U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-317; 50-318
License Nos:	DPR-53; DPR-69
Meeting Report:	Reference: NRC Combined Inspection No. 50-317; 318/98-05
Licensee:	Baltimore Gas and Electric Company
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	NRC Region I Office King of Prussia, Pennsylvania
Meeting Date:	June 18, 1998
Prepared By:	R. L. Nimitz, CHP, Senior Radiation Specialist
Approved by:	John R. White, Chief Radiation Safety Branch Division of Reactor Safety

MEETING SUMMARY

1. Attendees

Attachment 1 to this meeting report identifies the attendees of the conference.

2. Purpose of Meeting

The meeting was a Pre-decisional Enforcement Conference to discuss the radiological controls deficiencies experienced during replacement of nuclear instrumentation detectors in the Unit 1 reactor annulus on April 9, 1998. The licensee's assessment efforts, relative to this matter, including root causes and actions taken and planned, as specified in NRC Confirmatory Action Letter (CAL) No. 1-98-006, dated April 29, 1998, were also discussed.

The conference served to satisfy the specifications in the CAL (i.e., Items B.2. and B.3) that the licensee inform the NRC of the findings of its assessment efforts relative to the April 9, 1998 event, including root causes and actions taken or planned.

3. Licensee Presentations

BG&E discussed the various assessments performed of its radiation protection program, the findings of the assessments, and the short and long term corrective actions taken and planned to address identified weaknesses. BG&E also presented the specific actions taken in response to its commitments documented in NRC Confirmatory Action Letter (CAL) No. 1-98-006, dated April 29, 1998.

Attachment 2 to this meeting summary provides the licensee's slides used for discussion purposes. Attachment 3 to this meeting summary provides the licensee's June 17, 1998, summary of actions taken and planned, as documented in its April 27, 1998, letter to the NRC, and in response to its commitments to the NRC, relative to the April 9, 1998 event, including those taken in response to the CAL.

BG&E stated that the NRC Combined Inspection Report 50-317;318/98-05, dated June 2, 1998, reflected the circumstances surrounding the April 9, 1998, events. BG&E, however, clarified two statements made in the report. BG&E stated that the final results of its Significant Incident Finding Team concluded that those workers who entered the reactor cavity on the early morning of April 9, 1998, did properly wear their sacrificial dosimetry; and that the General Supervisor Radiation Safety attended the April 8, 1998, 11:00 p.m. pre-job meeting held prior to the entry of the workers into the reactor cavity on the early morning of April 9, 1998. BGE acknowledged that these clarifications were minor in nature and did not affect the substance of the findings and observations, and conclusions documented in NRC Inspection Report 50-317;318/98-05, dated June 2, 1998.

Attachment 1

Meeting Attendees:

Baltimore Gas and Electric Company:

Charles Cruse, Vice President-Nuclear Energy
Peter Katz, Plant General Manager
Kevin Cellers, Manager-Nuclear Engineering
Hearst Daman, Supervisor, Instrument Maintenance
Deborah Svendsgaard, Radiation Safety Technician
Thomas Pritchett, Superintendent, Technical Support
Steve Sanders, General Supervisor, Radiation Safety
Lawrence Smialek, Health Physics Consultant, Radiation Protection Manager
Lee Russell, Manager, Nuclear Performance Assessment
John Osborne, Acting Director, Nuclear Regulatory Matters

Nuclear Regulatory Commission:

William Axelson, Deputy Regional Administrator, Region I
Singh Bajwa, Project Director, PD1-1, NRR
Larry Nicholson, Deputy Director, Division of Reactor Safety, Region I
Larry Doerflein, Chief, Reactor Projects Branch I, Region I
A. W. Dromerick, Reactor Project Manager, NRR
J. Bradley Fewell, Regional Counsel, Region I
Tracy Walker, Senior Enforcement Specialist, Region I
Scott Stewart, Senior Resident Inspector, Calvert Cliffs
John White, Chief, Radiation Safety Branch, Region I
James Wigginton, Senior Reactor Health Physicist, NRR
John Lusher, Enforcement Specialist, OE
Thomas Moslak, Radiation Specialist, Region I
Ronald Nimitz, Senior Radiation Specialist, Region I
James Noggle, Senior Radiation Specialist, Region I

Attachment 2

Summary of Assessments and Findings
Short and Long Term Corrective Actions Taken and Planned
General Actions In Response to CAL No. 1-98-006

