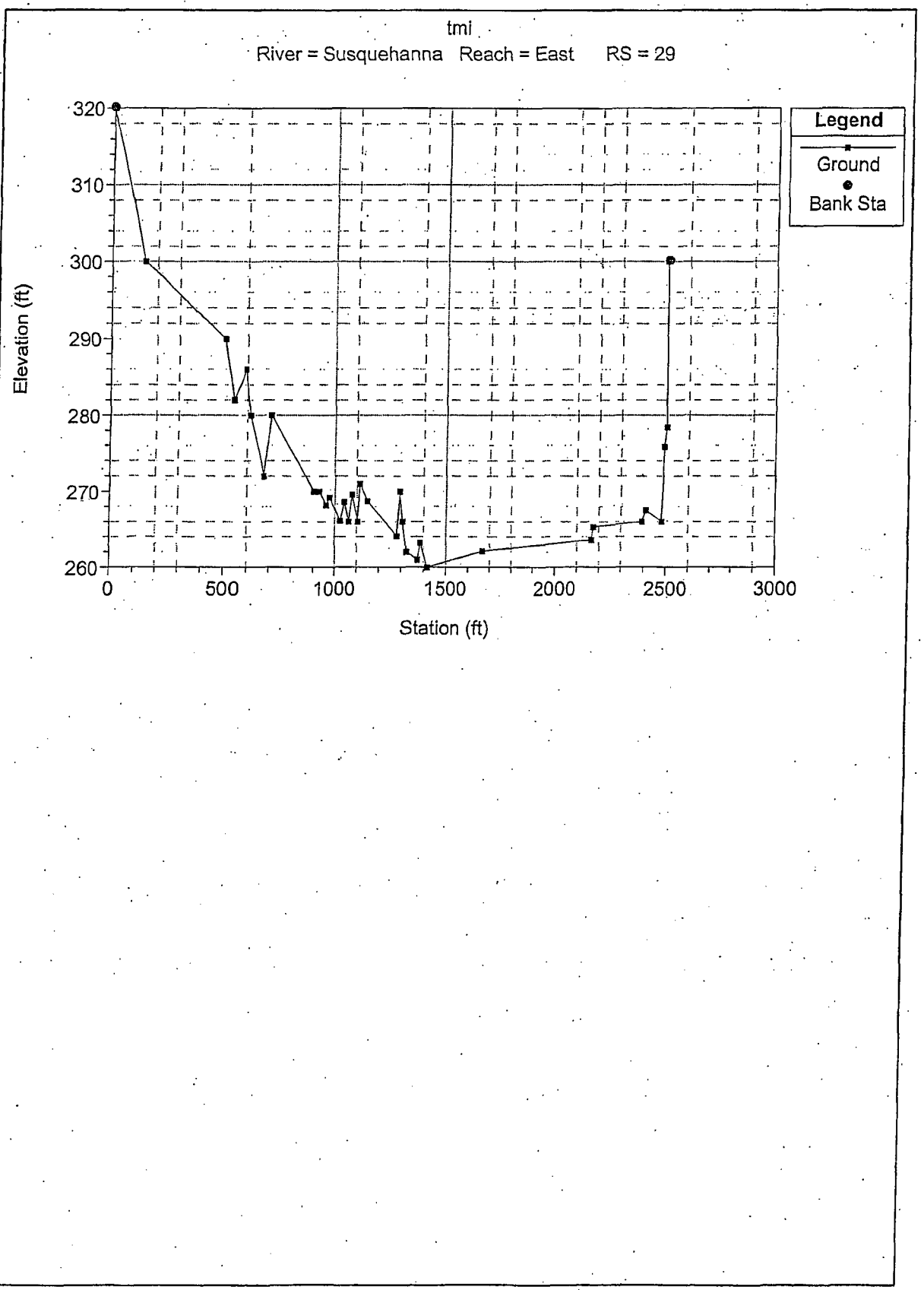

tmi
River = Susquehanna Reach = East RS = 48
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 47
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)


tmi
River = Susquehanna Reach = East RS = 46.18
Legend
Ground
Bank Sta
Elevation (ft)
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 46.1
Legend
Ground
Bank Sta
Elevation (ft)
300
295
290
285
280
275
270
265
0
200
400
600
800
1000
Station (ft)


tmi
River = Susquehanna Reach = East RS = 46
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
284
282
280
278
276
274
272
270
268
0
200
400
600
800
1000
tmi
River = Susquehanna Reach = East RS = 45.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
300
295
290
285
280
275
270
265
0
200
400
600
800
1000

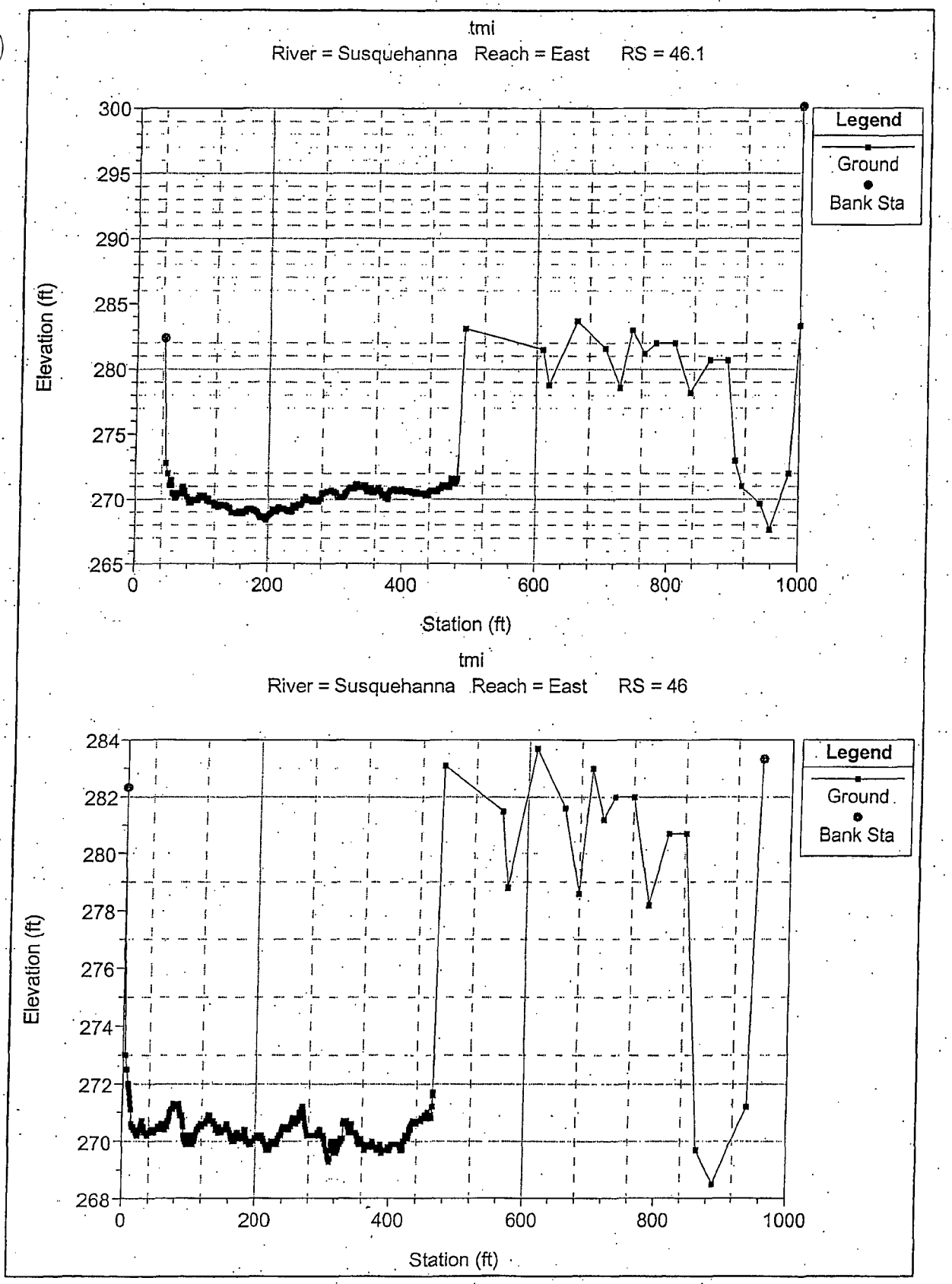

tmi
River = Susquehanna Reach = East RS = 45
Legend
Ground
Bank Sta
Elevation (ft)
290
285
280
275
270
265
0
100
200
300
400
500
600
700
800
Station (ft)
tmi
River = Susquehanna Reach = East RS = 44.2
Legend
Ground
Bank Sta
Elevation (ft)
300
295
290
285
280
275
270
265
0
100
200
300
400
500
600
700
800
Station (ft)

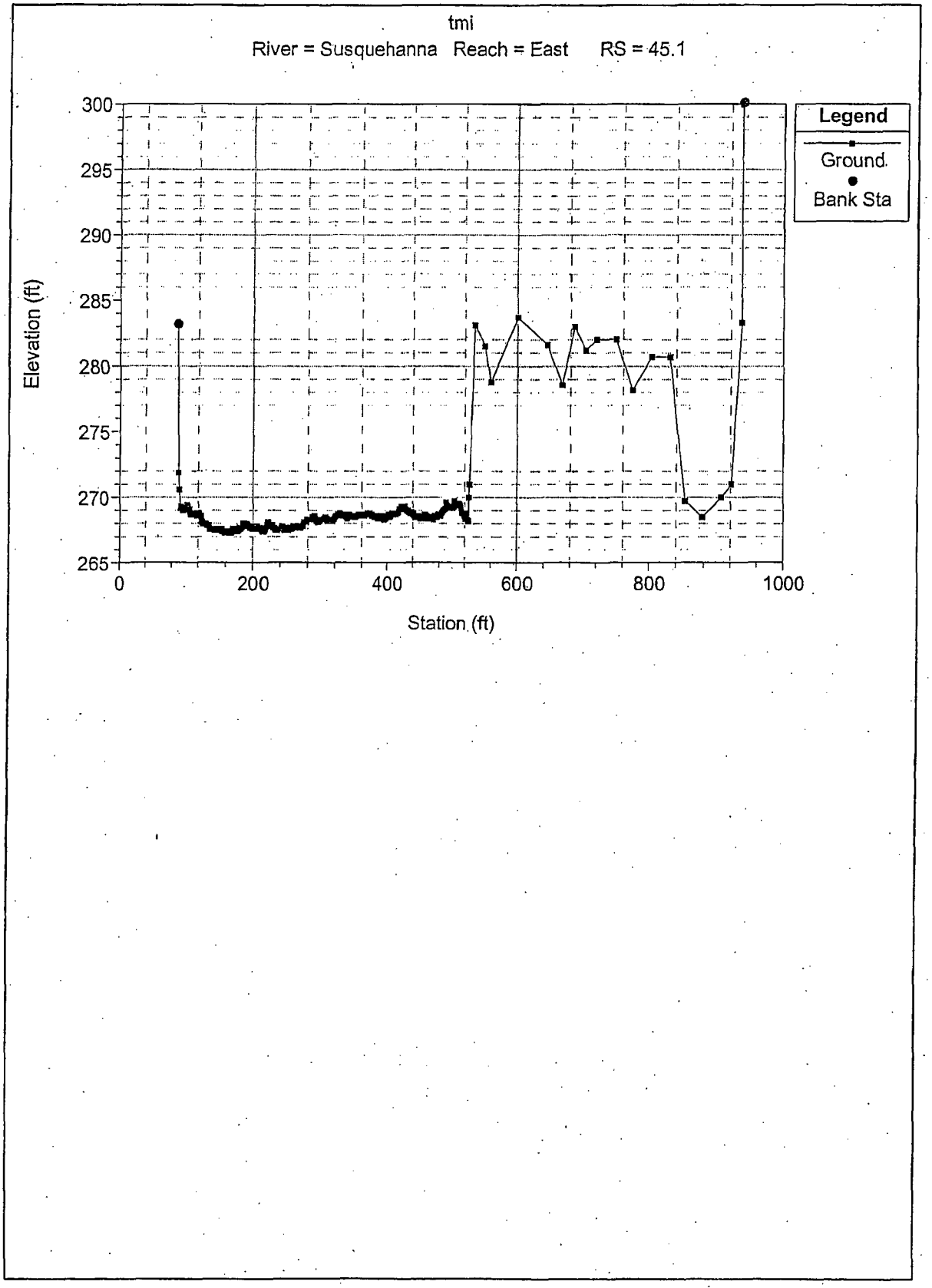

tmi
River = Susquehanna Reach = East RS = 44.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
300
295
290
285
280
275
270
265
0
100
200
300
400
500
600
700
800
tmi
River = Susquehanna Reach = East RS = 44
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
290
285
280
275
270
265
0
100
200
300
400
500
600
700


tmi
River = Susquehanna Reach = East RS = 29
Legend
Ground
Bank Sta
Elevation (ft)
320
310
300
290
280
270
260
0
500
1000
1500
2000
2500
3000
Station (ft)

Appendix 2

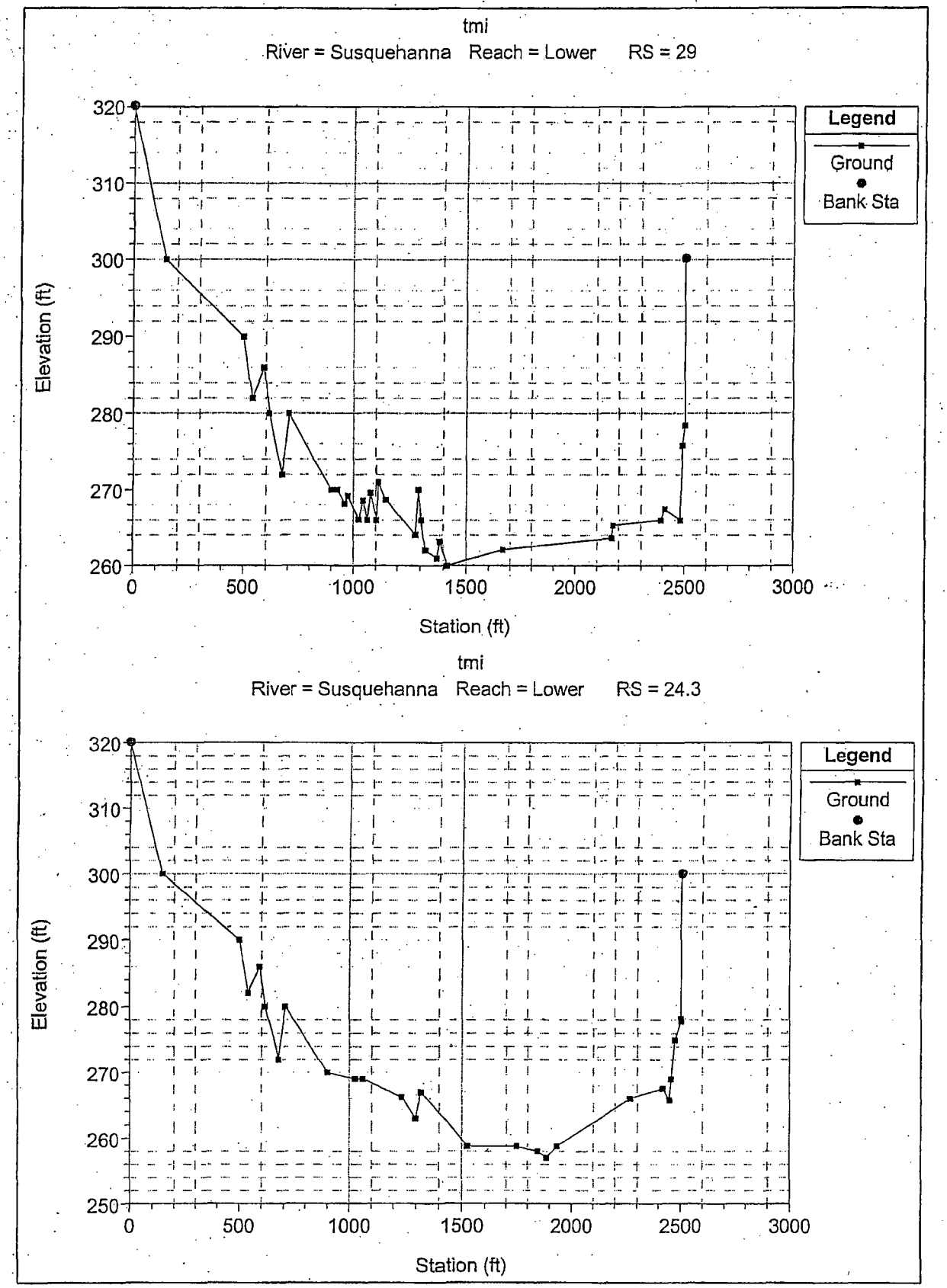
Cross Sections 45.1, 46, and 46.1 for Cases 6a and 6Ma


tmi
River = Susquehanna Reach = East RS = 46.1
Legend
Ground
Bank Sta
Elevation (ft)
300
295
290
285
280
275
270
265
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 46
Legend
Ground
Bank Sta
Elevation (ft)
284
282
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)

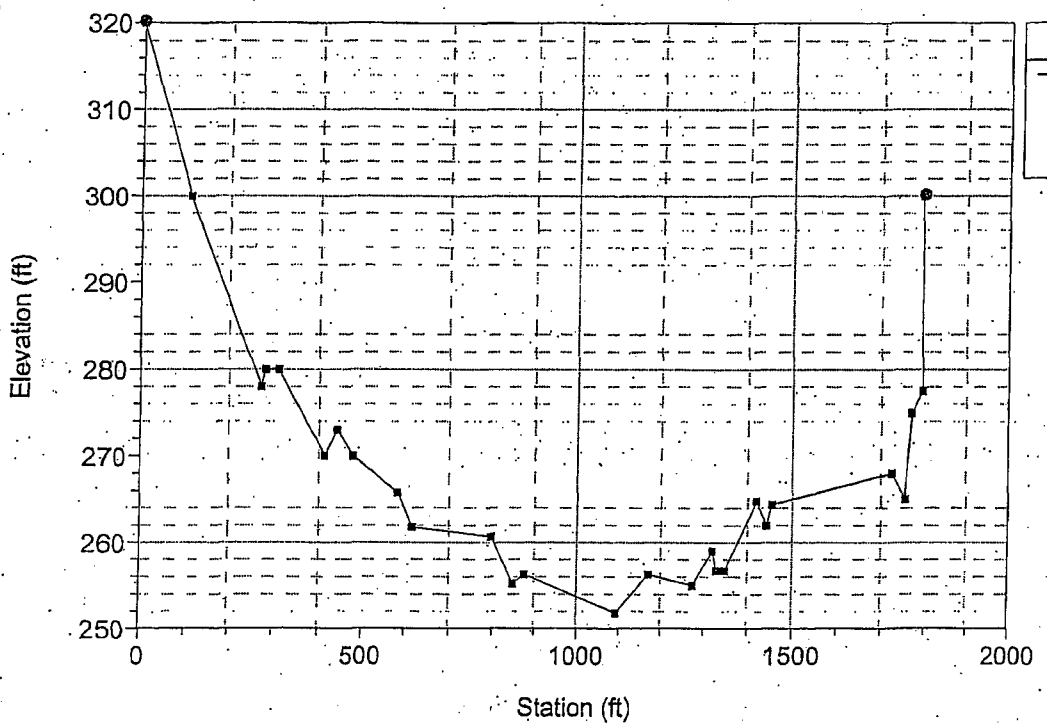

tmi
River = Susquehanna Reach = East RS = 45.1
Legend
Ground
Bank Sta
Elevation (ft)
300
295
290
285
280
275
270
265
0
200
400
600
800
1000
Station (ft)

Appendix 3

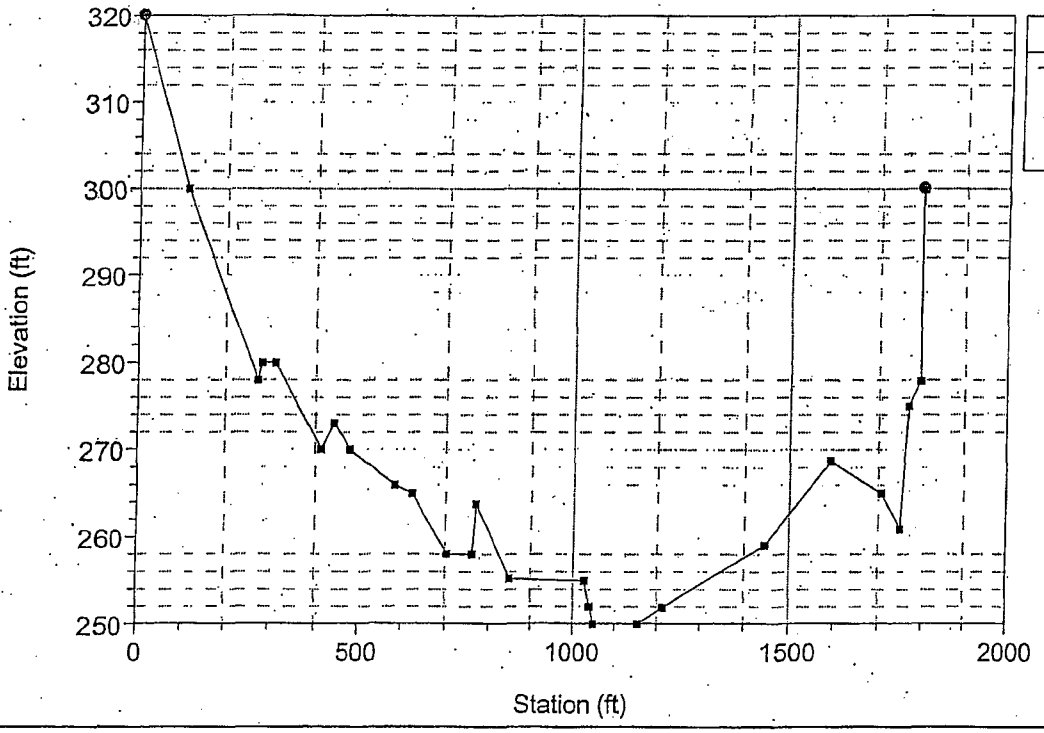
Cross Sections for Conewago Rapids

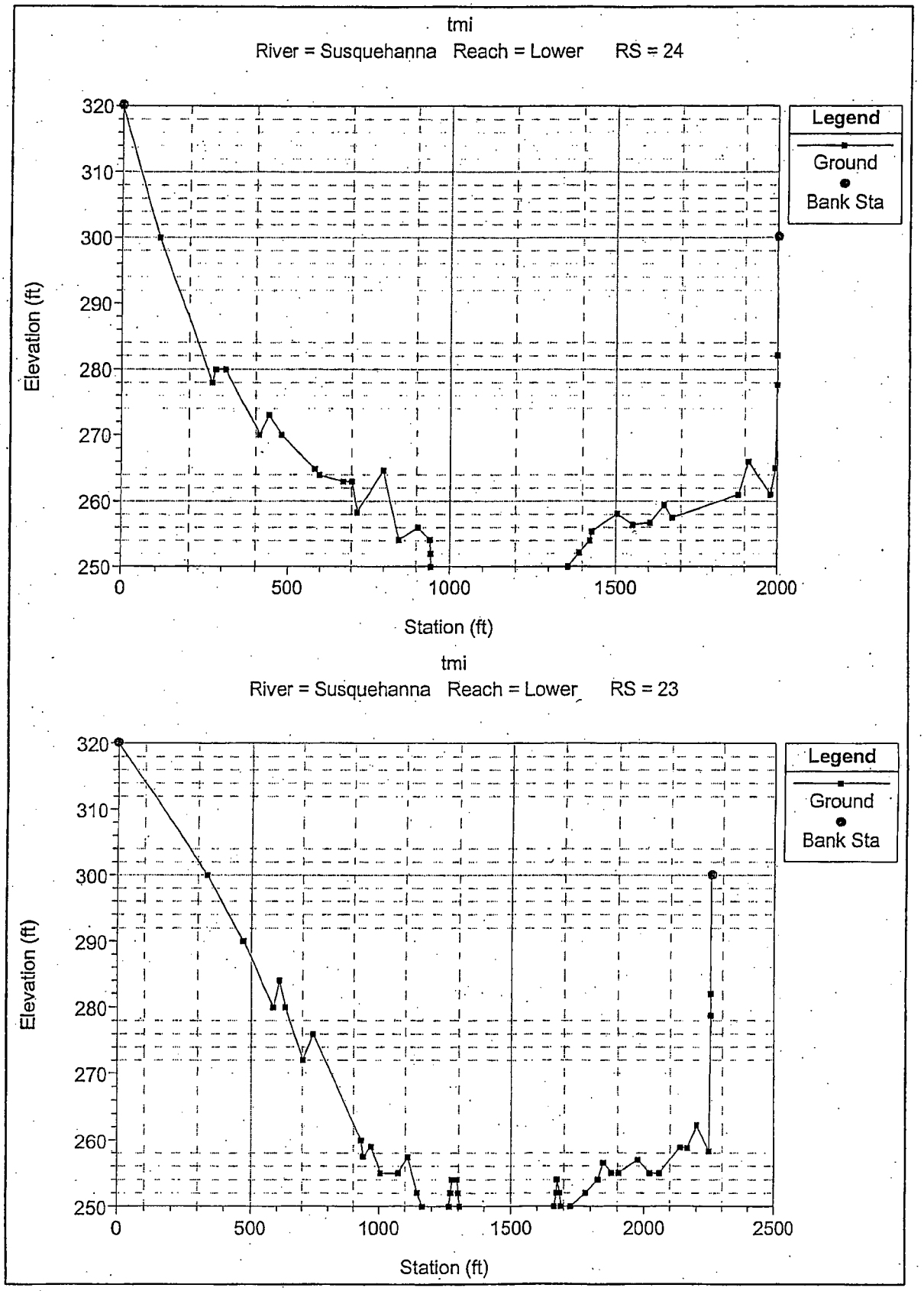

tmi
River = Susquehanna Reach = Lower RS = 29
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
320
310
300
290
280
270
260
0
500
1000
1500
2000
2500
3000
tmi
River = Susquehanna Reach = Lower RS = 24.3
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
320
310
300
290
280
270
260
250
0
500
1000
1500
2000
2500
3000

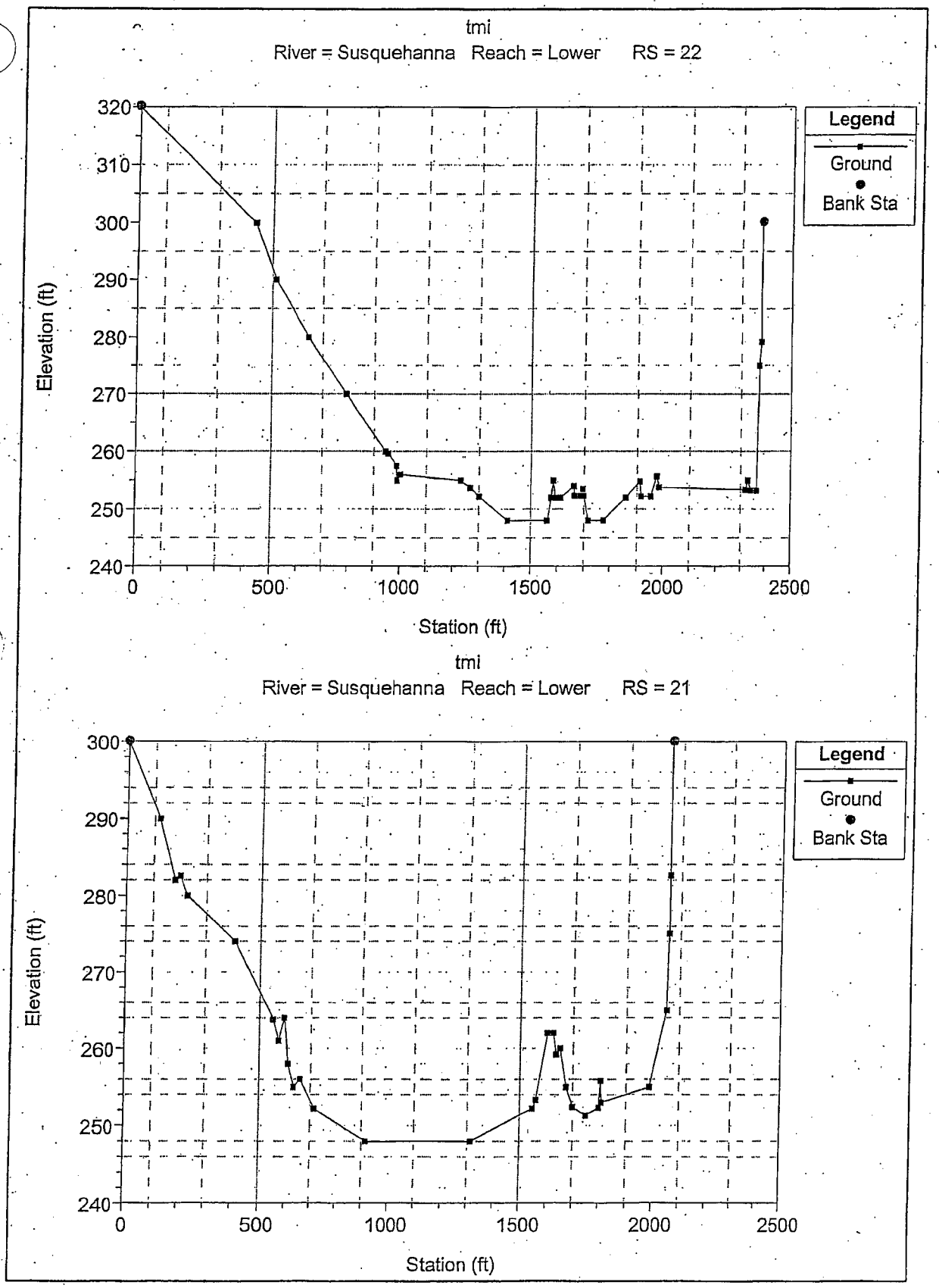
tmi
River = Susquehanna Reach = Lower RS = 24.2

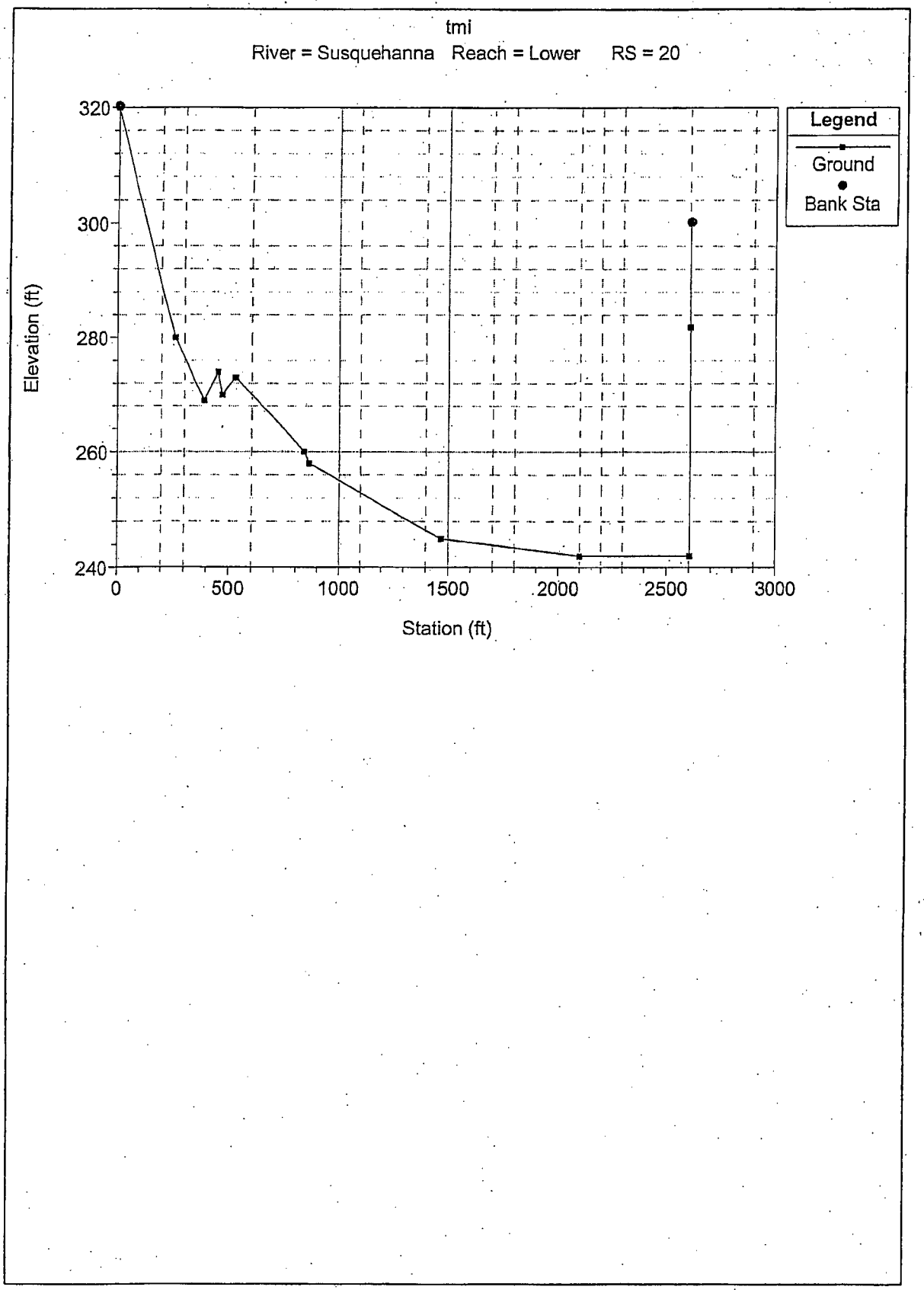


tmi
River = Susquehanna Reach = Lower RS = 24.1



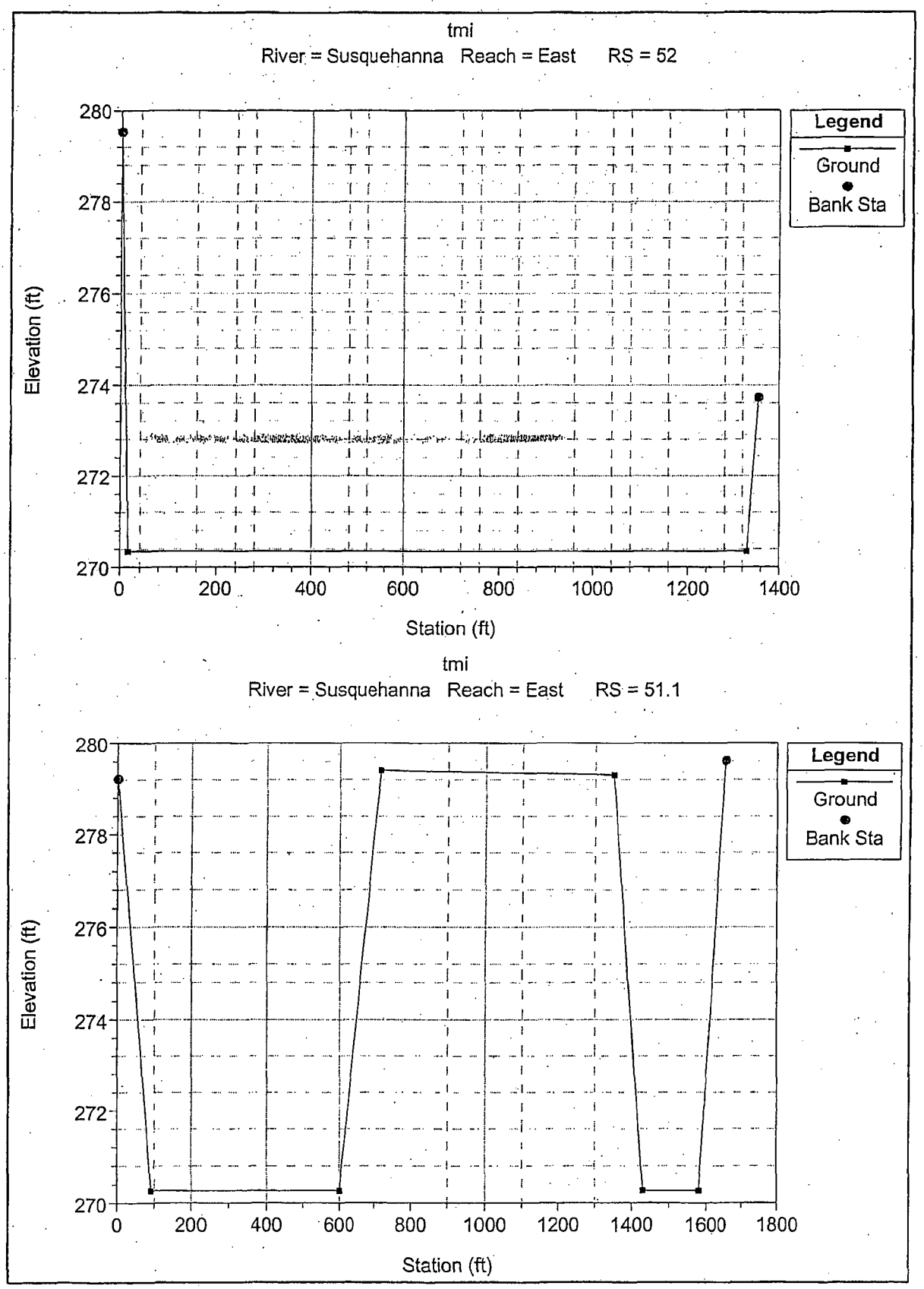

tmi
River = Susquehanna Reach = Lower RS = 24
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
320
310
300
290
280
270
260
250
0
500
1000
1500
2000
tmi
River = Susquehanna Reach = Lower RS = 23
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
320
310
300
290
280
270
260
250
0
500
1000
1500
2000
2500

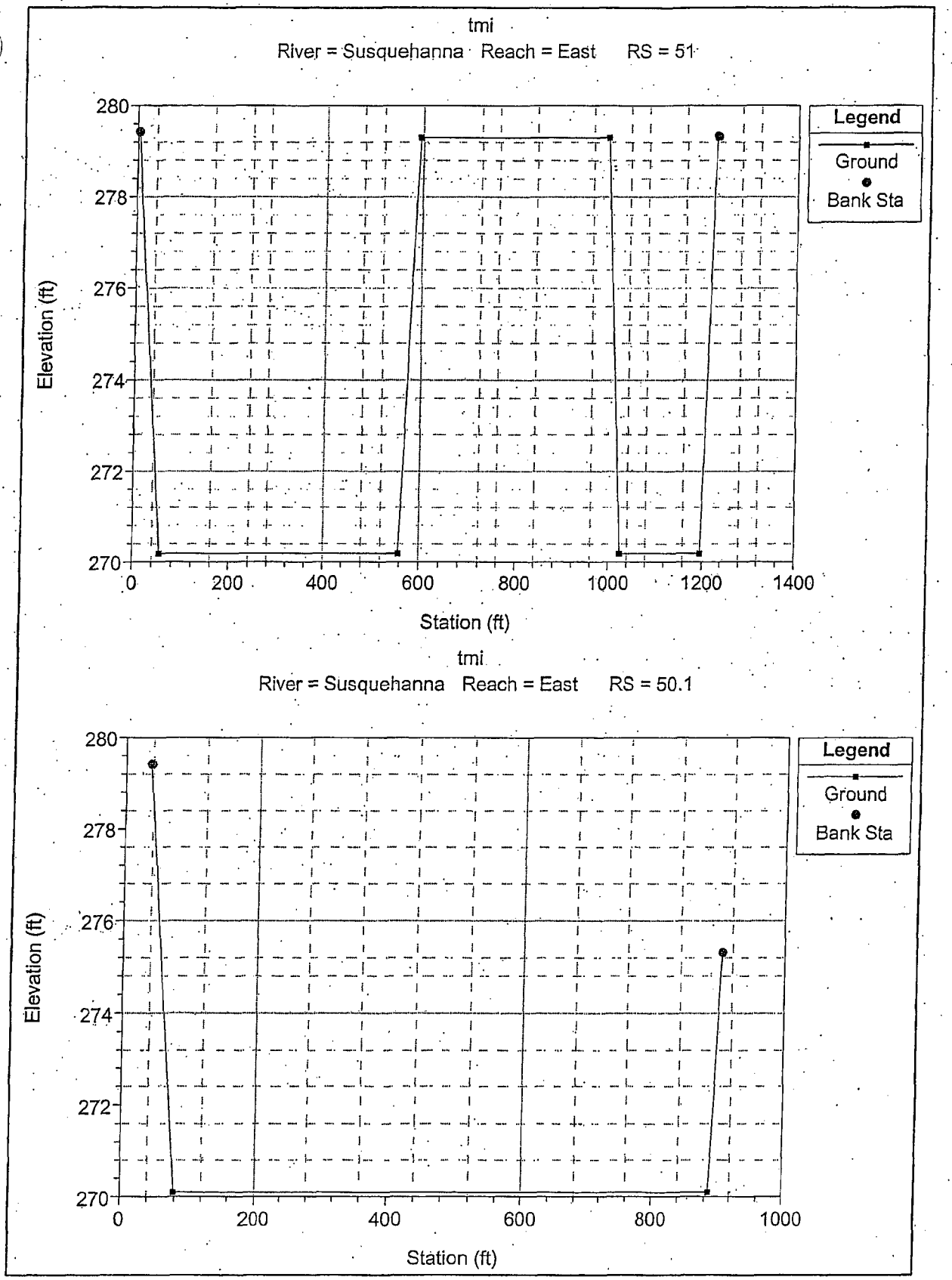

tmi
River = Susquehanna Reach = Lower RS = 22
Legend
Ground
Bank Sta
Elevation (ft)
320
310
300
290
280
270
260
250
240
0
500
1000
1500
2000
2500
Station (ft)
tmi
River = Susquehanna Reach = Lower RS = 21
Legend
Ground
Bank Sta
Elevation (ft)
300
290
280
270
260
250
240
0
500
1000
1500
2000
2500
Station (ft)

