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REGION I

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EXECUTIVE SUMMARY

Three Mile Island
Remedial Emergency Preparedness Exercise Evaluation
Inspection Report 50-289/97-04

This inspection evaluated the licensee's performance during its remedial emergency preparedness (EP) exercise. The inspectors observed emergency response facility (ERF) staffing, procedure implementation, effectiveness of mitigation actions, communications, command and control, emergency classification, offsite notifications, and protective action recommendation (PAR) formulation. The inspectors also assessed licensee activity pertaining to the four exercise weaknesses that were identified during the March 5, 1997 full-participation exercise.

Overall exercise performance was good, and much improved over the March 5 exercise. Event classifications were timely and accurate. Notifications to offsite officials and the NRC were timely. The PAR was appropriate and transmitted to offsite agencies in a timely manner. There was very good interaction between the EOF staff and Commonwealth of PA staff, a noticeable improvement since the March exercise. Remediation of the four weaknesses from the March exercise was adequately demonstrated during this exercise, and two of them are closed. However, two of the weaknesses are still being considered for enforcement action (not declaring a General Emergency in a timely fashion, and not considering a PAR outside 10 miles). The weakness (weak dose assessment) and unresolved item (PAR methodology not conforming to federal guidance) from the 1995 exercise were closed as well.

The licensee's post-exercise critique was also much improved over the one in March, identified most of the NRC independent findings, and was assessed as good.

Three issues identified during the inspection of the licensee's corrective actions taken for the March exercise weaknesses, were determined to not be in compliance with NRC requirements. First, there was no documentation of the continuous on-line assessment or quick calculation computer codes, nor were there written procedures to aid dose assessors in performing dose projection calculations. Secondly, the licensee assigned individuals to its ERO duty roster whose qualifications had lapsed. Lastly, although the EP program audits identified this ERO qualification issue and other deficiencies, the audit process was inadequate to correct those deficiencies. These issues are violations of NRC requirements.

Although the TSC staff was able to accurately use the new steam generator leakrate calculation tool during this exercise, there was disagreement between ERO members concerning its use. Additional guidance may be needed for 1) who should use the tool, and when it should be used, and 2) the limitations of the tool related to damage class estimates and use in differing scenarios.

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P3 EP Procedures and Documentation

P3.1 Review of Procedure Revision

a. Inspection Scope (92904)

The inspectors reviewed the licensee's revised emergency plan implementing procedure (EPIP)-COM-.44, "Thyroid Blocking," to determine if the appropriate changes had been made to satisfy NRC concerns identified during the March, 1997 exercise.

b. Observations, Findings and Conclusions

During the March 5-7, 1997, inspection of the licensee's full-participation exercise, the inspector reviewed procedure EPIP-COM-.44, "Thyroid Blocking," and found that it directed the Radiological Assessment Coordinator (RAC) to perform an assessment of radiation workers' doses prior to authorizing the administration of potassium iodide (KI) for thyroid blocking, but the procedure did not contain any guidance on how to perform the assessment. The licensee agreed to review the procedure and make the appropriate changes. During this exercise inspection, the licensee provided the revised procedure which included specific guidance for the RAC to use in determining if KI should be administrated to workers. The inspectors considered this guidance to be acceptable. No additional problems were noted.

P3.2 Documentation of Dose Assessment Computer Codes and Associated User Manuals

a. Inspection Scope (92904)

The inspectors sought to review documentation of the continuous on-line assessment (COLA) computer code, RAC computer code, and the quick calculation computer code. They also reviewed the licensee's *Emergency Dose Calculation Manual* (EDCM) and various other dose assessment documentation to determine the adequacy of that documentation for accident assessment.

b. Observations, Findings, and Conclusions

The inspector requested the documentation for the COLA computer code, the RAC computer code, and the quick calculation computer code. No documentation was available for the COLA or quick calculation codes, and the documentation for the RAC code was minimal. The inspectors concluded that these computer codes needed thorough verification and validation to ensure that licensee personnel are knowledgeable on current system operation. Additionally, no user manuals were available for any of the dose assessment computer codes. The licensee had

developed some informal guidance for use of the codes by dose assessment staff, but this guidance had not been incorporated into procedures or a formal training program. The inspectors also noted there was no reference to the use of these computer codes in the EPIPs.

The inspector reviewed the EDCM, revision five, dated October 30, 1995, and Temporary Change Notice 1-97-0010 to the EDCM, dated February 26, 1997. The EDCM provides the basis for the calculations used in the RAC code, but does not provide any consideration for radioiodine and radioactive particulate depletion under various reactor accident conditions and for various release pathways. Though the EDCM is referenced in the licensee's EPIPs, it was not apparent to the inspectors that the information it contains is utilized for assessment. The inspectors concluded through table-top walkthrough exercises with dose assessment staff and the licensee's performance during the remedial exercise that the staff could adequately use the computer codes for dose assessment calculations. However, the lack of documentation and user manuals greatly hampered the consistency and quality control of dose assessment training to ensure sustained good performance.

