The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

October 31, 1996
ST-HL-AE-5500
File No.: G20.01
G21.01
10CFR50.90

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Proposed Revision to Technical Specifications Removing
Surveillance Requirement 4.7.7.e.5 - Additional Information

Reference: Correspondence from T. H Cloninger to Document Control Desk, dated August 15, 1996 (ST-HL-AE-5403)

Pursuant to a request from Thomas Alexion, the South Texas Project submits the attached copy of Unreviewed Safety Question Evaluation #95-0027 addressing removal of the Toxic Gas Monitoring System. The evaluation is provided to support the staff's review of the referenced Technical Specification change request deleting surveillance requirement 4.7.7.e.5.

If there are any questions, please contact either Mr. P. L. Walker at (512) 972-8392 or me at (512) 972-7162.

S. E. Thomas
Manager,
Design Engineering

PLW/lf

Attachment: Unreviewed Safety Question Evaluation #95-0027

A001 1/1

Leonard J. Callan
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Thomas W. Alexion
Project Manager, Mail Code 13H3
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

David P. Loveless
Sr. Resident Inspector
c/o U. S. Nuclear Regulatory Comm.
P. O. Box 910
Bay City, TX 77404-0910

J. R. Newman, Esquire
Morgan, Lewis & Bockius
1800 M Street, N.W.
Washington, DC 20036-5869

M. T. Hardt/W. C. Gunst
City Public Service
P. O. Box 1771
San Antonio, TX 78296

J. C. Lanier/M. B. Lee
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

Central Power and Light Company
ATTN: G. E. Vaughn/C. A. Johnson
P. O. Box 289, Mail Code: N5012
Wadsworth, TX 77483

Rufus S. Scott
Associate General Counsel
Houston Lighting & Power Company
P. O. Box 61067
Houston, TX 77208

Institute of Nuclear Power
Operations - Records Center
700 Galleria Parkway
Atlanta, GA 30339-5957

Dr. Bertram Wolfe
15453 Via Vaquero
Monte Sereno, CA 95030

Richard A. Ratliff
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

J. R. Egan, Esquire
Egan & Associates, P.C.
2300 N Street, N.W.
Washington, D.C. 20037

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

J. W. Beck
Little Harbor Consultants, Inc.
44 Nichols Road
Cohassett, MA 02025-1166

	0PGP05-ZA-0002	Rev. 2	
10CFR50.59 Evaluations			
Form 2	Unreviewed Safety Question Evaluation Form		Page 1 of 4

Unreviewed Safety Question Evaluation # 95-0027 Revision No. 00

ORIGINATING DOCUMENT: CN-1979 REV. NO. 00

NOTE: Attach 10CFR50.59 Screening Form or License Compliance Review Form to this USQE.

A.1 I Does the subject of this evaluation increase the probability of occurrence of an accident previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: The SAR evaluated the probability of accidents related to postulated releases of hazardous chemicals onsite and within a five mile radius of STPEGS.Comprehensive analyses were performed to evaluate the effects of a postulated release of potentially hazardous chemicals which could pose a threat to control room habitability. The SAR evaluation was based on the original Onsite and Offsite Toxic Gas Analyses. The results of the latest revision to these analyses show that none of the potentially hazardous chemicals utilized onsite or in the surrounding 5 mile radius pose a credible hazard to STPEGS. The results of the latest analyses demonstrate a decrease in the probability of occurrence of an accident previously evaluated.

II Does the subject of this evaluation increase the consequences of an accident previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: The subject change revises the monitoring requirements for potentially hazardous chemicals based on the latest revision of the Onsite and offsite Toxic Gas Analyses. The results of these analyses demonstrate that deletion of the chemical detection system will not increase the consequences of an accident evaluated in the SAR since none of the chemicals considered pose a credible hazard to STPEGS.

III Does the subject of this evaluation increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: The subject CN eliminates the requirement for instrumentation to detect, alarm, and automatically isolate the control room in the event of high concentration of certain hazardous chemicals. The latest analyses determined that none of the potentially hazardous chemicals considered pose a credible hazard to STPEGS. Therefore, the equipment of concern is no longer important to safety and does not increase the probability of occurence of a malfunction of equipment important to safety.

IV Does the subject of this evaluation increase the consequences of a malfunction of equipment important to safety previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: The subject CN eliminates the requirement of monitoring for hazardous chemicals from the SAR and TRM based on the latest analyses. Since the instrumentation is no longer important to safety and will be isolated from all safety related equipment; consequences of a malfunction of this instrumentation no longer need to be evaluated in the Safety Analysis Report.

STI-95-013154-01

	0PGP05-ZA-0002	Rev. 2	
10CFR50.59 Evaluations			
Form 2	Unreviewed Safety Question Evaluation Form		Page 2 of 4

A.2 I Does the subject of the evaluation create the possibility of an accident of a different type than any previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: The Toxic Gas Monitoring system was provided to protect against hazardous toxic gas releases only. The revised analysis prove none of the hazardous chemicals evaluated pose a credible threat to STPEGS, therefore, no new accidents have been created.

II Does the subject of this evaluation create the possibility of a different type of malfunction than any previously evaluated in the Safety Analysis Report? ☐ YES ■ NO

Bases: Disabling of the chemical detection system, including all interfaces with Engineered Safety Features, will not create the possibility of a malfunction of a different type than previously evaluated.

A.3 I Does the subject of this evaluation reduce the margin of safety as defined in the basis for any Technical Specifications? ☐ YES ■ NO

Bases: The subject CN eliminates the requirement of monitoring for hazardous chemicals from the SAR and TRM based on the latest revision to the Onsite and Offsite Toxic Gas Analyses. The original analyses provided the basis for requiring a chemical detection system based on the existing chemical hazards to STPEGS. The latest revision to these analyses show that none of the chemicals considered pose a credible hazard to STPEGS, therefore, the basis for requiring a chemical detection system no longer exists. Elimination of the chemical detection system based on current chemical hazards to STPEGS does not reduce the margin of safety required to maintain control room habitability. Technical Specification 4.4.7 Surveillance e.5 requires testing of CRE HVAC damper response time. This test is governed by Plant Surveillance Procedure 0PSP-HE-0002 Rev. 9. The design change to disable the toxic gas analyzers does not inhibit performance of this test as written. Therefore, there is no decrease in margin of safety as defined in the basis for Technical Specification 4.4.7 Surveillance e.5.