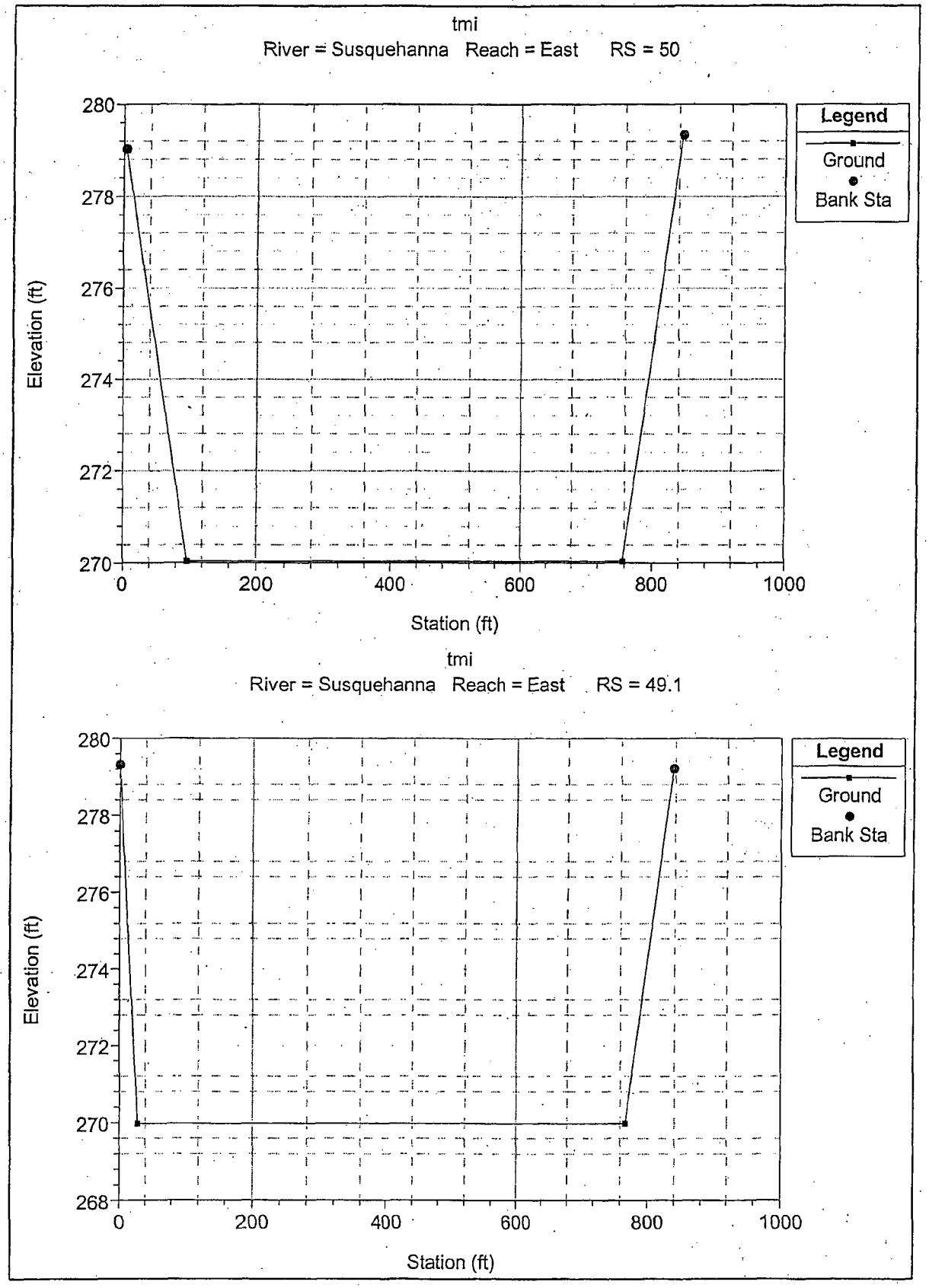

tmi
River = Susquehanna Reach = Lower RS = 20
Legend
Ground
Bank Sta
Elevation (ft)
320
300
280
260
240
0
500
1000
1500
2000
2500
3000
Station (ft)

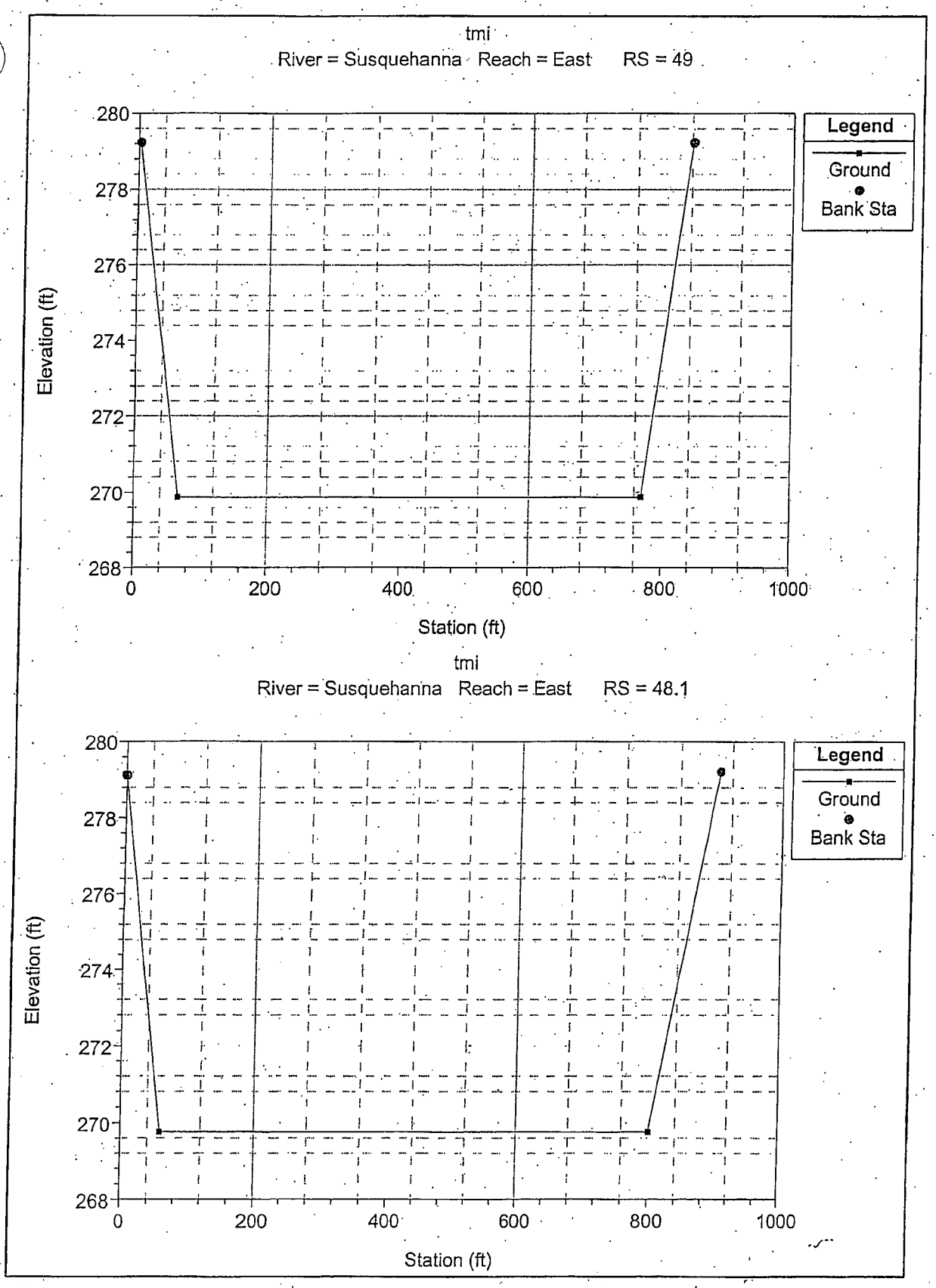
Appendix 4

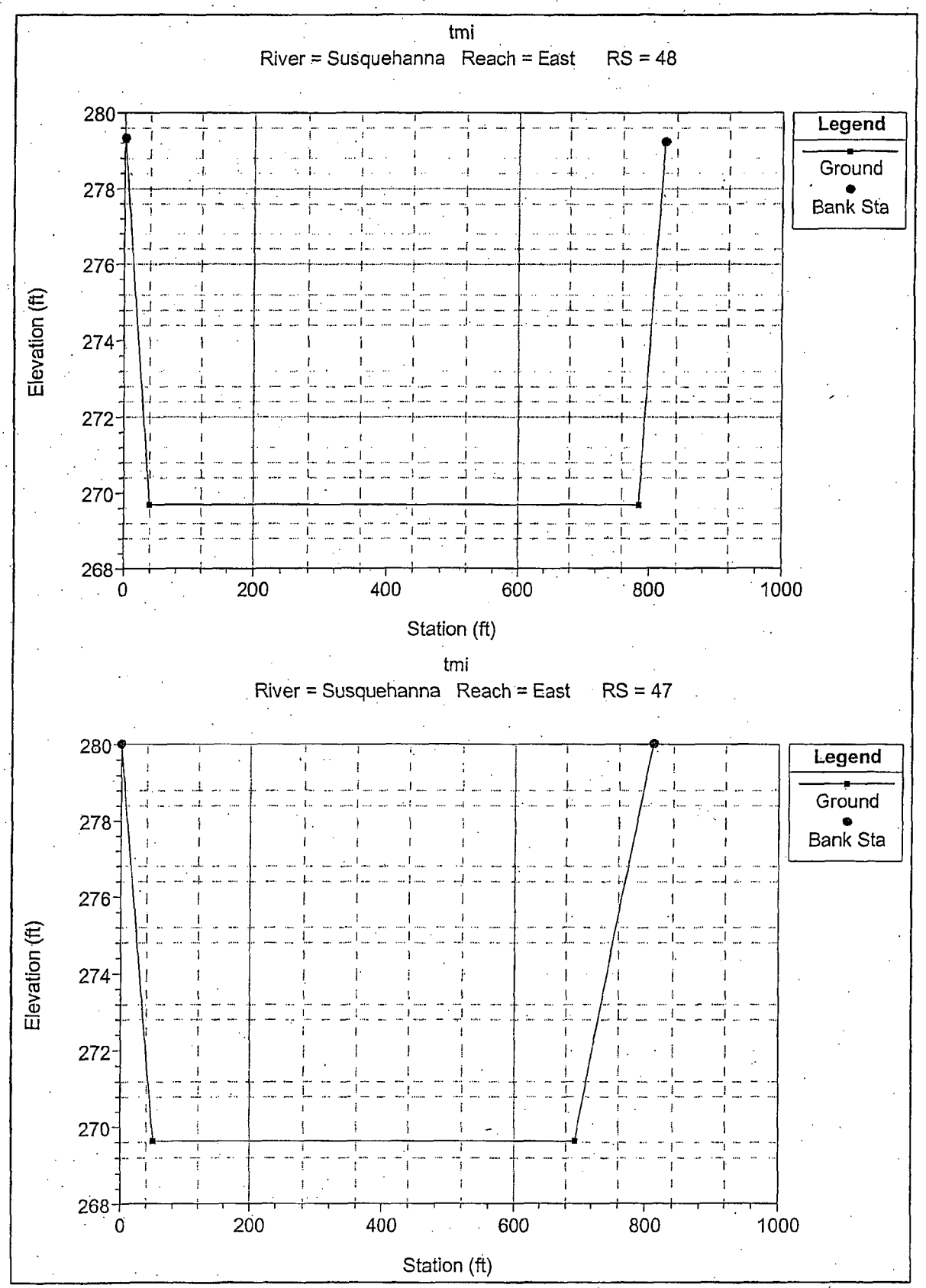
Cross Sections for Case 6M and 6Ma (Upper East Channel only)


tmi
River = Susquehanna Reach = East RS = 52
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
tmi
River = Susquehanna Reach = East RS = 51.1
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
1600
1800


tmi
River = Susquehanna Reach = East RS = 51
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
1200
1400
Station (ft)
tmi
River = Susquehanna Reach = East RS = 50.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
Station (ft)


tmi
River = Susquehanna Reach = East RS = 50
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 49.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)


tmi
River = Susquehanna Reach = East RS = 49
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)
tmi
River = Susquehanna Reach = East RS = 48.1
Legend
Ground
Bank Sta
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)


tmi
River = Susquehanna Reach = East RS = 48
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)
Legend
Ground
Bank Sta
tmi
River = Susquehanna Reach = East RS = 47
Elevation (ft)
280
278
276
274
272
270
268
0
200
400
600
800
1000
Station (ft)
Legend
Ground
Bank Sta

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 16-NOV-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

DEPOSITROL PY5204

PRODUCT APPLICATION AREA:

WATER-BASED DEPOSIT CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause slight irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause slight irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Protect from freezing.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.222	Vapor Pressure (mmHG)	- 18.0
Freeze Point (F)	55	Vapor Density (air=1)	< 1.00
Freeze Point (C)	13		
Viscosity(cps 70F,21C)	136	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		5.2
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable **ND = not determined**

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 1770; No Effect Level= 1250 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
0% Mortality= 2500; 45% Mortality= 5000 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay
LC50= 4000; No Effect Level= 2000 mg/L
Selenastrum (algae) 96 Hour Growth Inhibition
EC50= 524; No Effect Level= 300 mg/L
Sheepshead Minnow 96 Hour Static Renewal Bioassay
No Effect Level= 8000 mg/L

BIODEGRADATION

BOD-28 (mg/g): 14
BOD-5 (mg/g): 5
COD (mg/g): 400

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

SARA SECTION 312 HAZARD CLASS:

Product is non-hazardous under Section 311/312

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	10-SEP-1997	3,8,11,16;EDIT:4	29-JAN-1997
	03-MAY-2000	12	10-SEP-1997
	08-AUG-2000	2,4,8	03-MAY-2000
	01-MAY-2001	12	08-AUG-2000
	06-NOV-2001	12	01-MAY-2001
	16-NOV-2001	12	06-NOV-2001

Corporate_Logo

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 18-MAY-2001

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 1
FLAMMABILITY: 1
REACTIVITY: 0

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

DEPOSITROL PY5206

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR/DEPOSIT CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
1305-62-0	CALCIUM HYDROXIDE Corrosive (eyes and respiratory); severe irritant,possibly corrosive(skin)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Mild; Appearance: Pale Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Protect from freezing. Do not store at elevated temperatures.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

CALCIUM HYDROXIDE
PEL (OSHA): 5 MG/M3
TLV (ACGIH): 5 MG/M3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.
SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.
EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.270	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	27	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-3		
Viscosity(cps 70F,21C)	22	% Solubility (water)	100.0

Odor		Mild
Appearance		Pale Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		13.1
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable   ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: 3,050 mg/kg
28 Day Oral RAT: 1,000 mg/kg/day
NOTE - No clear indications of treatment related toxicity(dose adjusted to 100% active)
Dermal LD50 RABBIT: >1,000 mg/kg
NOTE - Estimated value
Skin Irritation Score RABBIT: 0.3
NOTE - DOT HM181: noncorrosive
Eye Irritation Score RABBIT: 3.3
NOTE - Maximum score at 48 hrs; completely reversible by day 4
Non-Ames Mutagenicity MOUSE: NEGATIVE
NOTE - In Vivo Bone Marrow Micronucleus Assay

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Acute Bioassay
LC50= 1635; No Effect Level= 870 mg/L
Fathead Minnow 96 Hour Static Acute Bioassay
LC50= 1680; No Effect Level= 1350 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay
LC50= 9900; 5% Mortality= 4000 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay (pH adjusted)

LC50= 837; No Effect Level= 648 mg/L
Sheepshead Minnow 96 Hour Static Renewal Bioassay
LC50= 28300; No Effect Level= 20000 mg/L

BIODEGRADATION
BOD-28 (mg/g): 9
BOD-5 (mg/g): 9
COD (mg/g): 130
TOC (mg/g): 70

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

5 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
SARA SECTION 312 HAZARD CLASS:
Immediate(acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds
CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds
MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard

Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	08-MAR-1999	12	29-JAN-1997
	03-MAY-2000	12	08-MAR-1999
	18-MAY-2001	2	03-MAY-2000

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 31-AUG-2001

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)

HEALTH:	3
FLAMMABILITY:	0
REACTIVITY:	1

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

FLOGARD MS6208

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7646-85-7	ZINC CHLORIDE Corrosive when wet; toxic (by ingestion)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause

irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Emergency Response Guide #154
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide or foam--Avoid water if possible.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause primary irritant dermatitis and/or tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

4 FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide or foam--Avoid water if possible.
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)
MISCELLANEOUS:
Corrosive to skin
UN1840;Emergency Response Guide #154

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Acidic. Corrosive(Skin/eyes). Do not mix with alkaline material.
STORAGE:
Keep containers closed when not in use. Protect from freezing. Do not store at elevated temperatures.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

ZINC CHLORIDE
PEL (OSHA): 1 MG/M3(2MG/M3-STEL)
TLV (ACGIH): 1 MG/M3(2MG/M3-STEL)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a

respirator with dust/mist filters.

SKIN PROTECTION:
gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.568	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	21	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		1.4
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: 350 mg/kg
NOTE - Value is for 100% active ingredient
Dermal LD50 RABBIT: >1,000 mg/kg
NOTE - Estimated value

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 7.4; No Effect Level= 1.24 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 6.2; No Effect Level= 1.56 mg/L

BIODEGRADATION
Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin
UN / NA NUMBER:	UN1840
DOT EMERGENCY RESPONSE GUIDE #:	154

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
153 gallons due to ZINC CHLORIDE;

USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:
This product contains ingredients previously approved by USDA to meet G1 classification, chlorine potable water treatment compounds.

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic);Reactive

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
7646-85-7	ZINC CHLORIDE	41.0-50.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

CAS#	CHEMICAL NAME
7646-85-7	ZINC CHLORIDE

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	1	Slight Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	03-APR-1997	1	28-JAN-1997
	20-APR-1998	15;EDIT:9	03-APR-1997
	04-JAN-1999	10	20-APR-1998
	09-FEB-2000	3,4,7,16;EDIT:5	04-JAN-1999
	22-MAR-2001	15	09-FEB-2000
	31-AUG-2001	15	22-MAR-2001

Corporate_Logo

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 24-AUG-1998

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SODIUM BROMIDE - CMD

PRODUCT APPLICATION AREA:

BIOCIDE.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7647-15-6	SODIUM BROMIDE Irritant

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

Non-hazardous to skin. May cause moderate irritation to the eyes.

Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Non-hazardous to skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
No treatment required.
EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.
INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.
INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Contaminated area may be washed down with water.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 HANDLING & STORAGE

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

CHEMICAL NAME	EXPOSURE LIMITS
SODIUM BROMIDE	
PEL (OSHA):	NOT DETERMINED
TLV (ACGIH):	NOT DETERMINED

ENGINEERING CONTROLS:

adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:

rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.403	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00

Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	12	% Solubility (water)	100.0

Odor	Slight
Appearance	Colorless
Physical State	Liquid
Flash Point P-M(CC)	> 200F > 93C
pH As Is (approx.)	7.5
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZ INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>5,000 mg/kg
Reproductive Toxicity RAT:	4,800 mg/kg/day
NOTE - 3-Generation: decreased fertility	
Dermal LD50 RABBIT:	>2,000 mg/kg
Skin Irritation Score RABBIT:	0
Eye Irritation Score RABBIT:	16

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION
No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

SARA SECTION 312 HAZARD CLASS:
Immediate(acute)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	A	Safety Glasses

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	24-AUG-1998		** NEW **

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 01-MAY-2001

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

FLOGARD MS6209

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7664-38-2	PHOSPHORIC ACID Corrosive
1314-13-2	ZINC OXIDE Nuisance particulate

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel
Emergency Response Guide #154

Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical/CO2/foam or water--slippery condition; use sand/grit.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

4 FIRST AID MEASURES

SKIN CONTACT:
Remove clothing. Wash area with large amounts of soap solution or water for 15 min. Immediately contact physician.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area. Apply necessary first aid treatment. Immediately contact a physician.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical/CO2/foam or water--slippery condition; use sand/grit.
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)
MISCELLANEOUS:
Corrosive to skin/steel
UN1805;Emergency Response Guide #154

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Acidic. Corrosive(Skin/eyes). Do not mix with alkaline material.
STORAGE:
Keep containers closed when not in use. Preferably stored between 40-100F (4.4-37.8C).

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS
CHEMICAL NAME

PHOSPHORIC ACID
PEL (OSHA): 1 MG/M3
TLV (ACGIH): 1 MG/M3

ZINC OXIDE
PEL (OSHA): 10 MG/M3(AS DUST)
TLV (ACGIH): 10 MG/M3(AS DUST)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.
SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.719	Vapor Pressure (mmHG)	~ 15.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	70	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		< 1.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,500 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	
Inhalation LC50 RAT:	>20 mg/L/hr
NOTE - Estimated value	
Skin Irritation Score RABBIT:	CORROSIVE
NOTE - EPA Category I	
Eye Irritation Score RABBIT:	CORROSIVE
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= 1.5; No Effect Level= .63 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 12; No Effect Level= 1.5 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 14; No Effect Level= 2.5 mg/L

Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 4.9; No Effect Level= 1.6 mg/L

BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH, steel).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin/steel
UN / NA NUMBER:	UN1805
DOT EMERGENCY RESPONSE GUIDE #:	154

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

647 gallons due to PHOSPHORIC ACID;

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
1314-13-2	ZINC OXIDE	11.0-15.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

CAS#	CHEMICAL NAME
1314-13-2	ZINC OXIDE

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	05-JAN-1999	10	29-JAN-1997
	25-JUN-1999	11	05-JAN-1999
	23-AUG-1999	12	25-JUN-1999
	13-JUL-2000	15	23-AUG-1999
	03-JAN-2001	15	13-JUL-2000
	01-MAY-2001	12	03-JAN-2001

Univar USA Inc.
6100 Carillon Point
Kirkland, WA 98033
(425) 889-3400

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

The Version Date for this MSDS is : 10/19/2004

PRODUCT NAME:	LIQUICHLOR / SODIUM HYPOCHLORITE 9-16%
MSDS NUMBER:	OX622680
EFFECTIVE DATE:	2/16/2004
SUPERSEDES:	1/15/2003
ISSUED BY:	007427

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sodium Hypochlorite Solution (9 - 16%)
CAS#: 7681-52-9
Synonyms: Sodium Hypochlorite Solution - Trade & (9 - 19), Bleach, Javel Water, Clorox, Sunny Sol 150, Liquid Chlorine Solution, Liquid Bleach, Hypochlorite Bleach, Hypo
Product Use: Bleach, disinfectant
Emergency Contacts (24 hr.)
A FOR INFORMATION REGARDING ON SITE CHEMICAL EMERGENCIES INVOLVING A SPILL OR LEAK, CALL
U.S.: 1-800-424-9300 - CHEMTREC
Canada: 1-613-996-6666 - CANUTEC

Distributed by:
Univar USA Inc.
6100 Carillon Point
Kirkland, WA 98033
425-889-3400

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient(s)	% (w/w)	ACGIH	OSHA	CAS NO.
Sodium Hypochlorite	9 - 16	Not established 0.5 ppm (as chlorine)	Not established	7681-52-9
Sodium Hydroxide	0.3 - 4	2 mg/m3 (ceiling)	2 mg/m3	1310-73-2
Non Hazardous Ingredient				
Water	80-90.7	Not established		7732-18-5

SECTION 3 HAZARD IDENTIFICATION
Emergency Overview: CORROSIVE! Contact with acid liberates toxic chlorine gas. Causes burns to skin, eyes, respiratory tract and mucous membranes. Harmful or fatal if swallowed. May cause sensitization by skin contact. Toxic to aquatic organisms. Read the entire MSDS for a more thorough evaluation of the hazards.
Potential Health Effects:
Inhalation: Mist can irritate the nose and throat. If mixed with acids, hypochlorite solutions release large amounts of chlorine gas. This gas can cause severe irritation of the nose and throat. Exposure to high levels of chlorine gas may result in severe lung damage.
Skin Contact: Sodium hypochlorite mist and solutions can cause skin irritation. In severe cases, chemical burns may result.
Eye Contact: Can cause severe eye irritation and permanent eye injury.
Ingestion: May cause irritation, pain and inflammation of the mouth and stomach, vomiting, shock, confusion, delirium, coma and, in severe cases, death. Perforation of the esophagus or stomach may occur.

Subchronic Effects: SKIN: Prolonged or repeated skin contact with solutions containing as little as 4-6% sodium hypochlorite can cause allergic contact dermatitis. Symptoms include chronic, itchy eczema. Sensitized people can react to very dilute (0.04-0.06% NaOCl) solutions that touch their skin.
Existing Medical Conditions Possibly Aggravated by Exposure: Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapors or mists may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.
Carcinogenicity: Sodium hypochlorite is not classified as a carcinogen by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as a carcinogen by OSHA (Occupational Safety and Health Administration), and not listed as a carcinogen by NTP (National Toxicology Program).

SECTION 4 FIRST AID MEASURES
General: If you feel unwell seek medical advice (show the label where possible).
Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance: induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give Cardiopulmonary Resuscitation (CPR) only if there is no pulse AND no breathing. Obtain medical attention IMMEDIATELY.
Skin Contact: Immediately flush skin with running water for at least 15 - 20 minutes. Under running water remove contaminated clothing, jewelry, and shoes. If irritation persists, repeat flushing. For burns, obtain medical attention. Discard heavily contaminated clothing and shoes in a manner, which limits further exposure. Otherwise, wash clothing separately before reuse.
Eye Contact: Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.
Ingestion: DO NOT INDUCE VOMITING. If victim is alert and not convulsing, rinse mouth and give as much water as possible to dilute material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians: Symptomatic. Treatment and supportive therapy as indicated. Do NOT give acidic antidotes such as juice, soft drink, vinegar, etc. This product contains materials that may cause severe pneumonitis if

aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Following exposure the patient should be kept under medical review for at least 48 hours as delayed pneumonitis may occur. Pulmonary edema is likely and may be delayed. Steroid therapy, if given early, may be effective in preventing or alleviating edema.

SECTION 5 FIRE FIGHTING MEASURES
Flash Point Not applicable. Not combustible
Flammable Limits (Lower) Not applicable
Flammable Limits (Upper) Not applicable
Auto Ignition Temperature Not applicable
Combustion and Thermal Decomposition Products Chlorine, sodium oxide, oxygen
Rate of Burning Not applicable
Explosive Power Not applicable
Sensitivity to Mechanical Impact Not applicable

Fire and Explosion Hazards: Sodium hypochlorite is a strong chemical oxidant, but solutions do not support combustion. Reaction with nitrogen compounds, chloroorganic compounds, or easily oxidizable compounds (reducing agents) may be explosive. This material is non-flammable but is decomposed by heat and light, causing a pressure build-up, which could result in an explosion. When heated, it may release chlorine gas. Vigorous reaction with oxidizable or organic materials may result in fire. See Section 10.
Extinguishing Media: For large fires use an all purpose type AFFF alcohol foam resistant medium expansion according to foam manufacturer's recommended techniques. The foam supplier should be consulted for recommendations regarding foam types and delivery rates for specific applications. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog.
Special Information: Water may be used to cool containers of Hypochlorite solution exposed to heat from a fire. This should be done from a safe distance since containers may rupture.
Move containers from fire area if you can do it without risk. Dike fire control water for later disposal; do not scatter the material.
Fire involving tanks or trailer loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from the ends of tanks.
Evacuation: If tank or tank truck involved in a fire, ISOLATE and consider evacuation of one-half (1/2) mile radius.
Fire Fighting Protective Equipment: Firefighters should wear protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode in a fire involving this material. Toxic gas and vapors are produced upon decomposition.
NOTE: Also see "Section 10 - Stability and Reactivity"

SECTION 6 - ACCIDENTAL RELEASE MEASURES
Spills, Leaks, or Releases:
Restrict access to area until completion of clean up. Ensure trained personnel conduct clean up.
Remove all ignition sources (no smoking, flares, sparks or flames). All equipment should be grounded and non-sparking. Ventilate area.
Wear adequate personal protective equipment. Do not touch spilled material.
Stop leak if possible without personal risk.

Small spills: Cover with DRY earth, sand or other non-combustible material. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal. Rinse area with water.

Large spills: Prevent entry into sewers and confined areas. Dike with inert material (sand, earth, etc.). Contact fire and emergency services and supplier for advice. Collect product for recovery or disposal by pumping it into polyethylene containers. Consider in-situ neutralization and disposal. Ensure adequate decontamination of tools and equipment following clean up. Collect contaminated soil and water, and absorbent for proper disposal. Comply with Federal, Provincial/State and local regulations on reporting releases.
Deactivation for Small Spills: Hypochlorite can be broken down by covering it with a reducing agent such as sodium sulfite or sodium thiosulfate.
Deactivating Chemicals: Use sodium sulfite or diluted hydrogen peroxide to reduce the material. Ensure there is no chlorine residue before neutralizing with a weak solution of hydrochloric or sulfuric acid.
Waste Disposal Methods: Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.
Note: - Clean-up material may be a RCRA Hazardous Waste on disposal.
- Spills are subject to CERCLA reporting requirements: RQ = 100 lbs.

SECTION 7 - HANDLING AND STORAGE
Precautions: Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Wear appropriate Personal Protection Equipment. People working with this chemical should be properly trained regarding its hazards and its safe use.
Handling Procedures and Equipment: Avoid generating mist. Use smallest possible amounts in designated areas with adequate ventilation. Keep containers closed when not in use. Empty containers may contain hazardous residues. Use corrosion-resistant transfer equipment when dispensing.
Storage Requirements: Store in a cool, dry, well-ventilated area, out of direct sunlight. Store containers at 15 - 29 deg C (59 - 84 deg F). Do not store above 30 deg C (86 deg F) or below freezing point. Keep containers tightly closed when not in use and when empty. Protect from damage. Vent caps should be checked with full personal protection. Store away from incompatible materials such as reducing materials, strong acids, nitrogen compounds, copper, nickel and cobalt. Use corrosion-resistant structural materials and lighting and ventilation systems in the storage area. This product has a shelf life of up to six months at 60 deg F or lower.
Outdoor storage tanks should be suitably diked or otherwise provided with an adequate means of secondary containment. Appropriate secondary containment measures should be taken to prevent spills or leaks from indoor storage tanks and tank-truck unloading stations from entering sewers or other channels that discharge directly to a water body or a municipal sewage system.

SECTION 8 - EXPOSURE CONTROLS t PERSONAL PROTECTION PREVENTIVE MEASURES
Recommendations listed in this section indicate the type of equipment, which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

Engineering Controls: Local exhaust ventilation should be applied wherever there is an incidence of point source emissions or dispersion of regulated contaminants in the work area. Ventilation control of the contaminant as close to its point of generation is both the most economical and safest method to minimize personnel exposure to airborne contaminants. The most effective measures are the total enclosure of processes and the

mechanization of handling procedures to prevent all personal contact. Smoking should be prohibited in areas in which sodium hypochlorite solution is stored or handled.

PERSONAL PROTECTIVE EQUIPMENT
Eye Protection: Wear splash resistant chemical goggles and full-face shield. Maintain eye wash fountain and quick-drench facilities in work area.
Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron, rain jacket, pants or coveralls, as appropriate, to prevent skin contact.
RECOMMENDED (resistance to breakthrough longer than 8 hours): butyl rubber, natural rubber, neoprene, nitrile rubber, polyethylene, Viton, SaranexTM, ResponderTM
Recommendations are valid for permeation rates reaching 0.1 ug/cm2/min or 1 mg/m2/min and over. Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.
Respiratory Protection: A NIOSH/MSHA approved air-purifying respirator equipped with acid mist cartridges for concentrations up to 10 times the TLV. Use a supplied air respirator if concentrations are higher or unknown.

EXPOSURE GUIDELINES PRODUCT:
Sodium Hypochlorite
Workplace environmental exposure level guides (WEELS) / American Industrial Hygiene Association (AIHA) / 2001 short-term time weighted average :
2 mg/m3: 15 minute

	Sodium Hypochlorite	Chlorine*	Sodium Hydroxide
ACGIH TWA	Not established	0.5 ppm	Not established
OSHA PEL	Not established	0.5 ppm	2 mg/m3
NIOSH IDLH	Not established	10 ppm	Not established
ACGIH STEL	Not established	1 ppm	Not established
OSHA STEL	Not established	1 ppm as Cl2	Not established
NIOSH (15 min. ceiling)	Not established	0.5 ppm	Not established
ACGIH Ceiling	Not established	Not established	2 mg/m3

* Chlorine may be present as a decomposition product.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES
Chemical Name Sodium hypochlorite
Chemical Family Hypochlorous acid salt
Molecular Formula Na-O-Cl
Molecular Weight 74.4
Appearance Green to yellow, watery liquid
Odor Pungent chlorine-like odor
PH 11-13
Vapor Pressure (mm Hg at 21 deg C(69.8 deg F) 12 mmHg
Vapor Density (Air = 1) No data
Boiling Point Decomposes above 40 deg C (104 deg F)
Freezing Point 7.5 deg F (-13.6 deg C)
Solubility (Water) Completely
Specific Gravity About 1.198 (12.5% w/w solution) @ 20 deg C (68 deg F)
Evaporation Rate Not available
% Volatile by Volume Not available

SECTION 10 - STABILITY AND REACTIVITY
Chemical Stability: Stable at room temperature.
Hazardous Decomposition Products: Thermal decomposition: Chlorine, sodium oxide, oxygen, oxides of chlorine, sodium chlorate, and hydrogen.

Conditions to Avoid: Keep away from high heat, and sunlight or ultra-violet light. Do not store above 30 deg C (86 deg F). Do not allow solutions to evaporate dry. Keep away from incompatibles.
Incompatibility with other Substances: May react violently with strong acids producing chlorine gas, which is toxic. Other incompatibles include organic material, cellulose, oxidizable materials, ammonia, urea, ammonium salts, ethyleneimine, cyanides, nitrogen compounds, alcohols, metals, and metal oxides. Reacts with metals to produce flammable hydrogen gas. Metal and metal oxide catalysts decompose hypochlorites, evolving oxygen and often causing explosions. May react explosively with nitrogen containing compounds or form chloroamines, which are explosive. Alkaline hypochlorite solutions may react explosively with some chloroorganic compounds.
Corrosivity to Metals: Solutions can be corrosive to many metals.
Hazardous Polymerization: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION
TOXICOLOGICAL DATA
Sodium Hypochlorite:
Toxicity Data: TDLo (Lowest published toxic dose) oral-woman- 1 gm/kg
45 mg/kg intravenous-man TDLo
LD50 oral rat- 8910 mg/kg
LD50 oral mouse- 5800 mg/kg
LC50 rat- >10500 mg/m3 (1 hr)

Irritation Data: Eyes: One drop of 15% solution (pH 11.2) caused immediate severe pain. If not quickly washed off with water, it caused bleeding and swelling of the tender tissue surrounding the eye (conjunctiva) and damage with swelling to the front part of the eye (cornea). The eyes sometimes healed in two to three weeks with slight or no scar damage to the cornea.
Skin: A solution of 3.5% NaOCl applied to rabbit skin for 15 or 30 minutes caused severe skin damage.

Sodium Hydroxide:
Irritation data: 500 mg/24 hour(s) skin-rabbit severe; 400 pg eyes-rabbit mild; 1 percent eyes-rabbit severe;
Toxicity data: 1350 mg/kg skin-rabbit LD50; 104-340 mg/kg oral-rat LD50
Mutagenicity: Sodium hypochlorite caused mutations in several short-term studies using bacteria and cultured mammalian cells. The significance of these tests is unclear. It was not mutagenic in tests (chromosome aberration and micronucleus) on live animals.
Reproductive Effects: High doses of NaOCl in drinking water caused a small but significant increase in abnormal sperm in mice.
Teratogenicity and Fetotoxicity: No data available
Carcinogenicity: See Section 3, page 2.
Synergistic Materials: None known

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicological Information: Harmful to aquatic life in low concentrations.
Fish Toxicity: LC50 (48 hr) rainbow trout 0.07 mg/l.
LC50 (96 hr) fathead minnow 5.9 mg/l.
Invertebrate and Microbial Toxicity: LOEC Oncorhynchus kisutch 0.02 mg/l.
Persistence and Degradation: No data available.

SECTION 13- DISPOSAL CONSIDERATIONS
Review federal, state and local government requirements prior to disposal. Do not dispose of waste with normal garbage, or to sewer systems. Whatever cannot be saved for recovery or recycling, including containers should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste

management options.
RCRA: Test waste material for corrosivity, D002, prior to disposal.

SECTION 14 TRANSPORT INFORMATION

	TDG CLR *	DOT
Shipping Name	Hypochlorite Solution - with more than 7 percent available chlorine	Hypochlorite Solution
Hazard Class / Division	8: Corrosive	8: Corrosive
Identification No.	UN1791	UN1791
	II	III
ERAP/RQ	N/AP	N/AP

Note: * TDG CLR (Clear Language Regulations) became effective August 15, 2002
IATA/ICAO Shipping Description: Hypochlorite solution, Class 8, UN1791, PG II or III is accepted for air transport.

SECTION 15 - REGULATORY INFORMATION
USA CLASSIFICATION
OSHA Classification: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
SARA Regulations sections 313 and 40 CFR 372: N

SARA Hazard Categories, SARA SECTIONS 311/312 (40CFR370.21):
ACUTE: Y
CHRONIC: N
FIRE: N
REACTIVE: N
SUDDEN RELEASE: N
OSHA PROCESS SAFETY (29CFR1910.119): N

CERCLA SECTION 103 (40CFR302.4): Y

Reportable Quantity (RQ) under CERCLA: 100 lbs. (45.4 kg)

TSCA Inventory Status: Y

Other Regulations/Legislation which apply to this product:
Right-to-Know/Disclosure Lists: Illinois, Massachusetts, New Jersey, Pennsylvania,

This product does not contain nor is it manufactured with ozone depleting substances.

CANADIAN CLASSIFICATION
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.
Controlled Products Regulations (WHMIS) Classification:
D2B: Material causing other toxic effects -Toxic
E: Corrosive

CEPA / Canadian Domestic Substances List (DSL): Y
WHMIS Ingredient Disclosure List: Meets criteria for disclosure at 1% or greater.

EINECS Number: 231-668-3

SECTION 16 - OTHER INFORMATION

National Fire Protection Association (NFPA) Rating
Hazardous Materials Identification System (HMIS) Rating

	NFPA	HMIS
HEALTH	3	3
FIRE	0	0
REACTIVITY	1	1

4 = Extreme/Severe
3 = High/Serious 2 = Moderate
1 = Slight
0 = Minimum
W = Water Reactive

LEGEND
ACGIH - American Conference of Governmental Industrial Hygienists
CAS # - Chemical Abstracts Service Registry Number
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
DOT - Department of Transportation
EPA - Environmental Protection Agency
IDLH - Immediately Dangerous to Life and Health
LC50 - The concentration of material in air expected to kill 50% of a group of test animals
LD50 - Lethal Dose expected to kill 50% of a group of test animals
MSHA - Mine Safety and Health Administration
NIOSH - National Institute for Occupational Safety and Health
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
PVC - Polyvinyl chloride
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reauthorization Act of the U.S. EPA
STEL - Short Term Exposure Limit
TDG - Transportation of Dangerous Goods Act/Regulations
TLV - Threshold Limit Value
TSCA - Toxic Substances Control Act

For Additional Information:
Contact: MSDS Coordinator - Univar USA
During business hours, Pacific Time - (425) 889-3400

NOTICE
Univar USA expressly disclaims all express or implied warranties of merchantibility and fitness for a particular purpose with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar USA Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar USA makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar USA's control. Therefore, users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes, and they assume all risks of their use, handling, and disposal of the product or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product

designated herein and does not relate to its use in combination with any other material or in any other process.

END OF MSDS

Arch Chemicals, Inc.

MATERIAL SAFETY DATA

FOR ANY EMERGENCY, CALL 24HOURS/ 7 DAYS:	**1-800-654-6911**
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC(R):	1-800-424-9300
FOR ALL MSDS QUESTIONS & REQUESTS, CALL:	1-800-511-MSDS

PRODUCT NAME: **SCAV-OX ® 35% HYDRAZINE SOLUTION**

1. PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE:	01-16-2005
SUPERCEDES:	01-09-2005
MSDS NO:	00129-0016 - 105242
SYNONYMS:	Hydrazine hydrate
CHEMICAL FAMILY:	Hydrazine
DESCRIPTION / USE:	Corrosion inhibitor for boilers
FORMULA:	N_2H_4

Arch Chemicals, Inc. 501 Merritt 7 P.O. Box 5204 Norwalk, CT 06856-5204

2. COMPOSITION / INFORMATION ON INGREDIENTS

CAS or CHEMICAL NAME	CAS #	% Range
Hydrazine	302-01-2	30 - 40

3. HAZARDS IDENTIFICATION

OSHA Hazard Classification: possible carcinogen, eye, skin and respiratory irritant, toxic by ingestion, dermal contact, and inhalation, eye and skin hazard, skin sensitizer, lung, liver, kidney, blood and nervous system toxin

Routes of Entry:	Inhalation, skin, eyes, ingestion
Chemical Interactions:	No known interactions
Medical Conditions Aggravated:	Liver, kidney, blood, respiratory and central nervous system disorders

Human Threshold Response Data

Odor Threshold:	
Hydrazine	3.7 ppm
Irritation Threshold:	Not established

Hazardous Materials Identification System/National Fire Protection Association Classifications

Hazard Ratings:	Health	Flammability	Reactivity
HMIS	2*	0	0
NFPA	Not established		

Immediate (Acute) Health Effects

Inhalation Toxicity:	Toxic by inhalation. This product is rapidly absorbed through the lungs. Immediate and prolonged contact may result in the following: damage to the liver, kidneys and blood with symptoms of vomiting, diarrhea, nausea, dizziness, methemoglobinemia leading to cyanosis (blue coloration to the skin).
Inhalation Irritation:	High concentrations are moderately irritating to the eyes, nose, throat, and lungs.
Skin Contact:	Skin contact may cause moderate irritation consisting of transient redness and swelling. This irritant effect would not be expected to result in permanent damage. Dermal contact may cause defatting of skin and/or dermatitis. This product is rapidly absorbed through the skin, and may result in the following: damage to the liver, kidneys and blood with symptoms of vomiting, diarrhea, nausea, dizziness, methemoglobinemia leading to cyanosis (blue coloration to the skin).
Skin Absorption:	Toxic if absorbed through the skin. This product is rapidly absorbed through the skin, and may result in the following: damage to the liver, kidneys and blood with symptoms of vomiting, diarrhea, nausea, dizziness, methemoglobinemia leading to cyanosis (blue coloration to the skin).
Eye Contact	Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva.
Ingestion Irritation:	Ingestion may cause severe irritation of the gastrointestinal tract and may also cause gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy or diarrhea.
Ingestion Toxicity:	Toxic if swallowed. This product is rapidly absorbed through the lungs. Immediate and prolonged contact may result in the following: damage to the liver, kidneys and blood with symptoms of vomiting, diarrhea, nausea, dizziness, methemoglobinemia leading to cyanosis (blue coloration to the skin).

Acute Target Organ Toxicity: Lungs, Liver, Kidneys, Blood, Central nervous system

Prolonged (Chronic) Health Effects

Carcinogenicity:	This chemical is considered to be a suspect human carcinogen based on animal data.
Reproductive and Developmental Toxicity:	Industrial exposures kept at or below the occupational exposure standard are not expected to pose a reproductive or developmental toxicity hazard. High dose levels of this chemical produced maternal toxicity, and embryolethality and fetal malformations.

Sensitization:	May cause allergic skin sensitization in some individuals.
Inhalation:	Prolonged or repeated exposure may cause continuous bronchitis.
Skin Contact:	Prolonged or repeated exposure may cause more severe irritation. Dermal contact may cause defatting of skin and/or dermatitis.

Skin Absorption:	Prolonged or repeated exposure, may result in toxic amounts being absorbed through the skin.
Ingestion:	Chronic ingestion of this product may cause severe irritation and possible corrosive effects.

Chronic Target Organ Toxicity:	Liver, Lungs, Kidneys, Blood, Central nervous system
Supplemental Health Hazard Information:	No additional health information available.

4. FIRST AID MEASURES

Inhalation:	IF INHALED: Remove individual to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Skin Contact:	IF ON SKIN: Immediately flush skin with plenty of water for 15 minutes. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use. Call a physician.
Eyes:	IF IN EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Seek medical attention immediately.
Ingestion:	IF SWALLOWED: Call a physician immediately. DO NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA):	Product is not known to be flammable, combustible, pyrophoric or explosive.