The licensee's Technical Specifications, Section 6.8.1 states, in part "Written procedures shall be established, implemented and maintained covering the items referenced below: ... f. Emergency Plan Implementation." The licensee had no written procedures to aid dose assessors in performing dose projection calculations. As mentioned, there was no documentation for the COLA and quick calculation computer codes. The inspectors concluded that dose assessment personnel were dependent on training and informal mechanisms, rather than structured procedures and documentation to perform their assessment function. This resulted in a dose assessment weakness during the April, 1995 exercise and inaccurate assumptions which led to excessively high dose projection calculations during the March, 1997 exercise. The lack of documentation of the dose assessment computer codes and procedural guidance for their use is a violation (VIO 50-289/97-04-01).

P4 Staff Knowledge and Performance

P4.1 Exercise Evaluation

a. Exercise Evaluation Scope (82301)

During this inspection, the inspectors observed and evaluated the licensee's remedial, emergency preparedness exercise, to verify the effectiveness of corrective actions taken as a result of poor performance in the March 5, 1997 full-participation exercise, when four exercise weaknesses were identified. The NRC team observed activities in the emergency control center (ECC) simulator, technical support center (TSC), operations support center (OSC), and emergency operations facility (EOF). The inspectors assessed licensee recognition of abnormal plant conditions, classification of emergency conditions, notification of offsite agencies,

development of PARs, command and control, communications, and the overall implementation of the Emergency Plan. In addition, the inspectors attended the licensee's post-exercise critique to evaluate the licensee's self-assessment of the exercise.

b. Emergency Response Facility (ERF) Observations and Critique

b.1 Emergency Control Center (ECC)

The Emergency Response Organization (ERO) staffed the ECC in a timely manner. The facility was functional within thirty minutes of the Alert declaration.

The Emergency Director (ED) exhibited very strong command and control of the ECC staff. He effectively directed the staff to accomplish diverse tasks concurrently. He delivered clear, accurate briefings to the ECC staff at appropriate intervals, and effectively consulted with his staff when collegial discussions were needed.

All emergency event classifications were accurate and timely. The General Emergency (GE) declaration was based on Emergency Action Level (EAL) G4.2, i.e., "loss of two fission product barriers with a potential loss of the third." The ED declared the GE, with Emergency Support Director (ESD) concurrence, because the reactor coolant system and fuel clad barriers were lost, and the containment was challenged. The inspectors noted that the basis for EAL G4.2 provides some guidance for determining whether barriers are challenged or breached, but does not specify guidance for every possible situation. Therefore, the ED exercised judgement in determining that the containment barrier was challenged. The inspectors concluded that the GE declaration was appropriate in this case for the existing plant conditions, which were degrading. Therefore, the weakness concerning the failure to recognize and classify a GE from the last exercise was adequately demonstrated during this exercise. However, it is being considered for enforcement action (See Section P8.3).

The inspectors reviewed the licensee's proposed Revision 5 to the classification procedure, which is based on the NUMARC guidance contained in NUMARC/NESP-007 and endorsed by the NRC in Revision 3 to Regulatory Guide 1.101. This revision contains an explicit "judgement" EAL for GE conditions that is completely separate from the fission product barrier EALs. Therefore, this revision, when approved by the NRC, will provide a GE-level "judgement" EAL and remove the potential arbitrariness of GE declarations based on the challenge to fission product barriers.

Notifications made to offsite authorities and the NRC for the Alert and Site Area Emergency were timely and accurate.

The ED and his staff appropriately considered the safety of onsite personnel. When the release from the Reactor Building began, the ED consulted with the Radiological Assessment Coordinator (RAC) concerning emergency dose authorizations for repair teams, and also evaluated the need for administration of thyroid blocking agent to those teams.

However, the ED was slow (delayed about one hour) in requesting a reactor coolant sample after the trip of reactor coolant pump 1A. This sample would have provided information on potential fuel damage, as well as aided in quantifying primary-to-secondary leakage, and any potential offsite doses.

The ECC staff effectively assessed plant conditions and initiated timely and appropriate corrective actions. For example, the Operations Coordinator (OC) was proactive in his efforts to reinstate Auxiliary and Fuel Building ventilation after it was lost. He also provided timely background information to the ED to evaluate a discrepancy between radiation monitoring channels in the Reactor Building. The Shift Technical Advisor continuously monitored plant temperature and pressure and reported these parameters' proximity to various thermal limits.

Throughout the exercise the operating crew effectively dealt with the challenges to plant safety. The operators implemented the appropriate emergency operating procedures in a timely manner. Procedural adherence was evident. The crew employed strong operating practices such as the initialing of procedural step completion and the use of repeat-backs in communications.