	0PGP05-ZA-0002	Rev. 2	
10CFR50.59 Evaluations			
Form 2	Unreviewed Safety Question Evaluation Form		Page 3 of 4

SAFETY EVALUATION SUMMARY

The subject of this evaluation involves a change to the STPEGS Updated Final Safety Analysis (UFSAR) and Technical Requirements Manual (TRM). Changes are being made to eliminate all references in the UFSAR to the Toxic Gas Monitoring System as well as eliminating monitoring requirements from the TRM based on the latest revisions (Revision 5 & 6) to the Onsite (NC9015) and Offsite (NC9006) Toxic Gas Analyses. These analyses consist of a comprehensive evaluation of all chemicals utilized onsite and stored or transported within a five mile radius of STPEGS. The evaluations consist of extensive screening, dispersion analysis and probability analysis in accordance with the guidance given in Regulatory Guide (RG) 1.78, methodology presented in NUREG-0570, and utilize the most current/applicable toxicity limits of potentially hazardous chemicals. The results of these analyses prove that none of the chemicals considered pose a credible hazard to STPEGS. Therefore, elimination of the requirement to maintain instrumentation to alarm and isolate the control room upon detection of certain chemicals does not compromise control room habitability.

ORIGINAL

	0PGP05-ZA-0002	Rev. 2	
10CFR50.59 Evaluations			
Form 2	Unreviewed Safety Question Evaluation Form		Page 8 of 8

B. 1. XXX All of the above questions were answered NO; therefore, the originating document does not involve an Unreviewed Safety Question.

2. ________ One or more of the above questions was marked YES; therefore, the originating document involves an Unreviewed Safety Question. The originating document, as presented, shall NOT be implemented without prior approval by the NRC. Provide a recommendation for disposition of the Unreviewed Safety Question below. Refer to 0PGP05-ZA-0004 for processing licensing amendments. Further processing of this form to the PORC, Plant Manager and NSRB is not required. Notify Procedure Control that the evaluation involved an Unreviewed Safety Question so that Procedure Control can close the USQE number.

RECOMMENDED DISPOSITION: These changes do not involve an Unreviewed Safety Question, therefore approval of this evaluation is recommended.

PREPARED BY:	Tim L. Locker (signature) ORIGINATOR - Tim L. Locker	8-8-95 Date
REVIEWED BY:	(signature) QUALIFIED REVIEWER	8-8-95 Date
APPROVED BY:	(signature) DEPARTMENT MANAGER	8/8/95 Date
PORC MEETING NO.	95-039	8-9-95 Date
APPROVED BY:	Robert E. Masse (signature) PLANT MANAGER	8-10-95 Date

REMARKS: ____

ORIGINAL

	0PGP05-ZA-0002	Rev. 2	
	10CFR50.59 Evaluations		
Form 1	10CFR50.59 Screening Form		Page 1 of 3

☐ UNIT #1 ■ UFSAR CN ☐ DESIGN CHANGE ■ OTHER TRM Change
☐ UNIT #2
■ BOTH

ORIGINATING DOCUMENT NO. CN-1979 REV. NO. 00

DESCRIPTION OF CHANGE: The subject Change Notice (CN) is being issued to revise the Toxic Gas monitoring requirements described in the UFSAR and detailed in the Technical Requirements Manual (TRM) to reflect the results of latest revisions of the Onsite and Offsite Toxic Gas Analyses, NC9015 and NC9006, respectively. The revised analyses evaluate all chemicals currently stored at and shipped to and from STPEGS and surrounding facilities within a five mile radius to determine the effects a postulated release of hazardous chemicals would have on control room habitability. The revised analyses are in accordance with the guidance given in Regulatory Guide (RG) 1.78 and methodology presented in NUREG-0570. Revisions 5 & 6 of these analyses show that none of the chemicals utilized onsite, at surrounding facilities or transported within five miles of the site pose a credible hazard to STPEGS. The subject CN is issued to revise the UFSAR by deleting all references to the toxic gas monitoring system and to remove the monitoring requirements from the TRM based on the results of the analyses.

PRELIMINARY SCREENING

	YES	NO
1. Does the proposed change represent a change to the Plant Technical Specifications?	☐	■
2. Is an Unreviewed Safety Question known to be associated with the subject change?	☐	■
NOTE: If "YES" to either questions 1 or 2 refer to 0PGP05-ZN-0004.		
Does the proposed change represent:		
3. A change to only correct a typographical, editorial or drafting error?	☐	■
4. A change which is identical to and addressed in its entirety by an existing approved 10CFR50.59 Screening/USQE or NRC approved licensing submittal?	☐	■
5. A spare or replacement part/component change with an equivalent part/component? (See Section 2.3 for a definition of equivalent)	☐	■
6. A configuration change within existing design specifications?	☐	■

If all answers to the above questions are "NO" perform the final screening and mark N/A in the approval blocks below.
If the answer to any question (3) through (6) is "YES" a final screening is not necessary.
Sign approval blocks below and discard pages 2 through 3.
Provide a justification and references if any of items (3) through (6) is answered "YES".

N/A

Prepared by: N/A (Originator) Date

Approved by: N/A (Qualified Reviewer) Date

ORIGINAL

Licensing Doc. Change Request: CN-1979 Rev. 0 Page 21 of ___

FINAL SCREENING

In response to the questions below, if the change involves something that is not described in the SAR and is not part of the licensing basis, the "NO" is appropriate. However, this decision must be clearly documented with adequate technical justification for each question and the sections reviewed of applicable documents and applicable attributes reviewed should be indicated. The listing of attributes and documents for 10CFR50.59 screening can be found in Addendum 5.