Flammable Properties

Flash Point:	Material is water-based and will not flash.
Autoignition Temperature:	Not applicable
Upper Flammable/Explosive Limit, % in air:	Not applicable
Lower Flammable/Explosive Limit, % in air:	Not applicable
Fire/Explosion Hazards:	Material will not ignite or burn.
Extinguishing Media:	Water is the preferred extinguishing media as it will dilute the material resulting in a non-flammable mixture. Use alcohol resistant foam, carbon dioxide, dry chemical, or vaporizing liquid extinguishing agents. Water spray or fog may also be effective for extinguishing or to absorb heat and keep exposed material from being damaged by fire.
Fire Fighting Instructions:	Use water to cool containers exposed to fire. See Section 6 for protective equipment for fire fighting.
Hazardous Combustion Products:	Ammonia, Hydrogen

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations:	Response to this material requires the use of a full encapsulated suit and full-face (NIOSH approved) self-contained breathing apparatus (SCBA). Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, impervious gloves, hard hat, splash-proof goggles, impervious clothing, i.e., chemically impermeable suit, self-contained breathing apparatus.

Spill Mitigation Procedures

Air Release:	Vapors may be suppressed by the use of water fog. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste.

Water Release:	This material is heavier than water. This material is soluble in water. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so.
Land Release:	Dike spill area as soon as possible. Dilute the spilled material to about 10% with water. Neutralize the diluted material by slowly adding a 5-8% calcium hypochlorite solution until all the diluted material has been reacted. DO NOT ADD DRY CALCIUM HYPOCHLORITE TO THE SPILL AS A VIOLENT REACTION MAY RESULT. If unable to remove as a liquid, absorb in clay, sand or a commercial absorbent. Do not place spill materials back in their original containers. This substance cannot be removed from leather. All contaminated leather articles should be rinsed with water and discarded.
Additional Spill Information:	If this material is released into a work area, evacuate the area immediately. Hazardous concentrations in air may be found in local spill area and immediately downwind. Utilize emergency response personal protection equipment prior to the start of any response. Stop source of spill as soon as possible and notify appropriate personnel. This material may be neutralized for disposal; you are requested to contact Arch Chemicals at 1- 800-654-6911 before beginning any such procedure. Containerize and label properly and remove to a secure location for proper disposal. Decontaminate all clothing and the spill area using a detergent and flush with large amounts of water.

7. HANDLING AND STORAGE

Handling:	Avoid contact with material, avoid breathing vapors, use only in a well ventilated area, use bonding and grounding when transferring quantities of material. Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water.
Storage:	Store in a cool dry ventilated location, away from sources of ignition or other incompatible conditions and chemicals. Keep container(s) closed. Avoid direct exposure to sunlight or ultraviolet (UV) light sources. Keep under a nitrogen blanket.
Shelf Life Limitations:	5 Years if not opened and exposed to the atmosphere. Material older than five years should be retested before use.
Incompatible Materials for Storage:	strong oxidizing agents, metal oxides, organic materials with high surface area such as rags, cotton waste, sawdust, etc., peroxides
Do Not Store At temperatures Above:	51 Deg. C. 124 Deg. F.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation:	Local exhaust ventilation or other engineering controls are imperative when handling or using this product to keep employee exposure to airborne contaminants below the exposure limit. Use explosion-proof ventilation equipment when handling this product.

Protective Equipment for Routine Use of Product

Respiratory Protection:	Wear a NIOSH approved respirator if any exposure occurs.
Respirator Type(s):	NIOSH approved full-face positive pressure supplied-air respirator
Skin:	A full impervious suit is recommended if exposure is possible to a large portion of the body. Wear impervious gloves, boots and apron.
Eyes:	Use chemical goggles and a faceshield.
Protective Clothing Type:	Butyl rubber

Other PPE: An eye wash and safety shower should be provided in the immediate work area.

Exposure Limit Data

CHEMICAL NAME	CAS #	OSHA PEL / STEL	ACGIH LIMITS	AIHA WEEL
Hydrazine	302-01-2	1 ppm TWA; 1.3 mg/m3 TWA prevent or reduce skin absorption	skin - potential for cutaneous absorption 0.01 ppm TWA	Not Established

CHEMICAL NAME	NIOSH Immediately Dangerous to Life or Health:
Hydrazine	50 ppm (not considering carcinogenic effects)

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	clear liquid
Color:	colorless
Odor	Ammonia
Molecular Weight:	(Active ingredient)32.04
pH	10.1 - 10.7 (1% solution in neutral, distilled water)
Octanol/Water Coeff:	No data
Solubility in Water:	Completely miscible
Bulk Density:	1.027 g/cc
Specific Gravity:	1.027
Vapor Density:	No data
Vapor Pressure:	(@ 30 Deg. C) (total pressure) 22 mmHg
Evaporation Rate:	No data
Boiling Point:	109 Deg. C. 228 Deg. F.
Freezing Point:	-65 Deg. C. -85 Deg. F.
Volatiles, % by vol.:	100 %
VOC Content %w/w / lbs/gal:	35.00 / 3.00
HAP Content %w/w / lbs/gal:	0.00 / 0.00

10. STABILITY AND REACTIVITY

Stability and Reactivity Summary:	May become unstable at elevated temperatures and/or pressure. Not sensitive to mechanical shock.
Reactive Properties:	Strong reducing agent, Corrosive
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Temperatures above the flash point in combination with sparks, open flames, or other sources of ignition. Avoid contact with organic materials.
Chemical Incompatibility:	strong oxidizing agents, peroxides, nitrogen tetroxide, fuming nitric acid, fluorine, halogen fluorides, metal oxides such as those of iron, copper, lead, manganese, and molybdenum
Packaging Incompatibility:	Package only in Teflon(R) high density polyethylene or 304L or 347 stainless steels containing less than 0.5% molybdenum.
Hazardous Decomposition Products:	ammonia, hydrogen

Decomposition Temperature: > 250 Deg. C. > 482 Deg. F.
Product May Be Unstable At Temperatures Above: 270 Deg. C. 518 Deg. F.

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology

Oral LD50 value:	
Hydrazine	Oral LD50: Rat 60 mg/kg
Dermal LD50 value:	
Hydrazine	Dermal LD50 Rabbit 93 mg/kg
Inhalation LC50 value:	
Hydrazine	Inhalation LC50 (4h) Rat 570 ppm

Product Animal Toxicity:

Oral LD50 value:	Oral LD50: Rat = 185 mg/kg
Dermal LD50 value:	Dermal LD50 Rabbit = 420 mg/kg
Inhalation LC50 value:	Inhalation LC50 (4h) Rat Approximately 1600 ppm
	Inhalation LC50 (1h) Rat = 12 mg/l
Skin Irritation:	This material is expected to be moderately irritating.
Eye Irritation:	This material is expected to be moderately irritating.
Skin Sensitization:	Positive skin sensitizer, guinea pig - Buehler Method Produces allergic skin response in Human Repeat Insult Patch test.
Acute Toxicity:	Damage occurs to liver, kidney, central nervous system, blood and lungs.

Reproductive and Developmental Toxicity:	Industrial exposures kept at or below occupational exposures standards should not pose a reproductive or developmental toxicity hazard. High dose levels of this chemical produced maternal toxicity, and embryolethality, and fetal malformations.
Component Data:	
Hydrazine	High dose levels of this chemical produced maternal toxicity, and embryolethality, and fetal malformations.
Mutagenicity:	This product has been tested and was found to be mutagenic.
Carcinogenicity:	This chemical is considered to be a suspect human carcinogen based on animal data.
Component Data:	
Hydrazine	This chemical is considered to be a suspect human carcinogen based on animal data.

12. ECOLOGICAL INFORMATION

Overview:	Moderate ecological hazard. Harmful to fish and other aquatic organisms.
Ecological Toxicity Values:	
35% Hydrazine	Rainbow trout (Salmo gairdneri), 96 hr. LC50: 4.3 mg/l.
	Bluegill 96 hr. LC50: 4.2 mg/l.
	Water flea (Daphnia magna), 48 hr. LC50: 0.46 mg/l.
Hydrazine	Bluegill 96 hr. LC50: 1.08 mg/l (static).
35% Hydrazine	The No Observable Effect Concentration (NOEC): 0.43 mg/l.
	Channel Catfish (Ictalurus punctatus rafinesque), 96 hr. LC50: 1 mg/l (static).
	Rainbow trout (Salmo gairdneri), 76 hr. LC50: 6 mg/l.
	Fatal within 1 hour at: 146 mg/l.
	Fathead minnow (Pimephales promelas), 96 hr. LC50: 5.98 mg/l (flow-through).
	Water flea (Daphnia magna), 24 hr. EC50: 2.3 mg/l.
	Green algae (Selenastrum capricornutum), 72 hr. EC50: 0.0061 mg/l.

13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary:	Spent or discarded material is a hazardous waste. If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by incineration.
Potential US EPA Waste Codes:	U133
Disposal Methods:	Dispose of by incineration following Federal, State, Local, or Provincial regulations.

Components subject to land ban restrictions: U133 Hydrazine

14. TRANSPORT INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.
DOT Description (49 CFR 172.101):

Land (U.S. DOT):	RQ,Hydrazine, aqueous solution , 6.1 , UN 3293 , PG III
Air (IATA/ICAO):	SAME AS LAND
Water (IMO):	SAME AS LAND
	Flash Point: (C) Not applicable

Hazard Label/Placard: (Primary) TOXIC

Reportable Quantity (49 CFR 172.101, Appendix):
Hydrazine RQ = 1 pound (0.454 kg); also listed as Diamine

Emergency Response Guide Number: 152

15. REGULATORY INFORMATION

UNITED STATES:
Toxic Substances Control Act (TSCA): This substance is listed on the TSCA Inventory of Existing Chemical Substances.

Pesticide acceptance indication: US EPA Registration Number: Not applicable

Superfund Amendments and Reauthorization Act (SARA) Title III:
Hazard Categories Sections 311/312 (40 CFR 370.2):

Health:	Acute and Chronic
Physical:	None

Emergency Planning & Community Right to Know (40 CFR 355, App. A):
Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:
Hydrazine 1000 lb TPQ; 1 lb EPCRA RQ
Reportable Quantity (40 CFR 302.4):

Hydrazine	1 lb final RQ; 0.454 kg final RQ

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components

Hydrazine	0.1 percent de minimis concentration

Clean Air Act VOC Section 111	Hydrazine
Clean Air Act Toxic ARP Section 112r	Hydrazine
Clean Air Act Haz. Air Pollutants Section 112	Hydrazine,

State Right-to-Know Regulations Status of Ingredients

Pennsylvania:	Hydrazine
New Jersey:	Hydrazine
Massachusetts:	Hydrazine

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - Proposition 65: "WARNING: This product contains a chemical(s) known to the State of California to cause cancer and/or birth defects or other reproductive harm."

CAS or CHEMICAL NAME	*CAS #*	
Hydrazine	302-01-2	carcinogen; initial date 1/1/88

16. OTHER INFORMATION

MSDS REVISION STATUS:
Section(s) Revised: 3, 11, 12, 13, 14

MAJOR REFERENCES:

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2. Haun, C. C., and E. R. Kinkead. January 1975. Chronic Inhalation Toxicity of Hydrazine. University of California, Irvine, Toxic Hazards Research Unit, Dayton, Ohio.
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12. Report on Acute Toxicity of SCAV-OX to Rainbow Trout (Salmo gairdneri), EG&G Bionomics Aquatic Toxicity Laboratory, Wareham, MA, Report #BW-80-9-738, September 1980.
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Additional references available upon request.

Other references available upon request.

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION INTHIS MSDS SHOULD BE PROVIDEDTO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. ARCH CHEMICALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT ARCH CHEMICALS MSDS CONTROL AT THE PHONE NUMBER ON THE FRONT PAGE TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT.

Company logo

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 05-MAR-2002

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

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1 PRODUCT IDENTIFICATION

PRODUCT NAME:

DEPOSITROL SF502

PRODUCT APPLICATION AREA:

SURFACTANT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

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POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Protect from freezing. Do not store at elevated temperatures.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.014	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-1		
Viscosity(cps 70F,21C)	4	% Solubility (water)	100.0

Odor	Mild
Appearance	Colorless To Yellow
Physical State	Liquid

Flash Point	P-M(CC)	> 200F	> 93C
pH As Is (approx.)		8.7	
Evaporation Rate (Ether=1)		< 1.00	

NA = not applicable   ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"A"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Renewal Bioassay
40% Mortality= 1200; 0% Mortality= 330 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 28; 20% Mortality= 22 mg/L

BIODEGRADATION
COD (mg/g): 242
TOC (mg/g): 65

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:
This product is composed of ingredients previously approved by USDA to meet G5 and G7 classification and may be used in water for cooking/cooling or in boiler or cooling systems with no food contact.
SARA SECTION 312 HAZARD CLASS:
Product is non-hazardous under Section 311/312
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	14-FEB-1997		** NEW **
	25-SEP-1998	15	14-FEB-1997
	16-MAR-1999	15	25-SEP-1998
	26-MAY-1999	12	16-MAR-1999
	21-DEC-2000	12	26-MAY-1999
	05-MAR-2002	4,16	21-DEC-2000

Corporate_Logo

ISSUE DATE: 30-AUG-2000

MATERIAL SAFETY DATA SHEET

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

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1 PRODUCT IDENTIFICATION

PRODUCT NAME:

KLARAID IC1173

PRODUCT APPLICATION AREA:

COAGULANT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
1327-41-9	ALUMINUM CHLORIDE, BASIC Potential irritant (eyes and skin)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate

irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to steel
Emergency Response Guide #154
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

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POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

MISCELLANEOUS:
Corrosive to steel
UN3264;Emergency Response Guide #154

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Store between 40-100F(4-38C). Store away from oxidizers.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

ALUMINUM CHLORIDE,BASIC
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): 2 MG/M3(AS Al)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as

necessary.

EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.271	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -40	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -40		
Viscosity(cps 70F,21C)	20	% Solubility (water)	100.0

Odor		Slight
Appearance		Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		1.3
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>1,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal
pH of test solutions was adjusted to a level of 6-9.

100% Mortality= 5000 mg/L
0% Mortality= 1000 mg/L

Daphnia magna 48 Hour Static Acute Bioassay
pH of test solutions was adjusted to a level of 6-9. No mortality was observed in highest concentration tested.

0% Mortality= 5000 mg/L

BIODEGRADATION
No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH, steel).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to steel
UN / NA NUMBER:	UN3264
DOT EMERGENCY RESPONSE GUIDE #:	154

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
FOOD AND DRUG ADMINISTRATION:
Generally recognized as safe (GRAS) for papermaking applications that may contact aqueous and fatty food per 21 CFR 170.30.
SARA SECTION 312 HAZARD CLASS:
Immediate(acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	ACID	pH below 2.1
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	16-MAY-1997		** NEW **
	27-MAY-1999	15	16-MAY-1997
	06-JUL-2000	12	27-MAY-1999
	30-AUG-2000	4	06-JUL-2000

Corporate_Logo

ISSUE DATE: 17-DEC-1998

MATERIAL SAFETY DATA SHEET

BetzDearborn, Division of Hercules Incorporated
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT)
(800) 877-1940 (USA)

HMIS RATINGS
(See Section 16 for additional information)
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

HPC 19M

PRODUCT APPLICATION AREA:

ACCELERATOR

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7631-95-0	SODIUM MOLYBDATE (MOLYBDIC ACID, DISODIUM SALT) Potential irritant (respiratory)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate

irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Mild; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Protect from freezing.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SODIUM MOLYBDATE (MOLYBDIC ACID,DISODIUM SALT)

PEL (OSHA): 5 MG/M3(AS Mo)

TLV (ACGIH): 5 MG/M3(AS Mo)

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:

neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.396	Vapor Pressure (mmHG)	~ 18.0

Freeze Point (F)	16	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-9		
Viscosity(cps 70F,21C)	17	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH 5% Sol. (approx.)		11.6
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >5,000 mg/kg
NOTE - Estimated value; 100% neat material rat oral LD50: 2,810 mg/kg
Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Estimated value; 100% neat material rabbit dermal LD50: >1,000 mg/kg
Inhalation LC50 RAT:
NOTE - 100% neat material maximum achievable concentration LC50: >8.68 mg/L/4hr

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Fathead Minnow 96 Hour Static Acute Bioassay

LC50: 21800 mg/L
No Effect Level: 16000 mg/L

Daphnia magna 48 Hour Static Acute Bioassay

LC50: 9200 mg/L
No Effect Level: 5140 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay

LC50: 20970 mg/L
No Effect Level: 9140 mg/L

Bluegill Sunfish 96 Hour Static Acute Bioassay

LC50: 19400 mg/L
No Effect Level: 6850 mg/L

BIODEGRADATION
No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
SARA SECTION 312 HAZARD CLASS:
Immediate(acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds
CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds
MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard

Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	17-DEC-1998		** NEW **

004 07/08/04 CHLORINE LIQUEFIED GAS

****
PRODUCT IDENTIFICATION
****

PRODUCT NAME: CHLORINE LIQUEFIED GAS

MSDS#: OZ35410

DATE ISSUED: 06/10/2004

SUPERSEDES: 02/24/2004

ISSUED BY: 008730

MATERIAL SAFETY DATA SHEET

SUBSTANCE: CHLORINE, LIQUID (PESTICIDE)

SYNONYMS:
Chlorine

PRODUCT USE: water treatment chemical

REVISION DATE: Jun 10 2004

Distributed by:
Univar USA Inc.
6100 Carillon Point
Kirkland, WA 98033
425-889-3400

2. COMPOSITION INFORMATION ON INGREDIENTS

COMPONENT: CHLORINE
CAS NUMBER: 7782-50-5
PERCENTAGE: 99.5-100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=1
HMIS RATINGS (SCALE 0-4): HEALTH=3 FLAMMABILITY=0 REACTIVITY=1

EMERGENCY OVERVIEW:
COLOR: Amber
PHYSICAL FORM: Liquefied gas
ODOR: Irritating odor, pungent odor

MAJOR HEALTH HAZARDS: MAY CAUSE BURNS TO THE RESPIRATORY TRACT, SKIN AND EYES. MAY CAUSE CHEMICAL PNEUMONIA. MAY CAUSE PERMANENT EYE DAMAGE. MAY BE LETHAL IN HIGH CONCENTRATIONS.

PHYSICAL HAZARDS: Strong oxidizer. Hazardous gas under pressure. May react explosively with organic materials.

POTENTIAL HEALTH EFFECTS:

INHALATION:
SHORT TERM EXPOSURE: irritation (possibly severe), chemical burns, pulmonary edema
LONG TERM EXPOSURE: to our knowledge, no effects are known

SKIN CONTACT:
SHORT TERM EXPOSURE: chemical burns, thermal burns
LONG TERM EXPOSURE: dermatitis

EYE CONTACT:
SHORT TERM EXPOSURE: chemical burns
LONG TERM EXPOSURE: visual disturbances

INGESTION:
SHORT TERM EXPOSURE: ingestion of harmful amounts is unlikely
LONG TERM EXPOSURE: ingestion of harmful amounts is unlikely

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Not a likely route of exposure.

NOTE TO PHYSICIAN: Steriod therapy, if given early, has been reported effective in preventing pulmonary edema.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials. May react explosively with organic materials.

EXTINGUISHING MEDIA: Use extinguishing agents appropriate for surrounding fire.

FIRE FIGHTING: Keep unnecessary people away, isolate hazard area and deny entry. Consider evacuation of personnel located downwind if material is leaking. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Wear NIOSH approved positive-pressure self-contained breathing apparatus. Fire fighting gear may not be protective due to the formation of acids with water.

SENSITIVITY TO MECHANICAL IMPACT: Not sensitive
SENSITIVITY TO STATIC DISCHARGE: Not sensitive
FLASH POINT: not flammable

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Remove sources of ignition. Stop leak if possible without personal risk. Consider evacuation of personnel located downwind if material is leaking. Do not apply water directly to the leak. Reacts with water to form corrosive,

acidic solution (hydrochloric acid). Keep out of water supplies and sewers. Releases should be reported, if required, to appropriate agencies. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800) 424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE:
Store and handle in accordance with all current regulations and standards. Keep container tightly closed. Store in a well-ventilated area. Keep away from heat, sparks and flame. Keep separated from incompatible substances. Protect from physical damage.

HANDLING:
Avoid breathing gas. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CHLORINE
1 ppm (3 mg/m3) OSHA ceiling
0.5 ppm (1.5 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
1 ppm (3 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
0.5 ppm ACGIH TWA
1 ppm ACGIH STEL
1 ppm (3 mg/m3) MEXICO TWA
3 ppm (9 mg/m3) MEXICO STEL

VENTILATION:
Use closed systems when possible. Provide local exhaust ventilation where gas may be generated. Ensure compliance with applicable exposure limits.

EYE PROTECTION:
Wear chemical safety goggles with a faceshield to protect against skin contact when appropriate. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING:
Wear appropriate chemical resistant clothing.

GLOVES:
Wear chemical resistant, insulated gloves such as Perfect Fit NL-56(TM) or Best 6781R(TM).

PROTECTIVE MATERIAL TYPES:
Perfect Fit NL-56(TM), Best 6781R(TM), Best Nitri Solve 727(TM), Tychem 10000 (TM)

RESPIRATOR:
A NIOSH approved respirator with acid gas cartridge(s) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits or when symptoms have been observed that are indicative of overexposure. A full facepiece air-purifying respirator may be used in concentrations up to the Immediately Dangerous to Life and Health (IDLH) Concentration of 10 ppm. Supplied air should be used when the level is expected to be above the IDLH concentration, or when there is a potential for uncontrolled release. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

1000-2163

PHYSICAL STATE:	liquid
COLOR:	amber
PHYSICAL FORM:	liquefied gas
ODOR:	irritating odor, pungent odor
MOLECULAR WEIGHT:	70.91
MOLECULAR FORMULA:	C12
BOILING POINT:	-29.27 F (-34.04 C)
FREEZING POINT:	-150 F (-101 C)
VAPOR PRESSURE:	5830 mmHg @ 25 C
VAPOR DENSITY (air=1):	2.4
SPECIFIC GRAVITY (water=1):	1.4 @ 15.6 C
DENSITY:	11.7 lbs/gal @ 15.6 C
WATER SOLUBILITY:	0.7% @ 20 C
PH:	Not applicable
VOLATILITY:	100%
ODOR THRESHOLD:	0.31 ppm approximate
EVAPORATION RATE:	Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

10. STABILITY AND REACTIVITY

REACTIVITY:
Stable at normal temperatures and pressure.

CONDITIONS TO AVOID:
Avoid contact with water. Reacts with water to form corrosive, acidic solution (hydrochloric acid). May react explosively with organic materials.

INCOMPATIBILITIES:
ammonia, combustible materials, metals, reducing agents, reacts in contact with aluminum to form hydrogen gas

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: None known.

POLYMERIZATION:
Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CHLORINE, LIQUID (PESTICIDE):
TOXICITY DATA: Chlorine is a primary irritant on contact and may be corrosive to the eyes, skin, throat and mucous membranes. Exposure may result in severe or permanent eye injury. Overexposure may be fatal. Long term overexposure may produce upper airway changes leading to an increased prevalence of colds, shortness of breath and reactive airways dysfunction syndrome. The hazard at different concentrations is reported to be as follows: 0.2 - 0.5 ppm (No immediate toxic effects); 1-3 ppm (Definite odor with irritation of eye and nose); 5-8 ppm (Throat, eye and mucous membrane irritation); 30 ppm (Intense coughing fits); 34-51 ppm (Lethal in 1 to 1.5 hours exposure); 40-60 ppm (Exposure for 30-60 minutes may cause upper respiratory irritation, pulmonary edema, or bronchopneumonia); 100 ppm (May be lethal after 50 minutes exposure (estimated)); 430 ppm (Lowest concentration known to cause lethality after 30 minutes of exposure); 1000 ppm (May be fatal within a few deep breaths)

12. ECOLOGICAL INFORMATION

...
ECOTOXICITY DATA:
FISH TOXICITY: This material has exhibited moderate toxicity to aquatic organisms.

FATE AND TRANSPORT:
BIODEGRADATION: This material is an element and not subject to biodegradation.

1000-2163

PERSISTENCE: This material will exist in the disassociated state.

BIOCONCENTRATION: This material is believed not to bioaccumulate.

OTHER ECOLOGICAL INFORMATION: This material has exhibited toxicity to terrestrial organisms. Use or process if possible. Chlorine may be absorbed into an alkaline solution such as caustic soda, soda ash or hydrated lime. Dispose in accordance with all applicable regulations.

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Chlorine
ID NUMBER: UN 1017
HAZARD CLASS OR DIVISION: 2.3
LABELING REQUIREMENTS: 2.3; 8
ADDITIONAL SHIPPING DESCRIPTION: Toxic-Inhalation Hazard Zone B

MARINE POLLUTANT: CHLORINE
DOT HAZARDOUS SUBSTANCE(S):
Chlorine 10 lb(s) (4.54 kg(s))

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: Not a registered pesticide. This material will not be shipped in Canada.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
CHLORINE: 10 LBS RQ
SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
CHLORINE: 100 LBS TPQ

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65):
This product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372. Refer to Section 2.

CHLORINE
OSHA PROCESS SAFETY (29CFR1910.119):
CHLORINE: 1500 LBS TQ

STATE REGULATIONS:
California Proposition 65: This product may contain contaminants known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act. For additional information, contact Customer Service.

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:
REPORTING REQUIREMENT:
CHLORINE 7782-50-5 99.5-100%
RIGHT TO KNOW HAZARDOUS SUBSTANCE LIST:
CHLORINE 7782-50-5 99.5-100%

SPECIAL HEALTH HAZARD SUBSTANCE LIST:
Not regulated.

PENNSYLVANIA RIGHT TO KNOW:
REPORTING REQUIREMENT:
CHLORINE 7782-50-5 99.5-100%

16000-2163

HAZARDOUS SUBSTANCE LIST:
CHLORINE 7782-50-5 99.5-100%
ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:
CHLORINE 7782-50-5 99.5-100%
SPECIAL HAZARDOUS SUBSTANCE LIST:
Not regulated.

CANADIAN REGULATIONS:
CONTROLLED PRODUCTS REGULATIONS (CPR): This product has been classified in accordance with the criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

WHMIS CLASSIFICATION: Not a registered pesticide.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): All the components of this substance are listed on or are exempt from the inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not a registered pesticide. This material will not be sold in Canada.

16. OTHER INFORMATION

---------- FOR ADDITIONAL INFORMATION ----------
CONTACT: MSDS COORDINATOR UNIVAR USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400
---------- NOTICE ----------

********** UNIVAR USA INC ("UNIVAR") EXPRESSLY DISCLAIMS

ALL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A

PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN,

AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

DO NOT USE INGREDIENT INFORMATION AND/OR INGREDIENT PERCENTAGES IN THIS MSDS AS A PRODUCT SPECIFICATION. FOR PRODUCT SPECIFICATION INFORMATION REFER TO A PRODUCT SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM YOUR LOCAL UNIVAR SALES OFFICE.

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, UNIVAR MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR SUFFICIENCY. CONDITIONS OF USE ARE BEYOND UNIVARS CONTROL AND THEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE UPON , INFORMATION CONTAINED HEREIN. THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS.

* * * E N D O F M S D S * * *

1100-0440

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 10-NOV-2000

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

CORTROL OS5010

PRODUCT APPLICATION AREA:

WATER BASED DISSOLVED OXYGEN SCAVENGER/METAL PASSIVATOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
302-01-2	HYDRAZINE Corrosive; highly toxic (by skin absorption); toxic (by ingestion); possible human carcinogen (IARC=2B; NTP=anticipated) and liver, kidney, blood or reproductive toxin

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Severe irritant to the skin. Absorbed by skin. Potential sensitizer. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Toxic
Emergency Response Guide #152
Odor: Ammonia; Appearance: Colorless To Light Brown, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Toxic; Severe irritant to the skin. Absorbed by skin. Potential sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
Toxic;
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Repeated exposure may cause skin sensitization and/or toxicity to the liver, kidney, nervous system, and blood system. Component(s) may cause reproductive toxicity at maternal toxic levels. Limited evidence for increased risk of cancer.

MEDICAL CONDITIONS AGGRAVATED:
Pre-existing skin, liver or kidney disorders.

SYMPTOMS OF EXPOSURE:
Inhalation of vapors/mists/aerosols cause eye, nose, throat and lung irritation. Skin contact may cause redness, itching, dermatitis, or skin sensitization.

4 FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate

medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

MISCELLANEOUS:

Toxic

3293 ;Emergency Response Guide #152

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Isolate spill by diking. Dilute spill to a 5% or less concentration. Neutralize with an equal amount of a 5% or less concentration of a hypochlorite solution.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:

Basic. Vent slowly before opening. Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

HYDRAZINE

PEL (OSHA): 1.0 PPM(SKIN)

TLV (ACGIH): 0.01 PPM(SKIN)-A3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
An air-supplying respirator (positive pressure full facepiece) may be needed for this product.

SKIN PROTECTION:
gauntlet type butyl or PVC gloves, impervious full body protective suit, rubber boots-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.026	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	~ 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	10	% Solubility (water)	100.0

Odor		Ammonia
Appearance		Colorless To Light Brown
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH 1% Sol. (approx.)		10.5
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: 185 mg/kg

Reproductive Toxicity ANIMALS:
NOTE - Effects only at maternal toxic levels
Carcinogenicity ANIMALS: Positive
NOTE - Suspect human carcinogen
Dermal LD50 RABBIT: 420 mg/kg
Inhalation LC50 RAT: 1,600 ppm/4hr
Non-Ames Mutagenicity : Positive

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
No Data Available.

BIODEGRADATION
No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
U133=HYDRAZINE.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD: Toxic
UN / NA NUMBER: 3293
DOT EMERGENCY RESPONSE GUIDE #: 152

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
0.3 gallons due to HYDRAZINE;
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)
SARA SECTION 302 CHEMICALS:

CAS#	CHEMICAL NAME
302-01-2	HYDRAZINE

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
302-01-2	HYDRAZINE	31.0-40.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:
This product contains these chemicals known to the state of California to cause cancer or reproductive toxicity:

CAS#	CHEMICAL NAME

302-01-2 HYDRAZINE

MICHIGAN REGULATORY INFORMATION

CAS#	CHEMICAL NAME
302-01-2	HYDRAZINE

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	X	Ask Your Supervisor

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	26-OCT-2000		** NEW **
	10-NOV-2000	4	26-OCT-2000

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

BASIC CHEMICAL SOLUTIONS

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **BCS SODIUM HYDROXIDE LIQUID**
(1% - 50%)

CHEMICAL NAME/CLASS: Sodium Hydroxide Solution

PRODUCT USE: Metal finishing, neutralization, industrial cleaners, chemical processing.

SUPPLIER/MANUFACTURER'S NAME: **BASIC CHEMICAL SOLUTIONS**

ADDRESS: **Corporate Office**
525 Seaport Blvd.
Redwood City, CA 94063

BUSINESS PHONE: 800-411-4227

EMERGENCY PHONE: **CHEMTREC**: 800-424-9300

DATE OF PREPARATION: May 7, 2003

Si usted no entiende las Hojas de Informacion de Seguridad sobre Materials, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the Material Safety Data Sheet, find someone to explain it to you in detail.)

2. COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	%w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			
			TLV mg/m^3	STEL mg/m^3	PEL mg/m^3	STEL mg/m^3	IDLH mg/m^3	OTHER mg/m^3
Sodium Hydroxide	1310-73-2	1-50	2, C	NE	2, C (Vacated 1989 PELs)	NE	10	NIOSH REL: 2 DFG MAKs: 2
Water and other ingredients. The other ingredients are each present in less than 1 percent concentration in this product.		Balance	The components present in the balance of this product do not contribute any significant, additional hazards. All hazard information pertinent to this product has been presented in the remaining sections of this Material Safety Data Sheet, per the requirements of Federal Occupational Safety and Health Hazard Communication Standard (29 CFR 1910.1200).					

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.
NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear to turbid liquid solution. This solution is corrosive, and can be damaging to contaminated tissue. Ingestion of large quantities can be fatal. In the event of fire or spill, adequate precautions must be taken. This solution reacts with water to generate heat. If involved in a fire, this product may decompose to produce sodium oxides and a variety of other compounds (i.e. carbon monoxide and carbon dioxide). Emergency responders must wear the proper personal protective equipment suitable for the situation to which the are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: This solution can damage skin, eyes, mucous membranes, and other contaminated tissue. Burns may not be immediately painful or visible.

INHALATION: If mists or sprays of this solution are inhaled, this product may cause pulmonary irritation, irritation of the mucus membranes, coughing, and a sore throat. Damage to the tissues of the respiratory system may occur.

CONTACT WITH SKIN or EYES: Severe irritation and/or burns can occur following eye exposure. Contact may cause impairment of vision and corneal damage possibly blindness. Skin contact may result in a "soapy" feel and cause reddening, discomfort, and irritation. Prolonged exposure may result in ulcerating burns which could leave scars.

SKIN ABSORPTION: Skin absorption is not anticipated to be a significant route of over-exposure to any component of this product.

INGESTION: Though ingestion is not anticipated to be a significant route of over-exposure to this product, if ingestion does occur burning and irritation of the mouth, throat, esophagus, and other tissues of the digestive system will occur immediately upon contact. Ingestion of large quantities may be fatal.

INJECTION: Though injection is not anticipated to be a significant route of over-exposure to this product, if it occurs, may cause local reddening, tissue swelling, and discomfort.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**.

ACUTE: This solution is corrosive, and can burn and damage eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty. Though unlikely to occur during occupational use, ingestion of large quantities may be fatal.

CHRONIC: Repeated skin contact with this product may result in dermatitis (inflammation and reddening of the skin).

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	3
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	1
PROTECTIVE EQUIPMENT		D

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		

For routine industrial applications

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

SKIN EXPOSURE: If the product contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove contaminated clothing, taking care not to contaminate eyes. Washing with large amounts of clean water should continue until affected skin surface no longer feels slippery. Victim must seek medical attention.

EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Do not attempt to neutralize. Oils or ointments should not be used at this time. Victim must seek immediate medical attention.

INHALATION: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with victim.

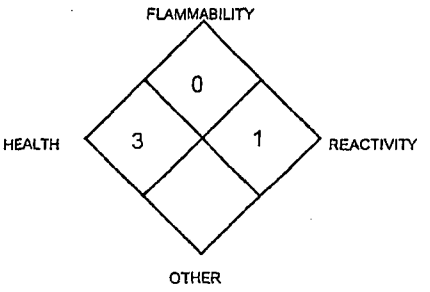
5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): Not flammable.
AUTOIGNITION TEMPERATURE, °C: Not flammable.
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES
Carbon Dioxide: YES
Foam: YES
Dry Chemical: YES
Halon: YES
Other: Any "ABC" Class.

NFPA RATING



UNUSUAL FIRE AND EXPLOSION HAZARDS: Not considered flammable or combustible. Does not support combustion. However, contact with water or acids may generate sufficient heat to ignite nearby combustible materials. Contact with aluminum, tin or zinc will result in the generation of heat and release of hydrogen gas. Run-off from fire control may cause pollution. Keep fire-exposed containers cool with water spray to prevent rupture due to excessive heat. High pressure water hose may spread product from broken containers increasing contamination. When involved in a fire, this material may decompose and produce irritating fumes and toxic gases (including carbon monoxide, carbon dioxide and sodium oxides). Products of combustion are irritating to the respiratory tract and may cause breathing difficulty. Symptoms may be delayed several hours or longer depending upon the extent of exposure.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

The proper personal protective equipment for incidental releases (e.g.-1 L of the product released in a well-ventilated area) use impermeable gloves, specific for the material handled, goggles, face shield, and appropriate body protection. In the event of a large release, use impermeable gloves, specific for the material handled, chemically resistant suit and boots, and hard-hat. Self Contained Breathing Apparatus or respirator may be required where engineering controls are not adequate or conditions for potential exposure exist. When respirators are required, Select NIOSH/MSHA approved based on actual or potential airborne concentrations in accordance with latest OSHA and/or ANSI recommendations.
Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with citric acid or other caustic neutralizing agent. Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residue in a suitable container. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations).

PART III *How can I prevent hazardous situations from occurring*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Do not eat or drink while handling this material. Remove contaminated clothing immediately. Discard contaminated clothing items, or launder before re-use. Inform anyone handling such contaminated laundry of the hazards associated with this product. Use ventilation and other engineering controls to minimize potential exposure to this product.

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing mists or sprays generated by this product. It is best to never add water to this product, always add product, with constant stirring, slowly to surface of lukewarm (80-100 °F, 27-38 °C) water, to assure product is being completely dispersed as it is added. Only trained personnel can add water to this product. Never add more product than can be absorbed by solution while maintaining temperatures below 200 °F(93 °C) to prevent boiling and spattering of caustic solution. Use in a well-ventilated location.

For Non-Bulk Containers: Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers, or in a diked area, as appropriate. Store containers away from incompatible chemicals. Keep container tightly closed when not in use. Wash thoroughly after using this material. Storage areas should be made of fire-resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Empty containers may contain residual liquid, therefore, empty containers should be handled with care.

Bulk Containers: All tanks and pipelines which contain this material must be labeled. Perform routine maintenance on tanks or pipelines which contain this product. Report all leaks immediately to the proper personnel.

Tank Car Shipments: Tank cars carrying this product should be loaded and unloaded in strict accordance with tank-car manufacturer's recommendation and all established on-site safety procedures. Appropriate personal protective equipment must be used (see Section 8, Engineering Controls and Personal Protective Equipment.). All loading and unloading equipment must be inspected, prior to each use. Loading and unloading operations must be attended, at all times. Tank cars must be level, brakes must be set or wheels must be locked or blocked prior to loading or unloading. Tank car (for loading) or storage tank (for unloading) must be verified to be correct for receiving this product and be properly prepared, prior to starting the transfer operations. Hoses must be verified to be clean and free of incompatible chemicals, prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions, before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blown-down and purged before disconnecting them from the tank car or vessel.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment before maintenance begins by a triple-rinse with water followed, if necessary, by using caustic neutralizing agent and an additional rinse. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: If required use a corrosion-resistant ventilation system separate from other exhaust ventilation systems to ensure that there is no potential for overexposure to sprays, or mists of this product and that exposures are below those in section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134, or applicable State regulations. If adequate ventilation is not available or if there is potential for airborne exposure above the exposure limits (listed in Section 2) a respirator may be worn up to respirator exposure limitations, check with respirator equipment manufactures recommendations/limitations. For a higher level of protection use positive pressure supplied air respiration protection or Self Contained Breathing Apparatus or if oxygen levels are below 19.5% or are unknown.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:

Positive pressure, full-facepiece Self Contained Breathing Apparatus; or positive pressure, full-facepiece Self Contained Breathing Apparatus with an auxiliary positive pressure Self Contained Breathing Apparatus.

EYE PROTECTION: Splash goggles or safety glasses. Face-shields are recommended when the operation can generate splashes, sprays or mists.

HAND PROTECTION: Wear appropriate gloves for routine industrial use. Use appropriate gloves for spill response, as stated in Section 6 of this MSDS (Accidental Release Measures).

BODY PROTECTION: Use body protection appropriate for task. Cover-all, rubber aprons, or chemical protective clothing made from natural rubber are generally acceptable, depending upon the task.

9. PHYSICAL and CHEMICAL PROPERTIES

Physical and chemical properties for various concentrations of **Sodium Hydroxide**, the main component of this product are as follows:

	Series			
	10	20	30	50
PHYSICAL STATE:	Liquid			
BOILING POINT @ 760 mm Hg:	110°C	113°C	119°C	140°C
FREEZING POINT:	-12°C 10°F	-26°C -14°F	0°C 32°F	12°C 53.6°F
VAPOR PRESSURE mm Hg @ 60°C:	135	110	76	13
SPECIFIC GRAVITY @ 15.6° C	1.11	1.22	1.33	1.53
DENSITY – lb-gal @ 15.6°C:	9.26	10.17	11.09	12.76
VAPOR DENSITY:	Not Determined			
EVAPORATION RATE (water = 1):	Similar to or slower than water depending upon weight percent.			
pH:	14.0 pH @ 7.5% solution			
SOLUBILITY in H_2O - % by wt:	Completely Soluble			

ODOR THRESHOLD: Not available.

APPEARANCE AND COLOR: This product is a clear light straw to turbid liquid solution.
HOW TO DETECT THIS SUBSTANCE (warning properties): Litmus paper will turn blue-purple upon contact with this solution even with low concentrations.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this solution can include carbon monoxide, carbon dioxide and sodium compounds.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product reacts with strong acids. Additionally, it is incompatible with organic halogen compounds, organic nitro compounds, aluminum, zinc, tin, and other metals. Avoid contact with leather and wool. **Reactions with various food sugars may form carbon monoxide.**

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures and incompatible chemicals.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Additional toxicology information for components greater than 1 percent in concentration is provided below.

SODIUM HYDROXIDE:
Eye Irritancy (monkey) = 1% solution, 24 hr, Severe.
Skin Irritancy (rabbit) = 500 mg, 24 hr, Severe.
Eye Irritancy (rabbit) = 4 g, Mild.
Eye Irritancy (rabbit) = 1% solution, Severe.
Eye Irritancy (rabbit) = 50 :g, 24 hr, Severe.
Eye Irritancy (rabbit) = 1 mg, 24 hr, Severe.
Eye Irritancy (rabbit) = 100 mg with rinse, Severe.
Cytogenic Analysis System (grasshopper, parenteral) = 20 mg
LD_{50} (Intraperitoneal, mouse) = 40 mg/kg.
LDLo (oral, rabbit) = 500 mg/kg.

11. TOXICOLOGICAL INFORMATION (Continued)

SUSPECTED CANCER AGENT: The components of this product's ingredients are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA; and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is severely irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: No component of this product is known to be a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Mutation data is available for the Sodium Hydroxide (component of this product), obtained during clinical studies on animal tissues exposed to high doses of this compound.
Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.
Teratogenicity: This product is not reported to cause teratogenic effects in humans.
Reproductive Toxicity: This product is not reported to cause reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently there are no Biological Exposure Indices (BEIs) associated with the components of this product.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Skin disorders can be aggravated by over-exposure to this product. Inhalation of this products mists may aggravate respiratory conditions.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure to this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product are relatively stable in the environment; they may degrade, after time, into other organic and inorganic constituents. Additional environmental data is available for the components of this product as follows:

SODIUM HYDROXIDE: K_{ow} = too low to be measured. Water solubility = 9 g/0.9 ml water. BOD: None.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product is harmful to plant and animal life if this product is released into the environment. As with all chemicals, work practices should be aimed at eliminating environmental releases.

EFFECT OF CHEMICAL ON AQUATIC LIFE This product can substantially raise the pH of an aquatic environment and can be extremely toxic to fish and aquatic plants. As with all chemicals, work practices should be aimed at eliminating environmental releases. Additional aquatic data for the components of this product is available as follows:

SODIUM HYDROXIDE:
LC_{100} (*Cyprimus carpio*) = 180 ppm/24 hr/25 °C
TL_m (mosquito fish) = 125 ppm/96 hr (fresh water)
TL_m (bluegill) = 99 mg/L/48 hr (tap water)

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: D002 (Characteristic, corrosive), applicable to wastes consisting only of this solution.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Sodium Hydroxide solution
HAZARD CLASS NUMBER and DESCRIPTION:	8 (Corrosive Material)
UN IDENTIFICATION NUMBER:	UN 1824
PACKING GROUP:	II
DOT LABEL(S) REQUIRED:	Corrosive

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 154

MARINE POLLUTANT: This product does not contain any components which are designated by the Department of Transportation to be Marine Pollutants. (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

Note: The latest DOT information is provided, please verify all DOT information as it is subject to change without notice.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of this product subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act are as follows.