Radiation Protection

Inspection Report 98-05

CAL 1-98-006

Radiation Protection

Inspection Report 98-05
CAL 1-98-006

1

Radiation Safety Section

Supervision Style

⇩

Insular Organization

⇩

Discouraged Learning

2

Site Management

⇩

Overreliance on results indicators

⇩

No good indicators of behaviors

3

Agenda

- **Opening Remarks** — *Cruse*
- **SIFT/Special Assessment** — *Russell*
- **Short Term Corrective Action** — *Katz*
  NPAD Surveillances
- **Independent Assessment** — *Cruse*
  Long Term Corrective Action
  Site Wide Application
- **Closing**

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Assessments

- Significant Incident Finding Team
- Special Assessment Team (CAL B.3)
- NPAD Surveillances (CAL A.3)
- Independent Assessment (CAL B.1)

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Special Assessment Team
(CAL B.3)

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Special Assessment Team (SAT) Members

Manager, NPAD, Team Leader
Outside Member, OSSRC
Plant Health Physicist
Lead Assessor
General Supervisor, Mechanical Maintenance
HPES Coordinator
Performance Management Analyst
Supervisor, Issue Assessment
Supervisor, Instrument Maintenance
Plant Health Physicist
Sr Rad-Chem Instructor

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Insights

- Inappropriate behavior
- RS management
- RS indicators

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CAL B.3

1 Review and assess performance deficiencies in radiological protection to:
   - Validate the root causes
   - Assess the effectiveness of corrective actions
2 Assess why previous corrective actions did not lead to effective radiological protection performance nor prevent poor performance in the Reactor Vessel Annulus work, April 9, 1998
3 Include measures, taken and planned, to improve corrective action effectiveness

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Process

- Review '97 and '98 RP significant events and reports
  - RCARs, assessments, improvement plans, NOVs
- Performed a collective significance analysis
  - Identified symptoms
  - Rolled up symptoms into common weaknesses
  - Identified underlying causes
- Reviewed assessment & improvement plans

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Common Weaknesses

- Behaviors
- Radiation Protection Fundamentals
- Corrective Action and Self-Assessment
- Risk Management
- Oversight and Management

Behaviors

Examples:

- RST not using backout criteria
- Culture heavily dependent on skill of RST
- Rad worker behaviors to ensure own safety were unclear

Behaviors

Why:

- Prior RS management
  - Very directive style
  - Did not encourage upward communication
- RS procedures silent on numerous expectations
- Management assumed 200% accountability understood

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Radiation Protection Fundamentals

Examples:

- Air samples not representative
- Did not monitor realtime exposure
- Stay time informally calculated and monitored
- SWP limits not based on latest work plan

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Radiation Protection Fundamentals

Why:

- Insufficient RS management observation, enforcement of procedure compliance and expectations
- Procedures inadequate in conveying detailed expectations

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Corrective Action and Self Assessment

Examples:

- Most RP RCARs contained
  - –Shallow underlying causes
  - –Narrow corrective actions
  - –Limited generic implications
- Self assessment program ineffective
- Some CAs not aggressively implemented

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Corrective Action and Self Assessment

Why:

- RS supervision discouraged CA and SA
- RS management - low expectations for RCARs
- Identification of behaviors/problems discouraged
- Self assessment coordinator inexperienced/program immature

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Risk Management

Examples:

- RS supervision failed to monitor the first Higher Risk jobs
- RS contingency/mitigation plans weak

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Risk Management

Why:

- **RS risk program - 10 R/hr**
- **No RS priority attached to HRA< 10R/hr**
- **"Higher risk" job was a maintenance risk activity**

Oversight and Management

Examples:

- **RST performance not identified as major weakness (6/97, 7/97, 9/97)**
- **INPO evaluation - pre job briefs and communications (7/97)**
- **RS personnel performance not in RPIP**
- **Management believed RS weaknesses being addressed**

Oversight and Management

Why:

- Audit and evaluation performed during non-stressed period
- RS management viewed problem primarily outside RS
- Effectiveness of implemented CAs not assessed

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Common Weaknesses

- Behaviors
- Radiation Protection Fundamentals
- Corrective Action and Self-Assessment
- Risk Management
- Oversight and Management

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Immediate Actions

- Stopped work in U-1 RV annulus
- Stopped use of remote alarming dosimetry
- Management oversight - higher risk/higher rad work
- Declared the event an NPI (SIFT)
- Conducted site-wide safety break

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Immediate & Short Term Actions (CAL A.1 & A.2)

All immediate and short term actions are complete (4/27/98 letter to NRC).