Inter-discipline Coordination Required? ■ YES ☐ NO
If "yes", obtain appropriate concurrence.

☐ Risk and Reliability Analysis ☐ Thermal Hydraulics _____ ☐ Reactor Engr. _____
☐ Civil _____ ☐ Mech _____ ☐ Elect _____ ☐ I&C _____ ☐ EQ _____ ■ Other SWU Licensing

		YES	NO
1.	Does the subject of this review involve a change to the facility as described in the Safety Analysis Report? Based on the results of Revisions 5& 6 to the Onsite and Offsite Toxic Gas Analysis the monitoring requirements discussed in the UFSAR and Technical Requirements Manual (TRM) are being deleted. Since a change is being made to the facility as described in the UFSAR, a USQE will be required. Refer to USQE 95-0027 for further evaluation of these changes. Affected UFSAR Section(s): 2.2.3, 6.4 and 9.4	■	☐
2.	Does the subject of this review involve a change to the procedures as described in the Safety Analysis Report? Refer to 0PAP01-ZA-0103. Procedures that require revision as a result of deleting monitoring requirements are not described in the UFSAR.	☐	■

ORIGINAL

	0PGP05-ZA-0002	Rev. 2	
	10CFR50.59 Evaluations		
Form 1	10CFR50.59 Screening Form		Page 3 of 3

		YES	NO
3.	Does the subject of this review propose the conduct of tests or experiments not described in the Safety Analysis Report? The subject change involves deletion of Toxic Gas Monitoring requirements and does not propose the conduct of any new tests or experiments.	☐	■
4.	Does the proposed change affect conditions or bases assumed in the Safety Analysis Report or safety-related functions of equipment/systems, even though the proposed change does not entail any physical change in existing structures, systems, or procedures as described in the SAR? The subject change notice to the UFSAR and TRM involves a change to the bases assumed in the UFSAR for requiring instrumentation to detect hazardous chemicals which could have adverse affects on control room habitability. Due to changes in the quantities and types of potentially hazardous chemicals stored at and transported to and from STPEGS and surrounding facilities the potential hazards have changed. The original bases were determined by the previous revisions to the analyses which identified potential hazards to STPEGS based on the conditions at the time of those revisions. Revisions 5 & 6 to the Onsite and Offsite Toxic Gas Analyses show that none of the current chemicals considered pose a credible hazard to control room habitability. Therefore, the latest analyses provide a new bases for determining the Toxic Gas Monitoring requirements at STPEGS.	■	☐

Refer to USQE No.: 95-0027

If any answer is affirmative, complete the screening form and perform an Unreviewed Safety Question Evaluation.

If all answers are negative, no Unreviewed Safety Question Evaluation is required.

Prepare by: Tim L. Locker — Originator - Tim L. Locker — 8-8-95 — Date

Approved by: Jeffrey L. Cashon — Qualified Reviewer — 8-8-95 — Date

ORIGINAL

Change Notice CN-1979

Deletion of Toxic Gas Monitor references in the UFSAR and monitoring requirements from the Technical Requirements Manual (TRM)

ORIGINAL

	0PGP05-ZN-0004	Rev. 1	
Changes to Licensing Basis Documents and Amendments to the Operating License			
Data Sheet 1	Licensing Document Change Request		Page 2 of ___

Change Number 1979 Date 7/10/95

Originator Tim L. Locker Dept DED/I&C

Change Description

Revise Updated Final Safety Analysis Report (UFSAR) and the Technical Requirements Manual (TRM) to incorporate changes in the Toxic Gas Monitoring requirements at STPEGS based on the latest revision of the Onsite and Offsite Toxic Gas Analyses (NC9015 and NC9006 Revision 6).

Initiating Documentation

Onsite Toxic Gas Analysis NC9015 Revision 6, Offsite Toxic Gas Analysis NC9006 Revision 6.

USQE Number 95-0027

Unit(s) Affected: Unit 1 ✓ Unit 2 ✓

TRM Updated 8/10/95
DCP 94-3615-10 (U1/U2)
RDP 8/28/95

Implementation Status: Unit 1 Completion Date 16 AUG 95

Unit 2 Completion Date 21 AUG 95

Reviewed and Approved by
Supervising Engineer, Nuclear Licensing 8/28/95 Date

Reviewed and Approved by
(ER, UFSAR 2.1, 2.2, 2.3)
Manager, Technical Services Department 9/21/95 Date

Reviewed by
(OQAP changes only)
NA
General Manager, Nuclear Assurance Date

CR 95-8833

This Form when completed, shall be retained for the life of the plant.

Order/Layout of Change Package

- Section 1 ▸ Description of Change
- Section 2 ▸ Description of Current Requirements and Bases
- Section 3 ▸ Summary of Analyses
- Section 4 ▸ Summary of Design Change to Disable the Analyzers
- Section 5 ▸ 50.59 Evaluation/Unreviewed Safety Question Evaluation
- Section 6 ▸ UFSAR Sections - including associated revisions
- Section 7 ▸ Affected TRM Pages
- Section 8 ▸ References

SECTION 1

Description of Change

The purpose of this change is to revise Licensing-based documents. The subject of this change involves a revision to the STPEGS Updated Final Safety Analysis (UFSAR) and Technical Requirements Manual (TRM) based on the latest revisions (Revisions 5 & 6) to the Onsite (NC9015) and Offsite (NC9006) Toxic Gas Analyses. These analyses consist of a comprehensive evaluation of all chemicals utilized onsite and stored or transported within a five mile radius of the South Texas Project Electric Generating Station. The evaluations consist of extensive screening, dispersion analysis and probability analysis in accordance with the guidance given in Regulatory Guide (RG) 1.78, methodology presented in NUREG-0570, and utilize the most current/applicable toxicity limits of potentially hazardous chemicals. The results of these analyses demonstrate that none of the chemicals considered pose a credible hazard to STPEGS. Therefore, elimination of the requirement to maintain instrumentation to alarm and isolate the control room upon detection of certain chemicals does not compromise control room habitability. The UFSAR is revised to reflect the results of the revised analyses. The TRM is revised to remove the Limiting Condition for Operation and Surveillance Requirements for Chemical Detection Systems.