COMPONENT	SARA 302	SARA 304	SARA 313
Sodium Hydroxide	No	Yes	No

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Sodium Hydroxide = 1000 lbs.

OTHER FEDERAL REGULATIONS: Not applicable.

STATE REGULATORY INFORMATION: Components of this product are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: Sodium Hydroxide.
California - Permissible Exposure Limits for Chemical Contaminants: Sodium Hydroxide.
Florida - Substance List: Sodium Hydroxide.
Illinois - Toxic Substance List: Sodium Hydroxide.
Kansas - Section 302/313 List: Sodium Hydroxide.
Minnesota - List of Hazardous Substances: Sodium Hydroxide.
Missouri - Employer Information/Toxic Substance List: Sodium Hydroxide.
New Jersey - Right to Know Hazardous Substance List: Sodium Hydroxide.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: Sodium Hydroxide.
Pennsylvania - Hazardous Substance : Sodium Hydroxide.
Rhode Island - Hazardous Substance : Sodium Hydroxide.
Texas - Hazardous Substance List: Sodium Hydroxide.
West Virginia Substance List: Sodium Hydroxide.
Wisconsin - Toxic and Hazardous Substances: Sodium Hydroxide.

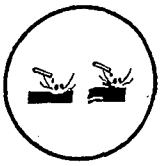
CALIFORNIA PROPOSITION 65 No component of this product is on the California Proposition 65 lists.

LABELING (Precautionary Statements): **DANGER!** CORROSIVE MATERIAL! LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. MAY CAUSE LUNG DAMAGE. REACTS VIOLENTLY WITH ACIDS. REACTS WITH WATER TO GENERATE HEAT. AVOID SPATTERING BY SLOWLY ADDING TO SOLUTION. Do not get into eyes, on skin or clothing. Avoid breathing spray or mist. Do not take internally. Use with adequate ventilation and employ respiratory protection when exposed to the mist or spray. When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing. Do not transfer to unlabeled containers. Use with adequate ventilation. Wash thoroughly after handling, Keep container closed when not in use. FIRST-AID: In case of contact, immediately flush skin or eyes for at least 15 minutes. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not induce vomiting. IN CASE OF FIRE: Use water, dry chemical, CO_2, or alcohol foam. IN CASE OF SPILL: Dike area to contain spill. Only trained personnel equipped full acid- protective gear should be permitted in this area. Spilled material may be absorbed into an appropriate absorbent material. Spills should be removed using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid or citric acid and then flush with water. If necessary a liberal covering of sodium bicarbonate should then be applied and then rinsed with water. Do not wash into storm or sanitary sewer system.

TARGET ORGANS: Skin, eyes and respiratory system.

15. REGULATORY INFORMATION (Continued)

WHMIS SYMBOLS: E- Corrosive Material



16. OTHER INFORMATION

INFORMATION SOURCE: CHEMICAL SAFETY ASSOCIATES, Inc.

PREPARED BY: BASIC CHEMICAL SOLUTIONS

THIS INFORMATION IS DRAWN FROM RECOGNIZED SOURCES BELIEVED TO BE RELIABLE. BASIC CHEMICAL SOLUTIONS MAKES NO GUARANTEES NOR ASSUMES ANY LIABILITY IN CONNECTION WITH THIS INFORMATION. THE USER SHOULD BE AWARE OF CHANGING TECHNOLOGY, RESEARCH, REGULATIONS AND ANALYTICAL PROCEDURES THAT MAY REQUIRE CHANGES HEREIN. THE ABOVE DATA IS SUPPLIED UPON THE CONDITION THAT PERSONS WILL EVALUATE THIS INFORMATION AND THEN DETERMINE ITS SUITABILITY FOR THEIR USE.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:
ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.
TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour **Time Weighted Average (TWA)**, the 15-minute **Short Term Exposure Limit**, and the instantaneous **Ceiling Level**. Skin adsorption effects must also be considered.
OSHA - U.S. Occupational Safety and Health Administration.
PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.
IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:
Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo, LDLo**, and **LDo**, or **TC, TCo, LCLo**, and **LCo**, the lowest dose (or concentration) to cause death. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REGULATORY INFORMATION:
This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Other acronyms used are: **Superfund Amendments and Reauthorization Act (SARA)**; the **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings which appear on the materials package label.

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

BASIC CHEMICAL SOLUTIONS

Received 13 Jun 05 1100-493

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**BCS SULFURIC ACID (>51%)**
CHEMICAL NAME/CLASS:	Sulfuric Acid Solution
PRODUCT USE:	Neutralization, metal processing, battery acid.
SUPPLIER/MANUFACTURER'S NAME:	**BASIC CHEMICAL SOLUTIONS**
ADDRESS:	**Corporate Office** 525 Seaport Blvd. Redwood City, CA 94063
BUSINESS PHONE:	800-411-4227
EMERGENCY PHONE:	**CHEMTREC:** 800-424-9300
DATE OF PREPARATION:	November 3, 2003

Si usted no entiende las Hojas de Informacion de Seguridad sobre Materials, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the Material Safety Data Sheet, find someone to explain it to you in detail.)

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	%w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			
			TLV mg/m³	STEL mg/m³	PEL mg/m³	STEL mg/m³	IDLH	OTHER mg/m³
Sulfuric Acid	7664-93-9	>51	1 mg/m³	10	1 mg/m³	3 mg/m³	15 mg/m³	NA
Water and other ingredients. The other ingredients are each present in less than 1 percent concentration in this product.		Balance	The components present in the balance of this product do not contribute any significant, additional hazards. All hazard information pertinent to this product has been presented in the remaining sections of this Material Safety Data Sheet, per the requirements of Federal Occupational Safety and Health Hazard Communication Standard (29 CFR 1910.1200).					

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.
NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear solution. Danger! Extremely corrosive. Causes sever burns. Reacts with water. Harmful if ingested or inhaled, can be fatal. In the event of fire or spill, adequate precautions must be taken. This product may decompose to produce a variety of compounds (i.e. carbon monoxide, carbon dioxide and oxides of sulfur). Flammable hydrogen gas can evolve when in contact with most metals. Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding. Transport in approved vehicles and containers.

3. HAZARD IDENTIFICATION (Continued)

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

INHALATION: If mists or sprays of this solution are inhaled, this product may cause pulmonary irritation, irritation of the mucus membranes, coughing, and a sore throat. Inhalation of high concentrations of this product may cause damage to the tissues of the respiratory system, producing potentially fatal lung disorders (chemical pneumonitis and pulmonary edema) and erosion of the tooth enamel.

CONTACT WITH SKIN or EYES: Contact with the eyes can cause severe irritation, eye burns and permanent eye damage. Contact with the skin can cause severe irritation, skin burns and permanent skin damage. Prolonged exposure may result in ulcerating burns which could leave scars.

SKIN ABSORPTION: Skin absorption is not anticipated to be a significant route of over-exposure to any component of this product.

INGESTION: Though ingestion is not anticipated to be a significant route of over-exposure to this product, if ingestion does occur burning and irritation of the mouth, throat, esophagus, and other tissues of the digestive system will occur immediately upon contact. Ingestion of large quantities may be fatal.

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE	3
FLAMMABILITY	(RED	0
REACTIVITY	(YELLOW	2
PROTECTIVE		D

EYES	RESPIRATOR	HAND	BODY
	SEE SECTION		

For routine industrial applications

INJECTION: Though injection is not anticipated to be a significant route of over-exposure to this product, if it occurs, may cause local reddening, tissue swelling, and discomfort.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.

ACUTE: This solution is corrosive, and can burn and damage eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty. Though unlikely to occur during occupational use, ingestion or injection of large quantities may be fatal.

CHRONIC: This product contains ingredients that are considered to be probable or suspected human carcinogens (see Section 11).

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

SKIN EXPOSURE: If the product contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention.
EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.
INHALATION: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers. If shortness of breath occurs, evaluate the possibility of bronchitis or pneumonitis. Chest x-ray and arterial blood gasses can be used to determined the presence of pulmonary edema. In severe causes, use of humidified oxygen and assisted ventilation including positive end expiratory pressure (PEEP) may be needed. Parenteral steroids may be useful in limiting the extent of pulmonary damage.
INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, **do not induce vomiting.** Victim should rinse mouth with large amounts of water. Victim should drink 2-3 glasses of water to dilute the ingested material. Never induce vomiting or give diluents (water) to someone who is unconscious, having convulsions, or who cannot swallow. The use of gastric lavage is controversial. The removal of acid must be weighed against the risk of perforation or bleeding. If a large amount of acid (greater than 1ml /kg body weight) has been ingested , cautious gastric lavage is generally advised if the patient is alert and there is little risk of convulsions. Consultation with a gastroenterologist and/or surgeon is advised. Serious complications such as perforation or stricture of the esophagus may occur requiring care by specialist. Laryngeal edema may develop requiring intubation or tracheostomy.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with victim.

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5. FIRE-FIGHTING MEASURES

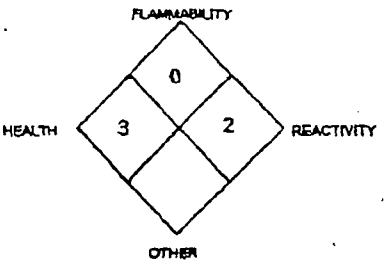
FLASH POINT, °C (method): Not flammable.
AUTOIGNITION TEMPERATURE, °C: Not flammable.
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not applicable.
Upper (UEL):Not applicable.

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES (Expect reaction) Carbon Dioxide: YES
Foam: YES Dry Chemical: YES
Halon: YES Other: NO.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is corrosive, and presents a significant contact hazard to fire-fighters. For large fires, flood fire area from a distance. Expect a reaction with water. Do not let solid stream of water contact spilled materials. When involved in a fire, this material may decompose and produce irritating fumes and toxic gases (including carbon monoxide, carbon dioxide and oxides of sulfur).

NFPA RATING



Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

The proper personal protective equipment for incidental releases (e.g.-1 L of the product released in a well-ventilated area) use impermeable gloves, specific for the material handled, goggles, face shield, and appropriate body protection. In the event of a large release, use impermeable gloves, specific for the material handled, chemically resistant suit and boots, and hard-hat. Self Contained Breathing Apparatus or respirator may be required where engineering controls are not adequate or conditions for potential exposure exist. When respirators are required, Select NIOSH/MSHA approved based on actual or potential airborne concentrations in accordance with latest OSHA and/or ANSI recommendations.
Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with lime or soda ash or other acid neutralizing agent. Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residue in a suitable container. Dispose of in accordance with Federal, State and local hazardous waste disposal regulations (see Section 13 – Disposal Considerations.)

PART III *How can I prevent hazardous situations from occurring*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Do not eat or drink while handling this material. Remove contaminated clothing immediately. Use ventilation and other engineering controls to minimize potential exposure to this product.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing mists or sprays generated by this product. Use in a well-ventilated location.

For Non-Bulk Containers: Cannot be handled in metal containers. Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers, or in a diked area, as appropriate. Store containers away from incompatible chemicals. Keep container tightly closed when not in use. Wash thoroughly after using this material. Storage areas should be made of fire-resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

Empty containers may contain residual liquid. Therefore, empty containers should be handled with care.

7. HANDLING and STORAGE (Continued)

Bulk Containers: Cannot be handled in metal containers. All tanks and pipelines which contain this material must be labeled. Perform routine maintenance on tanks or pipelines which contain this product. Report all leaks immediately to the proper personnel.

Tank Car Shipments: *Cannot be transported in unlined cold rolled, stainless steel or rubber lined tank cars. Determine compatibility with the vessel prior to shipment.* Tank cars carrying this product should be loaded and unloaded in strict accordance with tank-car manufacturer's recommendation and all established on-site safety procedures. Appropriate personal protective equipment must be used (see Section 8, Engineering Controls and Personal Protective Equipment.). All loading and unloading equipment must be inspected, prior to each use. Loading and unloading operations must be attended, at all times. Tank cars must be level, brakes must be set or wheels must be locked or blocked prior to loading or unloading. Tank car (for loading) or storage tank (for unloading) must be verified to be correct for receiving this product and be properly prepared, prior to starting the transfer operations. Hoses must be verified to be clean and free of incompatible chemicals, prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions, before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blown-down and purged before disconnecting them from the tank car or vessel.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment before maintenance begins by a triple-rinse with water followed, if necessary, by using acid neutralizing agent and an additional rinse. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: If required use a corrosion-resistant ventilation system separate from other exhaust ventilation systems to ensure that there is no potential for overexposure to sprays, or mists of this product and that exposures are below those in section 2. Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134, or applicable State regulations. If adequate ventilation is not available or if there is potential for airborne exposure above the exposure limits (listed in Section 2) a respirator may be worn up to respirator exposure limitations, check with respirator equipment manufactures recommendations/limitations. For a higher level of protection use positive pressure supplied air respiration protection or Self Contained Breathing Apparatus or if oxygen levels are below 19.5% or are unknown.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:
Positive pressure, full-facepiece Self Contained Breathing Apparatus; or positive pressure, full-facepiece Self Contained Breathing Apparatus with an auxiliary positive pressure Self Contained Breathing Apparatus.

EYE PROTECTION: Splash goggles or safety glasses. Face-shields are recommended when the operation can generate splashes, sprays or mists.

HAND PROTECTION: Wear appropriate gloves for routine industrial use. Use appropriate gloves for spill response, as stated in Section 6 of this MSDS (Accidental Release Measures).

BODY PROTECTION: Use body protection appropriate for task. Cover-all, rubber aprons, or chemical protective clothing made from natural rubber or other appropriate materials are generally acceptable, depending upon the task.

9. PHYSICAL and CHEMICAL PROPERTIES

Physical and chemical properties for Sulfuric Acid.

Appearance: Clear oily liquid.
Odor: Odorless.
Solubility: Miscible with water, liberates much heat.
Specific Gravity: 1.84 (98%), 1.40 (50%), 1.07 (10%)
pH: 1 N solution (ca. 5% w/w) = 0.3; 0.1 N solution (ca. 0.5% w/w) = 1.2; 0.01 N solution (ca. 0.05% w/w) = 2.1.
% Volatiles by volume @ 21C (70F): No information found.
Boiling Point: ca. 290C (ca. 554F) (decomposes at 340C)
Melting Point: 3C (100%), -32C (93%), -38C (78%), -64C (65%).
Vapor Density (Air=1): 3.4
Vapor Pressure (mm Hg): 1 @ 145.8C (295F)
Evaporation Rate (BuAc=1): No information found.

ODOR THRESHOLD: Not available.
APPEARANCE AND COLOR: No odor.
HOW TO DETECT THIS SUBSTANCE (warning properties): Litmus paper will turn red upon contact with even low concentrations of this solution.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this solution can include carbon monoxide, carbon dioxide and oxides of sulfur.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product reacts with bases, reducing agents, alkali metals, carbides, cyanides, sulfides and metal powders. Do not mix this product with sodium hypochlorite, sodium bisulfite, Chlorine Sanitizers or Chlorinated Cleaners – a deadly gas can be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures and incompatible chemicals.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Additional toxicology information for components greater than 1 percent in concentration is provided below.
SULFURIC ACID:
LD_{50} (oral, rat) 2140 mg/kg LC_{50} (rat) 510 mg/m2 /2 hrs LC_{50} (rat) 347 ppm/1 hr

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA; and are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

BCS,LLC only adds water to produce lower concentrations of sulfuric acid. The following quote is from a 93% sulfuric acid MSDS dated 5/7/97 from Rhodia Inc., who is a producer of sulfuric acid and is regarding cancer and strong acid mists. "The International Agency for Research on cancer (IARC) has classified strong inorganic acid mists containing sulfuric as a known human carcinogen (IARC Category 1). This classification applies to sulfuric acid when it is generated as a mist. There is still debate in the scientific community whether the studies reviewed by IARC adequately controlled for confounding occupational exposures and personal habits such as smoking and alcohol consumption. A few epidemiology studies have suggested a possible association between sulfuric acid exposure and laryngeal or lung cancer; however, in all these studies, workers were exposed to many other chemicals, some of which are recognized carcinogens, such as diethylsulfate and nickel. Considering the multiple chemical exposures and other limitations of the studies we (Rhodia Inc.) disagree with IARC's conclusions that a cause and effect relationship between cancer and exposure to strong inorganic acid mist containing sulfuric acid has been demonstrated."

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11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: This product is severely irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: No component of this product is known to be a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to produce mutagenic effects in humans.
Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.
Teratogenicity: This product is not reported to cause teratogenic effects in humans.
Reproductive Toxicity: This product is not reported to cause reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently there are no Biological Exposure Indices (BEIs) associated with the components of this product.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin disorders can be aggravated by over-exposure to this product. Inhalation of this products mists may aggravate respiratory conditions.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure to this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: No chemical fate data found.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product is harmful or fatal to plant and animal life if released into the environment. As with all chemicals, work practices should be aimed at eliminating environmental releases. Refer to Section 11 (Toxicological Information) for further toxicological data.

EFFECT OF CHEMICAL ON AQUATIC LIFE: The toxicity of sulfuric acid to fish is dependent on the resulting pH of the water, lethality at a ph of 5.0 or below. Required to cause lethality varies depending on the hardness of the water (hard water has some buffering capacity) and the species of fish (some fish are more resistant to the effects of acidity) . McKee, JE, and Wolf, HA (Editors) Water Quality Criteria, 2nd ed., Publications No. 3-A, p. 279, California State Water Quality Resources Control Board, Sacramento, CA (Rev.: 1963).

As with all chemicals, work practices should be aimed at eliminating environmental releases.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: D002 (Characteristic, Corrosivity), applicable to wastes consisting only of this solution.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Sulfuric Acid with more than 51% acid
HAZARD CLASS NUMBER and DESCRIPTION:	8 (Corrosive Material)
UN IDENTIFICATION NUMBER:	UN 1830
PACKING GROUP:	II
DOT LABEL(S) REQUIRED:	Corrosive

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 137

M00-493

14. TRANSPORTATION INFORMATION—(Continued)

MARINE POLLUTANT: This product does not contain any components which are designated by the Department of Transportation to be Marine Pollutants. (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

Note: The latest DOT information is provided, please verify all DOT information as it is subject to change without notice.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of this product subject to the reporting requirements of Section 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act are as follows.

COMPONENT	SARA 302	SARA 304	SARA 313
Sulfuric Acid	Yes	Yes	No

SARA Threshold Planning Quantity: NA

TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Sulfuric Acid = 1000 lbs.

OTHER FEDERAL REGULATIONS: Not applicable.

STATE REGULATORY INFORMATION: Not determined.

CALIFORNIA PROPOSITION 65: No component of this product is on the California Proposition 65 lists.

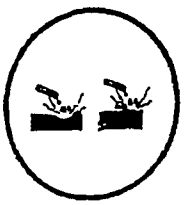
LABELING (Precautionary Statements): **DANGER!** CORROSIVE MATERIAL! LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. MAY CAUSE LUNG DAMAGE. Do not get into eyes, on skin or clothing. Avoid breathing spray or mist. Do not take internally. Use with adequate ventilation and employ respiratory protection when exposed to the mist or spray. When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing. Do not transfer to unlabeled containers. Wash thoroughly after handling. Keep container closed when not in use. FIRST AID: In case of contact, immediately flush skin or eyes for at least 15 minutes. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not induce vomiting. IN CASE OF FIRE: Use water, dry chemical, CO_2, or alcohol foam. IN CASE OF SPILL: Neutralize residue with acid neutralizing agent. Refer to MSDS for additional information.

TARGET ORGANS: Skin, eyes and respiratory system.

WHMIS SYMBOLS:

D1A- Poisonous and Infectious Materials
Very Toxic Materials

E- Corrosive Material



1100-493

16. OTHER INFORMATION

INFORMATION SOURCE: CHEMICAL SAFETY ASSOCIATES, Inc.
Rhodia Inc.

PREPARED BY: BASIC CHEMICAL SOLUTIONS

DEFINITIONS OF TERMS

15. OTHER INFORMATION (Continued)

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:
ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.
TLV - **Threshold Limit Value** - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour **Time Weighted Average (TWA)**, the 15-minute **Short Term Exposure Limit**, and the Instantaneous **Ceiling** Level. Skin adsorption effects must also be considered.
OSHA - U.S. Occupational Safety and Health Administration.
PEL - **Permissible Exposure Limit** - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.
IDLH - **Immediately Dangerous to Life and Health** - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The DFG - MAK is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. NIOSH is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (OSHA). NIOSH issues exposure guidelines called Recommended Exposure Levels (RELs). When no exposure guidelines are established, an entry of NE is made for reference.

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:
Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: LD_{50} - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; LC_{50} - Lethal Concentration (gases) which kills 50% of the exposed animals; ppm concentration expressed in parts of material per million parts of air or water; mg/m^3 concentration expressed in weight of substance per volume of air; mg/kg quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: IARC - the International Agency for Research on Cancer; NTP - the National Toxicology Program, RTECS - the Registry of Toxic Effects of Chemical Substances, OSHA and CAL/OSHA. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include TDLo, the lowest dose to cause a symptom and TCLo the lowest concentration to cause a symptom; TDo, LDLo, and LDo, or TC, TCo, LCLo, and LCo, the lowest dose (or concentration) to cause death. BEI - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REGULATORY INFORMATION:
This section explains the impact of various laws and regulations on the material. EPA is the U.S. Environmental Protection Agency. WHMIS is the Canadian Workplace Hazardous Materials Information System. DOT and TC are the U.S. Department of Transportation and the Transport Canada, respectively. Other acronyms used are: Superfund Amendments and Reauthorization Act (SARA); the Toxic Substance Control Act (TSCA); Marine Pollutant status according to the DOT; California's Safe Drinking Water Act (Proposition 65); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund); and various state regulations. This section also includes information on the precautionary warnings which appear on the materials package label.

1100-493

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 13-DEC-2004

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SULFURIC ACID 66 BE CMD

PRODUCT APPLICATION AREA:

COMMODITY CHEMICAL

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7664-93-9	SULFURIC ACID Corrosive

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel
Emergency Response Guide #39
Odor: Slight Acid; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide or foam--Avoid water if possible.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

4 FIRST AID MEASURES

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide or foam--Avoid water if possible.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

MISCELLANEOUS:
Corrosive to skin/steel
UN1830;Emergency Response Guide #39

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush with water. Spread sand/grit. Neutralize with bicarbonate.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Acidic. Corrosive to skin and eyes. Do not breathe mist or vapor. Do not mix with alkaline material.

STORAGE:
Keep containers closed when not in use. Use approved containers only. Store in cool, well-vented area. Contact with metals may release flammable hydrogen gas.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SULFURIC ACID
PEL (OSHA): 1 MG/M3
TLV (ACGIH): 1 MG/M3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with acid gas cartridges and dust/mist prefilters.

SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.829	Vapor Pressure (mmHG)	< ND
Freeze Point (F)	-17	Vapor Density (air=1)	> 1.00
Freeze Point (C)	-27		
Viscosity(cps 70F,21C)	22	% Solubility (water)	100.0

Odor		Slight Acid
Appearance		Colorless
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		< 1.0
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"C"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	2,140 mg/kg
Inhalation LC50 RAT:	510 mg/m3/2hr
Skin Irritation Score RABBIT:	CORROSIVE
NOTE - DOT HM181 Packing Group II: corrosive to skin at 60 minutes but not 3 minutes	
Eye Irritation Score RABBIT:	CORROSIVE

NOTE - Estimated value

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen (pH adjusted)
30% Mortality= 5000; 0% Mortality= 2000 mg/L
Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal (pH adjusted)
0% Mortality= 5000 mg/L

BIODEGRADATION

No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH, steel).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Corrosive to skin/steel
UN / NA NUMBER:	UN1830
DOT EMERGENCY RESPONSE GUIDE #:	39

15 REGULATORY INFORMATION

TSCA:

All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

71 gallons due to SULFURIC ACID;

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic);Reactive

SARA SECTION 302 CHEMICALS:

CAS#	CHEMICAL NAME
7664-93-9	SULFURIC ACID

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
7664-93-9	SULFURIC ACID	91.0-100.0

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	2	Moderate Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	18-MAY-1999		** NEW **
	31-JAN-2001	4	18-MAY-1999
	23-MAR-2001	15	31-JAN-2001
	13-DEC-2004	16	23-MAR-2001

GMF-UU-1640
Rcvd 2/27/01

Fg 1 of 5

18623

Degussa

Degussa Corporation

RECEIVED
JUL 29 1998

H202 35% STD BULK

MSDS # 1069 MATERIAL SAFETY DATA SHEET PAGE 1

Degussa Corporation
Chemical Group
65 Challenger Road, Ridgefield Park, NJ 07660
Non-Emergency Product Information: 1-201-641-6100
Emergency Only(Chemtrec): 1-800-424-9300

Revised: 7/09/98 Supersedes: 7/01/98

I. PRODUCT INFORMATION

TRADE NAMES/SYNONYMS: Hydrogen Peroxide 20% to 52%
50% PERTRONIC TM 10 Grade H2O2

CHEMICAL NAME: Hydrogen Peroxide 20% to 52% by wt.in aqueous soloution

CAS NUMBER: 7722-84-1

CHEMICAL FAMILY: Inorganic Peroxide

CHEMICAL FORMULA: H2O2

Distributed By:
Manley-Regan Chemicals
Div. Of E+E (US) Inc,.
Middletown, PA

II. SUMMARY OF HAZARDS

DANGER! This product is a strong oxidizer which may release oxygen and promote the combustion of flammable material. May cause eye and skin irritation and/or burns. May cause irritation to the respiratory tract.
See Section V for additional information on health hazards.

III. HAZARDOUS COMPONENTS

NAME	CAS NO.	%	EXPOSURE LIMITS PEL	TLV	OTHER
1. Hydrogen Peroxide	7722-84-1	20-52	1 ppm	1 ppm	None

No carcinogenicity designated by NTP, IARC, OSHA or others.

IV. CHEMICAL AND PHYSICAL PROPERTIES

BOILING POINT: 220-237 F(104-113 C) VAPOR PRESSURE: 18 - 27 mmHg @ 85 F

MELTING POINT: Not applicable VAPOR DENSITY: 1.0 (Air = 1)

SOL. IN WATER: Complete SPECIFIC GRAVITY: 1.1 - 1.2 (H2O = 1)

Degussa

Degussa Corporation

H202 35% STD BULK

CHEM# 100-1690
Pg 2 of 5

MSDS # 1069 Section IV. Contd. PAGE 2

pH: 0 - 3 EVAPORATION RATE: >1 (Butyl acetate=1)

APPEARANCE/ODOR: Clear, colorless liquid with a slightly pungent odor.

V. HEALTH HAZARD DATA & FIRST AID PROCEDURES

The LD50 below corresponds to 50% Hydrogen Peroxide.

	TOXICITY DATA	
CHEMICAL NAME	LD50	LC50
Hydrogen Peroxide	800 mg/kg rat-orl	Not Available

EYE CONTACT: Expected to cause eye irritation and/or burns. As a liquid, vapor or aerosol, this product could cause corneal damage which may occur several days later. In case of contact, flush eyes with plenty of water for at least 15 minutes. Call physician/ophtalmologist immediately.

SKIN CONTACT: Expected to cause skin irritation and/or burns. As the concentration and/or time of exposure increases, the extent of skin damage increases. In case of contact, flush skin with plenty of water while removing contaminated clothing. Call a physician if irritation persists or if burns occur.

SKIN ABSORPTION: May be harmful if absorbed through the skin. In the case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician if irritation persists or if burns occur.

INHALATION: Expected to be irritating to respiratory tract. If inhaled, remove to fresh air. If breathing is difficult, give oxygen. Call a physician if irritation persists.

INGESTION: Expected to cause burns to the gastrointestinal tract. If swallowed, do not induce vomiting. Give victim plenty of water to dilute stomach contents. Call a physician immediately. Never give anything by mouth to an unconscious person.

CHRONIC EFFECTS OF OVEREXPOSURE: No chronic (long term) effects are known for humans.

OTHER HEALTH EFFECTS: Medical conditions which may be aggravated by exposure to

Degussa

Degussa Corporation

H202 35% STD BULK

CHP# 100-1690
Pg 3 of 5

this product include: Conjunctivitis of the eye, dermatitis of the skin, asthma and respiratory diseases.

VI. EXPOSURE CONTROL MEASURES

EYE PROTECTION: Chemical goggles or face shield is required.

PROTECTIVE GLOVES: Wear chemical resistant neoprene, butyl rubber or vinyl gloves.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure limits listed in Section III by using engineering controls. If not feasible, use an approved supplied air respirator.

OTHER PROTECTION: If skin contact or contamination of clothing is possible, chemical resistant clothing must be worn.

VENTILATION: Provide general and/or local exhaust ventilation to maintain airborne levels below the exposure limits in Section III. Refer to "Industrial Ventilation" by ACGIH for a manual of recommended practices.

PERSONAL HYGIENE/ WORK PRACTICES: Establish good personal hygiene and work practices. Always wash hands and face before eating, drinking or smoking. Provide safety shower and eye wash station in work area.

VII. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): Non-flammable

FLAMMABLE LIMITS LOWER: None UPPER: None

EXTINGUISHING MEDIA: Use water only to fight fires in which this material is involved. Apply vast amounts of water for cooling and dilution.

FIRE FIGHTING INSTRUCTIONS: Evacuate enclosed and surrounding areas. If smoke and fumes cannot be avoided, use proximity suit and self-contained breathing apparatus. In case of external fire, cool hydrogen peroxide container with plenty of water.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Spontaneous combustion can occur if allowed to remain in contact with oxidizable materials. Drying of product on clothing or combustible material may cause fire. Do not

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Degussa Corporation

H202 35% STD BULK

CMP# 100-1690
Pg 4 of 5

MSDS # 1069 Section VII. Contd. PAGE 4

allow temperature of storage tanks to rise above 100F (38C) Do not heat solution to concentrate of 74% or greater. Mixtures with combustible material may be explosive.

VIII. REACTIVITY DATA

STABILITY: This product is stable only when cool and pure.

INCOMPATABILITY: Heavy metals, heavy metal ions/salts, rust, alkali, organic material, reducing agents, dust, and dirt.

HAZARDOUS PRODUCTS OF DECOMPOSITION: Can include oxygen, which will promote the combustion of flammable material.

HAZARDOUS POLYMERIZATION: Will not undergo hazardous polymerization.

IX. ENVIRONMENTAL & DISPOSAL INFORMATION

GENERAL: CERCLA/SARA requires notification to the appropriate Federal state and local authorities of releases of hazardous or extremely hazardous quantities equal to or greater than the Reportable Quantities (RQs) in 40 CFR 302.4 and 40 CFR 355.

SARA Title 313 requires submissions of annual reports of releases of toxic chemicals that appear in 40 CFR 372. Components present in this product at a level which could require reporting under the statute are: *None*

ACTION TO TAKE FOR SPILLS/LEAKS: See Section V and VI for hazards and exposure controls. Eliminate source of spill and wash away with vast amounts of water. For an emergency, call CHEMTREC at 1-800-424-9300 for assistance.

DISPOSAL METHOD: Dispose of in accordance with all local, state and federal regulations. Contact Degussa at (334) 443-4000, ext. 4287 or ext. 4427 for assistance with disposal requirements.

X. PRECAUTIONS FOR SAFE HANDLING, STORAGE AND USE

Store in original vented containers, in dry location and away from sun and heat or in dedicated bulk storage facilities. Protect from physical damage. Keep open flames, fire and sparks away from containers. Do not confine in unvented vessels or between closed valves. Never use

Degussa

Degussa Corporation

H202 35% STD BULK

CMP#100-1690 Pg 5 of 5

pressure to empty container and do not return product to the container after it has been removed.

XI. SHIPPING INFORMATION

PRIMARY HAZARD: Oxidizer SECONDARY HAZARD: Corrosive

DOT SHIPPING NAME: Hydrogen Peroxide Aqueous Solutions

HAZARD CLASS: Oxidizer, (Div. 5.1) UN #: 2014 UN CLASS: 5 PG #: II

49 CFR REFERENCE: 173.202, 173.243

LABEL(S): OXIDIZER CORROSIVE

PLACARD(S): OXIDIZER

SHIPPING RESTRICTIONS: Air - forbidden in concentrations of 40% or greater. Below 40%: Pass. A/C-1 liter max./pkg. Cargo only-5 liters max./pkg.

AUTHORIZED CONTAINER TYPE(S): Drum - UN 3H1. IM 101 Portable Tanks.

XII. ADDITIONAL INFORMATION

THIS MATERIAL IS IN COMPLIANCE WITH THE TOXIC SUBSTANCES CONTROL ACT

For additional product safety or product use information, contact the Product Manager at the address or phone number listed on page one.

NOTICE

1100-0394

MATERIAL SAFETY DATA SHEET

- **Trade Name:** WOOD FLOUR
- **Synonyms:** None
- **CAS. Number:** None
- **Description:** Particles generated by any manual or mechanical cutting or abrasion process performed on wood
- **Physical Data:**

Boiling Point	Not applicable
Specific Gravity	Variable (Dependent on wood species and moisture content)
Vapor Density	Not applicable
% Volatiles by Volume	Not applicable
Melting Point	Not applicable
Vapor Pressure	Not applicable
Solubility in H_2O (% by Wt.)	Insoluble
Evaporation Rate (Butyl Acetate =1)	Not applicable
pH	Not applicable
Appearance & Odor	Light to dark granular solid. Color and odor are dependent on the wood species and length of time since dust was generated.

- **Fire & Explosive Data**

Flash Point	Not applicable
Autoignition Temperature	Variable (Typically 400-500 degrees F)
Explosive Limits in Air	40 grams per cubic meter (LEL)
Extinguishing Media	Water, sand, CO_2
Special Fire Fighting Procedures	Use Water to wet down wood dust to reduce the likelihood of ignition or dispersion of dust into the air. Remove burned or wet dust to open area after fire is extinguished
Unusual Fire and explosive Hazard	Wood dust is a strong to severe explosive hazard if dust "cloud" contacts an ignition source

- **Health Effects Information:**

Exposure Limit	ACGIH TLV (R): TWA-5.0 mg/m3; STEL 915 min)-10.0 mg/m3 (softwoods); TWA-1.0 mg/m3 hardwoods.
See important footnote below	OSHA PEL: TWA - 15.0 mg/m3 (total dust);

concerning OSHA PEL's for wood dust skin and eye contact**	5.0 mg/m3 (restorable fraction)
Ingestion	Not applicable
Skin Absorption	Not known to occur
Inhalation	May cause nasal dryness, irritation and obstruction. Coughing, wheezing and sneezing; sinusitis and prolonged colds have also been reported.
Chronic Effects	Wood dust, depending on species, may cause dermatitis on prolonged, repetitive contact; may cause respiratory sensitization and or irritation. IARC classifies wood dust as a carcinogen to humans (group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust.

** In AFL-CIO v OSHA 965 F. 2d 962 (11th Cir. 1992) , the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PEL's for wood dust that OSHA had established at the time. The 1989 PEL's were: TWA-5.0 mg/m3; STEL (15 min) - 10.0 mg/m3 (all soft and hardwoods, except Western red color): Western Red Cedar: TWA - 2.5 mg/m3. Wood product is now officially regulated as an organic dust under the Particulates Not Otherwise Regulate (PNOR) or Inert or Nuisance Dust categories at PEL's noted under Health Effects Information section of this MSDS. How ever, a number of states have incorporated provisions of the 1989 standard in their state plans. Additionally, OSHA has announced that it may cite companies under the OSHA Act general duty clause under appropriate circumstances for non-compliance with the 1989 PEL's.

- **Reactivity Data**

Conditions Contributing to Instability	Stable under normal conditions
Incompatibility	Avoid contact with oxidizing agents and drying oils. Avoid open flames. Product may ignite at temperatures in excess of 400° F.
Hazardous Decomposition Products	Thermal oxidative degradation of wood produces irritating and toxic fumes and gases, including CO, aldehydes and organic acids.
Conditions Contributing to Polymerization	Not applicable

- **Precautions & Safe Handling**
  - Avoid eye contact.
  - Avoid repeated or prolonged contact with skin. Careful bathing and clean cloths are indicated after exposure.
  - Avoid prolonged or repeated breathing of wood dust in the air.
  - Avoid contact with oxidizing agents and drying oils.
  - Avoid open flame.

- **Generally Applicable Control Measures**

Ventilation	Provide adequate and local exhaust ventilation to maintain healthful working conditions.
Protection	Wear goggles or safety glasses. Other protective equipment such as gloves and approved dust respirators may be needed depending upon dust conditions.

- **Emergency & First Aid Procedures:**

Eyes	Flush with water to remove dust particles. If irritation persists, get medical attention.
Skin	If a rash or persistent irritation or dermatitis occur, get medical advice where applicable before returning to work where wood dust is present.
Inhalation	Remove to fresh air. If persistent irritation, severe coughing, or breathing difficulties occur, get medical advice before returning to work here wood dust is present.
Ingestion	Not Applicable

- **Spill/Leak Clean Up Procedures:** Sweep or vacuum spills for recovery or disposal; avoid creating dust conditions. Provide good ventilation where dust conditions may occur. Place recovered wood dust in a container for proper disposal.

1100-0449

MATERIAL SAFETY DATA SHEET

- **Trade Name:** WOOD FLOUR
- **Synonyms:** None
- **CAS. Number:** None
- **Description:** Particles generated by any manual or mechanical cutting or abrasion process performed on wood
- **Physical Data:**

Boiling Point	Not applicable
Specific Gravity	Variable (Dependent on wood species and moisture content)
Vapor Density	Not applicable
% Volatiles by Volume	Not applicable
Melting Point	Not applicable
Vapor Pressure	Not applicable
Solubility in H_2O (% by Wt.)	Insoluble
Evaporation Rate (Butyl Acetate =1)	Not applicable
pH	Not applicable
Appearance & Odor	Light to dark granular solid. Color and odor are dependent on the wood species and length of time since dust was generated.

- **Fire & Explosive Data**

Flash Point	Not applicable
Autoignition Temperature	Variable (Typically 400-500 degrees F)
Explosive Limits in Air	40 grams per cubic meter (LEL)
Extinguishing Media	Water, sand, CO_2
Special Fire Fighting Procedures	Use Water to wet down wood dust to reduce the likelihood of ignition or dispersion of dust into the air. Remove burned or wet dust to open area after fire is extinguished
Unusual Fire and explosive Hazard	Wood dust is a strong to severe explosive hazard if dust "cloud" contacts an ignition source

- **Health Effects Information:**

Exposure Limit	ACGIH TLV (R): TWA-5.0 mg/m3; STEL 915 min)-10.0 mg/m3 (softwoods); TWA-1.0 mg/m3 hardwoods.
See important footnote below	OSHA PEL: TWA - 15.0 mg/m3 (total dust);

concerning OSHA PEL's for wood dust skin and eye contact**	5.0 mg/m3 (restorable fraction)
Ingestion	Not applicable
Skin Absorption	Not known to occur
Inhalation	May cause nasal dryness, irritation and obstruction. Coughing, wheezing and sneezing; sinusitis and prolonged colds have also been reported.
Chronic Effects	Wood dust, depending on species, may cause dermatitis on prolonged, repetitive contact; may cause respiratory sensitization and or irritation. IARC classifies wood dust as a carcinogen to humans (group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust.

** In AFL-CIO v OSHA 965 F. 2d 962 (11th Cir. 1992) , the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PEL's for wood dust that OSHA had established at the time. The 1989 PEL's were: TWA-5.0 mg/m3; STEL (15 min) - 10.0 mg/m3 (all soft and hardwoods, except Western red color): Western Red Cedar: TWA - 2.5 mg/m3. Wood product is now officially regulated as an organic dust under the Particulates Not Otherwise Regulate (PNOR) or Inert or Nuisance Dust categories at PEL's noted under Health Effects Information section of this MSDS. How ever, a number of states have incorporated provisions of the 1989 standard in their state plans. Additionally, OSHA has announced that it may cite companies under the OSHA Act general duty clause under appropriate circumstances for non-compliance with the 1989 PEL's.

- **Reactivity Data**

Conditions Contributing to Instability	Stable under normal conditions
Incompatibility	Avoid contact with oxidizing agents and drying oils. Avoid open flames. Product may ignite at temperatures in excess of 400° F.
Hazardous Decomposition Products	Thermal oxidative degradation of wood produces irritating and toxic fumes and gases, including CO, aldehydes and organic acids.
Conditions Contributing to Polymerization	Not applicable

- **Precautions & Safe Handling**
  - Avoid eye contact.
  - Avoid repeated or prolonged contact with skin. Careful bathing and clean cloths are indicated after exposure.
  - Avoid prolonged or repeated breathing of wood dust in the air.
  - Avoid contact with oxidizing agents and drying oils.
  - Avoid open flame.

- **Generally Applicable Control Measures**

Ventilation	Provide adequate and local exhaust ventilation to maintain healthful working conditions.
Protection	Wear goggles or safety glasses. Other protective equipment such as gloves and approved dust respirators may be needed depending upon dust conditions.

- **Emergency & First Aid Procedures:**

Eyes	Flush with water to remove dust particles. If irritation persists, get medical attention.
Skin	If a rash or persistent irritation or dermatitis occur, get medical advice where applicable before returning to work where wood dust is present.
Inhalation	Remove to fresh air. If persistent irritation, severe coughing, or breathing difficulties occur, get medical advice before returning to work here wood dust is present.
Ingestion	Not Applicable

- **Spill/Leak Clean Up Procedures:** Sweep or vacuum spills for recovery or disposal; avoid creating dust conditions. Provide good ventilation where dust conditions may occur. Place recovered wood dust in a container for proper disposal.

MATERIAL SAFETY DATA SHEET

Product name: SAG® 2001 foam control agent

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: SAG® 2001 foam control agent

Chemical name: Polydimethylsiloxane emulsion

Supplier:
GE Silicones
3500 South State Route 2
Friendly, WV 26146, USA

Contact numbers:

CHEMTREC (24 hours):	800-424-9300
GE Silicones Emergency Response (24 hours):	800-809-9998
GE Silicones Emergency Response (24 hours):	304-926-8418
For Product Safety Inquiries:	304-652-8446
For MSDS only:	304-652-8155
Customer Service:	800-523-5862

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS#	CONCENTRATION
Water	7732-18-5	> 70.0 %
Silica filled polydimethylsiloxane	67762-90-7	< 20.0 %
Proprietary additives	Trade secret	< 10.0 %

Note(s): See Section 15 for chemicals appearing on Federal or State Right-To-Know lists.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

NORMAL PRECAUTIONS COMMON TO SAFE MANUFACTURING PRACTICE SHOULD BE FOLLOWED IN HANDLING AND STORAGE.

4. FIRST AID MEASURES

Swallowing
No emergency care anticipated.

Skin
Wash skin with soap and water.

Inhalation
No emergency care anticipated.

Eye contact

Flush eyes thoroughly with water for several minutes.

Notes to physician
There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Flammable limits

Lower limit:	Not available
Upper limit:	Not available

Special fire fighting procedures
None.

Special protective equipment for firefighters
Use self-contained breathing apparatus when fighting fires in enclosed areas.

Extinguishing media
Suitable: Non-flammable (aqueous solution).
After water evaporates, the remaining material will burn.
Large fires:
- alcohol-type foam or universal-type foams
Small fires:
- CO2
- dry chemical

Unsuitable: None.

Unusual fire and explosion hazards
This material may produce a floating fire hazard in extreme fire conditions.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid contact with eyes and skin. Avoid contact with liquid and vapors. Wear suitable protective equipment.

Environmental precautions
Prevent runoff.

Methods for cleaning up
Cover with absorbent or contain.
Collect for disposal.
Observe government regulations.