- Increased management involvement
- Increased supervisory oversight
- Heightened worker awareness

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Increased Management Involvement

- VP and managers assessment of RCA work
- PGM reports to VP regularly on health of RP program
- Health physics consultant to PGM/VP

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Increased Supervisory Oversight

- Management review board
- Supervisory Oversight for all RP Higher Risk Work (CAL A.1 & A.2)
  - Planning meetings
  - Pre-job briefs
  - In the field

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Heightened Worker Awareness

- Improved Radiological briefings
  - Incorporate lessons learned
  - Awareness of dosimetry requirements and location
  - Awareness to alarming dosimetry
  - Stay time verification
  - SWP compliance
- Mandatory Training for RCA access
- Ensuring understanding every aspect of the job

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NPAD Surveillance
(CAL A.3)

- Checklist based on Management expectations
- 22 job observations
- Observed integrated planning meeting, pre job brief and job
  - One occasion supervision not at pre job brief
- Supervision effective in ensuring appropriate RC planned, communicated and implemented (A.1 and A.2)

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Radiation Protection Results

- "Learning is taking place"
  - IRs/Gold Cards
  - Delaying work
  - Backing out of work
  - Briefings
- Outage results
  - 157 Person Rem
  - No unplanned exposures

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Assessments

- Significant Incident Finding Team
- Special Assessment Team (CAL B.3)
- NPAD Surveillances (CAL A.3)
- Independent Assessment (CAL B.1)

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Independent Assessment of Radiation Safety Program & Performance
(CAL B.1)

Independent Assessment
(CAL B.1)

- Strengths
  - Commitment to ALARA
  - Worker and Supervisor show improved SWP awareness
  - Management focus, effort and short term action effective at eliminating unplanned exposures

Independent Assessment

- Areas of Improvement
  - RS procedures
  - Integrate RS risk management into planning process
  - RS staffing, skills and resources
  - Reinforce RS fundamentals
  - Quality of RS program indicators
  - Single plan for Radiation Protection Improvement
  - Change management

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Goal: Excellent, event-free, performance in Radiation Safety

Strategy:

1 Address common weakness
  - Improve behaviors
  - Improve RP fundamentals & practices
  - Improve CA & SA
  - Improve RP risk management process
  - Improve oversight & management of RP field activities

2 Continue compensatory measures

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RP Corrective Action
(Long Term) (CAL Item)

- Continue RPIP
  - Improve site radiation protection knowledge
  - Improve radiation protection assessments
  - Integrate radiation protection into work processes
  - Improve management oversight and communications
- Update RPIP with lessons learned

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RP Corrective Actions
(Long Term) (CAL items)

- Standardize RP work practices
- Simplify process, improve procedures for work in RCA
- Conduct additional radiation safety training
- Leadership training in RS
- Incorporate industry and site experiences into job planning

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RP Corrective Actions
(Additional)

- Improve RP risk management process
- Provide RS resources
- Continue compensatory actions

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Assessments

- Proceduralize long term management oversight expectations
- Additional RP program assessment
- OSSRC subcommittee on health of RP program

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Site Wide Application

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Attachment 3

June 17, 1998 Document

Specific Actions Taken and Planned as Documented
in April 27, 1998, letter to NRC

Specific Actions In response to April 29, 1998, CAL

June 17, 1998

The following is summary of actions taken as described in the April 27, 1998 Baltimore Gas & Electric letter and the related April 29, 1998 Nuclear Regulatory Commission letter. All immediate and short term actions have been completed.

For additional information, contact Mark Draxton or John Osborne.

AREA No. 1:

We committed that the five Calvert Cliffs Managers and the Vice President-NED would make personal assessments of the radiological-controlled area (RCA) work on a regular basis to help assure that our expectations for the safe conduct of the work are communicated and met.

In fulfillment of this commitment:

During the week of April 27, 1998 the Vice President-Nuclear Energy Division (VP-NED) requested all Managers-NED to join him in regular assessments of radiological controlled area work.

Documented observations were sent to the Radiation Protection Self-Assessment Coordinator, and to the Vice President-NED. Expectations were again restated at the May 5th, 1998 VP's Staff Meeting.

The Radiation Protection Self-Assessment Coordinator reviews the observations, integrates the observation results into a trending database, and provides feedback on the results.

AREA No. 2:

We committed that the Plant General Manager (PGM) would report regularly to the Vice President-NED on the health of the RP Program.

In fulfillment of this commitment:

The VP-NED and PGM discussed the health of the Radiation Protection Program weekly through the end of the Unit 1 outage. Radiation Protection performance indicators are also reviewed during one-on-one meetings between the Executive Vice President-Generation and VP-NED and between the VP-NED and the PGM.

AREA No. 3:

We committed that the VP-NED would make it clear to the Managers and key Superintendents that they will hold people accountable for Special Work Permit (SWP) compliance.

In fulfillment of this commitment:

Since the April 9, 1998 event, the VP-NED communicated to the Managers, Superintendents, and Radiation Supervisors, during plant status meeting and other settings, that he will hold people accountable for radiation protection.

AREA No. 3: (Continued)

This expectation was discussed verbally during the week of April 12, 1998 and at the April 26th meeting with Managers. It was re-emphasized in a memo to all Managers, Supervisors and Work Leaders dated May 11, 1998.