The Chemical Detection Systems for each unit will be disabled per Design Change Package DCP#94-3615-10.

SECTION 2

Toxic Gas Monitoring Requirements and Bases

Original licensing basis that determined a need for Toxic Gas Monitoring:

Criterion 4, "Environmental and missile design bases," of Appendix A "General Design Criteria for Nuclear Power Plants" to 10CFR50 requires, in part, that structures, systems and components important to safety be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents. Criterion 19, "Control room," requires that a control room be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions. Release of hazardous chemicals can potentially result in the control room becoming uninhabitable. Regulatory Guide 1.78, "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release", describes assumptions acceptable to the Nuclear Regulatory Commission staff for assessing the habitability of the control room during and after a postulated external release of hazardous chemicals and describes criteria that are generally acceptable for the protection of the control room operators.

The Standard Review Plan (SRP) requires that toxic substances stored or transported in the vicinity of a nuclear site which may pose a threat to the plant operators upon a postulated accidental release be identified. The SRP refers to Regulatory Guide 1.78 for determining methods for analyzing the degree of risk and, in general terms, the various protective measures that could be instituted if the hazard is found to be too great. The protective measures should provide time for personnel in the control room to fit themselves with self-contained breathing apparatus.

During the licensing of the South Texas Project Electric Generating Station (STPEGS), it was determined that six of the chemicals stored at and shipped to and from the Celanese Chemical Company, located almost 5 miles from the plant, pose a potential hazard to STPEGS. An analysis was performed to determine the effects that a postulated release of these chemicals would have on control room habitability. The methods and assumptions of the analysis were in agreement with the guidance given in Regulatory Guide 1.78 and methodology presented in NUREG-0570 and NUREG/CR-1741. The results of the analysis showed:

1. Detection, alarm, and automatic isolation were necessary for vinyl acetate and anhydrous ammonia to allow ample time for control room personnel to don protective breathing apparatus.

2. Detection and alarm were necessary for hydrochloric acid, acetic acid, acetaldehyde, and naphtha to allow ample time for control room personnel to don protective breathing apparatus.

SECTION 2

Toxic Gas Monitoring Requirements and Bases Cont'd

Redundant chemical detectors are currently located in the outside air intake to the control room envelope to provide automatic isolation from potentially hazardous chemicals in the event of an onsite or offsite chemical spill accident. These same redundant detectors also provide for detection and alarm for specific chemicals.

The South Texas Project Technical Requirements Manual has Limiting Condition for Operation, Action statements for inoperable chemical detection systems, and Surveillance requirements for chemical detection systems.

SECTION 3

Summary of Analyses Methods and Results

The Onsite and Offsite Toxic Gas Analyses, NC9015 and NC9006, respectively, provide the bases for the chemical detection system requirements at the South Texas Electric Generating Station (STPEGS). These analyses evaluate all chemicals stored at and shipped to and from STPEGS and surrounding facilities within a five mile radius of the STPEGS control rooms to determine the effects a postulated release of hazardous chemicals would have on control room habitability. The analyses are in accordance with the guidance provided in Regulatory Guide (RG) 1.78, NUREG-0570 and NUREG-0800, Standard Review Plan, Section 2.2.3.

The requirements identified in Section 2 of this Change Notice (CN) are based on the results of Revision 4 to the Onsite Toxic Gas Analysis, NC9015, and the Offsite Toxic Gas Analysis, NC9006. These requirements are those currently stated in the UFSAR, and are as follows:

1. Detection, alarm, and automatic isolation were necessary for **vinyl acetate** and **anhydrous ammonia** to allow ample time for control room personnel to don protective breathing apparatus.

2. Detection and alarm were necessary for **hydrochloric acid**, **acetic acid**, **acetaldehyde**, and **naphtha** to allow ample time for control room personnel to don protective breathing apparatus.

Changes in type and quantity of chemicals used onsite and within the surrounding 5 mile radius of STPEGS prompted revision (Rev. 5) to the existing analyses to evaluate the current chemicals hazards to STPEGS. The STPEGS Tier Two Report dated February 24, 1994 was used to identify all potential onsite chemical hazards while a survey was performed to identify all chemical storage tanks, as well as barge, rail and truck shipments, within five miles of the control room. All chemicals identified were then evaluated for their effect on control room habitability.

NC9006 & NC9015, Revision 5

The evaluation consisted of three parts: preliminary screening, dispersion analysis, and probability analysis.

A preliminary screening was performed which evaluated the chemical storage quantities, shipping frequencies, vapor pressures and toxicity limits in accordance with RG 1.78. Based on RG 1.78, chemicals stored or situated at distances greater than five miles from the control room need not be considered in the analysis. Chemicals whose storage quantity is less than 100 lbs or whose vapor pressure is less than 10 torr at 100°F need not be considered. In addition infrequent chemical shipments need not be considered. No further analysis is required for chemicals with low vapor pressures, low shipping frequencies, small storage quantities, or nonestablished toxicity limits. Preliminary screening identified chemicals which pose a potential threat to the control room habitability.

SECTION 3

Summary of Analyses Methods and Results

A dispersion analysis was performed for all chemicals that pose potential threat to the control room. A nonisolated control room is considered, and the maximum control room concentration is determined. The dispersion analysis is based on the rupture of the largest storage or shipping container. The stored or shipped quantity is considered acceptable if the maximum concentration of a nonisolated control room is below the toxicity limit or if the control room concentration six minutes after nasal detection is below the toxicity limit. No further analysis is required if the maximum control room concentration is below the toxicity limit. A more detailed dispersion analysis is performed for all chemicals whose control room concentration exceeds the toxicity limit. Nasal detection is considered, and the control room concentration six minutes after nasal detection is determined (six minutes is the time allotted for STPEGS operators to don protective breathing apparatus). No further analysis is required if the six minute concentration is below the toxicity limit.