One operating decision was made without explicit procedural direction. During the latter stages of the exercise, with a reactor coolant system (RCS) leak of greater than 2000 gpm, the operators throttled low pressure injection (LPI) flow to the RCS in order to maintain a desired RCS pressure. The licensee's small-break loss of coolant accident cooldown procedure (in effect at the time) provides no guidance relative to throttling LPI flow. This decision did not adversely affect plant safety, as LPI flow adequately compensated for the RCS leakrate. The licensee's Operations Department acknowledged this procedural weakness and is evaluating the issue through its "Procedure Problem(s) Identified by Training" process.

b.2 Dose Assessment in the ECC

Shortly after the Alert declaration, the Group Radiological Controls Supervisor arrived at the ECC and activated the dose assessment function. He immediately activated the automated dose assessment computer to obtain an initial dose assessment and called for additional personnel.

The RAC arrived within 15 minutes of the Alert declaration and, after receiving a turnover, took charge of the dose assessment function. The RAC exhibited excellent command and control of the dose assessment team. Team members were assigned positions and directed to review procedures to support dose

assessment activities. The RAC routinely briefed the team members on plant status and his communications were clear and direct. The use of repeatbacks was observed in communications and, in at least one case, prevented the communication of erroneous information.

The RAC directed his staff to perform dose projection calculations based on existing plant conditions using the continuous on-line assessment (COLA) computer code and to perform "what if" calculations using the manual code. The personnel using the codes appeared knowledgeable and used the appropriate correction factors when using the manual code.

The field monitoring team (FMT) data were provided by onsite and offsite teams. Communications between the RAC and the FMTs were good. The RAC positioned the FMTs effectively based on the meteorological data so that they could measure the radiation levels and obtain air samples. The RAC used the field data in conjunction with the data from the Reuter-Stokes (R-S) area radiation monitors to verify the accuracy of the dose projection calculations.

The inspectors observed effective coordination between the RAC and the Radiological Controls Coordinator (RCC) in the OSC concerning the radiological safety of radiation survey and repair teams. The RAC discussed the need for radiation dose extensions with the ED in order to complete repairs of plant equipment.

Overall, the inspectors noted effective coordination, teamwork, and communication between dose assessment personnel and the ED concerning radiological conditions. The RAC demonstrated excellent control of the dose assessment area and direction of the FMTs. He had frequent interactions with his staff, the ED, and the operating crew concerning radiological conditions, both onsite and offsite. He exhibited a questioning attitude and continually anticipated the next course of action. Dose assessment team members effectively performed their job functions.

A weakness from the April, 1995 exercise concerning the licensee's ability to rapidly assess and predict potential offsite radiological consequences was reviewed. During this exercise, the licensee adequately demonstrated its ability to perform effective dose assessment calculations and make protective action recommendations. This exercise weakness is closed.

b.3 Technical Support Center (TSC)

The TSC was staffed and activated in a timely manner. The TSC coordinator (TSCC) exhibited good command and control throughout the drill. His staff briefings were generally done at appropriate intervals. TSC priorities were properly identified, matched ECC priorities, and were appropriately assigned for followup to the TSC staff. Since the March 5, 1997 exercise, a new status board was added to the TSC, which presented event classification, status of fission product barriers, and NRC fuel damage class. This information ensured that TSC staff members were uniformly aware of important information.

The TSCC and his assistants effectively processed the available data to make accurate assessments of plant conditions. The TSC staff was aware of plant conditions shortly after events occurred and in some instances as they occurred. The addition of a plant performance monitor (PPM) computer in the TSC was a major enhancement. For example, through monitoring the computer, an engineer identified the first RCS leak prior to being informed of the leak by the ECC. On another occasion, an engineer identified a reduction in LPI flow shortly after it occurred, and questioned the operators' basis for the reduction in flow. The new staffing arrangement in the TSC, which provided the TSCC an assistant and advisor, generally improved the operation of the TSC. However, occasionally the roles of the coordinator and the assistant overlapped which appeared to cause some difficulty in the flow of information. The coordinator addressed this problem on several occasions by conducting briefings with his assistant and advisor.

The TSC staff effectively referenced plant procedures to maintain an understanding of plant conditions. The EALs were reviewed and discussed with the ECC. The TSC did not fully understand the basis for the GE declaration and appropriately questioned the ECC. The TSC staff provided good identification and evaluation of several "what if" scenarios. For example, they pursued writing a procedure for starting a reactor coolant pump with no seal injection flow assuming they could potentially lose the only operating make up/high pressure injection pump. The TSC staff appropriately calculated fuel damage class as needed during the drill.