AREA No. 4:

We committed that we would communicate with senior management of all the major contractors onsite about these events. With regard to contractors involved in this issue, the VP-NED would direct their senior management to assess and take corrective actions for these events.

In fulfillment of this commitment:

On April 17, 1998, the VP-NED personally contacted the management of the major site contractors listed below to communicate the seriousness of the April 9, 1998 radiation safety events. He also clarified his expectations that radiation protection work must be conducted event-free for the rest of the outage.

- Bartlett — Mr. Bruce Bartlett
- Master Lee — Mr. Richard Dobbs
- Framatome — Mr. Charles England
- ABB — Mr. Jeff Isakson
- UNS — Mr. Rich Hirsch

In the case of Bartlett, he also faxed a letter dated April 17, 1998. On April 20th, 1998 he meet with Mr. Nick DiMascio, Bartlett Vice President of Technical Services, to outline expected actions from Bartlett. On April 28th, 1998 he had a second meeting with Mr. Nick DiMascio to discuss the status of Bartlett actions. Action item status is documented in Mr. Nick DiMascio's April 28th memo. Assessment feedback from Bartlett is being evaluated for inclusion into long term radiation protection improvements.

AREA No. 5:

We committed that site personnel must significantly raise their awareness of responsibilities for radiation safety. Under no circumstances should anyone perform a task without completely understanding every aspect of the job and safety requirements.

In fulfillment of this commitment:

Following the April 9th, 1998 events, a site-wide safety break occurred on April 16, 1998 which discussed the radiation protection lessons learned and generic implications. The expectation was also communicated to site personnel via April 24th and 30th, "Calvert Cliffs Hand-Outs." Additionally, the Superintendent, Nuclear Maintenance, reiterated the expectation to all Maintenance personnel in his April 27th memo on "Radiation Safety".

AREA No. 5: (Continued)

During the period of April 29 - May 6th, 1998 the expectation was again emphasized to all personnel with RCA access during GOT Training 98-003.

In addition, the May 8th weekly outage safety topic "Radiation Protection Responsibilities" provided additional details and reinforcement.

AREA No. 6:

We committed that prior to the performance of planned outage radiation protection higher risk work, the top level Management Review Board would recommend to the PGM that the work would proceed safely. The recommendation would include clearly specified line and radiation safety ownership and other important safety criteria.

In fulfillment of this commitment:

Per the May 8, 1998 Cellars/Sanders memo "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work," all higher risk radiological work required an integrated pre-job brief prior to the start of the work. Approval must be obtained from the General Supervisor-Radiation Safety (GS-RS), Maintenance Superintendent, Radiation Protection Manager, and Plant General Manager following the pre-job brief in order to start the work. All changes in key personnel, unplanned radiological conditions, or job scope required another integrated brief and a management approval to recommence work. Approvals are documented on the "Pre-Job Brief Approval Guide" (Attachment 2 of the May 8th Cellars/Sanders Memo). Outage Control Center (OCC) Log contained copies of the approval forms from each integrated pre-job brief. Originals are maintained in the respective Maintenance Order (MO) package.

AREA No. 7:

We committed that we would handle these items (opportunities to improve the pre-job planning and training for radiation protection higher risk jobs) in pre-job briefings immediately prior to conduct of the job.

In fulfillment of this commitment:

This item is a statement of fact and is addressed in further detail in Areas No. 8 and 9.

AREA No. 8:

We committed that we would establish multi-disciplinary teams to review radiation protection higher risk jobs and improve planning and training for them. The teams would involve stakeholders associated with each job. The goal for the reviews was to ensure planning and training for each radiation protection higher risk job that is conducted in advance of the pre-job planning.

AREA No. 8: (Continued)

In fulfillment of this commitment:

As described in the May 8th, 1998 Cellars/Sanders memo "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work," higher risk radiological work required a planning "verification" meeting prior to the pre-job briefing for the work. The objective of the planning verification meeting was to ensure that key players assigned to the job thoroughly reviewed and understood the scope of work, and that procedures, maintenance work orders, SWPs, and other tools were adequate to safely implement the evolution. Attachment 1 of this memo was used as a guide by the On-Shift Maintenance GS to ensure that all appropriate discussions have occurred. These are located in the OCC Log for each Integrated Planning Meeting. Originals are maintained in the respective MO package. The pre-job brief checklists (Attachments 8 & 9) were also used.

The planning verification meetings occurred typically three days before the high risk job was scheduled to work. These meetings were identified in the Plan of the Day (POD) and in the OCC on the radiological work whiteboard. The Radiation Safety planner/scheduler was responsible for notifying the On-Shift Radiation Control Supervisor of upcoming planning "verification" meetings.