A probability analysis is performed for all chemicals whose six minute concentration exceeds the toxicity limit. No monitoring is required for those chemicals whose occurrence probability is below the acceptable value, as specified in NUREG-0800. Based on NUREG-0800, Standard Review Plan, Section 2.2.3, if the realistic occurrence probability of an event is 10^{-7} or less per year, or if the occurrence probability based on conservative assumptions and combined with reasonable qualitative arguments is 10^{-6} or less per year, the event occurrence probability is acceptable and no further analysis is required.

Preliminary Screening

Preliminary screening identified 13 offsite chemicals including acetic acid, vinyl acetate, acetaldehyde, and naphtha which required further analysis.

The preliminary screening found that **anhydrous ammonia** and **hydrochloric acid** are no longer used at STPEGS or at the Celanese plant. Therefore, ammonia and hydrochloric acid do not present a hazard to control room habitability at STPEGS.

Dispersion Analysis

Based on dispersion analysis it was determined that no monitoring was required for all chemicals except **vinyl acetate, acetic acid, acetaldehyde**, and **naphtha**.

It was determined that a detector setpoint of 100 ppm was required to alarm and isolate the control room for **vinyl acetate** and **acetic acid** to maintain control room habitability based on the toxicity limits specified in revision 5.

SECTION 3

Summary of Analyses Methods and Results

Probability Analysis

The probabilities of causing uninhabitable conditions in the control room due to an accidental release of **acetaldehyde** and **naphtha** were determined as detailed below.

Acetaldehyde

The dispersion analysis referenced in the previous section is based upon the rupture of one sphere. For conservatism, it is assumed that the entire released quantity will flash forming an instantaneous puff. The results show that the control room concentration, six minutes after nasal detection, is 89 ppm for stability category E. This is below the toxicity limit of 100 ppm (Time Weighted Average TWA). Therefore, only stability categories G and F will cause uninhabitable conditions in the control room.

The probability of causing uninhabitable conditions in the control room due to an accidental release of acetaldehyde is evaluated in accordance with NUREG-0800. Based on design input, computations show the occurrence probability of stability categories G and F is 0.205, and that of the NNE wind direction is 0.079. These are the stability categories and the wind direction that would cause uninhabitable conditions in the control room. Based on design input the occurrence probability of catastrophic rupture of a pressure vessel is 1×10^{-6}/year.

Based on the above, the probability of causing uninhabitable conditions in the control room due to an accidental release of acetaldehyde, P_{event}, is determined as follows.

$P_{event} = N_{tanks}\ P_{tank/vessel\ rupture}\ P_{stability\ category}\ P_{wind\ direction}$

where

N_{tanks} is the number of tanks/vessels,

$P_{tank\ rupture}$ is the occurrence probability of tank/vessel rupture,

$P_{stability\ category}$ is the occurrence probability of the stability categories that would cause uninhabitable conditions in the control room, and

$P_{wind\ direction}$ is the occurrence probability of the wind directions that would cause uninhabitable conditions in the control room.

$P_{event} = (2)\ (1 \times 10^{-6})\ (0.205)\ (0.079) = 3.24 \times 10^{-8}$

Naphtha

Naphtha is stored in two tanks contained in the same berm. The two tanks hold 2.4×10^{6} gal and 0.9×10^{6} gal respectively, and the area of the berm is 180000 ft^2.

SECTION 3

Summary of Analyses Methods and Results

The dispersion analysis is based upon the rupture of a single 2.4×10^6 gal tank. The results of the dispersion analysis show that the maximum control room concentration is 354 ppm for stability category G, and 144 ppm for stability category F. These values exceed the toxicity limit of 100 ppm (TWA). The results also show that the maximum control room concentration is 59 ppm for stability category E. This is below the toxicity limit of 100 ppm (TWA). Therefore, only stability categories G and F will cause uninhabitable conditions in the control room.

The probability of causing uninhabitable conditions in the control room due to an accidental release of naphtha is evaluated in accordance with NUREG-0800. Based on design input the occurrence probability of catastrophic rupture of atmospheric storage tanks is 6×10^{-6}/year. Also the occurrence probability of stability categories G and F is 0.205, and that of the NNE wind direction is 0.079. These are the stability categories and the wind direction that would cause uninhabitable conditions in the control room.

Based on the above, the probability of causing uninhabitable conditions in the control room due to an accidental release of naphtha, P_{event}, is determined as follows.

$P_{event} = N_{tanks}\ P_{tank\ rupture}\ P_{stability\ category}\ P_{wind\ direction}$
where
N_{tanks} is the number of tanks,
$P_{tank\ rupture}$ is the occurrence probability of tank rupture,
$P_{stability\ category}$ is the occurrence probability of the stability categories that would cause uninhabitable conditions in the control room, and
$P_{wind\ direction}$ is the occurrence probability of the wind directions that would cause uninhabitable conditions in the control room.

$P_{event} = (2)\ (6 \times 10^{-6})\ (0.205)\ (0.079) = 1.95 \times 10^{-7}$

The results show the probabilities of event occurrence to be on the order of 10^{-8} and 10^{-7} for **Acetaldehyde** and **Naphtha**, respectively, which are acceptable based on the criteria specified in NUREG-0800, Standard Review Plan, Section 2.2.3. Therefore, no monitoring for these chemicals is required.

NC9006, Revision 6 - Offsite Analysis

An independent verification/validation of the subject analyses contracted to PLG, Inc identified assumptions in Revision 5 that were overly conservative. This prompted further evaluation of the previous analyses which resulted in Revision 6 to the Onsite and Offsite Toxic Gas Analyses, NC9015 and NC9006, respectively. **Revision 6** presents results based on a more realistic set of assumptions, which are consistent with the requirements set forth in Regulatory Guide 1.78 and NUREG-0570.