7. HANDLING AND STORAGE

HANDLING

Handling precautions
Avoid contact with eyes, skin and clothing. Do not breathe vapor, mist or aerosol. Use with adequate ventilation. Wash thoroughly after handling.

STORAGE
Storage requirements
Store in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTION
Respiratory protection
None expected to be needed.

Hand protection / protective gloves
Recommended order of use:
4H
Butyl
Neoprene
Nitrile (NBR)
PVC-coated

Eye protection
Safety glasses.

Other protective equipment
Eye bath
Safety shower

ENGINEERING CONTROLS
Ventilation
General (mechanical) room ventilation is expected to be satisfactory.

EXPOSURE LIMITS
No exposure limits have been established

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Physical state	*Liquid*
Color	Opaque white
Odor	Mild

OTHER PROPERTIES

Boiling point	> 100 °C at STP unless specified below. Mixture
Melting point	0 °C at STP unless specified below.

	(approximately)
pH	Not available
Specific gravity (H2O=1)	0.9660 at 25 °C (1,013 hPa)
Vapor pressure	< 26.6 hPa (20.00 mmHg) at 20 °C
Vapor density (air=1)	Heavier than air
Solubility in water	Dispersible
Evaporation rate (Butyl Acetate=1)	< 1
Flash point	None, Aqueous system
Upper explosion limits	Not available
Lower explosion limits	Not available
Percent volatiles	Not determined
Molecular weight	*Mixture*

10. STABILITY AND REACTIVITY

Stability: Stable.

Stability - Conditions to avoid
None known.

Incompatible materials
None currently known.

Hazardous combustion products
Burning can produce the following combustion products:
Oxides of carbon.
Oxides of silicon.
Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.
Acute overexposure to the products of combustion may result in irritation of the respiratory tract.

Hazardous polymerization: Will not occur.

Hazardous polymerization - Conditions to avoid
None known.

11. TOXICOLOGICAL INFORMATION

SWALLOWING

Acute effects
No evidence of harmful effects from available information.

SKIN ABSORPTION
Acute effects
No evidence of harmful effects from available information.

INHALATION
Acute effects
Short-term harmful health effects are not expected from vapor generated at ambient temperature.

SKIN CONTACT
Acute effects
No evidence of harmful effects from available information.

EYE CONTACT
Acute effects
No evidence of harmful effects from available information.

Medical conditions aggravated by overexposure
A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Other effects of overexposure
No adverse effects anticipated from available information.

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH
No information relevant to human health hazard evaluation is currently available.

12. ECOLOGICAL INFORMATION

All available ecological data have been taken into account for the development of the hazard and precautionary information contained in this Safety Data Sheet.

13. DISPOSAL CONSIDERATIONS

General: Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

14. TRANSPORT INFORMATION

DOT Classification
This product is not regulated by DOT.
Freight description road: OIL, O/T PETROLEUM, LUBRICATING, NOIBN

IMDG Classification
This product is not regulated by IMDG.

Product name: SAG® 2001 foam control agent

ICAO Classification
This product is not regulated by ICAO.

15. REGULATORY INFORMATION

Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of hazardous substances equal to or greater than the reportable quantities (RQ's) in 40CFR302.4.
Components present in this product at a level which could require reporting under the statute are:
**** NONE ****

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQ's) and release reporting based on Reportable Quantities (RQ's) in 40CFR355 (used for SARA 302 and 304).
Components present in this product at a level which could require reporting under the statute are:
**** NONE ****

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual reports of release of toxic chemicals that appear in 40CFR372 (for SARA 313). This information must be included in MSDS's that are copied and distributed for this material.
Components present in this product at a level which could require reporting under the statute are:
**** NONE ****

Massachusetts Right-To-Know Substance List (MSL)--Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products.
Components present in this product at a level which could require reporting under the statute are:
**** NONE ****

Pennsylvania Right-To-Know Hazardous Substance List--Hazardous Substances and Special Hazardous Substances on the list must be identified when present in products.
Components present in this product at a level which could require reporting under the statute are:
**** NONE ****

New Jersey Worker and Community Right-To-Know Act (Labeling Requirements)

Chemical name	CAS#	New Jersey TS Number
Water	7732-18-5	
Silica filled polydimethylsiloxane	67762-90-7	
Alkyl stearate	Trade secret	NJ Reg# 26175-20057P

EPA Hazard Categories (SARA 311, 312): None

California Proposition 65
This product contains no levels of listed substances, which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute.

California SCAQMD Rule 443.1 VOC's
Volatile Organic Components (VOC's) = Substances with vapor pressure of => 0.5 mmHg at 104'C (219.2'F).
****NOT DETERMINED****

CHEMICAL INVENTORY

Canada: The ingredients of this product are on the DSL.

Product name: SAG® 2001 foam control agent

Europe:	The ingredients of this mixture are on the EINECS inventory.
United States:	The components of this product are listed on the TSCA inventory or are exempt.
Australia:	This product, or the components, is listed or exempt from listing on the Australian Inventory of Chemical Substances (AICS).
Japan:	This product is not listed or exempt from listing on the Existing and New Chemical Substances (ENCS) list.
Korea:	This product is not listed on the Existing Chemicals List (ECL).
Philippines:	This product, or the components, is listed or exempt from listing on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).

16. OTHER INFORMATION

RECOMMENDED USES AND RESTRICTIONS
Please consult the product and/or application information bulletins for this product.

HMIS RATING

Health: 0	Flammability: 0	Reactivity: 0	PPI: X

LEGEND

STP	Standard temperature and pressure
W/W	Weight/Weight
0 (HMIS)	Minimal hazard
1 (HMIS)	Slight hazard
2 (HMIS)	Moderate hazard
3 (HMIS)	Serious hazard
4 (HMIS)	Severe hazard
X (HMIS)	Personal protection rating to be supplied by user depending on use conditions

The opinions expressed herein are those of qualified experts within GE Silicones. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and of these opinions and the conditions of use of this product are not within the control of GE Silicones, it is the user's obligation to determine the conditions of safe use of the products.

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 14-JAN-2003

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

CONTINUUM AEC3107

PRODUCT APPLICATION AREA:

WATER-BASED CORROSION INHIBITOR/DEPOSIT CONTROL AGENT.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) Corrosive; toxic (by ingestion)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Alkaline. Do not mix with acidic material.

STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SODIUM HYDROXIDE (CAUSTIC SODA)
PEL (OSHA): 2 MG/M3
TLV (ACGIH): 2 MG/M3(CEILING)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.275	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	15	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-9		
Viscosity(cps 70F,21C)	56	% Solubility (water)	100.0

Odor		Slight
Appearance		Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C

pH As Is (approx.)	> 13.0
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >2,000 mg/kg
NOTE - Estimated value
28 Day Oral RAT:
NOTE - 100% polymer at 1,000 mg/kg/day caused no treatment related toxicity
Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Estimated value
Non-Ames Mutagenicity MOUSE:
NOTE - 100% polymer was negative in the In Vivo Bone Marrow Micronucleus Assay

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1575; No Effect Level= 1300 mg/L
Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal (pH adjusted)
0% Mortality= 2000 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay (pH adjusted)
10% Mortality= 8000; No Effect Level= 4000 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 2929; No Effect Level= 2000 mg/L
Sheepshead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
No Effect Level= 8000 mg/L

BIODEGRADATION
BOD-28 (mg/g): 24
BOD-5 (mg/g): 10
COD (mg/g): 286
TOC (mg/g): 121

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
3,799 gallons due to SODIUM HYDROXIDE (CAUSTIC SODA);
SARA SECTION 312 HAZARD CLASS:
Immediate(acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds
CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds
MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	30-JAN-1997		** NEW **
	03-OCT-1997	;EDIT:9	30-JAN-1997
	11-JUN-1998	12	03-OCT-1997

02-SEP-1998	12	11-JUN-1998
05-JAN-1999	12	02-SEP-1998
14-JAN-2003	3,4,15	05-JAN-1999

Aluminum sulfate, solid

MSDS No. 010
9/15/04

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product/Chemical Name:	Aluminum Sulfate, Dry	**Manufacturer:**	
Chemical Formula:	$Al_2(SO_4)_3 \bullet (14\text{-}18)(H_2O)$	Delta Chemical Corporation	
CAS Number:	10043-01-3	2601 Cannery Avenue	
General Use:	Water Treatment Chemical	Baltimore, MD 21226-1595	
Emergency Contact:	**800-424-9300**	Phone 410-354-0100 (7:00am 5:00pm)	
	Chemtrec	FAX 410-354-1021	

HMIS	
H	1
F	0
R	1
PPE†	
†Sec. 8	

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% wt
Aluminum sulfate	10043-01-3	57
Water	7732-18-5	43

	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
Ingredient	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
Aluminum sulfate	2 mg/m^3 *as aluminum*	none estab.	2 mg/m^3 *as aluminum*	none estab.	2 mg/m^3 *as aluminum*	none estab.	none estab.

Toxicity Data:

Section 3 - Emergency Overview

Description: White granule or powder. Water soluable. Not volatile. Not flammable.
Hazards: Harmful by ingestion. Irritating to eyes, respiratory system and skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Section 4 - First Aid Procedures

Eye Contact: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention.

Skin Contact: Remove contaminated clothing and wash contaminated skin with water.

Ingestion: Do not induce vomiting, drink milk or water and immediately seek medical attention. Ingestion may irritate gastrointestinal tract.

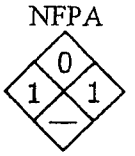
After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 5 - Physical and Chemical Properties

Physical State:	solid	**Water Solubility:**	Complete
Appearance:	White granule or powder	**Density:**	varies, <98 lb/cu ft
Odor:	negligible odor	**Boiling Point:**	117° C/242° F
Vapor Pressure:	None	**Freezing/Melting Point:**	105° C/221° F
Vapor Density (Air=1):	Not applicable	**% Volatile:**	0.0
pH of 1% solution:	3.3 ± 0.5		

Section 6 - Fire-Fighting Measures

Flash Point:	Not applicable
Burning Rate:	Not applicable
Autoignition Temperature:	Not applicable
LEL:	Not applicable
UEL:	Not applicable
Flammability Classification:	Non-flammable
Unusual Fire or Explosion Hazards:	If exposed to temperatures greater than 1400°F aluminum sulfate will decompose generating toxic and corrosive gas.
Hazardous Combustion Products:	See Section 7.
Fire-Fighting Instructions:	Do not release runoff from fire control methods to sewers or waterways.



Section 7 - Stability and Reactivity

Stability:	Stable at room temperature in closed containers under normal storage and handling conditions.
Polymerization:	Hazardous polymerization does not occur.
Chemical Incompatibilities:	Contact with alkalies and water-reactive materials causes exothermic reactions.
Conditions to Avoid:	None
Hazardous Decomposition Products:	Thermal oxidative decomposition of Aluminum Sulfate occurs at temperatures greater than 1400°F and can produce sulfur oxides.

Section 8 - Health Hazard Information

Primary Entry Routes:	Ingestion, inhalation, eye or skin contact
Target Organs:	None
Acute Effects	No unusual
Eye:	May cause a burning feeling.
Skin:	May cause a skin rash or burning feeling.
Ingestion:	May cause irritation of stomach and intestines. May cause nausea, vomiting or purging.
Inhalation:	Breathing aluminum sulfate can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
Carcinogenicity:	IARC, NTP, and OSHA do not list Aluminum Sulfate as a carcinogen.
Medical Conditions Aggravated by Long-Term Exposure:	Aluminum sulfate can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, an/or shortness of breath.
Chronic Effects:	IARC, NTP, and OSHA list no evidence showing that any of the ingredients cause cancer or affect reproduction.

Section 9 - Spill, Leak, and Disposal Procedures

Spill /Leak Procedures:	Spill procedures are dictated by site wastewater flow controls and will vary from site to site. General procedures are provided in this document, but authorization for any wastewater discharge must be obtained prior to the discharge.
Large and Small Spills:	Sweep and shovel up dry chemical and place in a covered container. Wash down residue with large amounts of water and neutralize with soda ash or lime if necessary. Aluminum sulfate solutions can have a pH less than two. The neutralization of aluminum sulfate can generate carbon dioxide. Adequate ventilation must be provided. Do not discharge wastewaters to the environment or a wastewater treatment plant without authorization from the appropriate officials.
Containment:	Aluminum sulfate may absorb moisture and powders or crystals can solidify into a single mass. Protect aluminum sulfate from moisture.
Cleanup:	Wash impacted areas with water to remove residues.
Regulatory Requirements:	Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal:	Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
Container Cleaning and Disposal:	Make sure bags are completely empty and dispose of as industrial/commercial waste.

Section 10 - Regulatory Information

EPA Regulations:	
RCRA Hazardous Waste Number:	Not listed (40 CFR 261.33)
RCRA Hazardous Waste Classification	(40 CFR 261.): Not classified
CERCLA Hazardous Substance (40 CFR 302.4)	Listed CWA, Sec. 311 (b)(4)
CERCLA Reportable Quantity (RQ)	5,000 lbs (2,270 kg) as $Al_2(SO_4)_3$ 8,870 lbs (4,023 kg) as $Al_2(SO_4)_3 \cdot 14(H_2O)$
SARA 311/312 Codes:	Immediate (acute) health hazard
SARA Toxic Chemical (40 CFR 372.65):	Not listed
SARA EHS (Extremely Hazardous Substance) (40 CFR 355):	Not listed
OSHA Regulations:	
Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A):	Not listed
OSHA Specifically Regulated Substance (29CFR 1910.)	Not listed
State Regulations:	Delta Chemical Corporation has not investigated state specific requirements.

Section 11 - Exposure Controls / Personal Protection

Engineering Controls:	The best protection is to enclose operations and/or provide local exhaust ventilation at the site of the chemical release. Dust emission control may be required depending on the dust generation rate. Isolation operations can also reduce exposure.
Ventilation:	Can be used to control dust exposure but may require emission controls.
Administrative Controls:	Good work practices can help to reduce exposures. Train employees to minimize dust while handling this material.
Respiratory Protection:	Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical

certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear protective gloves, boots, long pants and long sleeve shirts to prevent prolonged or repeated skin contact. Wear protective chemical safety glasses, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 12 - Special Precautions and Comments

Handling Precautions: Minimize and/or control dust while handling.

Storage Requirements: Store in a cool, dry place. Wet aluminum sulfate will corrode steel.

Section 13 - DOT Transportation Data (49 CFR 172.101)

Shipping Name:	RQ Environmentally Hazardous Substance, solid, N.O.S., 9, UN3077, III (Aluminum sulfate)	**Packaging Authorizations**	
		a) Exceptions:	173.155
		b) Non-bulk Packaging:	173.213
Hazard Class:	9	c) Bulk Packaging:	173.240
DOT No.:	UN3077	**Quantity Limitations**	
Packing Group:	III	a) Passenger, Aircraft, or Railcar:	no limit
Special Provisions (172.102):	8,146,B54,IB8,N20	b) Cargo Aircraft Only:	no limit
		Vessel Stowage Requirements	
NAERG 2000	Guide 171	a) Vessel Stowage:	A
		b) Other:	

Prepared By: Craig T. Owen
Effective Date: 12/10/01
Revision Notes: 9/15/04, 4/12/04 Formatting changed

CMP # 1100-380
Rec'd - 4/10/01

C-9L

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
24-Hour Emergency Telephone
Phone–(412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

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Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: C-9L

CHEMICAL DESCRIPTION: Acidic aqueous solution
PRODUCT CLASS: Corrosion inhibitor
MSDS CODE: 0E23-01-15-97

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Phosphoric acid	7664-38-2	30 - 41	TWA 1 mg/m3 STEL 3 mg/m3	TWA 1 mg/m3 STEL 3 mg/m3
Zinc chloride	7646-85-7	15 - 20	TWA 1 mg/m3 STEL 2 mg/m3 (fume)	TWA 1 mg/m3 STEL 2 mg/m3 (fume)

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

Clear, colorless, low viscosity liquid.
DANGER!
Permanent disability can occur from overexposure.
May cause severe eye and skin damage.
May be harmful if swallowed.
May cause respiratory tract irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, ingestion, inhalation

TARGET ORGANS: Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin and respiratory conditions.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product is expected to produce severe irritation and damage upon contact with the eyes.

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SKIN CONTACT: This product is expected to produce severe irritation and burns of the skin. It is not expected to be absorbed through the skin in harmful amounts. Zinc chloride may produce true sensitization (induction of allergy) of the skin in the form of eczematoid dermatitis. Phosphoric acid may not produce an immediate burning sensation upon skin contact, delaying the awareness that contact has occurred.

INGESTION: The low pH of the product would indicate that it may produce severe irritation or burns to the mouth, throat, esophagus, and stomach if swallowed. Symptoms of ingestion of zinc chloride may include stomach pain, nausea, vomiting, bloody diarrhea, constriction of the throat, protein or blood in the urine, and shock.

INHALATION: This product is not expected to present an inhalation hazard unless mist, fume, or vapor is generated. Phosphoric acid has a low vapor pressure at room temperature and is not expected to present a significant inhalation hazard under ambient conditions. Phosphoric acid, however, can be irritating to the respiratory tract if inhaled as a mist or if the material is vaporized. Symptoms of inhalation of zinc chloride mist include headache, hoarseness, cough, chest pain, fever, nausea, vomiting, shortness of breath, pneumonia, and cyanosis (bluish skin due to deficient oxygenation of the blood).

SUBCHRONIC, CHRONIC: Prolonged exposure to high concentration of mists may cause discomfort and ulceration of nasal passages. The effects of chronic exposure to eyes and skin are dependent upon concentration and duration of exposure. Dermatitis, conjunctivitis or effects similar to those for acute exposure may occur.

CARCINOGENICITY:
NTP: No ingredients listed in this section.
IARC: No ingredients listed in this section.
OSHA: No ingredients listed in this section.

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical aid immediately. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give one or two glasses of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASHPOINT: > 200°F (>93°C)
This product is not by definition a "flammable liquid" or a "combustible liquid".

LOWER FLAMMABLE LIMIT: Not available

UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

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FIRE-FIGHTING INSTRUCTIONS:
Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential. Avoid breathing corrosive vapors and keep upwind.

FIRE & EXPLOSION HAZARDS: Phosphoric acid may react with metals to release flammable hydrogen gas. Product may release zinc chloride and zinc oxide fumes and hydrogen chloride gas in a fire.

DECOMPOSITION PRODUCTS: Oxides of phosphorus, zinc oxide, hydrogen chloride.

NFPA CODES: Health = 3 Flammability = 0 Reactivity = 0 Special Hazard = COR

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container. Avoid discharge to natural waters.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes, on skin or clothing.
Avoid breathing vapor, mist or fume.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Do not store near incompatible materials.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local and/or general exhaust ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

UNSATISFACTORY MATERIALS OF CONSTRUCTION:
This product contains chloride at a low pH which is very corrosive to stainless steel.

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Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: > 212°F (> 100°C)

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: Similar to water

SPECIFIC GRAVITY: 1.40 - 1.44

VAPOR DENSITY (air = 1): Similar to water

pH: < 1.0

%VOLATILE BY WEIGHT: 47 (water)

FREEZING POINT: -4°F (-20°C)

APPEARANCE AND ODOR: Clear, colorless, low viscosity liquid.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: No specific information.

INCOMPATIBILITY: Product reacts violently with bases and is corrosive to most metals.

DECOMPOSITION PRODUCTS: Oxides of phosphorus, zinc oxide, hydrogen chloride.

Section 11. TOXICOLOGICAL INFORMATION

Test material	Oral LD50(rat)	Dermal LD50(rabbit)	Inhalation LC50(rat)
Phosphoric acid	1530 mg/kg	2740 mg/kg	Not available
Zinc chloride	350 mg/kg	Not available	Not available

Section 12. ECOLOGICAL INFORMATION

Test Material	Aquatic Toxicity Data
Zinc chloride	96 hr LC50 (bluegill sunfish): 2.86-3.78 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of corrosivity. The EPA Hazardous Waste Number is D002.

DISPOSAL: Dispose of in accordance with local, state and federal regulations.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Proper Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s. (contains Phosphoric acid and Zinc chloride)

Class/Division: 8

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ID Number: UN 3264
Packing Group: III
Label: Corrosive

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
Phosphoric acid	5000 lb
Zinc chloride	1000 lb

Product RQ: 6,250 lb (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
None			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
Phosphoric acid	7664-38-2	30 - 41
Zinc chloride	7646-85-7	15 - 20

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3 Flammability = 0 Reactivity = 0

Personal Protective Equipment = X (to be specified by user depending on use conditions)

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

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MSDS REVISION SUMMARY: Supersedes MSDS issued on 09/12/1996. No significant changes have been made to the MSDS.

PREPARED BY: **Megan G. Marks**

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 01-FEB-2006

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

NOVUS CE2680

PRODUCT APPLICATION AREA:

A RETENTION/DRAINAGE/CLARIFICATION AID.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
64742-47-8	ISOPARAFFINIC PETROLEUM DISTILLATE Combustible liquid; irritant
24938-91-8	POLY(OXY-1,2-ETHANEDIYL), ALPHA-TRIDECYL-OMEGA-HYDROXY- Irritant (eyes and skin)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause moderate irritation to the skin. May cause dermatitis. May cause moderate irritation to the eyes. Vapors, gases, mists or aerosols may cause irritation to the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight Hydrocarbon; Appearance: White To Off-White, Emulsion

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause moderate irritation to the skin. May cause dermatitis.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Vapors, gases, mists or aerosols may cause irritation to the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, diarrhea, mental confusion, dizziness and lethargy. Small amounts aspirated during ingestion or vomiting may cause lung injury, possibly leading to death.

TARGET ORGANS:
Prolonged or repeated exposures may cause CNS depression and/or defatting-type dermatitis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Excessive dermal exposure causes defatting and drying of skin. Excessive inhalation of vapors causes dizziness, headache and nausea.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician.

Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

This product contains a hydrocarbon solvent. Aspiration into the lungs will result in chemical pneumonia and may be fatal.

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:

Clean spill immediately. Wash contaminated skin promptly.

STORAGE:

Keep containers closed when not in use. Protect from freezing. Product forms an unusable solid that can not be thawed, even at room temperature, if subjected to freezing conditions.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

ISOPARAFFINIC PETROLEUM DISTILLATE
PEL (OSHA): 400 PPM
TLV (ACGIH): NOT DETERMINED

POLY(OXY-1,2-ETHANEDIYL), ALPHA-TRIDECYL-OMEGA-HYDROXY-
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER

WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges and dust/mist prefilters.

SKIN PROTECTION:
viton gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.034	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< 23	Vapor Density (air=1)	> 1.00
Freeze Point (C)	< -5		
Viscosity(cps 70F,21C)	1300	% Solubility (water)	ND

Odor		Slight Hydrocarbon
Appearance		White To Off-White
Physical State		Emulsion
Flash Point	P-M(CC)	> 200F > 93C
pH 1% Sol. (approx.)		4.8
Evaporation Rate (Ether=1)		< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= .09; No Effect Level= .06 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 2.4; No Effect Level= .39 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 5.1; No Effect Level= .8 mg/L

BIODEGRADATION

BOD-28 (mg/g): 132
BOD-5 (mg/g): 122
COD (mg/g): 850
TOC (mg/g): 320

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
Treat as oil spill

FOOD AND DRUG ADMINISTRATION:
Generally recognized as safe (GRAS) for papermaking applications that may contact aqueous and fatty food per 21 CFR 170.30.

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:
This product contains these chemicals known to the state of California to cause cancer and/or reproductive toxicity:

CAS#	CHEMICAL NAME
79-06-1	ACRYLAMIDE
7758-01-2	POTASSIUM BROMATE
5064-31-3	NITRILOTRIACETIC ACID,TRISODIUM SALT (NTA.3NA)
50-00-0	FORMALDEHYDE
75-21-8	ETHYLENE OXIDE (OXIRANE)

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	28-OCT-1998	2,8	29-JAN-1997
	01-JUN-1999	15	28-OCT-1998
	19-MAY-2000	3,4	01-JUN-1999
	13-AUG-2001	4	19-MAY-2000
	01-APR-2004	15	13-AUG-2001
	02-AUG-2004	2	01-APR-2004
	01-FEB-2006	8,15	02-AUG-2004

Material Safety Data Sheet
Zinc acetate dihydrate

ACC# 25250

Section 1 - Chemical Product and Company Identification

MSDS Name: Zinc acetate dihydrate
Catalog Numbers: AC207640010, AC317215000, S80246, S93399, Z20-500
Synonyms: Acetic acid, zinc salt, dihydrate.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
5970-45-6	Zinc acetate dihydrate	> 98	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Warning! Causes eye irritation. May cause skin and respiratory tract irritation. May be harmful if swallowed.
Target Organs: Eyes.

Potential Health Effects
Eye: Causes eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.
Chronic: Chronic exposure may cause kidney damage.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust and fume.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

ngineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Zinc acetate dihydrate	none listed	none listed	none listed
Zinc acetate anhydrous	none listed	none listed	none listed

OSHA Vacated PELs: Zinc acetate dihydrate: No OSHA Vacated PELs are listed for this chemical. Zinc acetate anhydrous: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: faint vinegar like odor
pH: 6-7 (5% soln)
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:200 deg C (dec)
Decomposition Temperature:200 deg C
Solubility: Very soluble in water.
Specific Gravity/Density:1.735
Molecular Formula: Zn(CH3COO)2.2H2O
Molecular Weight:219.50

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Loses 2H2O at 100°C.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, toxic fumes of zinc oxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 5970-45-6: ZG8750000
CAS# 557-34-6: AK1500000
LD50/LC50:
CAS# 5970-45-6:
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Oral, mouse: LD50 = 287 mg/kg;
Oral, rat: LD50 = 794 mg/kg;
CAS# 557-34-6:
Oral, rat: LD50 = 2510 mg/kg;
Carcinogenicity:
CAS# 5970-45-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 557-34-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous

waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 5970-45-6 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 557-34-6 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 557-34-6: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 5970-45-6: acute.

Section 313

This material contains Zinc acetate dihydrate (listed as Zinc compounds), > 98%, (CAS# 5970-45-6) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Zinc acetate anhydrous (listed as Zinc compounds), -%, (CAS# 557-34-6) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 557-34-6 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
CAS# 5970-45-6 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 557-34-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 5970-45-6 can be found on the following state right to know lists: California, (listed as Zinc compounds), Pennsylvania, (listed as Zinc compounds).
CAS# 557-34-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 22 Harmful if swallowed.
R 36 Irritating to eyes.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 39 Wear eye/face protection.

WGK (Water Danger/Protection)

CAS# 5970-45-6: No information available.
CAS# 557-34-6: 1

Canada - DSL/NDSL

CAS# 5970-45-6 is listed on Canada's DSL List.
CAS# 557-34-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

Canadian Ingredient Disclosure List

CAS# 5970-45-6 is not listed on the Canadian Ingredient Disclosure List.
CAS# 557-34-6 is not listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
evision #4 Date: 11/19/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

National Foam, Inc.

Material Safety Data Sheet

Universal Gold 3%

Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)

Section 1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

Product: ..... Universal Gold 3%
Synonyms: ..... Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)
CAS No: ..... Mixture - No single CAS # applicable

Company Identification

Manufacturer National Foam, Inc.
150 Gordon Drive
P.O. Box 270
Exton, PA 19341-1350

DEC 19

Emergency Phone Number (610) 363-1400 (U.S.A.)

Section 2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number
Water	7732-18-5
(2-Methoxymethylethoxy) Propanol	34590-94-8
Sodium Decyl Sulfate	142-87-0
Alkyl Polyglycoside	132778-08-6
Fluoroalkyl Surfactant	34455-29-3

Section 3. HAZARDS IDENTIFICATION

Potential Health Effects

Inhalation
No data available.

Skin Contact
Contact with liquid may cause moderate irritation or dermatitis due to removal of oils from the skin.

Eye Contact
Product is an eye irritant.

Ingestion
No significant signs indicative of any adverse health effect are expected to occur as a result of ingestion. Acute oral toxicity is >5.0 g/kg body weight in Wistar Albino rats.

Additional Health Effects
Existing eye or skin sensitivity may be aggravated by exposure.

Carcinogenicity Information
No data available.

1500-161

Section 4. FIRST AID MEASURES

Inhalation

If inhaled, remove victim to fresh air. Give oxygen or artificial respiration as needed. Obtain emergency medical attention.

Skin Contact

In case of skin contact, immediately flush skin with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. If irritation occurs, obtain medical attention. Wash contaminated clothing before re-use.

Eye Contact

In case of eye contact, immediately flush eyes with copious amounts of water for 15-30 minutes. Retract eyelids often. Contact a physician.

Ingestion

If swallowed, give victim plenty of water to drink. Do not induce vomiting. Call a physician or poison control center. Never administer anything by mouth to an unconscious person.

Section 5. FIRE FIGHTING MEASURES

Flammable Properties

Flash Point *N/A*

Fire and Explosion Hazards

Avoid contact with water reactive materials, burning metals and electrically energized equipment.

Extinguishing Media

Product is an extinguishing media. Use media appropriate for surrounding materials.

Special Fire Fighting Instructions

This product will produce foam when mixed with water.

Section 6. ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (Personnel) sections before proceeding with clean-up. Use appropriate Personal Protective Equipment during clean-up.

Accidental Release Measures

Concentrate

Stop flow if possible. Use appropriate protective equipment during clean up. Collect spilled concentrate with absorbent material. Flush area with water until it no longer foams. Exercise caution, surfaces may be slippery. Prevent discharge of concentrate to waterways or into biological sewer treatment systems. Disposal should be made in accordance with federal, state and local regulations.

Foam/Foam Solution

See above. Flush with water. Prevent discharge of foam/foam solution to waterways or into biological sewer treatment systems. Disposal should be made in accordance with federal, state and local regulations.

Section 7. HANDLING AND STORAGE

Handling (Personnel)

Avoid contact with eyes, skin or clothing. Avoid ingestion or inhalation. Rinse skin and eyes thoroughly in case of contact. Review HAZARDS and FIRST AID sections.

Storage

Recommended storage environment is within 35°F (2°C) - 120°F (49°C). Store product in original shipping container or tanks designed for product storage.

Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Special ventilation is not required.

Personal Protective Equipment

Respiratory

Recommended exposure limits (OSHA-PEL and ACGIH-TLV) have not been determined for this material. The need for respiratory protection should be evaluated by a qualified health specialist.

Protective Clothing

Rubber or PVC gloves recommended.

Eye Protection

Safety glasses, face shield or chemical splash goggles must be worn when possibility exists for eye contact. Contact lenses should not be worn. Eye wash facilities are recommended.

Other Hygienic Practices

Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before re-use.

Exposure Guidelines

Exposure Limits
(2-Methoxymethylethoxy) Propanol (34590-94-8)

PEL(OSHA)	100 ppm,	8 hr.	TWA Skin
	150 ppm,	15 min.	STEL Skin
TLV (ACGIH)	100 ppm,	8 hr.	TWA Skin
	150 ppm,	15 min.	STEL Skin

1500-1601

National Foam, Inc.

Material Safety Data Sheet

Universal Gold 3%

Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Vapor Density	Not applicable
Melting Point	Not applicable
Evaporation Rate	<1 (Butyl Acetate = 1.0)
Solubility in Water	100%
pH	8.0
Specific Gravity	1.025 @ 25°C
Odor	Mild, pleasant
Form	Viscous liquid
Color	Straw yellow

Section 10. STABILITY AND REACTIVITY

Chemical Stability

Stable.

Incompatibility, Materials to Avoid

Avoid use of product on burning metals, electrically-energized equipment and contact with water reactive materials.

Polymerization

Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

Mammalian Toxicity

Ingestion

This material was not toxic when administered to Wistar Albino rats at an acute oral dose of 5g/kg body weight.

Eye

Animal testing indicates this material is a primary eye irritant when tested undiluted on New Zealand White Rabbits.

Skin

Animal testing indicates this material is not a primary skin irritant when tested undiluted on New Zealand White Rabbits.

Inhalation

No data available at this time.

Carcinogenic, Developmental, Reproductive, Mutagenic Effects

No data available on this material.

1500-161

National Foam, Inc.

Universal Gold 3%

Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)

Section 12. ECOLOGICAL INFORMATION

Ecotoxicological Information Aquatic Toxicity

96 hr. Flow Through LC_{50} for Fathead Minnows (pimephales promelas) is reported to be greater than 500 ppm

Environmental Fate

BOD_5 ..... 91,500 mg/kg
COD ..... 290,000 mg/kg

Section 13. DISPOSAL CONSIDERATIONS

Water Disposal

Do not flush to waterways or into biological sewer treatment systems. Disposal should be made in accordance with federal, state and local regulations.

Section 14. TRANSPORTATION INFORMATION

Shipping Information

Proper Shipping Name ..... Fire Extinguishers or Compounds N.O.I.B.N.
Hazard Class ..... None
UN No. ..... None

Section 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are listed in the TSCA inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1988 (SARA), TITLE III
SECTION 302/304

There are no components of this material with known CAS numbers which are on the Extremely Hazardous Substances (EHS) list.

SECTION 311 & 312

Based on available information, this material contains the following components which are classified as the following health and/or physical hazards according to Section 311 & 312

(2-Methoxymethylethoxy) Propanol 34590-94-8 (Flammability)

SECTION 313

This material does not contain any chemical components subject to Section 313 reporting requirements.

1550-161

Universal Gold 3%

Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)

Section 15. REGULATORY INFORMATION (continued)

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

This material does not contain any components subject to the reporting requirements of CERCLA.

OTHER REGULATORY INFORMATION

None.

STATE REGULATIONS

PENNSYLVANIA RIGHT-TO-KNOW HAZARDOUS SUBSTANCES LIST PA Hazardous Substances present at levels greater than 1%:

(2-Methoxymethylethoxy) Propanol 34590-94-8

Section 16. OTHER INFORMATION

NFPA Rating

Health 0
Flammability 0
Reactivity 0

ADDITIONAL INFORMATION

Revision	Summary
8/21/95	Revised to ANSI format.

For further information, see National Foam Technical Data Sheet for Universal Gold 3%.

1500-161

Process Water Spill Report
NPDES Permit PA 0009920

Facility

Three Mile Island Unit 1, Dauphin County, Londonderry Township
Post Office Box 480, Middletown, PA 17057

Spilled Substance/Quantity

Leakage from the TMI Unit 1 Industrial Coolers was observed on April 30, 2003, at about 4:00 p.m. during the start-up of the equipment after the completion of equipment refurbishment activities. The total leakage rate was estimated to be approximately ½ gallon per minute. The leakage was observed at several locations (i.e., metal seams and joints) on the cooler outer housing. Leakage from the Industrial Coolers flows onto the Intermediate Building roof and then travels into the roof drain. The roof drain is hard-piped to the station Yard Drainage System.

There is no expected impact on discharges from the Yard Drainage System related to the Industrial Cooler leakage. This assumption is based on the following: 1) the location of the Intermediate Building is at remote upstream location in the Yard Drainage System; 2) the open design of the Yard Drainage System contributes to evaporation and natural attenuation in the soils; and 3) the Industrial Cooler leakage volume is insignificant in comparison to the Yard Drainage System design flows.

At the time of the leakage the TMI Unit 1 Industrial Cooler water was being treated with a water-based corrosion inhibitor/deposit control agent, BetzDearborn Continuum 3107, which is an approved chemical additive under NPDES PA 0009920. A copy of the Material Safety Data Sheet (MSDS) is attached for information. The concentration of AEC 3107 in the Industrial Cooler water was in the range of 500 to 550 mg/l at the time of the reported leakage. Comparative AEC 3107 aquatic toxicity data are listed as follows: Flathead minnow - 96 hour Static 0% Mortality = 2000 mg/l; and Daphnia magna - 48 hour LC50 = 1,575 mg/l.

Spill Date/Time

The leakage was observed at the TMI Unit 1 Industrial Coolers at about 4:00 p.m. on April 30, 2003. The accessible portions of the Industrial Coolers were repaired over the period from May 2, 2003, through May 5, 2003. The leakage rate was reduced to an estimated range of five to ten gallons per hour from the initial estimated leakage rate of 30 gallons/hour. Over the period starting on May 1, 2003, portions of the leakage have been diverted from the Yard Drainage System, collected and transferred to the TMI Industrial Waste Treatment System (Outfall 701) for treatment and discharge under the NPDES Permit. As of June 12, 2003, a temporary containment and pump system is in-place to minimize the amount of on-going Industrial Cooler leakage that is exiting the Intermediate Building via the roof drain.

Regulatory Reporting

PA Department of Environmental Protection - On May 1, 2003, at about 2:00 p.m. Jim Spontak, PADEP Operations Section, was notified via telephone of the on-going leakage at the TMI Unit 1 Industrial Coolers. During the conversation, Mr. Spontak agreed that a written Spill Report could be submitted with the May 2003 NPDES Discharge Monitoring Report instead of within five days of the spill event as referenced in the *Reporting Requirements* section of the NPDES Permit. Subsequent to the verbal notification a follow-up e-mail under the subject of "Status-Leakage from TMI Industrial Coolers" was sent to Jim Spontak and Jim Miller, PADEP Permit Engineer, on May 13, 2003. Jim Miller acknowledged receipt of the e-mail on May 15, 2003. A copy of the e-mail notification is attached for information.

Other Regulatory Notifications – There were no other reporting requirements for this spill incident. There is no associated off-site release associated with the Industrial Cooler leakage and the amount of AEC 3107 released was significantly below the listed 40 CFR 302 Reportable Quantity (RQ). The RQ for AEC 3107 as whole product is listed as 6,978 gallons over a 24-hour period. According to the MSDS the RQ is based on the presence of sodium hydroxide in the chemical formula. The total Industrial Cooler leakage containing diluted chemical (500 to 550 mg/l AEC 3107) was estimated to be a maximum of 30 gallons/hour or about 720 gallons per day over the first several days of the leakage. This maximum leakage rate containing AEC 3107 was significantly below the listed whole product RQ.

Description and Cause of Spill Event

The leakage was observed on April 30, 2003, when the Industrial Coolers were returned to service following an annual equipment outage that included cleaning and power washing the internals, repairing and/or replacing pumps and valves, and the installation of a new cooling water spray nozzle system. The leakage was occurring from the metal seams and joints associated with both Industrial Coolers. Leakage from the coolers flows onto the Intermediate Building roof and then travels to the roof drain which is hard-piped to the Yard Drainage System.

There are two Industrial Coolers (east and west) located on the Intermediate Building roof. The Industrial Coolers are evaporative-type coolers that are used to cool the ambient air temperature within the TMI Unit 1 Reactor Containment Building. The TMI Unit 1 Operating License (USNRC) requires that the Reactor Containment Building air temperature not exceed an average of 130 degrees Fahrenheit. Typically, both coolers are operated in the summer months to maintain the Containment Building temperatures within the specified range. Both Industrial Coolers can be removed from service in the cooler-temperature months for maintenance, however at least one Cooler is usually in service to maintain Reactor Building temperature.

The following contributing factors are listed as the potential cause of the leakage: 1) High pressure washing of the equipment internals may have dislodged scale and debris which was plugging small holes in the metal seams and joints; 2) The new spray nozzle system was designed to be more effective in distributing cooling water within the cooler and the new spray distribution may have caused the wetting of surfaces that were not subject to past operations; 3) The coolers were not subject to an aggressive inspection requirement for leakage identification and correction before placing the coolers back into service.

The following table summarizes the results of observations and monitoring related to the Industrial Cooler leakage. There has been no off-site release of the Industrial Cooler leakage and there is no detectable environmental impact from the leakage.

Date/Time	Sample Results	Comments/Observations
05/01/03 0700 hrs	Industrial Cooler – East AEC 3107 – 160 mg/l	Leakage occurring from both coolers. Combined leakage rate was estimated to be 0.2 gpm (12 gallons/hr) versus the initial leak rate estimate of 0.5 gpm (30 gallons/hr).
05/01/03 1100 hrs	Industrial Cooler – West AEC 3107 – 520 mg/l, pH = 8.6	Leakage occurring from both coolers. Significant leakage diverted from roof drain to collection tank for disposal into IWTS. Some minor flow to roof drain.
05/01/03 1130 hrs	Industrial Cooler leakage – AEC 3107 – 540 mg/l, pH = 8.7	Leakage occurring from both coolers. Plan developed to repair significant leaks on both Industrial Coolers.
05/02/03 1030 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 8.7	No impact on Yard Drainage System Outfall 005.
05/02/03 1300 hrs	Industrial Cooler Sump - AEC 3107 - 126 mg/l, pH = 8.6	Leakage occurring from both coolers.
05/06/03 0850 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 8.2	No impact on Yard Drainage System Outfall 005. Significant leakage repairs complete on East Cooler. Leakage continues from West Cooler. West Cooler cannot be removed from service for repairs due to operation concerns with East Cooler. Leakage reduce to about 3 to 5 gallons/hour.
05/07/03 2045 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 8.7	No impact on Yard Drainage System Outfall 005.
05/08/03 1030 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 8.2	No impact on Yard Drainage System Outfall 005.
05/11/03 0400 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 7.9	No impact on Yard Drainage System Outfall 005.
05/14/03 not listed	Industrial Cooler – West AEC 3107 – 111 mg/l, pH = 8.5	West Cooler is source of remaining measurable leakage at about 3 to 5 gallons/hr. Reduced leakage is flowing to roof drain pending West Cooler repair.
05/19/03 not listed	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0	No impact on Yard Drainage System Outfall 005.
05/21/03 0945 hrs	Industrial Cooler – East AEC 3107 – 77 mg/l, pH = 8.7	East Cooler continues to experience scaling and clogging of spray headers upon return to service. West Cooler repairs are delayed due to continued East Cooler operation concerns.
05/21/03 0945 hrs	Industrial Cooler – West AEC 3107 – 108 mg/l, pH = 8.7	See Above Comment.
05/26/03 1050 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 7.7	No impact on Yard Drainage System Outfall 005.
05/28/03 0645 hrs	Industrial Cooler – East AEC 3107 – 400 mg/l, pH = 8.7	East Cooler continues to experience scaling and clogging of spray headers upon return to service. West Cooler repairs are delayed due to continued East Cooler operation concerns.
05/28/03 0645 hrs	Industrial Cooler – West AEC 3107 – 400 mg/l, pH = 8.7	See Above Comment.
05/28/03 1310 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH = 7.8	No impact on Yard Drainage System Outfall 005.
06/02/03 1430 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0	No impact on Yard Drainage System Outfall 005.
06/04/03 1400 hrs	Industrial Cooler – East AEC 3107 – 38 mg/l, pH = 8.5	East Cooler continues to experience scaling and clogging of spray headers upon return to service. West Cooler repairs are delayed due to continued East Cooler operation concerns.
06/04/03 1400 hrs	Industrial Cooler – West AEC 3107 – 26 mg/l, pH = 8.3	AmerGen submits request to PADEP for approval to use two new chemicals for descaling and cleaning the Industrial Coolers. On June 5, 2003, PADEP approves use of new chemicals.
06/09/03 1100 hrs	East Dike Settling Basin (Outfall 005) – AEC 3107 < 1.0, pH =7.8	No impact on Yard Drainage System Outfall 005.
06/11/03 0700 hrs	Industrial Cooler – East AEC 3107 – 18 mg/l, pH = 8.4	East Cooler continues to experience scaling and clogging of spray headers upon return to service. West Cooler repairs are delayed due to continued East Cooler operation concerns.
06/11/03 0700 hrs	Industrial Cooler – West AEC 3107 – 18 mg/l, pH = 8.5	One of the approved descaling chemicals is added to the Industrial Coolers. Betz Depositrol SF502 is being added to the Coolers.