The TSC staff appropriately used the RCS activity versus condenser off-gas monitor readings, as well as discussions with the RAC, to calculate the primary-to-secondary leakrate. Although, their calculation did not match the expected result (they calculated between .1 and .5 gpm versus the actual 3.0 gpm leakrate on the simulator), it was an appropriate calculation based on the radiation monitor data available during the exercise.

The TSC staff also demonstrated that they could effectively deal with conflicting information within the ERO. For example, while the TSC staff used the new radiation monitor leakrate methods to calculate primary-to-secondary leakrate, the RAC used the new tool to estimate fuel damage class by assuming that the primary-to-secondary leakrate had not changed. Therefore, the RAC considered the increase in condenser off-gas reading to be due to increased RCS activity and thus a change in fuel damage class. It was not clear to the inspector that the new leakrate method was intended to be used in this manner. As a result, the TSC staff unnecessarily expended additional resources to evaluate conflicting information on damage class reported by the RAC early in the drill. The disagreement between the RAC and the TSC staff concerning the use of the tool for estimating fuel damage class demonstrated that additional guidance may be needed for: 1) how, who, and when the tool should be used, and 2) the limitations of the tool related to damage class estimates and use in differing scenarios (IFI 50-289/97-04-02).

In conclusion, the overall technical analysis of simulated accident conditions provided to the ECC by the TSC staff during the exercise was excellent. Therefore, the weakness concerning inadequate technical analysis by the TSC staff during the March 5 exercise is closed (See Section P8.4). Additionally, the TSC staff was able to use the new assessment tool to accurately calculate primary-to-secondary leakage. The weakness related to the incorrect analysis of primary-to-secondary leakage is also closed (See Section P8.5).

b.4 Operations Support Center (OSC)

The OSC was staffed and activated within 15 minutes of the Alert declaration. The OSC Coordinator exhibited excellent command and control, provided detailed briefings and effectively utilized the expertise of his managers. Logs and status boards were well-maintained and in-plant repair teams were effectively tracked. Job priorities were established, tracked and adjusted when plant conditions changed.

The licensee dispatched 15 in-plant repair teams. The emergency maintenance coordinator ensured the teams were thoroughly briefed before dispatch. The inspector observed one of the maintenance teams and found the team members to be professional, knowledgeable, and capable of performing their assigned task. The inspector observed very good teamwork and excellent discussions among the OSC staff for deciding the process for closing the inboard reactor building purge valve. Two TSC engineers provided their technical expertise, ERO staff thoroughly evaluated plant diagrams, and a video picture was obtained to view the valve location.

The Radiological Controls Coordinator was very good at ensuring radiological conditions were discussed with the repair team members, alternative routes for teams were discussed to ensure that doses were maintained as low as reasonably achievable, and dose extension approvals were obtained in a timely manner.

Overall, the OSC performance was excellent.

b.5 Emergency Operations Facility (EOF)

The command and control in the EOF demonstrated by the emergency support director (ESD) was very good. The ESD maintained a professional environment by keeping the noise level to a minimum and instructing his staff to not bring food into the working area. The ESD held frequent and informative briefings via the public address system to inform the EOF staff of current conditions. The ESD conducted effective meetings with the EOF team leaders by eliciting input, discussing mitigation strategies, and anticipating emergency classification escalation and the associated PAR.

The EOF staff interfaced well with representatives from the Commonwealth of Pennsylvania during the exercise. These representatives were included in the licensee's team leader meetings where their comments and questions were well received and appropriately addressed by the EOF staff. The staff kept the Commonwealth representatives apprised of changing plant conditions. The notification of the GE classification, and the associated PAR, was communicated to Commonwealth and county officials in a timely manner. Plant and radiological conditions were reviewed continuously with Commonwealth representatives to assess the need to extend the PAR out to 10 miles or beyond. Overall, the interaction between the licensee and offsite officials was very good.

The technical support staff in the EOF promptly and thoroughly assessed plant conditions. Plant status and conflicting information was continuously verified for accuracy. The technical support staff maintained contact with and worked closely with TSC staff in assessing plant status and developing mitigation strategies. The EOF staff closely tracked all assigned tasks to their completion. Overall, the technical support function at the EOF was performed very well.

The inspectors attended the post-exercise debrief of players and observers at the EOF. The debrief was appropriately self-critical as the comments were balanced with positive and negative observations.

Overall, the inspectors assessed the licensee's performance at the EOF to be very good.

b.6 Dose Assessment - EOF

The performance of the Group Leader Radiological and Environmental Controls (GLR&EC) was good. He was constantly aware of the radiological problems onsite and offsite. He directed good discussion of the primary-to-secondary leakage issue with his staff and the TSC staff. He also discussed at length the PAR decision with the ESD and Commonwealth of PA representatives, and provided key input for the final decision. The assistant GLR&EC performed several "what if" dose assessment calculations prior to the release to determine potential offsite consequences, including ones beyond the 10-mile emergency planning zone (EPZ).