SECTION 3

Summary of Analyses Methods and Results

NUREG-0570 suggests the use of a minimum spill thickness of 1 cm. Such an assumption is valid for spills on land. The spills of concern for this analysis are located on the Colorado River at it's nearest point to the STPEGS control rooms. For spills on quiescent water, a minimum spill thickness of 0.25 cm has been proposed. Revision 6 utilizes realistic pool spread models with a minimum spill thickness of 0.25 cm since the spills in the offsite analysis are on water rather than land. This assumption will yield pools having larger surface area and therefore a larger vapor release rate. This assumption is therefore more conservative than the assumption utilized in Revision 5.

The methodology/steps followed in **Revision 6** to both the Onsite Toxic Gas Analysis, NC9015, and Offsite Toxic Gas Analysis, NC9006 are described below.

Step 1: The establishment of the toxicity criteria.

Step 2: The definition of the source terms for the dispersion analysis are presented below in the chemical-specific subsections.

Steps 3 through 5: Conduct dispersion analysis for a representative matrix of stabilities and wind speed conditions and validate the results.

Regulatory Guide 1.78 states that "the value of the atmospheric dilution factor between the release point and the control room that is used in the analysis should be that value that is exceeded only 5% of the time". These high stability-low wind speed scenarios yield the highest concentrations of the hazardous substance at the control room air intake and meet the 5% exceedance criteria. If the concentration of the hazardous substance at the control room intake did not exceed the toxicity limit, no further analysis was conducted and it was concluded that no monitoring is required for that substance.

Steps 6 through 8: Prepare control room time histories to determine whether operators have adequate time to take protective action. The low dilution factor scenarios described above might not yield the fastest rise in concentration of the hazardous substance in the control room. Hence at this stage dispersion analysis was conducted for a representative matrix of stabilities and wind speed conditions. Control room time histories for the rise of concentration of the hazardous material were prepared. If the rise in the control room concentration of the hazardous material from the odor threshold to the toxicity limit occurred over a period greater than six minutes no further analysis was conducted.

Steps 9 and 10: Conduct release frequency analysis and PSA event sequence analysis to see if NUREG-0800 screening criteria could be met.

SECTION 3

Summary of Analyses Methods and Results

The following summarizes the source term determination and analysis conclusions for **acetic acid** and **vinyl acetate.**

The effect of releases of acetic acid and vinyl acetate, due to a barge accident, on the habitability of the STPEGS control rooms was studied using appropriate toxicity criteria (ERPG-2/IDLH) and dispersion models (dense gas in the near field). Immediately dangerous to life or health (IDLH) concentrations represent the maximum concentration from which in the event of respirator failure, one could escape within 30 minutes without a respirator and without any escape-impairing or irreversible health effects. ERPG-2 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

Since both acetic acid and vinyl acetate are substantially heavier than air, simple Gaussian models do not apply as pointed out in NUREG-0570, Section 2.2 "this diffusion model is applicable only to the vapors whose densities do not differ greatly from that of air". CHEM-MIDAS, a PLG computer code was used to conduct the dispersion analysis for these cases. CHEM-MIDAS is capable of dense gas dispersion analysis and of switching to Gaussian models at the point where the vapor cloud becomes neutrally buoyant. (Gaussian models were used in Rev. 5).

For the purpose of this analysis the code ALOHA has been used to verify the models implemented in CHEM-MIDAS. ALOHA is a dense gas dispersion code distributed by the U. S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the National Safety Council (NSC). Due to limitations of spill size and duration that ALOHA can treat, it could not be used to directly analyze the dispersion for the scenarios of interest to this study. Therefore, a benchmark case was analyzed using both CHEM-MIDAS and ALOHA. For both acetic acid and vinyl acetate it was concluded that CHEM-MIDAS yields valid, but conservative results.

Acetic Acid

Source Term:

The scenario that represents the maximum concentration accident for acetic acid is the instantaneous release of the entire contents of the largest container shipped by barge. The largest container holds 4.5×10^5 gallons of acetic acid. The ambient temperature and the temperature of the contents is assumed to be 100°F, which is the one percentile ambient temperature as per Revision 5. This analysis used a minimum spill thickness of 0.25 cm which represents an extremely conservative assumption. Further factors that will cause the actual vapor release to be smaller than the modeled quantities are listed on the following page..

SECTION 3

Summary of Analyses Methods and Results

- Acetic acid is miscible in water.
- Acetic acid is slightly heavier than water.
- Instantaneous release of the entire contents of a container is physically not possible.
- The spilled material will be limited in area by the width of the Colorado River and will flow away from the STP site toward the Gulf of Mexico.

Results of Dispersion Analysis:

The source term resulted in concentrations that exceeded the 1000 ppm limit out to about 1.75 Km (1.1 miles). No further analysis is necessary since the IDLH value of 1000 ppm is not exceeded at the control room intake which is at a distance of greater than 2.8 miles from the river. Therefore, it is not required to monitor the control room intake for **acetic acid**.

Vinyl Acetate

Source Term:

The scenario that represents the maximum concentration accident for vinyl acetate is the instantaneous release of the entire contents of the largest container shipped by barge. The largest container holds 5.04×10^5 gallons of vinyl acetate. The ambient temperature and the temperature of the contents is assumed to be 100°F, which is the one percentile ambient temperature as per Revision 5. This analysis used a minimum spill thickness of 0.25 cm which represents an extremely conservative assumption. Further factors that will cause the actual vapor release to be smaller than the modeled quantities are listed below.

- Instantaneous release of the entire contents of a container is physically not possible.
- The spilled material will be limited in area by the width of the Colorado River and will flow away from the STP site toward the Gulf of Mexico.

Results of Dispersion Analysis:

Runs were made for a tank rupture release of 5.04×10^{-5} gallons of vinyl acetate for undiked conditions. The ERPG-2 limit of 75 ppm was exceeded beyond the 2.84 mile distance from the barge to the control room intake. The worst case condition was for an "F" stability and a wind speed of 2.5 m/sec which would result in the vinyl acetate limit being exceeded out to about 40 km (25 miles). Further analysis was conducted to determine the control room time history.