Maintenance First Line Supervisors or Job Supervisors, On-Shift Maintenance GS, and selected Radiation Safety Technicians who will be executing the work were required to attend. Additional players, such as Job Path managers, System Managers, Outage Coordinators, Operations, etc., were asked to attend on a case-by-case basis as determined by the Maintenance Job Supervisor.

The General Supervisor Radiation Safety (GSRS) assured assignment of involved radiological personnel to assist with planning verification. He also insured other radiological resources, as may be called for in the planning documents, were in fact available. The GSRS also reviewed that planning and provides any concerns or comments to the planning verification meeting, either directly or through his representative. The GSRS provided periodic oversight of the planning verification meeting.

The Radiation Protection Manager (RPM) reviewed the planning and provided any concerns or comments to the planning verification meeting, either directly or through the Radiation Safety First Line Supervisor, The RPM considered adherence to the Radiation Protection Program for methods planned for work performance.

The assigned Radiation Safety (RS) Supervisor ensured the right resources were allocated to the planning verification meeting. The RS Supervisor assigned the radiation safety team for the evolution and identified other Radiation Safety personnel for attendance at the planning verification meeting. The RS Supervisor ensured required radiological information for the planning verification meeting is brought to the meeting and identified follow-up radiological issues were resolved prior to the pre-job brief.

AREA No. 8: (Continued)

The Lead Radiation Safety Technician (BGE Lead) attended and actively participated in the planning verification meeting as directed by the RS Supervisor. The BGE Lead came to the meeting with knowledge of the work to be performed, radiological conditions expected in the work area, and pre-planned radiological controls.

AREA No. 9:

We committed that in the interim, prior to achieving this goal, we would use integrated pre-job briefings with Radiation Safety and line organization supervisory oversight to ensure readiness to accomplish the radiation protection higher risk work.

In fulfillment of this commitment:

As described in the May 8th, 1998 Cellars/Sanders memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work," all higher-risk radiological work required an integrated pre-job brief prior to the start of the work. Approvals were obtained from the GS-RS, Maintenance Superintendent, RPM, and PGM following the pre-job brief in order to start the work. Any changes in key personnel, unplanned radiological conditions, or job scope required another integrated brief and all management approvals to recommence work. The Pre-Job Briefing Checklist (Attachment 9) was used by the Maintenance Job Supervisor at the brief. The Pre-Job Briefing Checklist (Attachment 8) was used by the Radiation Safety First Line Supervisor to ensure that all required key elements were adequately addressed. The Radiation Safety Supervisor ensured that all key participants are provided a copy of the SWP and ALARA review. Completed Radiation Safety Pre-Job Briefing Checklists (Attachment 8) are maintained in the SWP package. Completed Maintenance Pre-Job Briefing Checklists (Attachment 9) are maintained in the MO package.

The objective of the integrated pre-job brief was to ensure all players in the evolution can conduct the work in a safe and quality fashion. This objective was facilitated by following and discussing items on the Pre-Job Briefing Checklists. The pre-job briefs occurred as close to the start of the work as feasible. Typically, they were the day of the higher-risk evolution.

All key personnel involved in executing the evolution were present at the integrated pre-job briefs. In addition, the On-Shift Maintenance GS and Radiation Safety First Line Supervisor were required to be present. The On-Shift Maintenance GS and Radiation Safety Supervisor used Attachment 2 to ensure that radiological risk was adequately managed, then they both would obtain GS-RS, Maintenance Superintendent, RPM, PGM approval to commence work using Attachment 2 as a guide for approval briefing.

The GSRS provided periodic oversight of pre-job briefs in order to assure expectations were being met. He also assured that any feedback from the line or planning verification meeting was evaluated and incorporated into briefings, as appropriate.

The RPM provided periodic oversight of pre-job briefs in order to assure expectations were being met. He also assured that any feedback from the line or oversight was evaluated and incorporated into briefings or the Radiation Protection Program, as appropriate.

AREA No. 9: (Continued)

The RS Supervisor ensured attendance by all Radiation Safety personnel actively involved in the evolution. The RS Supervisor ensured that copies of SWP and ALARA Reviews were provided to appropriate pre-job brief participant. Also, the RS Supervisor coordinated with the Principal Radiation Safety Technician (PRST) or Radiation Safety Technical (RST) Lead, as to who will be presenting the radiological portion of the pre-job brief. It was preferable that the Lead PRST or RST present the radiological portion of the pre-job brief , so the RS Supervisor could provide oversight.

The Lead Radiation Safety Technician (BGE Lead) may lead the radiological portion, based upon experience and knowledge of the work. He actively participated in the discussion and ensured an adequate understanding of radiological conditions and controls by pre-job brief participants.