However, the EOF staff did not establish a priority for obtaining a reactor coolant sample to verify the radiological source term and the amount of primary-to-secondary leakage. The inspector also noted that if the EOF dose assessment staff had been limited to the minimum staffing levels prescribed in the emergency plan, they may not have been able to effectively accomplish all tasks required of them.

Overall, the performance of the EOF dose assessment staff was good.

b.7 Exercise Conduct

The licensee exhibited appropriate control of the exercise. Drill controllers maintained minimal interaction with exercise players and followed the scenario scope and timeline. The inspectors observed no prompting of the players and all cues given to the players were appropriate.

b.8 Licensee Exercise Critique

Immediately following the exercise, the licensee began its critique process. Players and controllers assembled in their assigned facilities and conducted a critique of their exercise performance. The inspectors noted that these facility critiques were very effective and provided an improved level of self assessment compared to the ones following the March 5 exercise.

The NRC inspection team attended the licensee's formal critique on May 15, 1997. This critique was much improved over the previous formal critique. The licensee discussed in detail whether the exercise objectives were met. Findings were characterized clearly for management, identified most NRC findings, and was assessed by the team as good.

c. Overall Exercise Conclusions

Overall, the licensee's exercise performance was good, and showed much improvement over the March 5 exercise. The ERFs were staffed in a timely manner. All ERF managers exhibited good command and control. The classification of simulated accident events were timely and accurate. Notifications to offsite officials and the NRC were timely. The PAR was appropriate and transmitted to offsite agencies in a timely manner. The performance of the OSC staff was excellent and the OSC coordinator demonstrated excellent command and control.

The four weaknesses from the March exercise were adequately demonstrated and two were closed. However, two of the weaknesses are being considered for enforcement action. The weakness and unresolved item from the April, 1995 exercise were also closed. The licensee's post-exercise critique was much improved, identified most NRC findings, and was assessed as good.

P4.2 Operator Walkthroughs on the Dynamic Simulator

a. Inspection Scope (92904)

The inspectors observed three senior reactor operators (SROs) classify simulated accident events during scenarios on the simulator in dynamic mode, to assess the classification training provided to SROs.

b. Observations, Findings, and Conclusions

All SROs observed (two shift supervisors and one shift foreman) correctly classified the simulated events and made appropriate classification upgrades, as necessary. Overall, the inspectors assessed the operators' training and ability to use the EALs for event classification as good.

P4.3 Dose Assessment Team Walkthroughs

a. Inspection Scope (92904)

The inspectors conducted table-top walkthrough exercises with two dose assessment teams, each consisting of a Radiological Engineering Support Engineer (RESE), a Radiological Assessment Coordinator (RAC), and a Group Leader-Radiological and Environmental Controls (GLR&EC), to assess the adequacy of dose assessment training.

b. Observations, Findings, and Conclusions

Both dose assessment teams observed performed well in their understanding and use of the dose assessment computer codes. They were knowledgeable of the assessment process and understood the limitations/assumptions of the codes. They were also familiar with the informal guidance recently provided for computer code use. Inspectors concluded that although the licensee lacked computer code documentation and user manuals for the codes, the training provided to team members was adequate for effective assessment of radioactive releases and their consequences.

P5 Staff Training and Qualification in EP

P5.1 Dose Assessment Training

a. Inspection Scope (92904)

The inspector reviewed lesson plans and training examinations for 1995 and 1996, and interviewed training instructors and ERO personnel to determine the adequacy of the dose assessment training.

b. Observations, Findings and Conclusions

The licensee provided extensive dose assessment training after the March, 1997 exercise. The inspector reviewed the lesson plans and procedures and found them to include both classroom instruction and hands-on training. Some of the topics discussed included review of the existing COLA screens,

situational analysis, and the PAR logic revision. The inspector reviewed the examinations and determined the exams given to the EOF dose assessment team to be somewhat abbreviated and nontechnical. The exams for the ECC dose assessment teams were more challenging with some technical questions, and the average grade was 99 percent.

The inspector discussed the dose assessment training with dose assessment team members and they indicated that training was adequate and had improved over the past two years. The remedial training that was provided after the March, 1997 exercise was excellent because it provided discussions of the methodology for assessing releases and their consequences when using the COLA or manual dose assessment models.

During the interviews, the dose assessment teams referred to a "dose assessment committee." This was not a formal committee but it was established to look into the maintenance of the dose assessment models and respond to any dose assessment concerns. Dose assessment team members acknowledged that the committee was an excellent idea, however, it did not meet on a regular basis, and there were no formal procedures that described the activities of the committee, such as handling suggestions for improvements. The inspector assessed the committee as an excellent initiative, which could assist the licensee in maintaining the dose assessment program, and address identified concerns and problems.