SECTION 3

Summary of Analyses Methods and Results

Joint frequency distributions were run to determine the percentage of the time a combination of wind speed, direction and stability were observed. The analyses show the number of hours and the percent of all hours in the year that weather conditions would have caused control room intake concentrations to exceed 75 ppm. For the barge accident scenarios, wind from the north, clockwise to the south-southeast were considered. The analyses show the peak concentration for each combination of direction, wind speed and stability that exceeded the 75 ppm limit for vinyl acetate.

Control room time histories generated from a CHEM-MIDAS run for Stability F and wind speed of 2.5 m/s were determined. For this case it takes more than 29 minutes from odor detection for the control room concentration to reach the ERPG-2 level with maximum air intake. If the dampers are closed after six minutes the control room concentration reaches only 22 ppm in 30 minutes. This is well within the six minute criterion for operators at STPEGS to take protective actions.

The maximum concentration of vinyl acetate for all of these runs is 910 ppm. A theoretical bounding calculation was conducted. The basis of this calculation is that the vinyl acetate concentration at the control room intake goes from zero to the maximum (910 ppm) in one computational time step of CHEM-MIDAS. It is thus impossible to get a faster rate of increase in the control room concentration of vinyl acetate irrespective of the prevailing meteorological conditions. For this case it takes 8 minutes for the control room concentration to rise to the ERPG-2 value with maximum air exchange rate. If the dampers are closed in six minutes, it takes 22 minutes for the control room concentration to rise to the ERPG-2 value. If the control room is in "recirc" mode from the beginning it takes 44 minutes for the control room concentration to reach the ERPG-2 level.

It was found that under the "worst" case conditions the concentration of vinyl acetate at the control room air intake does exceed the toxicity criterion used in this study. However, the time that it takes for the control room concentration to rise from the odor threshold to the toxicity limit is at least 22 minutes. Based on this result it was concluded that it is not necessary to monitor the control room air intake for **vinyl acetate**, since the vinyl acetate can be readily detected by odor within the first minute after arrival at the control room.

Conservatism inherent in the analysis:

- It is not physically possible to have an instantaneous spill of 450,000 or 504,000 gallon of material. Even in a severe accident, the entire contents of the barge may not be released.
- The size of the spill will be contained by the river banks. In this analysis such a constraint has not been applied. It has been postulated that the minimum thickness of the spill is 0.25 cm, which would be conservative even if the material could spill without any constraints.

SECTION 3

Summary of Analyses Methods and Results

- The river will be continuously removing the hazardous material. This effect has not been modeled.
- The temperature of the river has been taken to be 100°F, which is high. The actual source term is likely to be lower.
- In the case of acetic acid, the source term is likely to be substantially smaller since acetic acid will dissolve in water and will thus be removed from the surface.
- The vapor cloud moves towards the STPEGS control room at approximately the wind speed. The control room should be aware of the presence of the hazardous material well before it arrives at the control room air intake, since both materials have distinct odors and have also low odor thresholds. The odors would not go unnoticed by outdoor personnel. Further, STPEGS has an agreement with Hoechst Celanese and Lyondell Petrochemical for prompt notification in the event of a release.
- For vinyl acetate the results represent a theoretical upper bound on the rate of increase of the control room concentration based on the maximum control room air intake concentration being reached in one computational time step of five minutes. In reality CHEM-MIDAS runs show that it takes over two hours for the concentration to reach this peak value at the control room intake.
- For the calculations of control room time histories it has been assumed that even in "recirc" mode one of the three dampers remains open.
- The use of ERPG-2 as the toxicity limit implies that it is possible to tolerate up to sixty minutes of exposure at those levels.

NC9015, Revision 6 - Onsite Analysis

Revision 5 to the Onsite Analysis, NC9015, concluded that no monitoring of the control room air intake was necessary for any onsite chemicals. This analysis assumed modifications to the containment areas for ethanolamine and hydrazine. Further evaluation was conducted by PLG, Inc. based on the above described methodology to verify the conclusions of Revision 5 based on a more realistic set of assumptions which are consistent with the requirements set forth in Regulatory Guide 1.78 and NUREG-0570.

The following summarizes the source term determination and analysis conclusions for **ethanolamine (ETA)** and **hydrazine.**

SECTION 3

Summary of Analyses Methods and Results

Ethanolamine

Source Term:

The temperature of the contents and the ambient temperature is assumed to be 100°F. Minimum spill thickness is 1 cm as recommended by NUREG-0570 for spills on land. The onsite storage of ethanolamine has been identified in Calc No. NC9015, Rev. 5 as shown below.

Location/Identifier	Concentration	Capacity	Containment Area	Distance to	
				CR-1 Air Intake	CR-2 Air Intake
Ethanolamine Tote Tanks (Temporary Location Box #334)	80% Aqueous	500 Gallons (One of Two Tote Tanks)	2.86 m^2	>115m	>115m
Ethanolamine Tanks (Area 18)	80% Aqueous	500 Gallons (One of Five Tanks)	35 m^2	>115m	>115m
Aqua Ammonia Tank	85% Aqueous	13,400 Gallons	80 m^2	>115m	>115m

Results of Dispersion Analysis

Two Chem-MIDAS runs were made using the 0.5% meteorology: for source terms Nos. 2 and 3 in the table above. Source term No. 1 is bounded by source term No. 2 because of its smaller containment area. The peak concentrations at 100m were 2.9 ppm and 5.4 ppm for source term Nos. 2 and 3, respectively. In both cases the 1,000-ppm limit was not exceeded. The actual distance from the source to the control room air intake is greater than 115m. Based on these results no further analysis was conducted and it was concluded that it is not required to monitor the control room air intake for ethanolamine.

Hydrazine

Source Term

The temperature of the contents and the ambient temperature is assumed to be 100°F. The table given on the following page identifies the onsite locations for hydrazine storage. The minimum spill thickness was taken to be 1 cm as recommended by NUREG-0570. Containment does exist around the 120-gallon tank; however, the area of the berm is so large that it is possible to reach the minimum spill thickness of 1 cm. All the scenarios in the table following are therefore bounded by the release of the entire contents of the 120-gallon tank.