AREA No. 10:

We committed that Radiation Safety Supervisors are informed of all RP higher risk work. All radiation protection higher risk work would be overseen by BGE Radiation Safety and line personnel.

In fulfillment of this commitment:

All RP Higher Risk work was discussed during the 0430/1300 meetings which were attended by the RS Scheduler and OCC representatives. He would then relay this information to the RS Supervisors via voice mail and at the 0500/1700 RS turnover meetings. All RP Higher Risk work was discussed at the 0800 Managers Meeting and noted on the Plan of the Day (POD) and on the Daily Report. Additionally, all high radiation SWPs are stamped with the words "Contact RS Supervisor Prior to Pre-Job Briefs".

This area is further described in more detail in the following two areas (as specified in the 4/29/98 NRC Confirmatory Action Letter (CAL)).

AREA No. 10A:

We committed that relative to the current Unit 1 outage for radiological work that is determined to be "higher risk," department supervision from the task organization and radiation protection organization would provide periodic oversight of pre-job planning activities sufficient to assure that appropriate radiation safety controls are established and integrated with the task, and attend pre-job briefing efforts to assure that radiation safety control requirements are effectively communicated to personnel responsible for the conduct and control of the work activity (CAL A.1).

In fulfillment of this commitment:

As described in more detail in Area Nos. 8 and 9, per the May 8th, 1998 Cellars/Sanders memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work," Maintenance First Line Supervisors or Job Supervisors, On-Shift Maintenance GS, and selected Radiation Safety Technicians, who would be executing the work, were required to attend Integrated Planning Meetings. Additional players, such as Job Path Managers, System

AREA No. 10A: (Continued)

Managers, Outage Coordinators, Operations, etc., were asked to attend on a case-by-case basis as determined the Maintenance Job Supervisor.

All key personnel involved in executing the evolution must be present at the Integrated Pre-Job Brief. In addition, the On-Shift Maintenance GS and Radiation Safety First Line Supervisor must be present. The On-Shift Maintenance GS and Radiation Safety Supervisor will use Attachment 2 to ensure hat radiological risk can be adequately managed. Once satisfied that it can, they both together will obtain GS-RS, Maintenance Superintendent, RPM, and PGM approval to commence work using Attachment 2 as a guide for briefing approval.

AREA No. 10B:

We committed that relative to the current Unit 1 outage for radiological work that is determined to be "higher risk," lead or supervisory personnel from the task organization and the radiation protection organization would provide direct oversight of field activities whenever actual work is being conducted to assure that planned radiation safety controls are effectively established and implemented (CAL A.2).

In fulfillment of this commitment:

As described in the May 8th, 1998 Cellars/Sanders memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work," BGE Supervisor/Sponsor and Radiation Safety First Line Supervisor or Principal Radiation Safety Technician (PRST) were be present at all times during the conduct of higher risk work.

The RPM and GSRS periodically oversaw higher risk work implementation in order to verify effective implementation of pre-planning and Radiation Protection Program implementation. In addition, observations of personnel performance for such practices as formal communications, peer checking, and demonstrated use of STAR was performed.

The RS Supervisor or PRST provided continuous job site oversight for the implementation of the work plan, as discussed in the pre-job brief and in accordance with work documents. The oversight must have been at the pre-job brief and be a PRST or above. The oversight ensured adequate controls were being implemented and coached personnel on peer checks, formal communications, use of STAR and conservative decision making. No hands-on work was allowed by the oversight individual.

The BGE Lead worked with the coverage technicians to implement the radiological controls. The PRST ensured changing radiological conditions were communicated to workers and that conditions were within the bounds established by the back-out conditions. The PRST and/or RST coverage persons performed peer checks to the extent possible to reduce potential for error.

AREA No. 11:

We committed that we would take actions to strengthen oversight of contractor Radiation Safety Technicians during the current refueling outage.

In fulfillment of this commitment:

As described in more detail in Area No. 4, we increased oversight of contractor Radiation Safety Technicians in the field by adding two additional Bartlett HP supervisors, for a total of two per shift. In addition, a Bartlett Vice President was periodically onsite and reviewed expectations and performance in order to ensure that BGE expectations were achieved.

As described in more detail in Area No. 10, BGE line and RS Supervisors provided supervisory oversight for all RP Higher Risk work during the planning meetings, pre-job briefings, and in the field.

Also, as discussed below in Area No. 12, we have increased supervisory oversight of all personnel, including contractors, by BGE Radiation Safety (RS) Supervisors as documented on an observation checklist.

AREA No. 12:

We committed to we would develop observation tools for RS Supervisors, similar to those used in Nuclear Operations, to improve performance in field observations of work.