P5.2 Lapse in ERO Qualifications

a. Inspection Scope (92904)

The inspector reviewed the 1995 and 1996 quality assurance audits to assess an issue concerning the lapse in qualifications of some ERO personnel.

b. Observations, Findings and Conclusions

While reviewing the quality assurance audits of 1995 and 1996, the inspector noted that the licensee identified several instances in which ERO personnel had allowed their respirator training or whole body count to expire. The EP staff was aware of this recurring problem and has been working to establish effective tracking systems. As a result of improved tracking of expired qualifications, the number of unqualified individuals has decreased in the past three years. Although the tracking systems have improved the process, the licensee plans to present this matter to site plant management to gain support and endorsement in ensuring that all ERO personnel are aware of their responsibilities to maintain their qualifications current.

The inspector determined that the licensee did not follow procedure TEP-ADM-1300.02, "Emergency Preparedness Training," Section 4.0, Exhibit 1, which states in part, "On-Shift Emergency Organization, Initial Response Emergency Organization and Emergency Support Organization must

satisfactorily complete and maintain EP training program requirements for the position assigned and must satisfactorily maintain respirator qualifications and General Employee Radiation Worker Training (Category II) and must be active in the dosimetry system." Therefore, the inspector concluded that the licensee repeatedly, over a three year period, had individuals on the ERO duty roster that were not qualified. This is a violation (VIO 50-289/97-04-03).

P7 Quality Assurance in EP Activities

a. Inspection Scope (92904)

The inspector reviewed Nuclear Safety Assessment (NSA) EP program audit reports, quality deficiency reports (QDRs), procedures and other documentation to assess the adequacy of the EP audits conducted in 1995 and 1996. The inspector also interviewed the 1996 audit team leader, EP Manager, and EP staff members.

b. Observations and Findings

The NSA Department conducts an annual EP program quality assurance audit. The 1995 and 1996 audits were conducted by the same two NSA staff members with no EP technical experience. The audits consisted of an audit plan and checklist and were conducted over a three-month period. The inspector reviewed the 1995 and 1996 audit reports and identified several areas of concern.

The licensee's Emergency Plan, Section 8.2.1, required essential personnel to reverify their assigned EP training every 12 to 15 months to maintain current qualifications. A QDR, number 942005 was issued to the EP Department as a result of a 1994 EP program audit for a number of individuals on the ERO duty roster with incomplete training. As a result of this deficiency, the EP staff implemented a computerized EP qualification tracking system in late 1994 to monitor training qualification records. However, during the 1995 EP program audit, nine individuals were identified with expired qualifications, four of which were on duty. The audit report indicated that an additional computerized tracking system was being implemented and scheduled for completion by September 1, 1995 and QDR 942005 remained open.

In February 1996, the QDR was closed by memorandum from the EP Manager to the Director, Radiation Health and Safety, stating that the EP Department continued to monitor EP qualifications and a new tracking system was in place. However, during the 1996 EP program audit, an EP staff member stated that over a six-month period, ten ERO personnel had their qualifications lapse, three of which were on duty. The report stated, "since the actual error rate for expired qualifications while on duty is very low it will be considered a minor deficiency."

The NSA Audit Program Procedure 1110-ADM-7218.10 defines a minor deficiency as one not being programmatic, not generic, does not compromise quality, is not potentially reportable, and/or corrective action would not be extensive. The independent safety reviewer who evaluated the 1996 audit stated that "no significant safety conditions were identified, all findings were properly characterized as QDRs or minor deficiencies and no undetected trends were identified by this review." The inspector disagreed with the decision to downgrade the QDR to a minor deficiency and the determination that no trends were identified since ERO qualification problems had been identified in the past three audits (one individual's qualifications had lapsed as recently as March, 1997). The audit team leader stated that the EP staff identified the individuals and removed them from the ERO upon discovery. Since the EP staff was addressing the ERO qualification problem, NSA decided that a QDR was not necessary. Also, the auditor stated that NSA did not do an independent assessment during the 1996 audit to verify that all members of the ERO were qualified at that time.

Discussions with the EP Manager about this matter indicated that the problem was not only poor tracking systems but also the lack of management expectations regarding ERO personnel maintaining their qualifications current, and the consequences for not doing so.

While reviewing the audit reports, the inspector noted other "minor deficiencies" that were similar in nature in the 1995 and 1996 reports. For example, copies of EPIPs, the Emergency Plan, and operating procedures and drawings located in various ERFs were found to be out of date.

In 1996 it was identified that the equipment kits were insufficient and kit inventories were not being pr erly conducted. Since these issues were corrected during the audit, the licensee included them as findings, but did not assess them as deficiencies. The NSA did not trend these similar findings and therefore had no historical reference of the EP Department's performance in this area for identifying recurring issues.