Date/Time	Sample Results	Comments/Observations
06/18/03 1020 hrs	Industrial Cooler – East AEC 3107 – 16 mg/l, pH = 8.3	Effective June 12, 2003, the bulk of the leakage from the West Cooler is diverted from the roof drain and is directed to a temporary catchment and pump system. Collected water is diverted to a plant sump for treatment at IWTS and discharge at Outfall 007.
06/18/03 1020 hrs	Industrial Cooler – West AEC 3107 – 23 mg/l, pH = 8.5	Leakage from Industrial Coolers to roof drain is insignificant. Visible moisture on Intermediate Building roof area is a result of Industrial Cooler drift, minor equipment leakage and condensation from local steam pipes.
06/25/03	The East Cooler operation continues to improve based on the use of the new descaling chemical additive and the replacement of cooling water spray nozzles. Spray nozzle clogging from scale and debris has decreased. There is no significant on-going leakage from the East Cooler. The West Cooler continues to leak at a rate of about 5 to 10 gallons/hour. The leakage is being collected and diverted for treatment under the NPDES permit. Due to the current increased summer temperatures both Industrial Coolers will most likely be required to operate through the remaining summer months. Therefore, the repair of the West Industrial Cooler will be delayed until fall 2003 or the spring 2004. The temporary catchment and pump system will remain in-place until the significant leakage from the West Cooler can be repaired. There is no environmental impact anticipated from the Industrial Cooler leakage.	

Preventive Actions

The following preventive actions were implemented or will be implemented to prevent recurrence:

1. The East Industrial Cooler and portions of the West Cooler were repaired over the period from May 1, 2003 to May 5, 2003. The significant leakage from the East Industrial Cooler was repaired and the East Industrial Cooler was returned to service on May 6, 2003.

2. The majority of the leakage from both coolers (East & West) was diverted to an onsite portable tank for disposal and treatment at IWTS (Outfall 701) over the period of May 1, 2003, to May 6, 2003.

3. The measurable leakage from the West Industrial Cooler is continuing at an estimated leakage rate of 5 to 10 gallons per hour. Effective June 12, 2003, the bulk of the leakage from the West Cooler is diverted from the roof drain and is directed to a temporary catchment and pump system. Collected water is diverted to a plant sump for treatment at IWTS and discharged at Outfall 007 under the station's NPDES Permit.

   Oct SRC 7/18/03

4. Repairs will be made to the West Industrial Cooler after the summer months (either fall 2003 or spring 2004), but before the next cooling season of 2004. The West Industrial Cooler will remain in service throughout the summer months to assure that the TMI Unit 1 Reactor Building air temperatures remain in compliance with the TMI Unit 1 Operating License (USNRC) requirements. The initial plans were to promptly repair the leakage from the West Industrial Cooler after restoring the East Industrial Cooler to full service. The East Industrial Cooler continues to experience some scaling and spray nozzle clogging since its return to service in May 2003. Because of the slightly degraded condition of the East Industrial Cooler both Industrial Coolers (East and West) are required to remain is service through the 2003 summer months.

5. Each Industrial Cooler will be inspected and repaired during the next scheduled annual equipment outage. The equipment will be more aggressively inspected for leakage during post maintenance testing.

6. The NPDES Permit currently addresses the potential discharge of treated Industrial Cooler water into the station Yard Drainage System. The potential source of the treated water listed in the NPDES permit application is associated with annual Industrial Cooler maintenance. The discharge is described in the current Permit Application, Section C., DSN 005, as occurring up to five days per year at a maximum flow of 5,000 gallons per day. TMI Chemistry/Environmental will discuss with the PADEP the option of revising the NPDES Permit Application to allow for a continuous release of a *de minimis* amount of Industrial Cooler leakage into the Yard Drainage System. The continuous discharge of small amounts of Industrial Cooler leakage into the station Yard Drainage System will have no detectable environmental impact on releases from TMI Unit 1.

Submitted By: S. R. Cogley / DR 06/26/03

Supervisor Radwaste and Environmental

To:	jspontak@state.pa.us, jamesmille@state.pa.us
cc:	
From:	Scott Cogley/TMI
Date:	05/13/2003 05:11:32 PM
Subject:	Status - Leakage from TMI Industrial Coolers

For information here is a brief description of the on-going treated water leakage from the Industrial Cooler System associated with TMI Unit 1:

- Leakage discovered on April 30, 2003, at about 4:00 p.m.
- Leakage reported to Jim Spontak - DEP on May 1, 2003, via voice mail and then by direct telephone conversation on May 1, 2003, at about 2:00 p.m.
- Leakage rate was reported at as 0.5 gallons per minute. The leakage path is from several leaks from the in-service cooler to a roof drain that then enters the station Yard Drainage System.
- The Industrial Coolers contain water treated with Betz Continuum AEC 3107 (anti-scaling chemical). Betz Continuum 3107 is an NPDES Permit approved chemical.
- The system concentration for Betz Continuum 3107 was analyzed and determined to be in the range of 500 to 550 ppm on May 1, 2003. The comparative toxicity (96-Hr LC50) is 2000 mg/l for flathead minnows.
- The system pH was determined to be 8.6 on May 1, 2003.
- Repairs were made to accessible sections of the in-service Industrial Cooler over the period from Friday, May 2, 2003, through Monday, May 5, 2003, to reduce the overal leakage rate from the equipmnent. There were several leaking sections of the cooler that were repaired, however several leaks remain active and cannnot be repaired with the cooler in service.
- The leakage from the in-service Industrial Cooler is continuing at a reduced rate (approx. 1 to 3 gallons per hour) as of Monday, May 12, 2003.
- There is no direct discharge from the leakage via the Yard Drainage System to the river due to the low leakage rate and distant location at the facility from the Yard Drainage Outfall to the river (Outfall 005). The leakage will be mixed with rainwater during rain events however the mixed discharge is not expected to have any detectable influences from the chemical additive (i.e., no effect on pH and no detectable scale-inhibitor additive, AEC).
- The Industrial Cooler leakage rate is being monitored and and the Yard Drainage System outfall to the river (DSN 005) is being monitored for AEC and pH. There is no evidence of the Industrial Cooler leakage reaching the Yard Drainage System.
- The NPDES permit application does address the potential discharge and some releases of Industrial Cooler treated water (w/AEC 3107) into the Yard Dranage System during maintenance activities. See NPDES Permit PA 0009920 application sections pertinent to DSN 005.

There are two Industrial Coolers located on the TMI -1 Intermediate Building roof. One cooler is currently operating and the other is undergoing maintenance. The out-of-service Industrial Cooler is planned to be returned to service this week. Upon returning the current out-of-service Industrial Cooler to service the current leaking Industrial Cooler will be removed from service for further inspections and repairs if the ambient weather conditions permit. Normal summer operations require that both Industrial Coolers be operated to maintain USNRC license requirements for cooling the reactor building. It is possible that some Industrial Cooler leakage may continue through the summer months if both coolers are continuously needed to maintain the required TMI-1 Reactor Building ambient air temperatures. AmerGen will continue to monitor Industrial Cooler leakage rates and the Yard Drainage System outfall point to the river (Outfall 005) until further notice.

In accordance with NPDES Permit PA 0009920, Part A., C. Reporting Requirements, 3. Unanticipated Noncompliance or Potential Polluition Reporting, Item C., Mr Spontak granted a waiver from the written reporting rerquirements of Part A.,C. 3. Item a. A written spill report will be submitted with the May 2003 NPDES DMR (due June 28, 2003).

Please confirm receipt of this status report.

S. R. Cogley
Supervisor Radwaste And Environmental
(717) 948-8881

BetzDearborn

18361

CMP#1100-372

Pg 1 of 8

BETZDEARBORN MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 02-SEP-1998
PRINTED DATE: 17-OCT-1998

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : CONTINUUM AEC3107

PRODUCT APPLICATION AREA: WATER-BASED CORROSION INHIBITOR/DEPOSIT CONTROL AGENT.

COMPANY ADDRESS:
BetzDearborn Inc., Water Management Group
200 Witmer Road, Horsham, PA 19044
Information phone number (215) - 773-6131

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)

2) COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation. This product is subject to the Pennsylvania and New Jersey Worker and Community Right to Know Law.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) Corrosive; toxic (by ingestion)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at Pennsylvania thresholds for carcinogens.

Pg 2 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

NON-HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7732-18-5	WATER
109578-44-1	2,3-OXIRANEDICARBOXYLIC ACID,DISODIUM SALT,HOMOPOLYMER (AEC)
78266-09-8	2-PROPENOIC ACID POLYMER WITH 2-HYDROXY-3-(2-PROPENYLOXY)-1-PROPANE SULFONIC ACID,SODIUM SALT

CONTINUED

Pg 3 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

3) HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

Pg 4 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

4) FIRST AID MEASURES

SKIN CONTACT:
Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.
EYE CONTACT:
Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.
INHALATION:
Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.
INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

5) FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
FLASH POINT:
> 200F > 93C P-M(CC)

6) ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7) HANDLING AND STORAGE

HANDLING:
Alkaline. Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

Pg 5 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

8) EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

SODIUM HYDROXIDE (CAUSTIC SODA)
PEL (OSHA): 2 MG/M3
TLV (ACGIH): 2 MG/M3(CEILING)

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
neoprene gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.275	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	15	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-9		
Viscosity(cps 70F,21C)	56	% Solubility (water)	100.0

Odor		Slight	
Appearance		Yellow	
Physical State		Liquid	
Flash Point	P-M(CC)	> 200F	> 93C
pH As Is (approx.)		> 13.0	
Evaporation Rate (Ether=1)		< 1.00	

NA = not applicable **ND** = not determined

Pg 6 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

10) STABILITY AND REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
BETZ INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >2,000 mg/kg
NOTE - Estimated value
28 Day Oral RAT:
NOTE - 100% polymer at 1,000 mg/kg/day caused no treatment related toxicity
Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Estimated value
Non-Ames Mutagenicity MOUSE:
NOTE - 100% polymer was negative in the In Vivo Bone Marrow Micronucleus Assay

Pg 7 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Mysid Shrimp 48 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

10% Mortality: 8000 mg/L
No Effect Level: 4000 mg/L

Sheepshead Minnow 96 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

No Effect Level: 8000 mg/L

Fathead Minnow 96 Hour Static Screen with 48-Hour Renewal
pH of test solutions was adjusted to a level of 6-9. No mortality was observed in highest concentration tested.

0% Mortality: 2000 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 1575 mg/L
No Effect Level: 1300 mg/L

BIODEGRADATION

COD (mg/gm):	286 Calculated
TOC (mg/gm):	121 Calculated
BOD-5 (mg/gm):	10 Calculated
BOD-28 (mg/gm):	24 Calculated

13) DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002 = Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14) TRANSPORT INFORMATION

DOT HAZARD:	Not Applicable
UN / NA NUMBER:	Not applicable
DOT EMERGENCY RESPONSE GUIDE #:	Not applicable

Pg 8 of 8

PRODUCT NAME : CONTINUUM AEC3107
EFFECTIVE DATE: 02-SEP-1998

15) REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
6,978 gallons due to SODIUM HYDROXIDE (CAUSTIC SODA);
SARA SECTION 312 HAZARD CLASS:
Immediate(acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituent present at OSHA thresholds

MICHIGAN REGULATORY INFORMATION

~~No regulated~~ constituent present at OSHA thresholds

16) OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	17-JUN-1997		** NEW **
	03-OCT-1997	;EDIT:9	17-JUN-1997
	11-JUN-1998	12	03-OCT-1997
	02-SEP-1998	12	11-JUN-1998

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-944-7621

AmerGen SM

An Exelon/British Energy Company

June 26, 2003
5532-2003-034

Mr. Randy King
Bureau of Water Quality Management
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Dear Mr. King:

SUBJECT: MAY 2003 - DISCHARGE MONITORING REPORT (DMR)
NPDES PERMIT PA 0009920
THREE MILE ISLAND UNIT 1

In accordance with the conditions of NPDES Permit PA 0009920 please find attached the completed monthly DMR forms and two Supplemental Form Ws for May 2003. There were no exceedances of effluent limitations reported during this monitoring period. Also, as requested by the Department attached is a spill report for leakage from the TMI Unit 1 Industrial Cooler System.

Should the Department have questions concerning this submittal or require additional information please contact Scott Cogley, Supervisor, Environmental and Radwaste at (717) 948-8881 or e-mail at *scogley@amergenenergy.com.*

Sincerely,

G. H. Gellrich
Plant Manager

GHG/src

Attachments

cc: NPDES Discharge Monitoring Reports
USEPA Region III – Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS P O BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	001 A

MAJOR
(SUBR 03)
F - FINAL
001-MAIN STATION DISCHARGE

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

*** NO DISCHARGE [ ] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	84.6	(15	0	Cont.	Rcord.
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	115 DAILY MX	DEG. F		CONTINUOUS	RCORDR
PH	SAMPLE MEASUREMENT	******	******		7.4	******	7.8	(12	0	2/31	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE MONTH	GRAB
SOLIDS TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	18	27	(19	0	2/31	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	15.3	22.7	(03)	******	******	******		0	Cont.	Rcord.
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	N/A*	(19	0*	N/A*	N/A*
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	N/A*	(19	0*	N/A*	N/A*
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature]	717	948-8400	03	06	26
TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

SEE PART C OF PERMIT FOR OTHER REQUIREMENTS.

* See Supplemental Form W for comments and explanations.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used. This is a 4-part form. PAGE 1 OF

00187/030411-P1015

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location (If Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS P. O. BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920	003 A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 03 MO 05 DAY 01 TO YEAR 03 MO 05 DAY 31

MAJOR
(SUBR 03)
F - FINAL
003-EMERGENCY UNIT 1 DISCHARGE

*** NO DISCHARGE (**) ***

NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	***	(15	*	***	***
00011 1 1 0	PERMIT REQUIREMENT	******	******	**** ****	******	******	110 DAILY MX	DEG. F		ONCE/ SEMIS	INSTN
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12	*	***	***
00400 1 0 0	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00530 1 0 0	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		DAILY	ESTIM
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	***	(19	*	***	***
50064 1 0 0	PERMIT REQUIREMENT	******	******	**** ****	******	******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	***	(19	*	***	***
51315 1 0 0	PERMIT REQUIREMENT	******	******	**** ****	******	******	0 INST MX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE			DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.						
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER		YEAR	MO	DAY
		717	948-8400		03	06	26

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * No Discharge.
THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT THAT OUTFALL 001 BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT THE MAIN DISCHARGE-OUTFALL 003. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

PA Form 3320-1 (Rev. 3/99) Previous editions may be used. 00190/ This is a 4-part form. PAGE 1 OF

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	004 A

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
004-EMERGENCY UNIT 1 DISCHARGE

*** NO DISCHARGE [**] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	***	(15	*	***	***
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	******	REPORT DAILY MX	DEG. F		ONCE/SHIFT	IMMERSN
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		DAILY	ESTIMA
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	***	(19	*	***	***
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	******	0.5 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	***	(19	*	***	***
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	03	06	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * No Discharge.

THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT UNIT 1 MECHANICAL DRAFT COOLING TOWER BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT OUTFALL 004. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

Page 3 of 8

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920 — PERMIT NUMBER
005 B — DISCHARGE NUMBER

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 005B

*** NO DISCHARGE | ** | ***

NOTE: Read instructions before completing this form.

Form Approved.
OMB No. 2040-0004

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/MONTH	GRAB
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	15 MO AVG	20 DAILY MX	MG/L		TWICE/MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		ONCE/MONTH	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	03	06	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
* No Discharge. See Attached Spill Report for additional information related to Industrial Cooler leakage.

PA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00196/[illegible] This is a 4-part form.

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME AMERGEN ENERGY CO LLC
ADDRESS P O BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

PA0009920 — PERMIT NUMBER
101 A — DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 03 MO 05 DAY 01 TO YEAR 03 MO 05 DAY 31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 101 - STP

*** NO DISCHARGE [ ] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	0.012	0.022	(03)	******	******	******		0	Cont.	Rcord.
	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

[signature]

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	03	06	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

PA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00199/000411-1019 This is a 4-part form.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	401 A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
401 IW FILTER SYS DISCHARGE

*** NO DISCHARGE [**] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RECORD
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
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	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
G. H. Gellrich
Plant Manager
TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	03	06	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * No Discharge.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used. 00206/ This is a 4-part form. PAGE OF

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920 — PERMIT NUMBER | 501 A — DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
501-UNIT 1 SECONDARY NEUT TANK

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

*** NO DISCHARGE | ** | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	AVERAGE	MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		TWICE/ MONTH	CALCTD
	SAMPLE MEASUREMENT				*						
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NOTE: Discharges from Secondary Neutralizer Tank are treated and released via the Industrial Waste Treatment System (DSN 701) in accordance with NPDES Permit.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE AREA CODE	NUMBER	DATE YEAR	MO	DAY
717	948-8400	03	06	26

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* *No Discharge. See Comment Above.

SAMPLES SHALL BE TAKEN AT THE POINT OF DISCHARGE OF UNIT 1 SECONDARY NEUTRALIZATION TANK OR FROM THE MIXE D TANK PRIOR TO RELEASE.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00210/000911-1015 This is a 4-part form. PAGE 1 OF 1

Form Approved.
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location (If Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	701 A	MAJOR
PERMIT NUMBER	DISCHARGE NUMBER	(SUBR 03)
		F - FINAL
		701-IW TREATMENT SYSTEM

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	05	01	TO	03	05	31

*** NO DISCHARGE ( ) ***
NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		8.0	******	8.1	(12	0	3/31	Grab
00400 1 0 0	PERMIT REQUIREMENT	******	******	***	6.0	******	9.0			TWICE	GRAB
EFFLUENT GROSS VALUE				****	MINIMUM		MAXIMUM	SU		MONTH	
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	2	3	(19	0	3/31	Grab
00530 1 0 0	PERMIT REQUIREMENT	******	******	***	******	30	100			TWICE	GRAB
EFFLUENT GROSS VALUE				****		MO AVG	DAILY MX	MG/L		MONTH	
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.085	0.139	(03)	******	******	******		0	Cont.	Rcord.
50050 1 0 0	PERMIT REQUIREMENT	REPORT	REPORT		******	******	******	****		CONTIN	RCORD
EFFLUENT GROSS VALUE		MO AVG	DAILY MX	MGD				****		UOUS	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	717	948-8400	03	06	26
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
SAMPLES SHALL BE TAKEN AT POINT OF DISCHARGE OF INDUSTRIAL WASTE TREATMENT SYSTEM.

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W) *For the MONTH* **MAY** **2003**

AmerGen Energy Company, LLC - Three Mile Island Nuclear Station

Londonderry Township, Dauphin County **7-G Watershed**

Day	Flow	pH	TSS	Temp	Free Cl_2	Spectrus NX 1104	Spectrus OX 1200 (4)	Spectrus CT 1300	Hydrazine	Powerline 3623	Comments
	MGD	SU	mg/l	Deg F	mg/l	mg/l	TRO - mg/l	mg/l	mg/l	mg/l	
1	13.3			81.3							
2	13.2			82.6							
3	13.6			81.2	S	N			S	N	
4	13.4			80.5	E	O			E	O	
5	14.3			78.0	E			See Comment Section # 2	E		
6	14.0	7.4	10	75.9		C	5/06 < 0.01 < 0.01 < 0.01			C	
7	14.9			78.5	C	H			C	H	
8	17.8			79.6	O	E			O	E	
9	22.7			77.0	M	M			M	M	
10	22.1			77.0	M	I			M	I	
11	13.2			83.7	E	C			E	C	
12	13.6			82.3	N	A	5/12 0.011 0.012 0.013		N	A	
13	14.2	7.8	27	73.0	T	L			T	L	
14	14.1			68.8	S				S		
15	14.3			78.1		A				A	
16	15.5			76.2	S	D			S	D	
17	16.0			74.5	E	D			E	D	
18	15.6			74.5	C	I			C	I	
19	14.8			76.7	T	T	5/19 0.018 0.015 0.015		T	T	
20	16.3			72.1	I	I		5/20 Clam Kill < 0.05 < 0.05	I	I	
21	15.8			75.4	O	O			O	O	
22	14.5			78.9	N	N			N	N	
23	15.4			78.4				5/21 Clam Kill < 0.05			
24	16.2			78.0	# 1				# 3		
25	14.6			79.8			5/27 0.028 0.011				
26	15.1			81.2							
27	15.3			80.8			5/29 < 0.01 0.012				
28	15.5			79.7							
29	15.4			81.9	-	-	5/29 0.011 0.012 0.012	-	-	-	
30	15.1			84.2	-	-		-	-	-	
31	15.8			84.6	-	-	-	-	-	-	
Avg	15.3	7.6	18	78.4	N/A	N/A	0.014	< 0.05	N/A	N/A	

1) Chlorine monitoring not required because chlorine compounds were not added to the River Water or Circulating Water Systems as the sole active ingredient for biocide treatment (see NPDES Permit Footnote No. 9, page 3).

2) Betz Spectrus CT 1300 biocide concentrations were verified to be < 0.05 ppm in the Circulating Water System before opening system blowdown for two chemical treatments in May 2003. DSN 001 monitoring was not required (see NPDES Permit Footnote No. 8, page 3).

3) Hydrazine monitoring not required because there were no discharges associated with OTSG wet lay-up (see NPDES Permit Footnote No. 7, page 3).

4) Per agreement with the Department all Total Residual Oxidant (TRO) monitoring is reported in this column. TRO monitoring covers River Water System treatment with Spectrus OX 1200 and Circulating Water System treatment with a sodium bromide and sodium hypochlorite.

Laboratory Name: TMI Plant Chemistry Laboratory In house ? Yes

Signature: S. R. Cogley/ DR SRC 6/23/2003

REMARKS: Permit allows discharge sampling for TRO at the TMI-1 Mechanical Draft Cooling Tower or DSN 001.

Telephone: (717) 948-8881

NPDES Permit PA 0009920 - Outfall DSN 001

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W)
AmerGen Energy Company, LLC - Three Mile Island Nuclear Station
Londonderry Township, Dauphin County **7-G Watershed**

For the MONTH **MAY** **2003**

Day	Outfall 501				Outfall 701				Outfall 005B				Comments
	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	
1	0	-	-	-					0	-	-	-	DSN 005B discharges are industrial-type discharges from the East Dike Settling Basin (EDSB).
2	0	-	-	-					0	-	-	-	
3	0	-	-	-					0	-	-	-	
4	0	-	-	-					0	-	-	-	
5	0	-	-	-					0	-	-	-	
6	0	-	-	-					0	-	-	-	
7	0	-	-	-	0.026	8.0	1		0	-	-	-	Outfall 005 was monitored during the month for pH related to the Industrial Cooler Leakage. The results are reported in the attached Spill Report. Discharges at Outfall 005 were stormwater discharges and were not impacted by the Industrial Cooler Leakage.
8	0	-	-	-	0.131	8.0	3		0	-	-	-	
9	0	-	-	-	0.120	8.1	1		0	-	-	-	
10	0	-	-	-	0.087				0	-	-	-	
11	0	-	-	-					0	-	-	-	
12	0	-	-	-					0	-	-	-	
13	0	-	-	-					0	-	-	-	
14	0	-	-	-					0	-	-	-	
15	0	-	-	-					0	-	-	-	
16	0	-	-	-					0	-	-	-	
17	0	-	-	-	0.031				0	-	-	-	
18	0	-	-	-	0.139				0	-	-	-	
19	0	-	-	-	0.029				0	-	-	-	
20	0	-	-	-					0	-	-	-	
21	0	-	-	-					0	-	-	-	
22	0	-	-	-					0	-	-	-	
23	0	-	-	-	0.048				0	-	-	-	
24	0	-	-	-	0.120				0	-	-	-	
25	0	-	-	-	0.106				0	-	-	-	
26	0	-	-	-	0.111				0	-	-	-	
27	0	-	-	-	0.075				0	-	-	-	
28	0	-	-	-					0	-	-	-	
29	0	-	-	-					0	-	-	-	
30	0	-	-	-					0	-	-	-	
31	0	-	-	-					0	-	-	-	
Avg	0	-	-	-	0.085	8.0	2	-	0	-	-	-	

Laboratory Name: TMI Plant Chemistry Laboratory In house? Yes

Signature: S.R. Cogley/ ORP/R 6/23/2003

REMARKS: No discharges via DSN 501 - Sec. Neutralizer Tank discharged via DSN 701.

Telephone: (717) 948-8881

NPDES Permit **PA0009920** for **Outfalls DSN 501, 701 & 005B**

Sewage Sludge Spill Report
NPDES Permit PA 0009920

Facility

Three Mile Island Unit 1, Sewage Treatment Plant
Dauphin County, Londonderry Township
Post Office Box 480, Middletown, PA 17057

Spilled Substance/Quantity

Approximately 500 gallons of digested sewage sludge spilled to the floor of the TMI Sewage Treatment Plant (STP) during the transfer of sludge between tanks located within the STP building. There was no environmental impact associated with the spill. The sludge remained in the building and there was no direct discharge of spill residue to surface water or ground water. Lime was applied to the spill areas and the excess residue was cleaned-up.

Spill Date/Time

The spill incident occurred on August 28, 2003, between 2:00 p.m. and 2:20 p.m.

Regulatory Reporting

The Department, Tim Carpenter, NPDES Permit Engineer, was notified by telephone of the spill incident on August 28, 2003, at about 2:50 p.m. Mr. Carpenter waived the five-day written report and requested that a spill report be submitted with the August 2003 NPDES DMR.

The verbal spill notification was made to the PADEP under the requirements of NPDES PA0009920, III.C.3.a, related to "Potential Pollution Reporting." This requirement states: "The permittee shall report any noncompliance or incidents causing or threatening pollution pursuant to 25 PACODE 91.33 immediately if possible, but in case later than 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances....."

NPDES PA0009920, III.C.3.c. states: "The Department may waive the written report on a case-by-case basis for reports under paragraph C.3.a. of this section if the oral report has been received within 24 hours."

Description and Cause of Spill Event

A cam-lock hose connector became disconnected during the transfer of digested sewage sludge from one sewage holding tank to another holding tank. The disconnected hose caused the release of about 500 gallons of digested sewage sludge during a short period (approximately 10 minutes) when the STP operator was not physically watching the job.

The sludge transfer was being conducted using an air driven diaphragm pump and temporary hoses with cam-lock fittings. The cam-lock hose connector that opened and caused the hose disconnection was located at the discharge side of an air driven diaphragm pump. The type of cam-lock connector that caused the spill was a different type than the others used for the sludge transfer activity. Tie-wraps were used to secure the locking arms for the cam-lock hose connections except for the hose connection that failed open. The cam-lock connector that opened had installed locking pins that when properly secured will prevent the cam-lock fitting from disconnecting.

The apparent cause of this spill incident was the failure of the cam-lock connector. The STP operator apparently did not properly secure the locking pins into the cam-lock arms during the sludge transfer line setup. The operator indicated that the hose connections were hand-checked for tightness and the sludge transfer system was visually inspected for leakage after starting the transfer pump. The system leakage occurred during a period after the operator exited the STP job location to perform other tasks at the STP.

Preventive and Corrective Actions

1. Upon discovery of the spill the sludge transfer process was immediately isolated.
2. The spilled sludge was cleaned-up and residues were neutralized with lime.
3. The STP operating procedure was enhanced to include more detailed steps for transferring sewage sludge.
4. Work practices for the use of temporary hoses and pumps have been written and documented. The STP operators have been provided instruction to use tie-wraps on all cam-lock hose connectors (including the cam-locks with installed locking pins).
5. Station Engineering has been requested to evaluate the design and installation of permanent piping and pumps for sludge transfer operations.
6. STP licensed supervisors have been requested to increase oversight of STP operations activities by non-licensed staff.
7. The STP operators have been coached on the importance of "self-checking" and the use of "self-checking" as a tool that may have precluded the cam-lock from disconnecting during the sludge transfer operations.
8. Spill incident corrective actions are being tracked through the Exelon corrective action process (reference no. 173598).

Submitted By: S. R. Cogley/ 09/24/2003

Environmental Chemist

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-944-7621

An Exelon/British Energy Company

September 25, 2003
5532-2003-048

Mr. Randy King
Bureau of Water Quality Management
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Dear Mr. King:

SUBJECT: AUGUST 2003 - DISCHARGE MONITORING REPORT (DMR)
NPDES PERMIT PA 0009920
THREE MILE ISLAND UNIT 1

In accordance with the conditions of NPDES Permit PA 0009920 please find attached the completed monthly DMR forms and two Supplemental Form Ws for August 2003. There were no exceedances of effluent limitations reported during this monitoring period. Also, as requested by the Department please find attached a report related to the spill of digested sewage sludge at the station sewage treatment plant.

Should the Department have questions concerning this submittal or require additional information please contact Scott Cogley, Environmental Chemist at (717) 948-8881 or e-mail at *scogley@amergenenergy.com.*

Sincerely,

G. H. Gellrich
Plant Manager

GHG/src

Attachments

cc: NPDES Discharge Monitoring Reports
USEPA Region III – Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

PA0009920 — PERMIT NUMBER
001 A — DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	08	01	TO	03	08	31

MAJOR
(SUBR 03)
F - FINAL
001-MAIN STATION DISCHARGE

*** NO DISCHARGE | | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT 00011 1 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		*******	*******	95.5	(15)	0	Cont.	Rcord
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	1.5 DAILY MX	DEG. F		CONTINUOUS	RECORDR
PH 00400 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		7.6	*******	8.3	(12)	0	5/31	Grab
	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED 00530 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		*******	73	214	(19)	0	5/31	Grab
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	19.3	28.7	(03)	*******	*******	*******		0	Cont.*	Rcord*
	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		CONTINUOUS	RECORDR
CHLORINE, FREE AVAILABLE 50064 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		*******	*******	N/A*	(19)	0*	N/A*	N/A*
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE 81313 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		*******	*******	N/A*	(19)	0*	N/A*	N/A*
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE	DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	717 948-8400	03	09	25
TYPED OR PRINTED			AREA CODE NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
SEE PART C OF PERMIT FOR OTHER REQUIREMENTS.

* See Supplemental Form (W) for Comments and Explanations.
DSN 006 TRO Monitoring: < 0.01; 1/31 Frequency; 0 Exceedance.

NAME AMERGEN ENERGY CO LLC

ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480

FACILITY AMERGEN ENERGY CO LLC

LOCATION MIDDLETOWN PA 17057-0480

ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

PA0009920 — PERMIT NUMBER

003 A — DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 03 MO 08 DAY 01 TO YEAR 03 MO 08 DAY 31

MAJOR
(SUBR 03)
F - FINAL
003 EMERGENCY UNIT 1 DISCHARGE

*** NO DISCHARGE [XX] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
TEMPERATURE, WATER DEG. FAHRENHEIT 00011 1 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	*******		*******	*******	***	(15)	*	***	***
	PERMIT REQUIREMENT	******	*******	*** *****	*******	*******	15 DAILY MX	DEG. F		ONCE/ SHIFT	IMERSN
PH 00400 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	*******		***	*******	***	(12)	*	***	***
	PERMIT REQUIREMENT	******	*******	*** *****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		ONCE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED 00530 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*******	*******		*******	***	***	(19)	*	***	***
	PERMIT REQUIREMENT	******	*******	*** *****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L		ONCE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	***	***	(03)	*******	*******	*******		*	***	***
	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	***** *****		*****	DAILY ESTIM
CHLORINE, FREE AVAILABLE 50064 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	*******		*******	*******	***	(19)	*	***	***
	PERMIT REQUIREMENT	******	*******	*** *****	*******	*******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE 81313 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	*******		*******	*******	***	(19)	*	***	***
	PERMIT REQUIREMENT	******	*******	*** *****	*******	*******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	717	948-8400	03	09	25
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * No Discharge.
THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT THAT OUTFALL 001 BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT THE MAIN DISCHARGE--OUTFALL 003. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC

ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480

FACILITY AMERGEN ENERGY CO LLC

LOCATION MIDDLETOWN PA 17057-0480

ATTN: BRUCE WILLIAMS/VICE PRES

PA0009920 — PERMIT NUMBER

004 A — DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
004-EMERGENCY UNIT 1 DISCHARGE

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	08	01	TO	03	08	31

*** NO DISCHARGE [XX] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	*******	*******		*******	*******	***	(15)	*	***	***
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	REPORT DAILY MX	DEG. F		ONCE/ SHIFT	IMERSN
PH	SAMPLE MEASUREMENT	*******	*******		***	*******	***	(12)	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU	2	TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	***	***	(19)	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	*******	*******	*******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		DAILY	ESTIMA
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	*******	*******		*******	*******	***	(19)	*	***	***
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	1.0 DAILY MX	MG/L	2	SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	*******	*******		*******	*******	***	(19)	*	***	***
88313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0 INST MAX	MG/L	2	SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE	DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	G. Gellrich	717 948-8400	03	09	25
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * No Discharge.

THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT UNIT 1 MECHANICAL DRAFT COOLING TOWER BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT OUTFALL 004. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*

DISCHARGE MONITORING REPORT *(DMR)*

OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC

ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480

FACILITY AMERGEN ENERGY CO LLC

LOCATION MIDDLETOWN PA 17057-0480

ATTN: BRUCE WILLIAMS/VICE PRES

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	005 B

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 005B

MONITORING PERIOD	YEAR	MO	DAY
FROM	03	08	01
TO	03	08	31

*** NO DISCHARGE [XX] ***

NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12)	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ***	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	***	***	(19)	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	**** ****	*******	30 MO AVG	100 DAILY MX	MG/L		TWICE/ MONTH	GRAB
OIL & GREASE	SAMPLE MEASUREMENT	*******	*******		*******	***	***	(19)	*	***	***
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	**** ****	*******	15 MO AVG	20 DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	*******	*******	*******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		ONCE/ MONTH	ESTIMA
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE			DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	G. Gellrich	717	948-8400	03	09	25
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

* No Discharge.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00216/ This is a 4-part form.

PAGE OF

DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

PA0009920 — PERMIT NUMBER
101 A — DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 03 MO 08 DAY 01 TO YEAR 03 MO 08 DAY 31

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 101 - STP

*** NO DISCHARGE |__| ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0	SAMPLE MEASUREMENT	0.014	0.020	(03)	******	******	******		0	Cont.	Rcord
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTIN UOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
G. H. Gellrich
Plant Manager
TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE 717 NUMBER 948-8400
DATE: YEAR 03 MO 09 DAY 25

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00219/This is e-pa form. PAGE OF

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	401 A

MAJOR
(SUBR 03)
F - FINAL
401 IW FILTER SYS DISCHARGE

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	08	01	TO	03	08	31

*** NO DISCHARGE | XX | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	AVERAGE	MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature]	717	948-8400	03	09	25
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

* No Discharge.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00223/ This is a 1-page form. PAGE OF

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

PA0009920 — PERMIT NUMBER
501 A — DISCHARGE NUMBER

MONITORING PERIOD

YEAR	MO	DAY		YEAR	MO	DAY
03	08	01	TO	03	08	31

MAJOR
(SUBR 03)
F - FINAL
501-UNIT 1 SECONDARY NEUT TANK

*** NO DISCHARGE [XX] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	*******	*******		***	*******	***	(12)	*	***	***
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		TWICE/MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	***	***	(19)	*	***	***
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	30 MO AVG	100 DAILY MX	MG/L		TWICE/MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	*******	*******	*******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		TWICE/MONTH	CALCTD
	SAMPLE MEASUREMENT				**						
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NOTE: Discharges from Secondary Neutralizer Tank are treated and released via the Industrial Waste Treatment System (DSN 701) in accordance with NPDES Permit.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE	DATE		
G. H. Gellrich Plant Manager TYPED OR PRINTED	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		AREA CODE 717 NUMBER 948-8400	YEAR 03	MO 09	DAY 25

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* ** See Above Comment.
SAMPLES SHALL BE TAKEN AT THE POINT OF DISCHARGE OF UNIT 1 SECONDARY NEUTRALIZATION TANK OR FROM THE MIXED TANK PRIOR TO RELEASE.

PERMITTEE NAME/ADDRESS (Include Facility Name, Location, if Different)

NAME AMERGEN ENERGY CO LLC

ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480

FACILITY AMERGEN ENERGY CO LLC

LOCATION MIDDLETOWN PA 17057-0480

ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	701 A

MAJOR
(SUBR 03)
F - FINAL
701-IW TREATMENT SYSTEM

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
	03	08	01	TO	03	08	31

*** NO DISCHARGE | | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		8.3	******	8.3	(12)	0	2/31	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	4	7	(19)	0	2/31	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.094	0.124	(03)	*******	*******	*******		0	Cont.	Rcord
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		717	948-8400	03	09	25
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

SAMPLES SHALL BE TAKEN AT POINT OF DISCHARGE OF INDUSTRIAL WASTE TREATMENT SYSTEM.

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W)

AmerGen Energy Company, LLC - Three Mile Island Nuclear Station

Londonderry Township, Dauphin County 7-G Watershed

For the ***MONTH*** AUGUST 2003

Day	Flow	pH	TSS	Temp	Free Cl_2	Spectrus NX 1104	Spectrus OX 1200 (4)	Spectrus CT 1300	Hydrazine	Powerline 3623	Comments
	MGD	SU	mg/l	Deg F	mg/l	mg/l	TRO – mg/l	mg/l	mg/l	mg/l	
1	28.7	8.3	2	86.9							1) Chlorine monitoring not required because chlorine compounds were not added to the River Water or Circulating Water Systems as the sole active ingredient for biocide treatment (see NPDES Permit Footnote No. 9, page 3).
2	21.0			91.4							
3	18.3			93.2	S	N		S	S	N	
4	18.7			91.5	E	O		E	E	O	
5	19.4	7.6	214	88.4	E		08/05 0.027	E	E		
6	19.4			85.5		C	0.017 0.019			C	
7	19.8			86.5	C	H	0.017 0.017	C	C	H	
8	19.2			88.4	O	E	08/07 < 0.01	O	O	E	
9	19.1			90.0	M	M	0.022 0.019	M	M	M	2) No Chemical Addition in August 2003.
10	18.9			90.6	M	I		M	M	I	
11	19.3			91.4	E	C	08/12 0.030	E	E	C	
12	19.6	7.7	50	86.5	N	A	0.025 0.023	N	N	A	3) Hydrazine monitoring not required because there were no discharges associated with OTSG wet lay-up (see NPDES Permit Footnote No. 7, page 3).
13	19.8			86.1	T	L	0.023 0.022	T	T	L	
14	19.8			91.2	S		08/14 0.012	S	S		
15	18.8			92.8		A	0.012 0.018			A	
16	19.3			92.9	S	D	0.020 0.017	S	S	D	
17	19.0			91.9	E	D	0.014	E	E	D	4) Per agreement with the Department all Total Residual Oxidant (TRO) monitoring is reported in this column. TRO monitoring covers River Water System treatment with Spectrus OX 1200 and Circulating Water System treatment with a sodium bromide and sodium hypochlorite.
18	19.0			92.1	C	I		C	C	I	
19	21.3	7.7	74	86.9	T	T	08/19 0.010	T	T	T	
20	18.6			89.2	I	I	0.019 0.019	I	I	I	
21	18.9			94.9	O	O	< 0.01	O	O	O	
22	17.7			95.5	N	N	08/21 < 0.01	N	N	N	
23	18.4			93.7			< 0.01 < 0.01				
24	19.9			90.0	# 1			# 2	# 3		
25	17.8			91.8							
26	17.4	8.1	23	85.1			08/26 < 0.01				
27	18.5			90.4			< 0.01 < 0.01				
28	18.0			92.2			08/28 0.011				
29	18.0			94.0			0.036 0.035				
30	17.6			94.0			0.023				
31	18.4			90.5							
Avg	19.3	7.9	73	90.3	N/A	N/A	0.017	N/A	N/A	N/A	

Laboratory Name: TMI Plant Chemistry Laboratory In house ? Yes

signature: S. R. Cogley/ 9/24/03

REMARKS: Permit allows discharge sampling for TRO at the TMI-1 Mechanical Draft Cooling Tower or DSN 001. Telephone: (717) 948-8881

Flow estimated over period of 08/27/2003 to 08/30/2003 due to instrument out of service. PADEP notified on 08/27/2003 pursuant to NPDES requirement.

NPDES Permit PA 0009920 - Outfall DSN 001

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W) *For the MONTH* AUGUST 2003

AmerGen Energy Company, LLC - Three Mile Island Nuclear Station

Londonderry Township, Dauphin County **7-G Watershed**

Day	Outfall 501				Outfall 701				Outfall 005B				Comments
	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	
1	0	-	-	-	0.118	8.3	1		0	-	-	-	DSN 005B discharges are industrial-type discharges from the East Dike Settling Basin (EDSB).
2	0	-	-	-	0.116	8.3	7		0	-	-	-	
3	0	-	-	-	0.124				0	-	-	-	
4	0	-	-	-	0.115				0	-	-	-	
5	0	-	-	-	0.117				0	-	-	-	
6	0	-	-	-	0.009				0	-	-	-	
7	0	-	-	-					0	-	-	-	Outfall 005A (stormwater) was monitored during the month for pH and Betz Continuum 3107 (AEC) related to the Industrial Cooler Leakage reported to the Department in the May 2003 DMR. Results: pH = 7.9, one sample; AEC < 1.0, one sample. Stormwater total suspended solids (TSS) and Oil & Grease were also monitored during the month: TSS = 41, one sample; Oil & Grease = results not available this report (will report when results received), one sample. There is no Industrial Cooler leakage entering Outfall 005. There is no significant on-going leakage to the Yard Drainage System from the Coolers.
8	0	-	-	-					0	-	-	-	
9	0	-	-	-					0	-	-	-	
10	0	-	-	-					0	-	-	-	
11	0	-	-	-	0.039				0	-	-	-	
12	0	-	-	-	0.119				0	-	-	-	
13	0	-	-	-	0.109				0	-	-	-	
14	0	-	-	-	0.117				0	-	-	-	
15	0	-	-	-	0.114				0	-	-	-	
16	0	-	-	-	0.110				0	-	-	-	
17	0	-	-	-	0.040				0	-	-	-	
18	0	-	-	-					0	-	-	-	
19	0	-	-	-					0	-	-	-	
20	0	-	-	-					0	-	-	-	
21	0	-	-	-					0	-	-	-	
22	0	-	-	-	0.023				0	-	-	-	
23	0	-	-	-	0.099				0	-	-	-	
24	0	-	-	-	0.102				0	-	-	-	
25	0	-	-	-	0.104				0	-	-	-	
26	0	-	-	-	0.099				0	-	-	-	
27	0	-	-	-	0.105				0	-	-	-	
28	0	-	-	-					0	-	-	-	
29	0	-	-	-					0	-	-	-	
30	0	-	-	-					0	-	-	-	
31	0	-	-	-					0	-	-	-	
Avg	0	-	-	-	0.094	8.3	4	-	0	-	-	-	

Laboratory Name: TMI Plant Chemistry Laboratory In house? Yes

Signature: S.R. Cogley/ 9/24/2003

REMARKS : No discharges via DSN 501 - Sec. Neutralizer Tank discharged via DSN 701.