In fulfillment of this commitment:

Radiation Safety Policy Memorandum (RSPM)-022, "Radiation Safety Assessment Program," was approved 6/11/98. This RSPM outlines the expectations for performing supervisory observations. The purpose is to provide a "tool" to supervisors for conducting observations to ensure personnel are meeting expectations.

AREA No. 13:

We committed to implement a requirement for peer checks and supervisory review for a new form to standardize stay time calculations which would ensure SWPs provide adequate radiation exposure margin to accomplish work safely and maintain ALARA.

In fulfillment of this commitment:

Radiation Safety determines stay time calculation and documents peer checks and supervisory reviews on a new Stay Time Calculation form. This form is placed with the SWP package.

Line items 22, 23, 24, and 25 of the Maintenance Pre-Job Briefing Checklist (Attachment 9, May 8th Cellars/Sanders Memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/ High Radiation Work") ensured an independent verification of stay times and that workers understood how they would know what their accumulated dose was and the criteria to exit the area.

AREA No. 14:

We committed that at briefings for line workers, we would review the required dosimetry and its proper location for radiation protection higher risk work.

In fulfillment of this commitment:

Line item 17 of the Maintenance Pre-Job Briefing Checklist, (Attachment 9, May 8th Cellars/Sanders Memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/High Radiation Work") directed a verification that all required dosimetry had been identified and placement of dosimetry on body had been discussed and understood.

AREA No. 15:

We committed to have improved the ability to hear alarming dosimeters or will take compensatory measures. A standard form was used to display the correct locations of required special personal dosimetry. The maintenance pre-job brief form had been revised to prompt worker verification of stay time, dosimetry requirements, and alarm audibility prior to commencing work.

In fulfillment of this commitment:

In the ALARA Review package, a TLD/DRD/SAIC/ALNOR Placement Form was used to display the current locations of required special personal dosimetry.

Maintenance Pre-Job Briefing Checklist (Attachment 9, May 8th Cellars/Sanders Memo, "Expectations for Higher Risk Radiological Work/Risk Significant Work/ High Radiation Work")

- **Line items 22, 23, 24, and 25** directed an independent verification of stay times and ensured that workers understood how they would know what their accumulated dose was and the criteria to exit the area.

- **Line item 19a** directed a verification that the worker understood what to do if the EPD or other instruments alarm and specifically directed personnel to leave the area and contact Radiation Safety for all alarms.

- **Line item 19b** directed a confirmation that the workers understood how they would verify they could hear the alarm in the work area, and what action would be taken if alarms could not be heard. At a minimum, a buddy system shall was used with increased monitoring of EPD reading.

AREA No. 16:

We committed that we would address safe work in all RCAs at CCNPP and conduct training for all personnel with RCA access on these events and management expectations for worker performance in any RCA.

In fulfillment of this commitment:

Following the April 9th, 1998 event, a site-wide safety break occurred on April 16, 1998 which discussed the radiation protection lessons learned and generic implications.

As directed in the April 28, 1998 Vice President - NED memo to all Site Supervisors, Radiation Safety Training was conducted for all General Orientation Training (GOT) Part 2 employees and contractors April 29 through May 6, 1998 (Training ID # GOT-98-003). In most cases, the training was conducted by General Supervisors and Direct Reports to Managers, unless it was more feasible for the First-Line Supervisor to do so.

The training applied to approximately 2,000 employees and contractors who were GOT Part 2 only, currently on site. Off-site employees and contractors had RCA access denied until training was completed. The training sessions were held in noise-free areas of the plant.

On 4/30/98, the VP-NED's office provided additional clarification on expectations to all site supervisor's for training on dosimetry and dosimetry locations.

On 6/15/98, the key objectives from GOT 98-003 were incorporated into the GOT program, and its respective computer-based training.

AREA No. 17:

We committed that we would retain Health Physics and Radiation Protection Manager consultants to advise the PGM. The consultants would regularly brief the Vice President-NED on the performance of the site Radiation Protection Program.

In fulfillment of this commitment:

Two Health Physics consultants worked together reviewing the site Radiation Protection Program. Weekly, a consultant briefed the Vice-President-NED and the Plant General Manager. The General Supervisor - Radiation Safety and the Radiation Protection Manager were also in attendance.

AREA No. 18:

We committed that an Institute of Nuclear Power Operations assist visit would be conducted in radiation protection starting April 27, 1998, to examine our site Radiation Protection Program.

In fulfillment of this commitment:

The INPO assist visit was conducted the week of April 27, 1998.

AREA No. 19:

We committed that the Significant Incident Finding Team process would be completed and causal factors identified. These will lead to long-term corrective actions.