In 1995 it was identified that Lancaster County officials were concerned about the handling of false siren soundings. The EP staff informed the auditors that only a few sirens had been inadvertently activated and a system upgrade was expensive. The EP staff committed to evaluate the siren system. The 1996 audit stated "there is still a problem with false siren soundings" and that EP is getting contract bids for installation of a system to identify faulty sirens and give feedback directly to the counties. Although this was a repeat item, it was not made a deficiency in the 1996 audit report. The QA team leader stated that since the EP staff had been

reviewing this concern for the past two years, and was in the process of making additional corrective action decisions, the issue did not warrant a deficiency. The licensee appeared to characterize the repeat audit finding as insignificant due to the EP staffs' commitment to continue to review the issue. The NSA was nonconservative in its characterization of findings as conditions adverse to quality.

c. Conclusions

The inspector determined that the audits covered many areas of review but that they appeared to be narrowly focused on compliance rather than substance. The short-term corrective actions taken by the EP staff that were identified during the audit were considered acceptable even though an in-depth review for determining the adequacy of the corrective actions was not performed. Characterization of audit findings appeared to be negotiated with the EP staff and minor deficiencies were not trended for determination of recurrence. Overall, the inspector assessed the NSA audit of the EP program to be perfunctory.

The licensee's Technical Specifications, Section 6.5.3.1, states, in part, "audits shall be performed in accordance with the TMI-1 Operational Quality Assurance Plan." The Operational Quality Assurance Plan requires that the audit system provide for corrective action systems and management reviews for timely correction of identified deficiencies and prevention of recurrent nonconformances. The licensee did not provide effective prevention of recurring deficiencies nor review corrective actions for deficiencies to determine their adequacy. This is a violation (VIO 50-289/97-04-04).

P8 Miscellaneous EP Issues

P8.1 (Closed) Weakness Observed During the April 12, 1995 Full-participation Exercise: Weak Ability to Rapidly Assess and Reliably Predict Potential Offsite Radiological Consequences

The inspection team reviewed this item during this exercise. The licensee adequately demonstrated its ability to perform effective dose assessment calculations and make protective action recommendations. This exercise weakness is closed.

P8.2 (Closed) Unresolved Item (URI 50-289/95-05-01): PAR Logic Methodology Not Conforming With Federal Guidance

The NRC inspection team for Inspection 95-05 concluded that the licensee's PAR logic diagram methodology did not appear to conform with Federal guidance, in that it relied on evacuation time estimates and release duration, without consideration of radiation doses that could be received.

The team reviewed this issue during this inspection. The licensee had revised its PAR logic diagram in a recent change to the EPIPs. The inspectors reviewed the revised PAR logic diagram and determined that it satisfactorily follows NRC

guidance. While the NRC's guidance follows a sector approach, evacuating the EPZ out to a two mile radius and five miles downwind (the "keyhole" concept), the licensee's default PAR guidance relies on an evacuation out to a five mile radius.

The licensee chose this approach because topographical characteristics of the plant caused frequent wind shifts, and to more closely coincide with the PAR methodology used by offsite officials which prescribes protective actions uniformly for all sectors. The inspectors concluded that this deviation from NRC guidance was acceptable.

The inspectors noted one other way in which the licensee's new PAR logic deviates from NRC guidance. The licensee's PAR logic diagram recommends the default PAR for all GE classifications, regardless of core damage severity, except when security events or known release duration justify otherwise. The NRC guidance recommends the keyhole evacuation only for severe core accidents. However, a review of the licensee's EALs revealed that, except for the security events already considered, all the GE conditions considered in the current scheme would be severe core accidents. Therefore, the licensee's new PAR logic diagram conforms to NRC guidance, and the previously identified unresolved item is closed.

P8.3 (Open) EEI 50-289/97-02-01: Failure to recognize and classify a GE

During the previous exercise, the ERO failed to recognize a condition in which all three fission product barriers were breached as one that required a GE declaration.

During this remedial exercise, the ERO accurately recognized the conditions that constituted each level of emergency classification and declared the appropriate emergency classification in each case. The satisfactory performance of the GE classification adequately addressed this item from a performance standpoint.

The inspectors also reviewed the licensee's short-term programmatic corrective actions taken to respond to the weakness, which included EAL training for ERO staff for classification of emergency events and coaching drills held at the various ERFs to discuss expectations for the principal decision-makers, as well as their soliciting input from supporting staff members. The inspectors verified that these short-term corrective actions had been completed.

The inspectors interviewed five ERO members who had attended the EAL remedial training. The inspectors noted varying degrees of retention of the information covered in the training, but concluded that the training was generally effective. Additionally, the licensee's performance during the remedial exercise demonstrated the adequacy of the remedial training, and the licensee incorporated the concepts covered in the remedial EAL training into the EP continuing training program.