Telephone: (717) 948-8881

NPDES Permit **PA0009920** for **Outfalls DSN 501, 701 & 005B**

Process Water Spill Report
NPDES Permit PA 0009920

Facility

Three Mile Island Unit 1, Dauphin County, Londonderry Township
Post Office Box 480, Middletown, PA 17057

Spilled Substance/Quantity

Approximately 500 gallons of treated process water was released to the ground when one of the TMI Unit 1 Auxiliary Boilers ('A' unit) ruptured water tubes during start-up of TMI Unit 1 from a maintenance and refueling outage. The excessive boiler water leakage caused by the tube rupture traveled from inside the TMI Unit 1 Turbine Building and into a curbed concrete area located on the east side of the TMI Unit 1 Turbine Building. The curbed area overflowed and some of the boiler water traveled onto the ground. A portion of the leakage (estimate 100 gallons) entered a Yard Drainage collection culvert located just north of the spill area. The Yard Drainage System was promptly inspected downstream of the drainage culvert and there was no visible indication of leakage in the open-end of the pipe. Cleanup of the area was immediately initiated. Free-standing liquid spill residue was removed from the area and several inches of stone and gravel were excavated from spill footprint. Five 55-gallon drums of soil and gravel were excavated from the area. There was no off-site release and there was not impact on station surface water discharges.

The released boiler water is typically treated with the following NPDES-approved chemical additives: hydrazine, ammonium hydroxide, methoxypropylamine (MPA – Betz Steamate PWR 0160), and monoethanolamine (ETA – Betz Steamate PWR 1440). The liquid spill residual was determined to have the following chemical characteristics: pH = 4.4 (chemical analysis), hydrazine = 16 ppm (chemical analysis), ammonia = 1 ppm (chemical analysis), MPA ≈ 5 ppm (estimated based on boiler feed water chemistry), and ETA ≈ 4 ppm (estimated based on boiler feed water chemistry).

Spill Date/Time

The leak occurred from the failed Auxiliary Boiler ('A' unit) on December 3, 2003, between the hours of about 3:30 p.m. to 4:00 p.m. The leak duration was approximately thirty minutes. The leakage was stopped as a consequence of shutting down the Auxiliary Boiler. The boiler was removed from service and will not be returned to service until the leaks are repaired.

Regulatory Reporting

- *PA Department of Environmental Protection* - On December 4, 2003, at about 10:00 a.m., Mr. Tim Carpenter, Permit Engineer, PADEP Water Management, was verbally notified by S. Cogley, AmerGen Environmental Chemist, of the Auxiliary Boiler water spill. As a follow-up to the phone call a more detailed e-mail was sent to Mr. Carpenter at about 3:30 p.m. on December 4, 2003. AmerGen requested Department concurrence that a written spill report could be submitted with the December 2003 Discharge Monitoring Report (DMR) instead of within five days of the spill event as referenced in the *Reporting Requirements* section of the permit. Mr. Carpenter responded by e-mail on December 5, 2003, and indicated that a five-day written report was not required provided that a written report is submitted with the December 2003 DMR.

- *Other Regulatory Notifications* - There were no other reporting requirements associated with this spill incident. There was no offsite release of the spill and there was no downstream water users affected by the spill. The 40 CFR 302 Reportable Quantity (RQ) for hydrazine is one pound and it is estimated that less than one-tenth pound of hydrazine was discharged onto the ground as a constituent of the treated water (e.g., 16 ppm hydrazine x 500 gallons x 8.34/1,000,000 = 0.07 lbs hydrazine).

- *Other Regulatory Notifications (cont'd)* - The 40 CFR 302 Reportable Quantity (RQ) for ammonium hydroxide is 1,000 pounds and it is estimated that less than one pound of ammonia was discharged. There are no federal RQs for the ETA and MPA additives.

Description and Cause of Spill Event

The spill was caused by the sudden failure of boiler water tubes during boiler operations associated with restarting TMI Unit 1 following a plant maintenance and refueling outage. A contributing cause to the tube ruptures is normal degradation due to the age of the equipment. The TMI Unit 1 Auxiliary Boilers are used every two years for plant shutdowns and startups associated with planned TMI Unit 1 maintenance and refueling outages. Approximately 500 gallons of treated boiler water was released to the ground as a result of the tube ruptures. The leakage was stopped when the boiler was removed from service. Gravel and soil cleanup was initiated and completed.

Preventive/Corrective Actions

The leakage was stopped within approximately 30 minutes of occurrence by shutting down the damaged Auxiliary Boiler. The Yard Drainage System was promptly inspected downstream of the drainage culvert and there was no visible indication of leakage in the open-end of the pipe. Clean-up of the area was immediately initiated. Free-standing liquid spill residue was removed from the area and several inches of stone and gravel were excavated from spill footprint. Five 55-gallon drums of soil and gravel were excavated from the area. There was no off-site release and there was not impact on station surface water discharges.

The leaking Auxiliary Boiler was removed from service and will not be returned to service until the source of the leakage is repaired. Options being investigated include long-term boiler repairs, boiler replacement, and/or the use of a temporary boiler in place of the boiler that failed during the most recent plant outage. Corrective actions will be addressed and tracked by the AmerGen corrective action process (reference Condition Report # 00189022) for this event.

Report Prepared By: 01/26/2004

S. R. Cogley, Environmental Chemist

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

AmerGen SM

An Exelon Company

Janaury 26, 2004
5532-2004-001

Mr. Randy King
Bureau of Water Quality Management
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Dear Mr. King:

SUBJECT: DECEMBER 2003 DISCHARGE MONITORING REPORT (DMR)
NPDES PERMIT PA 0009920
THREE MILE ISLAND UNIT 1

In accordance with the conditions of NPDES Permit PA 0009920 please find attached the completed monthly DMR forms and two Supplemental Form Ws for December 2003. This report also includes DMRs for the quarterly monitoring period of October through December 2003, and a Spill Report for the release of process water from a malfunctioned Auxiliary Boiler. There were no exceedances of effluent limitations reported during this monitoring period.

Should the Department have questions concerning this submittal or require additional information please contact Scott Cogley, Supervisor Radwaste and Environmental at (717) 948-8881 or e-mail at *scogley@amergenenergy.com.*

Sincerely,

G. H. Gellrich
Plant Manager

GHG/src

Attachments

cc: USEPA Region III
NPDES Discharge Monitoring Reports
Water Protection Program
1650 Arch Street
Philadelphia, PA 19103-2029

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920 — PERMIT NUMBER

001 A — DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
001-MAIN STATION DISCHARGE

*** NO DISCHARGE |__| ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	50.5	(15)	0	Cont.	Rcord.
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	110 DAILY MX	DEG. F		CONTINUOUS	RCORDR
PH	SAMPLE MEASUREMENT	******	******		7.5	******	7.7	(12)	0	3/31	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	13	20	(19)	0	3/31	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	20.8	26.0	(03)	******	******	******		0	Cont.	Rcord.
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	N/A*	(19)	0*	N/A*	N/A*
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	N/A*	(19)	0*	N/A*	N/A*
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature]	717	948-8400	04	01	26
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

*See Supplemental Form W for comments.

SEE PART C OF PERMIT FOR OTHER REQUIREMENTS.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used. This is a 4-part form.

00187/001002-P0788

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	003 A

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
003-EMERGENCY UNIT 1 DISCHARGE

*** NO DISCHARGE | * | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	*	(15)	*	*	*
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	110 DAILY MX	DEG. F		ONCE/ SHIFT	IMERSN
PH	SAMPLE MEASUREMENT	******	******		*	******	*	(12)	*	*	*
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	*	*	(19)	*	*	*
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	*	*	(03)	******	******	******		*	*	*
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		DAILY	ESTIMA
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	*	(19)	*	*	*
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	*	(19)	*	*	*
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	CERTIFICATION	SIGNATURE	TELEPHONE	DATE
Plant Manager G. H. Gellrich TYPED OR PRINTED	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature] SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	717 (AREA CODE) 948-8400 (NUMBER)	04 (YEAR) 01 (MO) 26 (DAY)

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* *No discharge.

THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT THAT OUTFALL 001 BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT THE MAIN DISCHARGE-OUTFALL 003. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004

PA0009920 PERMIT NUMBER | 004 A DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
004-EMERGENCY UNIT 1 DISCHARGE

MONITORING PERIOD: FROM YEAR 03 MO 12 DAY 01 TO YEAR 03 MO 12 DAY 31

*** NO DISCHARGE | * | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	******	******		******	******	*	(15)	*	*	*
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	REPORT DAILY MX	DEG. F		ONCE/ SHIFT	IMERSN
PH	SAMPLE MEASUREMENT	******	******		*	******	*	(12)	*	*	*
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	*	*	(19)	*	*	*
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	*	*	(03)	******	******	******		*	*	*
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		DAILY	ESTIMA
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	******	******		******	******	*	(19)	*	*	*
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	******	******		******	******	*	(19)	*	*	*
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	******	0 INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
G. H. Gellrich
Plant Manager
TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: 717 (AREA CODE) 948-8400 (NUMBER)
DATE: 04 (YEAR) 01 (MO) 26 (DAY)

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here) *No Discharge.
THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT UNIT 1 MECHANICAL DRAFT COOLING TOWER BECOMES BLO CKED. SAMPLES SHALL BE TAKEN AT OUTFALL 004. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920	005 B
PERMIT NUMBER	DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 005B

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

*** NO DISCHARGE [ ] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	******	******		7.7	******	7.7	(12	0	1/31*	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	10	10	(19	0	1/31*	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/ MONTH	GRAB
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	N/A*	N/A*	(19	0	N/A*	N/A*
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	15 MO AVG	20 DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.054	0.054	(03)	******	******	******		0	1/31*	Est.
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		ONCE/ MONTH	ESTIMA
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

[signature]

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	04	01	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

* See Supplemental Form W for comments and explanations. Reporting in accordance with PADEP discussion for Natural Draft Cooling Tower overflow from icing. Discharge for one day during December 2003.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

This is a 4-part form.

00196/031002-P0756

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location If Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920	101 A
PERMIT NUMBER	DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 101 - STP

MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

*** NO DISCHARGE | __ | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.011	0.023	(03)	******	******	******		0	Cont.	Rcord
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	CERTIFICATION	SIGNATURE	TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature]	717	948-8400	04	01	26
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used. This is a 4-part form.

00199/031002407058

Form Approved.
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	101 G
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	10	01	TO	03	12	31

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 101 - STP

*** NO DISCHARGE | | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
SOLIDS, TOTAL SUSPENDED 00530 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		******	<5	******	(19	0	1/Qrtr	Grab
	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	******	MG/L		QTRLY	COMP-8
PHOSPHORUS, TOTAL (AS P) 00665 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		******	0.2	******	(19	0	1/Qrtr	Grab
	PERMIT REQUIREMENT	******	******	**** ****	******	2.0 MO AVG	******	MG/L		QTRLY	COMP-8
COLIFORM, FECAL GENERAL 74055 1 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		******	<1	******	(13	0	1/Qrtr	Grab
	PERMIT REQUIREMENT	******	******	**** ****	******	100000 30DAVGEC	******	#/ 100ML		QTRLY	GRAB
BOD, CARBONACEOUS 05 DAY, 20C 80082 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		******	25*	******	(19	0	1/Qrtr	Grab
	PERMIT REQUIREMENT	******	******	**** ****	******	25 MO AVG	******	MG/L		QTRLY	COMP-8
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE	DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	717 948-8400	04	01	26
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE / NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

* CBOD5 reported as 24.6 mg/l from vendor laboratory. Vendor confirmed result as reported. Data not consistent with historical data. Follow-up CBOD5 sampling conducted in January 2004.. 6 12

Form Approved.
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location If Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	401 A

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

MAJOR
(SUBR 03)
F - FINAL
401 IW FILTER SYS DISCHARGE

*** NO DISCHARGE | * | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*	*	(03)	******	******	******		*	*	*
	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

[signature]

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	04	01	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

*No Discharge

Form Approved.
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	401 G
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	10	01	TO	03	12	31

MAJOR
(SUBR 03)
F - FINAL
401 IW FILTER SYS DISCHARGE

*** NO DISCHARGE | * | ***
NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		*	******	*	(12	*	*	*
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		QTRLY	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	*	*	(19	*	*	*
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	100 DAILY MX	MG/L		QTRLY	GRAB
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	*	*	(19	*	*	*
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	15 MO AVG	20 DAILY MX	MG/L		QTRLY	GRAB
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE		DATE		
G. H. Gellrich Plant Manager TYPED OR PRINTED	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE 717	NUMBER 948-8400	YEAR 04	MO 01	DAY 26

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

* No Discharge.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	501 A

MAJOR
(SUBR 03)
F - FINAL
501-UNIT 1 SECONDARY NEUT TANK

*** NO DISCHARGE [*] ***

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	12	01	TO	03	12	31

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		***	******	***	(12	*	***	***
00400 1 0 0 EFFLUENT GROSS VALU	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	***	***	(19	*	***	***
00530 1 0 0 EFFLUENT GROSS VALU	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	***	***	(03)	******	******	******		*	***	***
50050 1 0 0 EFFLUENT GROSS VALU	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		TWICE/MONTH	CALCTD
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT			**							
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NOTE: Discharges from Secondary Neutralizer Tank are treated and released via the Industrial Waste Treatment System (DSN 701) in accordance with NPDES Permit.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE	DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE 717 NUMBER 948-8400	YEAR 04	MO 01	DAY 26
TYPED OR PRINTED						

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * NO DISCHARGE. SEE COMMENT ABOVE.
SAMPLES SHALL BE TAKEN AT THE POINT OF DISCHARGE OF UNIT 1 SECONDARY NEUTRALIZATION TANK OR FROM THE MIXE D TANK PRIOR TO RELEASE.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920 — PERMIT NUMBER
501 Q — DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
501-UNIT 1 SECONDARY NEUT TANK

Form Approved.
OMB No. 2040-0004

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	10	01	TO	03	12	31

*** NO DISCHARGE | * | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	AVERAGE	MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	***	***	(19)	*	***	***
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	15 MO AVG	20 DAILY MX	MG/L		QTRLY	GRAB
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

** NOTE: Discharges from Secondary Neutralizer Tank are treated and released via the Industrial Waste Treatment System (DSN 701) in accordance with NPDES Permit.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE		DATE		
G. H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	[signature]	717	948-8400	04	01	26
TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* * NO DISCHARGE. SEE COMMENT ABOVE.

SAMPLES SHALL BE TAKEN AT THE POINT OF DISCHARGE OF UNIT 1 SECONDARY NEUTRALIZATION TANK OR FROM THE MIXE D TANK PRIOR TO RELEASE.

Form Approved.
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	701 A

MONITORING PERIOD	YEAR	MO	DAY
FROM	03	12	01
TO	03	12	31

MAJOR
(SUBR 03)
F - FINAL
701-IW TREATMENT SYSTEM

*** NO DISCHARGE | __ | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	******	******		8.1	******	8.2	(12)	0	4/31	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	4	8	(19)	0	4/31	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	30 MO AVG	100 DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.124	0.146	(03)	******	******	******		0	Cont.	Rcord
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTIN UOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE AREA CODE	NUMBER	DATE YEAR	MO	DAY
717	948-8400	04	01	26

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

SAMPLES SHALL BE TAKEN AT POINT OF DISCHARGE OF INDUSTRIAL WASTE TREATMENT SYSTEM.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00211/031002 This is a 2-part form.

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved. - OMB No. 2040-0004

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

PA0009920 — PERMIT NUMBER
701 Q — DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
701-IW TREATMENT SYSTEM

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	03	10	01	TO	03	12	31

*** NO DISCHARGE | __ | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	AVERAGE	MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	<2	<2	(19)	0	1/Qrtr	Grab
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	15 MO AVG	20 DAILY MX	MG/L		QTRLY	GRAB
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
G. H. Gellrich
Plant Manager
TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	04	01	26
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00212/031002-P0798 This is a 4-part form.

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W) *For the MONTH* DECEMBER 2003

AmerGen Energy Company, LLC - Three Mile Island Nuclear Station

Londonderry Township, Dauphin County **7-G Watershed**

Day	Flow	pH	TSS	Temp	Free Cl_2 (1)	Spectrus NX 1104	Spectrus OX 1200 (4)	Spectrus CT 1300	Hydrazine	Powerline 3623	Comments
	MGD	SU	Mg/l	Deg F	mg/l	mg/l	TRO – mg/l	mg/l	mg/l	mg/l	
1	21.2			46.9							
2	21.4			45.4							
3	17.2			46.2	S	N		S	S	N	
4	19.6	7.7	12	45.5	E	O		E	E	O	
5	24.0			44.4	E			E	E		
6	20.7			44.6		C	12/06 < 0.01			C	
7	24.9			42.2	C	H	< 0.01 < 0.01	C	C	H	
8	15.7			44.4	O	E		O	O	E	
9	14.5	7.6	6	44.4	M	M		M	M	M	
10	25.6			43.0	M	I		M	M	I	
11	25.0			48.1	E	C	12/11 < 0.01	E	E	C	
12	26.0			48.3	N	A	< 0.01 < 0.01	N	N	A	
13	24.8			47.3	T	L		T	T	L	
14	23.2			46.4	S			S	S		
15	22.5			46.3		A				A	
16	22.2			45.4	S	D	12/16 < 0.01	S	S	D	
17	21.7			45.5	E	D	< 0.01 < 0.01	E	E	D	
18	22.2			44.6	C	I		C	C	I	
19	22.2			44.6	T	T		T	T	T	
20	22.0			44.9	I	I		I	I	I	
21	20.6			45.4	O	O		O	O	O	
22	18.0			46.6	N	N		N	N	N	
23	17.7	7.5	20	48.4			12/23 0.011				
24	18.0			50.5	#1		0.02 0.03 0.02	#2	#3		
25	19.2			49.7							
26	19.5			49.2							
27	19.5			49.3							
28	20.0			48.6							
29	19.5			48.5			12/30 < 0.01				
30	18.8			49.2			< 0.01 < 0.01				
31	18.6			48.6			< 0.01				
Avg	20.8	7.6	13	46.4	N/A	N/A	0.01	N/A	N/A	N/A	

1) Chlorine reporting not required when chlorine compounds not added to the River Water or Circulating Water Systems as the sole active ingredient for biocide treatment (see NPDES Permit Footnote No. 9, page 3).

2) No Chemical Addition.

3) Hydrazine monitoring not required because there were no discharges associated with OTSG wet lay-up (see NPDES Permit Footnote No. 7, page 3).

4) Per agreement with the Department all Total Residual Oxidant (TRO) monitoring is reported in this column. TRO monitoring covers River Water System treatment with Spectrus OX 1200 and Circulating Water System treatment with sodium bromide and sodium hypochlorite.

Laboratory Name: TMI Plant Chemistry Laboratory In house ? Yes

Signature: S. R. Cogley/ DR 1/22/04

REMARKS: Permit allows discharge sampling for TRO at the TMI-1 Mechanical Draft Cooling Tower or DSN 001. Telephone: (717) 948-8881

NPDES Permit PA 0009920 - Outfall DSN 001

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W)
AmerGen Energy Company, LLC - Three Mile Island Nuclear Station
Londonderry Township, Dauphin County **7-G Watershed**

For the MONTH DECEMBER 2003

Day	Outfall 501				Outfall 701				Outfall 005B				Comments
	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	
1	0	-	-	-	0.142	8.1	5	-					DSN 005B discharges are industrial-type discharges from the East Dike Settling Basin (EDSB).
2	0	-	-	-	0.127	8.1	3	-					
3	0	-	-	-	0.123	8.2	1	-	0.054	7.7	10	*N/A	
4	0	-	-	-	0.127	8.1	8	-					
5	0	-	-	-	0.119								
6	0	-	-	-	0.127								
7	0	-	-	-	0.114								* Outfall 005 discharges on 12/03/2003 were related to the overflow of TMI Unit 1 Natural Draft Cooling Towers (NDCTs) due to tower icing during restart of TMI Unit 1 from refueling and maintenance outage. The overflow conditions were verbally reported to the Department. The Department requested that, monitoring results (pH, TSS and TRO) be reported with December DMR. See Table for pH & TSS. TRO < 0.01 mg/l. Oil & Grease not required per agreement with the Department.
8	0	-	-	-									
9	0	-	-	-	0.061								
10	0	-	-	-	0.127								
11	0	-	-	-	0.138								
12	0	-	-	-	0.128								
13	0	-	-	-	0.130								
14	0	-	-	-	0.134								
15	0	-	-	-	0.130								
16	0	-	-	-	0.131								
17	0	-	-	-	0.128								
18	0	-	-	-	0.132								
19	0	-	-	-	0.118								
20	0	-	-	-	0.125								
21	0	-	-	-	0.119								
22	0	-	-	-	0.126								Outfall 005A (stormwater) was visually monitored during the month related to the Industrial Cooler Leakage. There is no Industrial Cooler leakage entering Outfall 005. There is no significant on-going leakage to the Yard Drainage System from the Coolers.
23	0	-	-	-	0.125								
24	0	-	-	-	0.131								
25	0	-	-	-	0.140								
26	0	-	-	-	0.133								
27	0	-	-	-	0.146								
28	0	-	-	-									
29	0	-	-	-									
30	0	-	-	-	0.057								
31	0	-	-	-	0.130								
Avg	0	-	-	-	0.124	8.1	4	-	0.054	7.7	10	*N/A	

Laboratory Name: TMI Chem. Laboratory; Analytical Laboratory Services, Inc (oil & grease) In house? Yes Signature: S.R. Cogley/ DRG 4/22/04
REMARKS : No discharges via DSN 501 - Sec. Neutralizer Tank discharged via DSN 701. Telephone: (717) 948-8881

NPDES Permit **PA0009920** for **Outfalls DSN 501, 701 & 005B**

ATTACHMENT
May 2004 NPDES DMR Supplemental Form (W)

Discussion on Industrial Cooler Leakage

Background

The status of leakage from the TMI Unit 1 Industrial Coolers have been discussed in the monthly DMRs as a note on page 2 of the Supplemental (W) Forms since May 2003. Comments have been attached to the DMR as a follow-up to a Spill Report submitted with the May 2003 DMR. In the May 2003 DMR AmerGen Energy Company, LLC (AmerGen) reported that leakage of chemically treated water from the Industrial Coolers had entered the local portion of the station stormwater collection system. The two Industrial Coolers (east unit and west unit) are located on the roof of the TMI Unit 1 Intermediate Building roof. Leakage from the coolers flows onto the building roof and then travels to the roof drain which is hard-piped to the Yard Drainage System.

The May 2003 DMR Spill Report identified that repairs were made to each of the two leaking industrial coolers following identification of the leakage in May 2003. As discussed in the May 2003 report significant leakage from the east cooler was repaired and the cooler was returned to service. However due to operational constraints related to the station's TMI Unit 1 Operating License (USNRC requirements) the west cooler could not be removed from service for repairs until after the 2003 summer months. To mitigate the flow of on-going measurable industrial cooler leakage from the west industrial cooler AmerGen installed a temporary catchment and pump system to collect and transfer cooler leakage to a plant sump for treatment and discharge at Outfall 701 under the station's NPDES Permit. The completed repairs on the east cooler and the installation of the temporary leakage collection system for the west cooler mitigated the significant leakage from the coolers into the Yard Drainage System.

Current Status Industrial Cooler Leakage

As listed in the 2003 Spill Report under "Preventive Actions", both Industrial Coolers were inspected and repaired during their annual preventive maintenance outages in the Spring 2004. Significant leakage sources from the east industrial cooler were repaired and the current leakage rate from the east cooler is insignificant. Some identified leakage sources from the west cooler were repaired, however the measurable leakage from the west cooler continues at this time. The temporary catchment and pump system (installed June 2003) for the west cooler continues to be used at the present time. Inspections during the Spring 2004 cooler outages revealed that two cooler fan housings are the source of the current measurable west cooler leakage. Inspections by the manufacturer and station engineers during the outage identified the source of leakage (from two fan housings), however a repair method could not be identified and implemented within the cooler outage window. Obvious water leakage paths into the fan housings were not identified during the inspections and station engineers were not able to determine the cause of the excessive water entering the two fan housings. Additional engineering evaluations and/or inspections are needed to determine the cause of the excessive fan housing leakage.

Following the Spring 2004 cooler outages and after the return of both coolers to service the temporary catchment and pump system (for west cooler) was inadvertently removed from service during post work site clean-up activities.

ATTACHMENT
May 2004 NPDES DMR Supplemental Form (W)

Current Status Industrial Cooler Leakage (cont'd)

The temporary leakage collection system was not in service over the period from May 15, 2004, at approximately 4:00 p.m. through May 27, 2003, at approximately 7:00 p.m. The table below describes the characteristics of the treated industrial cooler leakage that entered the roof drain over this period.

Sample Date/ Location	Chemical Analyses Results – Industrial Coolers						
	Conductivity (mmho/cm^2)	pH	AEC 3107 (mg/l)	Alkalinity (mg/l)	Temp. (°F)	Ca Hardness (mg/l)	Langlier Index
May 4, 2004							
East Cooler	No Sample – System Not Operating						
West Cooler	1624	8.79	38	380	68	680	2.28
May 11, 2004							
East Cooler	970	8.54	16	200	77	323	1.53
West Cooler	840	8.53	18	272	80	272	1.43
May 25, 2004							
East Cooler	1295	8.57	15	240	-	476	1.75
West Cooler	1356	8.60	17	240	-	476	1.78
June 1, 2004							
East Cooler	983	8.44	12	220	71	374	1.48
West Cooler	962	8.47	21	200	71	357	1.45

The estimated flow to the Intermediate Building roof drains from the Industrial Cooler leakage over the period was approximately 50 to 75 gallons per day. This flow estimate was based on measured flows of the current west Industrial Cooler fan housing leakage (currently collected and diverted to plant sump). There was no effect on discharges from the Yard Drainage System at Outfall 005 during this period. Routine observations indicate that there was no observed flow from the Intermediate Building area downstream in the Yard Drainage System. During rain events there would be no detected impact anticipated due to the low initial concentration of AEC 3107 in the Industrial Cooler water. As a comparison, the aquatic toxicity data for Betz AEC 3107 are listed as follows: Flathead minnow - 96 hour Static 0% Mortality = 2000 mg/l; and Dahnia magna - 48 hour LC50 = 1,575 mg/l. The AEC 3107 concentration in the Industrial Coolers over this period (range 12 to 38 mg/l) was significantly less than any listed toxicity levels

The collection equipment was promptly re-installed upon identification that the temporary leakage collection system was a listed preventive action under the original Spill Report. To prevent recurrence the temporary equipment will be clearly identified and labeled. Additionally, station engineering has been tasked with developing a plan to mitigate significant system leakage as well as identify and quantify other less significant leakage that can be expected to occur on a periodic or continuous basis from the Industrial Cooler area.

ATTACHMENT
May 2004 NPDES DMR Supplemental Form (W)

Current Status Industrial Cooler Leakage (cont'd)

Because of the equipment age, design, and physical location, some water leakage from the Industrial Coolers will occur and at times may cause an observable flow of water from the Intermediate Building roof into the station Yard Drainage System. Sources of water that may flow from the Intermediate Building roof into the roof drains are emergent small leaks from the Industrial Coolers, condensation from local steam pipes, and drift/carry-over from the Industrial Coolers. AmerGen intends to submit clarifying information to the Department related to the frequency and quantity of potential discharges of treated Industrial Cooler water into the Station Yard Drainage System.

As discussed in the original Spill Report, the current NPDES Permit application addresses the potential discharge of treated Industrial Cooler water into the station Yard Drainage System during maintenance activities. The current Permit Application, Section C., Outfall 005, states that input into the Yard Drainage System from cooler maintenance occurs up to five days per year at a maximum flow of 5,000 gallons per day. The current Permit Application information will be updated to reflect the expected input into the Yard Drainage System from continuing Industrial Cooler operations.

There is no expected identifiable impact on discharges from the Yard Drainage System at Outfall 005 related to Industrial Cooler leakage. This assumption is based on the following reasons: 1) The location of the Intermediate Building is at a remote upstream location from Outfall 005 in the Yard Drainage System; 2) The open design of the Yard Drainage System contributes to evaporation and natural attenuation in the soils; and 3) The Industrial Cooler leakage volume is insignificant in comparison to the volume and design flow of the Yard Drainage System.

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

AmerGen SM

An Exelon Company

June 24, 2004
5532-2004-029

Mr. Randy King
Bureau of Water Quality Management
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Dear Mr. King:

SUBJECT: MAY 2004 - DISCHARGE MONITORING REPORT (DMR)
NPDES PERMIT PA 0009920
THREE MILE ISLAND UNIT 1

In accordance with the conditions of NPDES Permit PA 0009920 please find attached the completed monthly DMR forms and two Supplemental Form Ws for May 2004. There were no exceedances of effluent limitations reported on the completed DMR forms.

Should the Department have questions concerning this submittal or require additional information please contact Scott Cogley, Environmental Chemist, at (717) 948-8881 or e-mail at *scogley@amergenenergy.com.*

Sincerely,

G. H. Gellrich
Plant Manager

GHG/src

Attachments

cc: NPDES Discharge Monitoring Reports
USEPA Region III – Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920 — PERMIT NUMBER
001 A — DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 04 MO 05 DAY 01 TO YEAR 04 MO 05 DAY 31

Form Approved.
OMB No. 2040-0004

MAJOR
(SUBR 03)
F - FINAL
001-MAIN STATION DISCHARGE

*** NO DISCHARGE [ ] ***

NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	*******	*******		*******	*******	92.0	(15)			
00011 1 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	110 DAILY MX	DEG. F	0	Cont. RECORD	Rcord.
PH	SAMPLE MEASUREMENT	*******	*******		7.8	*******	7.8	(12)			
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU	0	2/31 TWICE/MONTH	Grab GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	36	40	(19)			
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L	0	2/31 TWICE/MONTH	Grab GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	17.7	23.2	(03)	*******	*******	*******				
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****	0	Cont. CONTINUOUS	Rcord. RECORD
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	*******	*******		*******	*******	N/A*	(19)	0*	N/A*	N/A*
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0.2 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	*******	*******		*******	*******	N/A*	(19)	0*	N/A*	N/A*
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0 DAILY MX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G. H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE 717, NUMBER 948-8400

DATE: YEAR 04, MO 06, DAY 24

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
SEE PART C OF PERMIT FOR OTHER REQUIREMENTS.

*See Attached Supplemental Form (W) for explanations and Comments.

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	003 A

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	03	01	TO	04	03	31

MAJOR
(SUBR 03)
F - FINAL
003-EMERGENCY UNIT 1 DISCHARGE

*** NO DISCHARGE | **| ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
TEMPERATURE, WATER DEG. FAHRENHEIT 00011 1 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		*******	*******	**	(15)	**	**	**
	PERMIT REQUIREMENT	******	******	*** ****	*******	*******	110 DAILY MX	DEG. F		INCE/ SHIP	GRAB
PH 00400 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		**	*******	**	(12)	**	**	**
	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		PRICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED 00530 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		*******	**	**	(19)	**	**	**
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L		1/WEEK MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT 50050 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	**	**	(03)	*******	*******	*******		**	**	**
	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		DAILY	ESTIM
CHLORINE, FREE AVAILABLE 50064 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		*******	*******	**	(19)	**	**	**
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0.5 DAILY MX	MG/L		SEE PERMIT	GRAB
HYDRAZINE 81313 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	******	******		*******	*******	**	(19)	**	**	**
	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	INST MAX	MG/L		SEE PERMIT	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G.H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA CODE	NUMBER	YEAR	MO	DAY
717	948-8400	04	06	24

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* **No Discharge.
THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT THAT OUTFALL 001 BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT THE MAIN DISCHARGE-OUTFALL 003. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920	004 A
PERMIT NUMBER	DISCHARGE NUMBER

MAJOR
(SUBR 03)
F - FINAL
004-EMERGENCY UNIT 1 DISCHARGE '

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	05	01	TO	04	05	31

*** NO DISCHARGE | ** | ***

NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
TEMPERATURE, WATER DEG. FAHRENHEIT	SAMPLE MEASUREMENT	*******	*******		*******	*******	**	(15)	**	**	**
00011 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	REPORT DAILY MX	DEG. F		INCE EVERY	IMMERSI
PH	SAMPLE MEASUREMENT	*******	*******		**	*******	**	(12)	**	**	**
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	**	**	(19)	**	**	**
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	REPORT MO AVG	REPORT DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	**	**	(03)	*******	*******	*******		**	**	**
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		DAILY	ESTIM
CHLORINE, FREE AVAILABLE	SAMPLE MEASUREMENT	*******	*******		*******	*******	**	(19)	**	**	**
50064 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0.2 DAILY MX	MG/L		PER	GRAB
HYDRAZINE	SAMPLE MEASUREMENT	*******	*******		*******	*******	**	(19)	**	**	**
81313 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	*******	0 INST MAX	MG/L		PER	
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
G.H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	717	948-8400	04	06	24
TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* **No Discharge.
THIS IS AN EMERGENCY DISCHARGE FROM UNIT 1 IN THE EVENT UNIT 1 MECHANICAL DRAFT COOLING TOWER BECOMES BLOCKED. SAMPLES SHALL BE TAKEN AT OUTFALL 004. SEE PERMIT FOR ADDITIONAL REQUIREMENTS.

PERMITTEE NAME/ADDRESS *(Include Facility Name/ Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	005 B

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 005B

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	05	01	TO	04	05	31

*** NO DISCHARGE | ** | ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	******	******		**	******	**	(12)	**	**	**
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		ONCE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	**	**	(19)	**	**	**
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	30 MO AVG	100 DAILY MX	MG/L		ONCE/ MONTH	GRAB
OIL & GREASE	SAMPLE MEASUREMENT	******	******		******	**	**	(19)	**	**	**
00556 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	15 MO AVG	20 DAILY MX	MG/L		ONCE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	**	**	(03)	******	******	******		**	**	**
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		ONCE/ MONTH	ESTIM
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
G.H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		AREA CODE	NUMBER	YEAR	MO	DAY
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	717	948-8400	04	06	24

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* **No Discharge. See Supplemental Form (W) for comments.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	101 A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	05	01	TO	04	05	31

MAJOR
(SUBR 03)
F - FINAL
OUTFALL 101 - STP

*** NO DISCHARGE [ ] ***

NOTE: Read instructions before completing this form.

Form Approved.
OMB No. 2040-0004

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.013	0.019	(03)	******	******	******		0	Cont.	Rcord.
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTINUOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G.H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

G. Gell [signature]

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	04	06	24
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

Page 5 of 8

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

PA0009920	401 A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	05	01	TO	04	05	31

MAJOR
(SUBR 03)
F - FINAL
401 IW FILTER SYS DISCHARGE

*** NO DISCHARGE | ** | ***

NOTE: Read instructions before completing this form.

Form Approved.
OMB No. 2040-0004

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	**	**	(03)	******	******	******		**	**	**
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONTIN UOUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

G.H. Gellrich
Plant Manager

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
717	948-8400	04	06	24
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* **No Discharge.

EPA Form 3320-1 (Rev. 3/99) Previous editions may be used.

00204 / This is a 4-part form.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
PA0009920	501 A

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	03	01	TO	04	03	31

MAJOR
(SUBR 03)
F - FINAL
501-UNIT 1 SECONDARY NEUT TANK '
*** NO DISCHARGE (**) ***
NOTE: Read Instructions before completing this form.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
PH	SAMPLE MEASUREMENT	*******	*******		**	*******	**	(12)	**	**	**
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	6.0 MINIMUM	*******	9.0 MAXIMUM	SU		TWICE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	*******	*******		*******	**	**	(19)	**	**	**
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*******	*******	*** ****	*******	30 MO AVG	100 DAILY MX	MG/L		TWICE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	**	**	(03)	*******	*******	*******		**	**	**
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	*******	*******	*******	**** ****		TWICE/ MONTH	CALC
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

** NOTE: Discharges from Secondary Neutralizer Tank are treated and released via the Industrial Waste Treatment System (DSN 701) in accordance with NPDES Permit.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE	DATE		
G.H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	717 948-8400	04	06	24
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE / NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)* **No Discharge. See Comment Above.
SAMPLES SHALL BE TAKEN AT THE POINT OF DISCHARGE OF UNIT 1 SECONDARY NEUTRALIZATION TANK OR FROM THE MIXE
D TANK PRIOR TO RELEASE.

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME AMERGEN ENERGY CO LLC
ADDRESS PO BOX 480
ROUTE 441 SOUTH
MIDDLETOWN PA 17057-0480
FACILITY AMERGEN ENERGY CO LLC
LOCATION MIDDLETOWN PA 17057-0480
ATTN: BRUCE WILLIAMS/VICE PRES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved.
OMB No. 2040-0004

PA0009920	701 A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	04	05	01	TO	04	05	31

MAJOR
(SUBR 03)
F - FINAL
701-IW TREATMENT SYSTEM

*** NO DISCHARGE [ ] ***

NOTE: Read instructions before completing this form.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
PH	SAMPLE MEASUREMENT	******	******		8.4	******	8.4	(12)	0	3/31	Grab
00400 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	6.0 MINIMUM	******	9.0 MAXIMUM	SU		ONCE/ MONTH	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	******	******		******	2	3	(19)	0	3/31	Grab
00530 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	*** ****	******	30 MO AVG	100 DAILY MX	MG/L		ONCE/ MONTH	GRAB
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	0.100	0.130	(03)	******	******	******		0	Cont.	Rcord.
50050 1 0 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT MO AVG	REPORT DAILY MX	MGD	******	******	******	**** ****		CONT IN USUS	RCORDR
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE	DATE		
G.H. Gellrich Plant Manager	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	717 948-8400	04	06	24
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
SAMPLES SHALL BE TAKEN AT POINT OF DISCHARGE OF INDUSTRIAL WASTE TREATMENT SYSTEM.

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W)
AmerGen Energy Company, LLC - Three Mile Island Nuclear Station
Londonderry Township, Dauphin County **7-G Watershed**

For the MONTH MAY 2004

Day	Flow	pH	TSS	Temp	Free Cl_2 (1)	Spectrus NX 1104	Spectrus OX 1200 (4)	Spectrus CT 1300	Hydrazine	Powerline 3623	Comments
	MGD	SU	mg/l	Deg F	mg/l	mg/l	TRO – mg/l	mg/l	mg/l	mg/l	
1	20.7			72.9							1) Chlorine reporting not required when chlorine compounds not added to the River Water or Circulating Water Systems as the sole active ingredient for biocide treatment (see NPDES Permit Footnote No. 9, page 3). 2) Spectrus CT 1300 sampled in Circulating Water System on May 12, 2004. CT 1300 concentration confirmed to be less than 0.05 mg/l before opening blowdown to the Main Station Discharge (see NPDES Permit Footnote No. 8, page 3). 3) Hydrazine monitoring not required because there were no discharges associated with OTSG wet lay-up (see NPDES Permit Footnote No. 7, page 3). 4) Per agreement with the Department all Total Residual Oxidant (TRO) monitoring is reported in this column. TRO monitoring covers River Water System treatment with Spectrus OX 1200 and Circulating Water System treatment with sodium bromide and sodium hypochlorite.
2	21.0			75.8							
3	19.5			74.8	S	N			S	N	
4	18.7			73.3	E	O	05/04 < 0.01	Periodic clam kill over period 05/10/04 to 05/12/04.	E	O	
5	20.5			72.1	E		0.015 0.015		E		
6	20.9	7.8	31	71.5		C	0.014			C	
7	23.2			73.3	C	H	05/06 < 0.01		C	H	
8	17.1			76.0	O	E	0.01 0.01		O	E	
9	16.6			76.0	M	M			M	M	
10	17.1			73.6	M	I		05/10 < 0.05 <0.05	M	I	
11	16.2			74.5	E	C			E	C	
12	16.7			78.5	N	A		05/12 (2) < 0.05	N	A	
13	17.1	7.8	40	85.4	T	L	05/13 < 0.01		T	L	
14	17.2			85.9	S		< 0.01 < 0.01		S		
15	17.0			83.3		A	< 0.01 < 0.01			A	
16	17.8			86.5	S	D			S	D	
17	17.5			87.9	E	D			E	D	
18	17.4			88.4	C	I	05/18 < 0.01		C	I	
19	18.1			87.2	T	T	< 0.01 0.011		T	T	
20	18.1			84.0	I	I	0.010		I	I	
21	16.9			83.4	O	O	05/20 0.015		O	O	
22	15.8			85.5	N	N	0.016 0.015		N	N	
23	15.2			87.6							
24	15.4			87.9	# 1				# 3		
25	16.0			89.5			05/26 0.018				
26	16.7			92.0			0.026 0.041				
27	18.3			90.9			0.041 0.035				
28	15.4			87.6			0.027				
29	17.0			85.3			05/27 0.029				
30	16.6			85.1			0.029 0.026				
31	16.9			85.3							
Avg	17.7	7.8	36	81.6	N/A	N/A	0.017	< 0.05	N/A	N/A	

Laboratory Name: TMI Plant Chemistry Laboratory In house ? Yes

Signature: S. R. Cogley/ 6/22/04

REMARKS: Permit allows discharge sampling for TRO at the TMI-1 Mechanical Draft Cooling Tower or DSN 001.

Telephone: (717) 948-8881

NPDES Permit PA 0009920 - Outfall DSN 001

DISCHARGE MONITORING REPORT SUPPLEMENTAL FORM (W) *For the MONTH* MAY 2004

AmerGen Energy Company, LLC - Three Mile Island Nuclear Station

Londonderry Township, Dauphin County **7-G Watershed**

Day	Outfall 501				Outfall 701				Outfall 005B				Comments
	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	Flow MGD	pH SU	TSS mg/l	O&G mg/l	
1	0	-	-	-	0.091	8.4	2	-	0	-	-	-	DSN 005B discharges are industrial-type discharges from the East Dike Settling Basin (EDSB).
2	0	-	-	-	0.088	8.4	2	-	0	-	-	-	
3	0	-	-	-	0.090	8.4	3	-	0	-	-	-	
4	0	-	-	-	0.093				0	-	-	-	
5	0	-	-	-	0.086				0	-	-	-	
6	0	-	-	-	0.087				0	-	-	-	
7	0	-	-	-	0.022				0	-	-	-	
8	0	-	-	-					0	-	-	-	
9	0	-	-	-					0	-	-	-	
10	0	-	-	-					0	-	-	-	
11	0	-	-	-	0.054				0	-	-	-	
12	0	-	-	-	0.121				0	-	-	-	
13	0	-	-	-	0.118				0	-	-	-	
14	0	-	-	-	0.123				0	-	-	-	
15	0	-	-	-	0.128				0	-	-	-	
16	0	-	-	-	0.121				0	-	-	-	
17	0	-	-	-	0.017				0	-	-	-	
18	0	-	-	-					0	-	-	-	
19	0	-	-	-					0	-	-	-	
20	0	-	-	-					0	-	-	-	Outfall 005A (stormwater) was visually monitored during the month related to the Industrial Cooler Leakage. There is no detectable Industrial Cooler leakage entering Outfall 005. See attached discussion for Industrial Cooler leakage description during May 2004
21	0	-	-	-					0	-	-	-	
22	0	-	-	-	0.105				0	-	-	-	
23	0	-	-	-	0.130				0	-	-	-	
24	0	-	-	-	0.123				0	-	-	-	
25	0	-	-	-	0.125				0	-	-	-	
26	0	-	-	-	0.125				0	-	-	-	
27	0	-	-	-	0.124				0	-	-	-	
28	0	-	-	-	0.123				0	-	-	-	
29	0	-	-	-	0.111				0	-	-	-	
30	0	-	-	-	0.085				0	-	-	-	
31	0	-	-	-					0	-	-	-	
Avg	0	-	-	-	0.100	8.4	2	-	0	-	-	-	

Laboratory Name: TMI Chem. Laboratory, Analytical Laboratory Services, Inc (oil & grease) In house? Yes Signature: S.R. Cogley/ SRC 6/22/04

REMARKS : No discharges via DSN 501 - Sec. Neutralizer Tank discharged via DSN 701. Telephone: (717) 948-8881

NPDES Permit **PA0009920** for **Outfalls DSN 501, 701 & 005B**

2H.107

2007 Circ Acid Tank Leak Report

AmerGen SM

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057

Telephone: 717-948-8000

An Exelon Company

July 26, 2007
5532-2007-036

Mr. Tim Barrick
Storage Tank Program
PA Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

SUBJECT: NOTIFICATION OF REPORTABLE RELEASE
SULFURIC ACID TANK LEAK
THREE MILE ISLAND UNIT 1

Dear Mr. Barrick:

In accordance with the Storage Tank Program corrective action regulations, please find attached a completed Notification of Reportable Release form. The form covers the release of concentrated sulfuric acid from a regulated storage tank. The entire release was contained within the tank secondary containment structure, and there was no environmental contamination caused by the incident. A verbal report was provided to the Department on July 15, 2007. The attached completed form meets the requirement to provide the Department with a written report within 15 days of providing the verbal release notification.