In fulfillment of this commitment:

On June 16, 1998, the Plant General Manager approved the results of a nine person Significant Incident Finding Team (SIFT). The SIFT performed an investigation of the April 9th events, determined causal factors, and provided recommended corrective actions, CCER 98-02. These actions will be incorporated into the site Radiation Protection Improvement Plan (RPIP).

AREA No. 20:

We committed that we would assess the implementation of the Radiation Protection Improvement Plan and take appropriate corrective actions.

This area was further clarified in the April 29, 1998 NRC Confirmatory Action Letter.

We will review and assess previous performance deficiencies involving radiological control implementation to validate our determination of root cause and assess the effectiveness of corrective actions; and by June 26, 1998, provide our assessment of why previous corrective actions were not effective in preventing the deficient radiological control performance relative to the Reactor Vessel Annulus work activities on April 8 and 9, 1998, including measures, taken or planned, to improve corrective action effectiveness (CAL B.3)

In fulfillment of this commitment:

On June 17, 1998, the Vice President-NED approved the results of a eleven person Special Assessment Team (SAT). The SAT was appointed to provide an assessment of why previous corrective actions from Radiological Protection events were not effective in preventing the reactor vessel annulus entry event in April 1998, Supplement to CCER 98-02. These actions will be incorporated into the site Radiation Protection Improvement Plan (RPIP).

AREA No. 21:

We committed that we would capture all long-term corrective actions under our site Radiation Protection Improvement Plan.

This commitment is long term.

AREA No. 22:

We committed that we would strengthen the performance of Radiation Safety Supervisors and Work Leaders by conducting leadership training.

This commitment is long term.

AREA No. 23:

We committed that we would conduct advanced radiation worker training for maintenance workers.

This commitment is long term.

AREA No. 24:

We committed that we would review processes used to conduct work in the RCA in order to assure appropriate attention to important job steps and simplify steps where possible. This review would include line workers and supervision.

This commitment is long term.

AREA No. 25:

We committed that we would conduct an effectiveness review of radiation protection higher risk work preparations.

This commitment is long term.

AREA No. 26:

We committed that we would improve the incorporation of our site and industry radiation protection experience into job planning.

This commitment is long term.

AREA No. 27:

We committed that the Nuclear Performance Assessment Department would perform an effectiveness review of corrective actions.

This area was further clarified in the April 29, 1998 NRC Confirmatory Action Letter.

AREA No. 27A:

Relative to the Unit 1 Outage we will establish and implement a planned series of surveillances or audits by either the quality assurance organization or other organizations, independent of the task organization and radiation safety organization, to determine the effectiveness of the actions described in items A.1 and A.2, above (CAL A.3)

In fulfillment of this commitment:

The Nuclear Performance Assessment Department (NPAD) assessors performed surveillances, i.e., assessments, on twenty-two maintenance and radiation safety activities that were determined to be Radiation Protection Higher Risk (RPHR) evolutions. NPAD developed a checklist based on management's expectations for RPHR evolutions. The checklist also included items to allow assessors to verify current radiation protection work practices, and the

AREA No. 27A: (Continued)

site's response to the CAL. NPAD conducted observations of the pre-job planning meetings, pre-job briefs, and field activities. Observations of the RPHR evolutions were conducted between May 3, 1998 and June 1, 1998. NPAD completed fifteen assessment reports based on the observations. The specific details are available in the individual assessment reports.

NPAD concluded that Calvert Cliffs Nuclear Power Plant effectively implemented the actions of items A.1 and A.2 of the Confirmatory Action Letter (CAL) dated April 29, 1998.

- Radiation safety and maintenance oversight was effective. Adherence to safe radiological work practices was consistently demonstrated.

- The radiation safety and maintenance supervisors provided oversight of all field activities observed. All personnel, observed in the field, participated in the briefs.

- Management oversight stopped some briefs when information presented by radiation safety was either incorrect or unclear.

AREA No. 27B:

During the Unit 1 Outage, we will engage the services of an independent assessor to assess the quality and performance of ongoing radiological control activities (CAL B.1).

In fulfillment of this commitment:

An independent assessment of the plant's Radiation Protection Program and performance was performed by Mike White (Safety Management Services, Inc.) and Pat Volza (Management Strategies, Inc.). The objectives of the assessment were:

1. Assess the plant's current program and implementation to prevent unplanned uptakes of radioactive material and external exposures.

2. Assess the effectiveness of immediate action implemented as a result of the April 9, 1998 unplanned exposure.

3. Assess the effectiveness of corrective actions from previous event sand assessments.

4. Assess the quality and effectiveness of other important elements of the plant's Radiation Protection Program and performance.

The independent assessment was performed from May 3-22, 1998. The assessment included field observations, personnel interviews, review of events, and review of documents. Recommended actions will be incorporated into the site Radiation Protection Improvement Plan (RPIP).