SECTION 3

Summary of Analyses Methods and Results

Location/Identifier	Concentration	Capacity	Containment Area	Distance and Direction to	
				CR-1 Air Intake	CR-2 Air Intake
in TGB-1	35% Aqueous	500 Gallons	21.9 m^2	91 m NW	92m NE
in TGB-1	10% Aqueous	500 Gallons	21.9 m^2	91m NW	92m NE
in TGB-2	35% Aqueous	500 Gallons	21.9 m^2	252m WNW	92m NW
in TGB-2	10% Aqueous	500 Gallons	21.9 m^2	252m WNW	92m NW
South of TGB-1	35% Aqueous	500 Gallons	2.87m^2	138m WNW	72m NE
South of TGB-2	35% Aqueous	500 Gallons	2.87m^2	317m W	138m WNW
Auxiliary Boiler Hydrazine Tank	35% Aqueous	120 Gallons	No Containment	99m SSW	172m SE
Building 19 Section G	35% Aqueous	55 Gallons (7 no.)	No Containment	340m	340m

Results of Dispersion Analysis

Chem-MIDAS runs showed that the toxicity limit of 80 ppm is not exceeded beyond 50m from the source of the spill. The shortest distance from a hydrazine tank to the intake of either control room is 72m. Therefore the toxicity limit will not be exceeded at the control room air intake for any of the above scenarios. Based on these results no further analysis was conducted and it was concluded that it is not required to monitor the control room air intake for **hydrazine**.

The effect of releases of ethanolamine and hydrazine, due to failure of onsite storage tanks, on the habitability of the STPEGS control rooms was studied using appropriate toxicity criteria (IDLH) and dispersion models (dense gas in the near field).

It was found that under the "worst" case conditions the concentration of either ethanolamine or hydrazine at the control room air intake does not exceed the toxicity criterion used in this study. Revision 6 to the Onsite Toxic Gas Analysis NC9015 concludes it is not required to monitor the control room air intake at STPEGS for **Ethanolamine (ETA)** or **Hydrazine** to assure control room habitability on the requirements set forth in Regulatory Guide 1.78.

Conservatism Inherent in the Analysis:

- Entire contents of the storage tank are assumed to be instantaneously released.
- The ambient, ground and spill temperature has been taken to be 100°F, which is the one percentile temperature.
- The use of IDLH as the toxicity limit implies that it is possible to tolerate up to thirty minutes of exposure at those levels.

SECTION 3

Summary of Analyses Methods and Results

General Conclusions/Results:

Based on the previous analysis STPEGS design features incorporated instrumentation to detect, alarm, and provide automatic isolation of the control room as necessary for Vinyl Acetate and Anhydrous Ammonia. Instrumentation is also provided to detect and alarm as necessary for hydrochloric acid, acetic acid, acetaldehyde, and naphtha.

Revisions 5 & 6 to these analyses justify elimination of these instrument functions. Both revisions 5 & 6 of the analyses comply with Regulatory Guide 1.78, NUREG-0570, and NUREG-0800, Standard Review Plan, Section 2.2.3. The Revision 6 analyses identified assumptions in Revision 5 that were overly conservative and presented results based on a more realistic set of assumptions.

The Toxic Gas monitoring requirements detailed in the UFSAR and TRM are no longer valid. The subject CN is issued to correct the references in the UFSAR and remove the monitoring requirements from the TRM.

SECTION 4

Summary of Design Change to Disable the Analyzers

Design Change Package DCP# 94-3615-10 disables the Toxic Gas Analyzers, associated actuation circuitry, ERFDADS displays and annunciators. This design change is issued to disable the analyzers based on the results of Revisions 5 & 6 to the Onsite and Offsite Toxic Gas Analyses, NC9015 and NC9006, respectively.

This design change package is intended to disable the analyzers by making changes to the key drawing associated with the Toxic Gas Monitoring System. The design change consists of lifting leads and installing jumpers to disable toxic gas monitoring inputs to the Control Room HVAC actuation circuitry, ERFDADS computer points and associated control room annunciators. EE580 cards are provided to replace the normally closed contacts of the toxic gas system with a jumper in series between the smoke detectors contacts and the coils of the actuation relays. Installation of this jumper will eliminate the toxic gas analyzer contacts from the actuation circuit. Leads will also be lifted to the ERFDADS computer points, which in conjunction with ERFDADS software changes will disable the ERFDADS displays and control room annunciators. Power to the analyzers will be removed by lifting leads at each analyzers associated distribution panel. Implementation of this design change will isolate the Toxic Gas Monitoring System from the HVAC system, therefore preventing any future interaction or risk of spurious actuations.

Following a detailed cost analysis, a decision will be made to either abandon the system in place or remove all or part of the chemical detection system. At that time an all encompassing design change package will be issued to incorporate these changes to all vendor and design documents which are associated with the Toxic Gas Monitoring system.

SECTION 6

UFSAR Sections 2.2.3, 6.4, 7A & 9.4

The following pages include the UFSAR sections which reference the Toxic Gas Monitors. Changes made by this Licensing Document Change Request are marked on the affected page. Affected pages are noted as "requiring revision" in the lower margin.

UFSAR SECTION 2.2

Nearby Industrial, Transportation, and Military Facilities

Affected Sections:	2.2.3	Evaluation Of Potential Accidents
	2.2.3.1	Determining of Design Basis Events
	2.2.3.1.1.	Industrial Facilities
	2.2.3.1.2	Transportation
	2.2.3.1.6	Plant Site Chemical Storage Protection
	2.2.3.2	Effects of Design Basis Events
	Table 2.2-5	Potentially Hazardous Chemicals Stored at Celanese Chemical Company and on the STPEGS Site
	Table 2.2-6	Potentially Hazardous Chemicals Shipped from the Celanese Chemical Company.