Should the Department have questions concerning this notification or require additional information, please contact Scott Cogley, Environmental Chemist, at (717) 948-8881 or e-mail at *scott.cogley@exeloncorp.com*

Sincerely,

T. J. Dougherty
Plant Manager

TJD/src

Attachments

cc: Londonderry Township
783 South Geyer's Church Road
Middletown, PA 17057

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2550-FM-BWM0082 12/2005
BUREAU OF WASTE MANAGEMENT

NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

☒ Initial
☐ Follow-Up

NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

NOTIFICATION OF REPORTABLE RELEASE *(Owners and Operators)*

The Storage Tank Program's Corrective Action Process (CAP) regulations establish release reporting requirements for owners and operators of storage tanks and storage tank facilities.

Subsection 245.305(a) of the regulations requires owners or operators to notify the appropriate regional office of the Department as soon as practicable, but no later than 24 hours, after the confirmation of a reportable release.

Subsection 245.305(d) requires owners or operators to provide an initial written notification to the Department, each municipality in which the reportable release occurred, and each municipality where that release has impacted environmental media or water supplies, buildings, or sewer or other utility lines, within 15 days of the notice required by Subsection 245.305(a).

Subsection 245.305(e) requires owners or operators to provide follow-up written notification to the Department and to each impacted municipality of new impacts to environmental media or water supplies, buildings, or sewer or other utility lines discovered after the initial written notification required by subsection 245.305(d). Written notification is to be made within 15 days of the discovery of the new impact.

This form may be used to comply with Subsection 245.305(d) and (e).

OWNERS AND OPERATORS (O/O)
INDICATE IF THIS IS AN INITIAL OR FOLLOW-UP NOTIFICATION BY MARKING THE APPROPRIATE BOX FOUND IN THE TOP RIGHT-HAND CORNER OF THIS FORM. PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIB, IV, V, VII and VIII.

NOTIFICATION OF CONTAMINATION *(Certified Installers and Inspectors)*

The Storage Tank Program's Certification regulations establish standards of performance for certified installers and inspectors of storage tanks and storage tank facilities.

Subsection 245.132(a)(4) of the regulations requires certified installers and inspectors to report to the Department a release of a regulated substance or confirmed or suspected contamination of soil, surface or groundwater from regulated substances observed while performing services as a certified installer or inspector.

This form may be used to comply with Subsection 245.132(a)(4). Subsection 245.132(a)(4) requires submission of the form within 48 hours of observing suspected or confirmed contamination. Where there is a reportable release, the form may be submitted jointly by the owner, operator, certified installer and certified inspector. In this instance, the form must be received by the appropriate regional office within 15 days of the notice required by Subsection 245.305(a).

CERTIFIED INSTALLERS AND INSPECTORS (I/I)
PLEASE COMPLETE ALL INFORMATION IN SECTIONS I, II, IIIA, IIIC, VI, VII and VIII.

INSTRUCTIONS

I. **FACILITY INFORMATION** - Record the name, I.D. number and physical location (not P.O. Box) of the facility at which a reportable release has been confirmed or at which suspected or confirmed contamination has been observed. Include the name and phone number of a person to contact at the facility.

II. **OWNER/OPERATOR INFORMATION** - Record the name, business address and phone number of the owner of the facility identified in Section I. Also, record the name and phone number of the operator of the facility.

III. **REGULATED SUBSTANCE INFORMATION** - Indicate to the best of your knowledge: A) the type of product or products involved; B) the quantity of product or products released; and C) whether the contamination is suspected or confirmed.

IV. **REPORTABLE RELEASE INFORMATION** - Record the date of confirmation of the reportable release, e.g., "9/18/01"; the date and regional office notified; and the date the local municipality(ies) [provide name of municipality(ies)] was/were sent a copy of this form. Indicate to the best of your knowledge the source/cause of the release, how the release was discovered and the environmental media affected and impacts.

V. **INTERIM REMEDIALACTIONS** - Indicate the interim remedial actions planned, initiated or completed.

VI. **SUSPECTED/CONFIRMED CONTAMINATION INFORMATION** - Record the date of observation of the suspected or confirmed contamination, e.g., "11/24/01". Indicate to the best of your knowledge the indications of a suspected release or extent of confirmed contamination resulting from the release of the regulated substance.

VII. **ADDITIONAL INFORMATION** - Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include in this section specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Use additional 8½" x 11" sheets of paper, if necessary.

VIII. **CERTIFICATION** - Please print your name, and provide your signature and date of signature. If a certified installer/inspector, provide certification number and company certification number.

IX. **ATTACHMENT** - If a certified installer/inspector, provide a copy of failed valid tightness test(s), if applicable.

PLEASE SEND COMPLETED ORIGINAL FORM TO:
PA Department of Environmental Protection
Environmental Cleanup Program
Storage Tank Section
(and the appropriate address below,
depending on where the FACILITY is located)

Southeast Region	Northeast Region	Southcentral Region	Northcentral Region	Southwest Region	Northwest Region
East Main Street rristown, PA 19401 HONE: 484-250-5900 FAX: 484-250-5943	2 Public Square Wilkes-Barre, PA 18711-0790 PHONE: 570-826-2511 FAX: 570-820-4907	909 Elmerton Avenue Harrisburg, PA 17110 PHONE: 877-333-1904 FAX: 717-705-4830	208 W. Third Street, Suite 101 Williamsport, PA 17701 PHONE: 570-321-6525/327-3696 FAX: 570-327-3420	400 Waterfront Drive Pittsburgh, PA 15222 PHONE: 412-442-4091/4000 FAX: 412-442-4328	230 Chestnut Street Meadville, PA 16335-3481 PHONE: 814-332-6945 800-373-3398 FAX: 814-332-6121
Counties Bucks, Chester, Delaware, Montgomery, Philadelphia	**Counties** Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming	**Counties** Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York	**Counties** Bradford, Cameron, Centre, Clinton, Clearfield, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union	**Counties** Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland	**Counties** Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, Warren

I. FACILITY INFORMATION (Both O/O and I/I)

Facility Name: Three Mile Island Unit 1
Facility I.D. Number: 22-60170
Street Address (P.O. Box not acceptable): Route 441 South
City: Middletown
State: PA
Zip Code: 17057 -
County: Dauphin
Municipality: Londonderry Township
Contact Person: Scott R. Cogley - Environ. Chemist
Phone Number: (717) 948 - 8881

II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)

Owner Name: AmerGen Energy Company, LLC
Address: Post Office Box 480
City: Middletown
State: PA
Zip Code: 17057 -
Phone Number: (717) 948 - 8881
Operator Name: Scott R. Cogley
Phone Number: (717) 948 - 8881

III. REGULATED SUBSTANCE INFORMATION

A. Type of Product(s) Involved (Mark All That Apply ☒): Both O/O and I/I		B. Quantity (Gallons) of Product(s) Released: O/O Only	C. Contamination Suspected [S] or Confirmed [C] (Mark All That Apply ☒): I/I Only
Leaded Gasoline	☐		[S] [C]
Unleaded Gasoline	☐		[S] [C]
Aviation Gasoline	☐		[S] [C]
Kerosene	☐		[S] [C]
Jet Fuel	☐		[S] [C]
Diesel Fuel	☐		[S] [C]
New Motor Oil	☐		[S] [C]
Used Motor Oil	☐		[S] [C]
Fuel Oil No. 1	☐		[S] [C]
Fuel Oil No. 2	☐		[S] [C]
Fuel Oil No. 4	☐		[S] [C]
Fuel Oil No. 5	☐		[S] [C]
Fuel Oil No. 6	☐		[S] [C]
Other (Specify) Sulfuric Acid	☒	500	[S] [C]
Unknown	☐		[S] [C]

IV. REPORTABLE RELEASE INFORMATION (O/O Only)

Date Reportable Release was Confirmed: 07 (m) / 15 (d) / 2007 (y)

Date Owner/Operator Verbally Notified Appropriate Regional Office of Reportable Release and Office Notified:
Date: 07 (m) / 15 (d) / 2007 (y) Office: PADEP 24-Hour Response

Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified:
Date: 07 (m) / 26 (d) / 2007 (y) Municipality: Londonderry Township
Date: 0 (m) / ___ (d) / ___ (y) Municipality: N/A

Source/Cause (Mark All That Apply ☒):		How Discovered (Mark All That Apply ☒):		Environmental Media Affected and Impacts (Mark All That Apply ☒):	
Tank (DEP Assigned Nos. 116A)	☒	During Closure	☐	Soil	☐
Piping System (Aboveground Regulated)	☒	Lining Installation	☐	Sediment	☐
Piping System (Underground Regulated)	☐	Routine Leak Detection	☐	Surface Water	☐
Piping System (Non-Regulated)	☐	Third Party Inspection	☐	Ground Water	☐
Dispenser/Dispensing Equipment	☐	Tightness Testing Activities	☐	Bedrock	☐
Spill Catchment Basin	☐	Visible Product or Odor Reports	☒	Water Supplies	☐
Accident/Act of God	☐	Water in Tank	☐	Vapors/Product in Buildings	☐
Containment/Sump Failure	☐	Construction	☐	Vapors/Product in Sewer/Utility Lines	☐
Faulty Installation	☐	Upgrade/Repair	☐	Ecological Receptors	☐
Corrosion	☐	Supply Well Sample Results	☐		
Mechanical Failure	☐	Monitoring Well Sample Results	☐		
Spill During Delivery	☐	Property Transfer	☐		
Overfill at Delivery	☐	Other (Specify)	☐		
Vehicle Gas Tank Overfill	☐	Unknown	☐		
Product Delivery Hose Rupture	☐				
Other (Specify)	☐				
Unknown	☐				

V. INTERIM REMEDIAL ACTIONS (O/O Only)

(Mark All That Apply ☒):

	Planned	Initiated	Completed	Not Applicable
Regulated Substance Removed from Storage Tanks	☐	☐	☒	☐
Fire, Explosion and Safety Hazards Mitigated	☐	☐	☒	☐
Contaminated Soil Excavated	☐	☐	☐	☒
Free Product Recovered	☐	☐	☐	☒
Water Supplies Identified and Sampled	☐	☐	☐	☒
Temporary Water Supplies Provided	☐	☐	☐	☒
Other (Specify)	☐	☐	☐	☒

VI. SUSPECTED / CONFIRMED CONTAMINATION INFORMATION (I/I Only)

Date of Observation of Suspected/Confirmed Contamination: ___ / ___ / ___ (m / d / y) N/A - No Contamination.

Indication of Suspected Contamination (Mark All That Apply ☒):

- Unusual Level of Vapors ☐
- Erratic Behavior of Product Dispensing Equipment ☐
- Release Detection Results Indicate a Release ☐
- Discovery of Holes in the Storage Tank ☐
- Other (Specify) N/A - No Contamination ☐

Extent of Confirmed Contamination (Mark All That Apply ☒):

- Product Stained or Product Saturated Soil or Backfill ☐
- Ponded Product ☐
- Free Product or Sheen on Ponded Water ☐
- Free Product or Sheen on the Ground Water Surface ☐
- Free Product or Sheen on Surface Water ☐
- Other (Specify) N/A - No Contamination ☐

VII. ADDITIONAL INFORMATION (Both O/O and I/I)

Provide any additional, relevant, available information concerning the reportable release or suspected or confirmed contamination. Include specific details or problems about the release. For example, if the piping was the source of the release and the cause was corrosion of a metal connector or flexible connector, it is important to include that information here. Provide DEP assigned and owner/operator assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

****

On July 14, 2007, at approximately 10:00 p.m., a leak was observed from a pipe connected to an onsite sulfuric acid storage tank (Circulating Water System, WT-T-23; 10,000 gallon capacity; PADEP Tank Registration No. 116A; carbon steel; approximate age 35 years). The leak was observed by a plant operator during routine rounds. The leak rate was estimated to be in the range of 1/4 to 1/2 gallon per minute. The leakage was completely contained in the the tank's concrete secondary containment structure and there was no release to the environment. There was no environmental contamination associated with the sulfuric acid pipe leak. A verbal reportable release notifcation was made to the PADEP 24-hour spill response phone number on July 15, 2007, at 1:35 a.m. The verbal notification was made to assure proper release reporting in the event that the pipe leakage could not be contained and cleaned-up within 24-hours.

During the daylight hours on July 15, 2007, arrangements were made to have a qualified hazardous materials response vendor (Enironmental Products and Services of Vermont, Inc) mitigate the pipe leakage. The hazmat vendor placed a temporary leak diversion device on the leaking pipe and coordinated the delivery of an empty tank trailer to support acid tank off-loading. The release into the secondary containment was stopped around 11:30 p.m. on July 15, 2007, when the hazmat vendor completed the transfer of the acid from the storage tank into the tank trailer. It is estimated that approximately 5,800 gallons of sulfuric acid were transferred into the tank trailer. Acid is currently being fed from the tank trailer into the Circulating Water System for its intended use (cooling water pH control). The acid that was collected in the secondary containment was used in the Circulating Water System and the containment structure has been rinsed and cleaned-up.

The acid leak was from a two inch carbon steel pipe connected directly to the bottom of the storage tank. The pipe failure mechanism will be identified during inspection and repair work activities. The tank will be neutralized and rinsed. A full tank system out-of-service inspection will be performed. Required repair work will be performed by a PADEP certified tank handler. Pending repair of the permanent acid storage tank a temporary tank trailer will be located on-site to support the required chemical addition of sulfuric acid to the Circulating Water System.

VIII. CERTIFICATION (Both O/O and I/I)

I, T. J. Dougherty - Plant Manager, hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

Signature of Owner or Operator — Date: 7/26/2007

I, NOT APPICABLE, hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

N/A — Signature of Certified Installer

/ / — Date

N/A — Installer Certification Number

N/A — Company Certification Number

I, NOT APPLICABLE, hereby certify, under penalty of law as provided in 18 Pa. C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

(Print Name)

N/A — Signature of Certified Inspector

/ / — Date

N/A — Inspector Certification Number

N/A — Company Certification Number

EDMS 2H-107

CTRC H2O Tank Repair
Rec'd 11/7/07
10/2007
SRC

2570-FM-BWM0152 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

ABOVEGROUND STORAGE TANK MODIFICATION REPORT

I. FACILITY INFORMATION

Facility I.D. Number 22-60170

Facility Name Three Mile Island Nuclear Station

Facility Address Route 441 S

Middletown, PA 17057

Municipality Londonderry

County Dauphin County

OFFICIAL USE ONLY

	INITIAL	DATE
CO Review		
Data Entry		
RO Review		

II. TANK INFORMATION From Tank Registration Certificate? ☒ Yes ☐ No

Tank ID Number 636248 A Owner Tank Number 116 A Tank Capacity (gallons) 10000

Substance Stored sulfuric acid

Tank modification is in accordance with manufacturer's specifications, engineer's design criteria and current industry standards. If no, explain all irregularities in the comment section.
☐ Yes ☐ No Modification standard

Is this tank field constructed or manufactured?
☐ Field constructed ☒ Shop manufactured Tank construction code

Is this modification in response to an inspection?
☐ Yes ☒ No

Tank configuration
☒ Horizontal ☐ Vertical

Tank modification complies with Fire Safety Requirements (for flammable & combustible liquids). If no, explain all irregularities in the comment section.
☐ Yes ☐ No ☒ Not Applicable

Fire/Safety Permit Number Issued By Date

III. INSTALLER INFORMATION (Please Type, or Print Clearly)

Installer Name	Certification Number	Certification Category(ies)	Company Name	Company Certification
Franklin L Specht	343	AMEX	Frank's Electrical Construction	96

IV. INSPECTOR INFORMATION This section must be completed when major modifications are performed on aboveground field constructed tanks and/or aboveground tanks greater than 21,000 gallon capacity.

Inspector Name	Certification Number	Inspection Category	Company Name	Company Certification No.

FACILITY I.D. # 22 - 60170 DEP TANK # 116 A

V. TANK SYSTEM COMPONENTS - INSTALLED OR MODIFIED

(1) Tank Construction & Corrosion Protection
- ☐ B Cathodic protection (galvanic)
- ☐ C Cathodic protection (impressed current)
- ☐ I Steel with lined interior
- ☐ K Modification of tank bottom
- ☐ L Modification of tank shell
- ☐ M Modification of tank roof
- ☐ O Cathodic protection (double wall steel)
- ☐ P Cathodic protection (steel with liner)
- ☐ Q Double bottom
- ☐ 99 Other (explain) _____

(2) Underground Piping Construction and Corrosion Protection
- ☐ A Steel
- ☐ B Cathodically protected steel
- ☐ D Fiberglass/rigid non-metallic
- ☐ E Flexible non-metallic
- ☐ H Modification of piping
- ☐ I Double wall steel
- ☐ J Double wall fiberglass
- ☐ K Double wall plastic
- ☐ 99 Other (explain) _____

(3) Aboveground Piping Construction & Corrosion Protection
- ☒ A Steel
- ☐ F PVC
- ☐ H Modification of piping
- ☒ 99 Other (explain) pipe flange

(5) Pipe Release Detection
- ☐ A Automatic line leak detector
- ☐ L Interstitial monitor w/alarm or shut off

(7) Overfill Prevention
- ☐ Y Installed/modified the following:

(12) Tank Release Detection
- ☐ E Automatic tank gauge
- ☐ H Interstitial monitor (2 walls)
- ☐ I Interstitial monitor (liner)
- ☐ L Grooves made in the impermeable pad
- ☐ M Slotted pipe above the impermeable pad
- ☐ P Visual inspection
- ☐ 99 Other (explain) _____

(16) Emergency Containment
- ☐ Y Installed/modified

(17) Secondary Containment
- ☐ Y Installed/modified

Briefly Describe the scope of work completed: Replaced pipe flange and pipe

VI. COMMENTS

VII. INSTALLER CERTIFICATION

This Section must be completed by the certified installer(s) for tank handling activities performed on aboveground storage tank systems. By signing below, the certified installer verifies that the tank handling activity was conducted in compliance with the design, installation, modification and operation standards of Act 32 and applicable regulations. The signature also certifies, under penalty of law as provided in 18 PA C.S.A. Section 4904 (relating to unsworn falsification to authorities), that the information provided is true, accurate, and complete to the best of his/her knowledge and belief.

Signature	Date(s) of Signature	Date(s) Work Completed
Franklin L Spicht	10102007	10102007

Reports must be submitted to PADEP within 60 days of the completion of the Activity(s)

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-48 **Topic:** Hydrology

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide TMI-1 Spill Prevention, Control and Countermeasures/Pollution Incident Prevention Plan (or related).

Date Received: 3/19/2008 **Response Date:**

Response: The existing TMI-1 SPCC Plan, Procedure 6510-ADM-4520.02, Rev. 1 and the new draft SPCC Plan, Procedure EN-TM-406-0001, Rev 0b, are being provided. Also being provided is the current TMI-1 Procedure 1203-44, Rev 42, for Hazardous Releases.

List Attachments Provided:

1. Procedure 6510-ADM-4520.02, Rev. 1
2. Draft Procedure EN-TM-406-0001, Rev. 0b
3. Procedure 1203-44, Rev. 42

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-53 **Topic:** Radiological

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide information on radioactive waste increase during the refurbishment period, including:

- What is the projected increase in liquid waste volume and activity?
- What is the projected increase in gaseous waste volume and activity?
- What is the projected increase in solid waste volume and activity?
- Any changes in the radiological effluent release and/or radiological environmental monitoring program methodology?

Date Received: 3/19/2008 **Response Date:**

Response: The response has been provided in four subparts: liquid radioactive waste, gaseous radioactive waste, solid radioactive waste, and changes to radiological effluent release and / REMP methodology.

1. There will be no increase in radioactive liquid waste volume and activity created during the replacement of steam generators at TMI above that incurred for a normal refueling outage.

2. There will be no increase in radioactive gaseous waste volume and activity during replacement of steam generators at TMI above that incurred during a normal refueling outage.

3. There will be an increase in solid radioactive waste volume for the steam generator replacement at TMI. This is characterized in the following manner based on a preliminary assessment:

- 1,925 ft3 of low level radioactive waste due to the replacement of all mirror insulation on the steam generators
- 60 ft3 of low-level radioactive waste due to debris resulting from the Pipe End Decontamination process.
- 8,089 ft3 of low-level radioactive waste due to other processes.
- 202,000 lbm of scrap metal of an indeterminate volume from various processes.

The determination of detailed waste quantities will occur during the work planning process, which extends from May 2008 through April 2009. Once determined, disposal will occur through utilizing existing contracts or new contracts as required.

The two existing steam generators are not classified as radioactive waste. They will be stored on site until

decommissioning in a shielded storage facility similar to those used for most past steam generator replacement projects.

4. There is no change to radiological effluent release and/or radiological environmental monitoring methodology.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-54 **Topic:** Radiological

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: What is the projected radiation dose to workers during the refurbishment period?

Date Received: 3/19/2008 **Response Date:**

Response: The preliminary projected collective radiation dose to workers for the steam generator replacement portion of refueling outage is 121.905 person-REMs.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-55 **Topic:** Radiological

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: What is the projected radiation dose to the public during the refurbishment period?

Date Received: 3/19/2008 **Response Date:**

Response: The projected radiation dose to the public during the steam generator replacement is none.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-62 **Topic:** Non-Radiological Waste/Pollution Prevention

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Description of non-radioactive waste systems and applicable procedures at TMI-1; NRC staff would like to meet with plant personnel who are knowledgeable about non-radiological waste management and compliance issues.

Date Received: 3/19/2008 **Response Date:**

Response: Industrial Waste Treatment

The Industrial Waste Treatment System provides treatment of secondary plant sumps and drains, as needed to meet the limits of the stations NPDES permit. Treatment includes settling and filtration to remove solids, an air floatation unit to remove oil and grease and pH adjustment. Applicable procedures include 1104-50A and 1104A.1.

TMI-Sewage Treatment Plant

The TMI sewage treatment plant is comprised of one (1) equalization tank and three (3) extended aeration tanks. All four (4) tanks are approximately 25,000 gallons in capacity. The equalization tank serves to take influent surges in the collection system around the site. The site has eight pump stations and a main wet well for collection of raw wastewater. Typical operation of the sewage treatment plant is the equalization tank and one (1) extended aeration tank in service during non-outage operations. Average plant effluent is approximately 11000 to 12000 gallons/day. The effluent is comprised of approximately 7000 gallons of treated effluent and approximately 4000 gallons of filtered water used to deliver chlorine gas to the effluent for disinfection of the effluent wastewater. A second extended aeration tank is used as a holding tank for digested sewage sludge awaiting release from the site to a facility authorized by the PADEP for land application of sewage sludge (agricultural utilization). The remaining extended aeration tank sits empty and idle during non-outage operations. Procedures used for operation of the facility are 1104-58 through 1104-58D. A letter agreement between AmerGen and the PADEP (issued 1991; amended January 2000 and July 2000) establishes radiological and non-radiological constituent limits applicable to sewage sludge releases.

Municipal Waste (Plant Trash)

Municipal waste (plant trash) is collected by the janitorial staff on a daily basis and deposited in dumpsters onsite. The dumpsters are then picked-up by the waste hauler (Waste Management) and taken to the Lancaster County Solid Waste Facility - see below for the 2007 totals.

To the Frey Farm Land fill
G829A Plant Trash 10.10 tons

Resource Recovery (incineration)
G829A Plant Trash 188.48 tons

List Attachments Provided:

1. Industrial Waste Treatment System - 1104-50A
2. Cleanup Recirculation Process for the IWST Sump - 1104-50A.1
3. Routine Operation of the Sewage Treatment Plant -1104-58
4. Disposal of Digested Sewage Sludge from the STP - 1104-58A
5. Sewage Treatment Chemical Addition, Receipt, and Composite Sampling - 1105-58B
6. Initial Startup of Sewage Treatment and Collection Systems -1104-58C
7. Sewage Plant Non-Routine Operations - 1104-58D

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-64 **Topic:** Non-Radiological Waste/Pollution Prevention

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please identify the type of non-radiological wastes that the TMI-1 site has produced for each of the past five years. Please provide an accounting of waste quantities by year and waste stream.

Date Received: 3/19/2008 **Response Date:**

Response: Type and quantity of non-radiological waste for TMI.

2003

Month	Hazardous Waste (kg)	Non-hazardous Waste (kg)	Universal Waste (kg)	Comments
Jan	15	300	405	
Feb	42	217	292	
Mar	718	1681	877	
Apr	239	1936	254	
May	23	1012	145	
Jun	1	927	497	
Jul	340	455	274	
Aug	20	4	209	
Sep	40	224	207	
Oct	98	3526	677	
Nov	130	4205	1159	
Dec	388	1256	388	

2004

Month	Hazardous Waste (kg)	Non-hazardous Waste (kg)	Universal Waste (kg)	Comments
Jan	86	539	556	
Feb	4841	69.5	670	*tank cleanout
Mar	20	2949	321	
Apr	101	1110	226	
May	2	1431	211	
Jun	24	10733	253	
Jul	59	795	294	

Aug	766	18	357	
Sep	162	378	61	
Oct	64	2339	81	
Nov	7813	100	105	*one-time tank cleanouts acid WT-T-6 and WT-T-7
Dec	46	4805	28	

2005

Month	Hazardous Waste (kg)	Non-hazardous Waste (kg)	Universal Waste (kg)	Comments
Jan	53	28	355	
Feb	46	257	14	
Mar	440	927	301	
Apr	104	481	428	
May	157	1806	69	
Jun	482	18	148	
July	483	2513	127	
Aug	102	894	93	
Sep	321	354	68	
Oct	29	3536	100	
Nov	573	2542	380	
Dec	40	415	231	

2006

Month	Hazardous Waste (kg)	Non-hazardous Waste (kg)	Universal Waste (kg)	Comments
Jan	942	430	75	
Feb	176	11	45	
Mar	0	370	0	
Apr	0	815	57	
May	398	1506	0	
Jun	9	278	16	
Jul	318	1542	277	
Aug	101	716	197	
Sep	577	747	22	

Oct	233	1465	14	
Nov	543	2657	137	
Dec	3480	228	236	*Blast grit with lead; all haz.; LQG for Dec.2006

2007 Month	Hazardous Waste (kg)	Non-hazardous Waste (kg)	Universal Waste (kg)	Comments
Jan	182	1601	478	
Feb	529	639	193	
Mar	453	317	64	
Apr	195	2429	303	
May	290	745	36	
Jun	34	51	154	
Jul	52	235	0	
Aug	179	1116	247	
Sep	325	7380	1108	
Oct	130	6752	697	
Nov	5792	2013	18	*oil contaminated with halogens IR# 710606.
Dec	200	300	0	

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-65 **Topic:** Non-Radiological Waste/Pollution Prevention

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide the amounts (by weight) of mixed wastes at the TMI-1 site generated over the past five years.

Date Received: 3/19/2008 **Response Date:**

Response: The site has not generated any mixed waste in the previous 5 years. The site relies on the Controlled Materials Program (CMP, EN-MA-501) to avoid the generation of mixed wastes at the site. The program takes various factors into consideration when a material is approved for use at the station, including its potential to generate a mixed waste should the product become contaminated with radioactive material. Since this program has been in place at the station, no mixed waste has been generated.

List Attachments Provided:

EN-MA-501, Controlled Materials Program

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-66 **Topic:** Non-Radiological Waste/Pollution Prevention

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Please provide copies of waste generator permits.

Date Received: 3/19/2008 **Response Date:**

Response: Waste permits and Hazardous Materials certification for TMI are provided

List Attachments Provided:

Hazardous Materials Certification of Registration for Registration Year(s) 2007-2010
Generator ID TMI-1
Generator ID TMI-2

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

HAZARDOUS MATERIALS CERTIFICATE OF REGISTRATION FOR REGISTRATION YEAR(S) 2007-2010

Registrant: AMERGEN ENERGY COMPANY LLC
Attn: LANCE J MARTIN
200 EXELON WAY
KENNETT SQUARE, PA 19348

This certifies that the registrant is registered with the U.S. Department of Transportation as required by 49 CFR Part 107, Subpart G.

This certificate is issued under the authority of 49 U.S.C. 5108. It is unlawful to alter or falsify this document.

Reg. No: 022307 701 001PR **Issued: 5/16/2007** **Expires: 6/30/2010**

Record Keeping Requirements for the Registration Program

The following must be maintained at the principal place of business for a period of three years from the date of issuance of this Certificate of Registration:

(1) A copy of the registration statement filed with PHMSA, and
(2) This Certificate of Registration

Each person subject to the registration requirement must furnish that person's Certificate of Registration (or a copy) and all other records and information pertaining to the information contained in the registration statement to an authorized representative or special agent of the U. S. Department of Transportation upon request.

Each motor carrier (private or for-hire) and each vessel operator subject to the registration requirement must keep a copy of the current Certificate of Registration or another document bearing the registration number identified as the "U.S. DOT Hazmat Reg. No." in each truck and truck tractor or vessel (trailers and semi-trailers not included) used to transport hazardous materials subject to the registration requirement. The Certificate of Registration or document bearing the registration number must be made available, upon request, to enforcement personnel.

For information, contact the Hazardous Materials Registration Manager, PHH-60, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, Washington, DC 20590, telephone (202) 366-4109.

USEPA Acknowledgement of Notification of Regulated Waste Activity

AmerGen Energy Company, LLC
Three Mile Island Unit-1

Generator ID No. PAR 000037861
Effective March 22, 1999

EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF REGULATED WASTE ACTIVITY
(VERIFICATION)

This is to acknowledge that you have filed a Notification of Regulated Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Biennial Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER

PAR000037861 03/22/99

THREE MILE ISLAND NUCLEAR STA UNIT 1
PO BOX 480
MIDDLETOWN , PA 17057
STEPHEN ACKER ENV SCIENTIST

INSTALLATION ADDRESS

ET 441 S UNIT 1
MIDDLETOWN , PA 17057

EPA Form 8700-12A (1/98)

DOCUMENT CONTROL
CONTROLLED
COPY 9

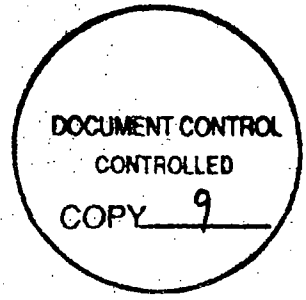
USEPA Acknowledgement of Notification of Regulated Waste Activity

GPU Nuclear, Inc.
Three Mile Island Unit-2

Generator ID No. PAD 000765982

Use for TMI Unit-2 Regulated Waste Activities Effective December 20, 1999

Originally Issued for TMI Unit-1 and TMI Unit-2 - Effective 1981



EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER ➤ *PAD000765982

THREE MILE ISLAND NUCLEAR STATION
PO BOX 480
MIDDLETOWN PA 17057

INSTALLATION ADDRESS ➤

ROUTE 441
MIDDLETOWN PA 17057

EPA Form 8700-12A (4-80)

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-67 **Topic:** Non-Radiological Waste/Pollution Prevention

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: Analyses of planned refurbishment activities (steam generator replacement), projected increase in non-radioactive waste and measures that will be implemented in order to handle this increase.

Date Received: 3/19/2008 **Response Date:**

Response: Non-radioactive waste produced during implementation of the steam generator replacement project will primarily consist of the following:

- Containment wall concrete (~100 cubic yards)
- Containment wall reinforcing steel (~ 10 cubic feet)
- Containment wall tendons (~30 tendons totaling approximately 300 cubic feet of steel wire)
- Containment wall tendon sheathing (~ 750 linear feet of tendon sheath)
- Containment wall tendon grease (~5,600 gallons)
- Containment wall mock up
- Reactor building dome gantry
- U2 RP checkpoint masonry block
- Waste products due to the demolition of the Outage Equipment Storage Building (OESB) (i.e. structural steel, siding, concrete, interior partitions, etc.)
- Miscellaneous trash /and construction debris (packing materials, paper, temporary use scrap steel and lumber, etc)

The tendon subcontractor will remove the old tendons and tendon grease from site per contractual agreements. All other construction debris will be disposed of (or recycled) through contracts with local disposal firms. Regular trash will be disposed of through the use of the existing site waste disposal contractor.

The determination of detailed waste quantities will occur during the work planning process. Existing waste disposal contracts will be modified or new contracts created when final waste quantities are determined.

Summary Report of TMI License Renewal Application Review Questions for: Environmental Audit

Request No: ENV-70 **Topic:** Air Quality and Meteorology

Source: ENV **Requested by:** Lopas, Sarah **Assigned to:** Nancy Ranek **Status:** Accepted by NRC

Information Request: NRC would like a description of the onsite meteorological system/tower with a discussion of the system's backup capabilities in the event of a sensor failure situation

Date Received: 3/19/2008 **Response Date:**

Response: The met tower instruments and their backup channels are listed in monthly reports received from the Met tower vendor Murray & Trettle. The monthly reports also document sensor failures, repairs and calibration, and the Data Recovery percentage for the year to date is also tracked. Copies of the 2008 monthly reports to date and all of 2007 have been provided. Copies of the Joint Frequency Tables for all of 2007 that were included in TMI's 2007 Annual Radiological Effluent Release Report (ARERR) were provided.

The meteorological tower measures the following parameters:

Wind Speed at 100 feet.
Wind Speed at 150 feet.
Wind Direction at 100 feet.
Wind Direction at 150 feet.
Air Temperature at 33 feet.
Air Temperature at 150 feet.
Air Temperature Difference 150 ft -- 33 ft

List Attachments Provided:

Monthly reports from Murry & Trettle, Inc for the period from February 2007 to January 2008

Joint Frequency Tables for 2007

Monthly Report

on the

Meteorological Monitoring Program

at the

Three Mile Island Nuclear Station

February 2007

prepared for

Exelon Nuclear
Warrenville, Illinois 60555

by

Murray and Trettel, Incorporated
600 First Bank Drive, Suite A
Palatine, Illinois 60067
(847) 963-9000

e-mail: mt@weathercommand.com
web: http://www.weathercommand.com

For Exelon Use Only

Reviewed By: [signature]

Date: 4/11/07

Table of Contents

1. Three Mile Island Station Action Items

Pending Action Items	Problem	Recommended Solution	Date*

*date Exelon was notified of problem or date of Monthly Report where problem was first reported

2. Equipment Maintenance at Three Mile Island

A regular scheduled visit to inspect the equipment was made on the 8th of February. The Routine Site Visitation Log, a record of existing onsite conditions, was completed during the visit. A copy of this log is included in this report.

No problems were encountered with the equipment during February, and at the end of the month, there were no problems evident at the site.

3. Data Recovery

The record of data recovery for the year through February is summarized in Table 1.

Table 1

Three Mile Island A
Data Recovery Summary
February 2007

Hours in Month = 672 Hours to date = 1416 Hours in year = 8760

Measurement	This Month Valid Hrs	This Month Valid %	This Month Lost Hrs	This Month Edits %	Year to Date Valid Hrs	Year to Date Valid %	Year to Date Lost Hrs	Year to Date Edits %
100Ft Wind Speed	672	100.0	0	16.1	1416	100.0	0	7.9
150Ft Wind Speed	672	100.0	0	19.2	1414	99.9	2	9.4
100Ft Wind Direction	672	100.0	0	16.5	1416	100.0	0	8.1
150Ft Wind Direction	672	100.0	0	19.2	1415	99.9	1	9.3
33Ft Temperature	672	100.0	0	15.3	1416	100.0	0	7.3
150Ft Temperature	672	100.0	0	18.9	1415	99.9	1	44.8
150Ft-33Ft Delta-T	672	100.0	0	15.5	1411	99.6	5	7.6
3Ft Precipitation	658	97.9	14	21.0	1395	98.5	21	11.3
A V E R A G E *		100.0				99.9		

* average of priority parameters (all except precipitation)

Data Recovery Scores Summary

	February	Year to Date
Three Mile Island A	0	0
All Exelon Sites	11	30

3. Data Recovery

The record of data recovery for the year through February is summarized in Table 1.

Table 1

Three Mile Island B
Data Recovery Summary
February 2007

Hours in Month = 672 Hours to date = 1416 Hours in year = 8760

Measurement	This Month Valid Hrs	This Month Valid %	This Month Lost Hrs	This Month Edits %	Year to Date Valid Hrs	Year to Date Valid %	Year to Date Lost Hrs	Year to Date Edits %
100Ft Wind Speed	672	100.0	0	19.5	1414	99.9	2	9.7
100Ft Wind Direction	672	100.0	0	19.5	1414	99.9	2	9.6
33Ft Temperature	672	100.0	0	100.0	1401	98.9	15	99.9
150Ft Temperature	672	100.0	0	18.9	1415	99.9	1	44.8
150Ft-33Ft Delta-T	672	100.0	0	100.0	1401	98.9	15	99.9
A V E R A G E *		100.0				99.5		

* average of priority parameters (all except precipitation)

Data Recovery Scores Summary

	February	Year to Date
Three Mile Island B	0	0
All Exelon Sites	11	30

4. Summary of Billings for Equipment Repairs, Replacement Parts, and Other Work not Included in Fixed-Cost Maintenance Agreement – February 2007

Three Mile Island

Description		Cost
Meteorological equipment maintenance	$	0.00
Meteorological parts, materials & contractors services	$	0.00
Total for Month:	$	0.00
Year to Date Total:	$	293.80

5. Data Analysis (Data Reduction and Processing)

The Zeno 3200 was routinely interrogated to obtain hourly average data of wind speed, wind direction, ambient temperature, and differential temperature. Wind sigma (standard deviation of wind direction) and precipitation data were also obtained. A professional meteorologist then reviewed the data, calibration findings, maintenance reports, computerized quality control checks, and other information and determined which data were valid. Only valid data were retained in the data base.

6. Computer Processing

Computer programs were run to generate summary tables of the hourly averages of the meteorological data as well as other statistics based on the monthly data record.

A table of means and extremes of the measurements recorded during the month is included in this report. Wind direction shears (variance of wind direction between levels) are also included in the table.

7. Annual Report Preparation

Joint frequency stability wind rose tables of hourly data are generated quarterly and will be included in the annual report. These tables indicate the prevailing wind direction, wind speed, and stability classes measured during the period of observation as well as the joint frequencies of occurrence of the wind direction, wind speed, and stability classes.

TMI -A February 2007 672 Hours in Period

Parameter	Elev	Units	MEAN	MAX	MIN	Hours Missing	Hours Valid
AMBIENT TEMP	33 FT	[F]	26.0	49.1	6.2	0	672
AMBIENT TEMP	150 FT	[F]	25.8	48.9	5.3	0	672
WIND SPEED	100 FT	[MPH]	8.9	28.0	Calm	0	672
WIND SPEED	150 FT	[MPH]	9.4	30.7	Calm	0	672
DIFFERENTIAL TEMP	150 FT	[F]	-0.1	10.0	-1.5	0	672
PRECIPITATION	2 FT	[IN]				14	658
TOTAL			2.43				
Max 24 Hour Total			1.82				
Max 1 Hour Total			0.33				

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TMI -B February 2007 672 Hours in Period

Parameter	Elev	Units	MEAN	MAX	MIN	Hours Missing	Hours Valid
AMBIENT TEMP	33 FT	[F]	26.0	49.2	6.2	0	672
AMBIENT TEMP	150 FT	[F]	25.9	49.0	5.4	0	672
WIND SPEED	100 FT	[MPH]	8.6	28.5	Calm	0	672
DIFFERENTIAL TEMP	150 FT	[F]	-0.1	9.7	-1.5	0	672

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Three Mile Island A

Differential Temperature Distribution (degC/100m)

2/2007

150-30 ft

		DT	LT	-7.5		0
-7.5	GE	DT	LT	-7.0		0
-7.0	GE	DT	LT	-6.5		0
-6.5	GE	DT	LT	-6.0		0
-6.0	GE	DT	LT	-5.5		0
-5.5	GE	DT	LT	-5.0		0
-5.0	GE	DT	LT	-4.5		0
-4.5	GE	DT	LT	-4.0		0
-4.0	GE	DT	LT	-3.5		0
-3.5	GE	DT	LT	-3.0		0
-3.0	GE	DT	LT	-2.5		0
-2.5	GE	DT	LT	-2.0		5
-2.0	GE	DT	LT	-1.5		51
-1.5	GE	DT	LT	-1.0		129
-1.0	GE	DT	LT	-0.5		243
-0.5	GE	DT	LT	0.0		79
0.0	GE	DT	LT	0.5		46
0.5	GE	DT	LT	1.0		25
1.0	GE	DT	LT	1.5		10
1.5	GE	DT	LT	2.0		11
2.0	GE	DT	LT	2.5		11
2.5	GE	DT	LT	3.0		14
3.0	GE	DT	LT	3.5		10
3.5	GE	DT	LT	4.0		9
4.0	GE	DT	LT	4.5		8
4.5	GE	DT	LT	5.0		6
5.0	GE	DT	LT	5.5		2
5.5	GE	DT	LT	6.0		2
6.0	GE	DT	LT	6.5		2
6.5	GE	DT	LT	7.0		2
7.0	GE	DT	LT	7.5		1
7.5	GE	DT				6

NRC Stability Classes	
Unstable	94
Neutral	334
Stable	244

TOTAL NO. HOURS 672

TABLE PRODUCED 04/02/07 12:45:29

Three Mile Island B

Differential Temperature Distribution (degC/100m)

2/2007

						150-30 ft
		DT	LT	-7.5		0
-7.5	GE	DT	LT	-7.0		0
-7.0	GE	DT	LT	-6.5		0
-6.5	GE	DT	LT	-6.0		0
-6.0	GE	DT	LT	-5.5		0
-5.5	GE	DT	LT	-5.0		0
-5.0	GE	DT	LT	-4.5		0
-4.5	GE	DT	LT	-4.0		0
-4.0	GE	DT	LT	-3.5		0
-3.5	GE	DT	LT	-3.0		0
-3.0	GE	DT	LT	-2.5		0
-2.5	GE	DT	LT	-2.0		3
-2.0	GE	DT	LT	-1.5		33
-1.5	GE	DT	LT	-1.0		112
-1.0	GE	DT	LT	-0.5		258
-0.5	GE	DT	LT	0.0		87
0.0	GE	DT	LT	0.5		53
0.5	GE	DT	LT	1.0		27
1.0	GE	DT	LT	1.5		14
1.5	GE	DT	LT	2.0		9
2.0	GE	DT	LT	2.5		13
2.5	GE	DT	LT	3.0		9
3.0	GE	DT	LT	3.5		16
3.5	GE	DT	LT	4.0		7
4.0	GE	DT	LT	4.5		8
4.5	GE	DT	LT	5.0		8
5.0	GE	DT	LT	5.5		3
5.5	GE	DT	LT	6.0		1
6.0	GE	DT	LT	6.5		2
6.5	GE	DT	LT	7.0		2
7.0	GE	DT	LT	7.5		2
7.5	GE	DT				5

NRC Stability Classes	
Unstable	67
Neutral	339
Stable	266
TOTAL NO. HOURS	672

TABLE PRODUCED 04/02/07 12:45:29