The inspectors concluded that the corrective actions taken for the above weakness were effective and that the GE classification was adequately demonstrated during this exercise. However, it is still under consideration for enforcement action.

P8.4 (Closed) IFI 50-289/97-02-02: Inadequate technical analysis by TSC staff

The technical analysis of simulated accident conditions provided to the ECC by the TSC staff during the March 5, 1997 drill was inadequate, and was assessed as an exercise weakness.

To address this weakness, the licensee made significant staffing, roles, and expectation changes in the TSC. The staffing changes included the addition of two individuals to directly support the TSC coordinator. For each duty section, one of these individuals, the TSC Advisor, was a former STA in the control room. In addition, the licensee provided additional training to the TSC staff regarding RCS and primary-to-secondary leakrate calculations, the role of the TSC, expected resource allocation, control of activities in the TSC, and communications.

Based on the changes made to TSC staffing, the training provided, the leakrate calculation enhancements and the excellent TSC performance in this exercise, the previous weakness related to the adequacy of technical analysis of simulated accident conditions provided to the ECC by the TSC staff is closed.

P8.5 (Closed) IFI 50-289/97-02-03: Incorrect analysis of steam generator tube leakage

During the March 5, 1997 exercise, the analysis of primary-to-secondary leakage by the ERO was incorrect and assessed as an exercise weakness.

As a result, the licensee provided guidance and developed new methods to analyze primary-to-secondary leakage. One of the new methods estimates the leakage based upon condenser off-gas monitor readings and RCS activity. The results are only as accurate as the estimate of the RCS activity and only when the entire release is going through the condenser. Based on the estimate of RCS activity and condenser off-gas readings, off-gas flowrate and a factor from a series of graphs is used to estimate primary-to-secondary leakage. The licensee provided training on the guidance and new methods for determining leakrates to members of the TSC and other emergency response staff. The inspector attended the training on May 7, 1997 and found it to be very good and informative.

Based on the new leakrate determination methods and guidance, the training provided to the ERO on these tools, and the performance of the TSC staff during this exercise to use the tools in accurately calculating primary-to-secondary leakage, this weakness is closed.

P8.6 (Open) EEI 50-289/97-02-04: Failure to assess need for PAR beyond 10-mile EPZ

During the March 5, 1997 exercise, the EOF staff did not assess and discuss with offsite officials the need for PARs for residents outside the 10-mile EPZ when dose projections appeared to indicate that the Environmental Protection Agency protective action guidelines (PAGs) would be exceeded.

The inspectors reviewed EPIP-TMI-.27, "Emergency Operations Facility." This procedure requires the GLR&EC to periodically brief Commonwealth representatives on the current radiological and environmental conditions. The procedure was revised to require the GLR&EC to immediately notify the ESD if dose assessment calculations indicated that EPA PAGs would be exceeded anywhere offsite, including outside the 10-mile EPZ. The procedure included a note that clarified that dose projections for areas from a 10 to 30 mile radius can be performed using a computer code on the Emergency Information Network. The procedure provided guidance on protective actions to be taken outside the 10-mile EPZ. The GLR&EC must notify the PA Bureau of Radiation Protection of any problems with the dose assessment calculations.

In addition to the guidance contained in the procedure, an e-mail memorandum was issued on March 12, 1997, from Mr. J. Grisewood to members of the ERO concerning the importance of thorough communications with Commonwealth representatives regarding plant conditions during an emergency. Coaching sessions were conducted with ERO members on March 27 and April 3, 1997 to emphasize this new guidance.

During this exercise, the inspectors observed that ERO personnel communicated well with Commonwealth personnel on plant and radiological conditions. In particular, there was good discussion on PAR formulation both within the 10-mile EPZ and beyond (though a PAR was not necessary beyond the 10-mile EPZ for the existing radiological conditions). Based on the licensee's improved guidance and performance during this exercise, this item was adequately demonstrated. However, it is still under consideration for enforcement action.

P8.7 Updated Final Safety Analysis Report (UFSAR) Review

A recent discovery of a licensee operating its facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the UFSAR or the emergency plan. During this exercise, the inspectors observed the licensee's compliance with the emergency plan regarding ERO structure, facility activation and usage, and classification of simulated events. No discrepancies were noted.

P8.8 In-Office Review of Licensee Procedure Changes

An in-office review of revisions to the emergency plan and its implementing procedures submitted by the licensee was completed. A list of the specific revisions reviewed are included in Attachment 1 to this report. Based on the licensee's determination that the changes do not decrease the overall effectiveness of the emergency plan, and that it continues to meet the standards of 10 CFR 50.47(b) and the requirements of Appendix E to Part 50, NRC approval is not required for those changes. Implementation of those changes will be subject to inspection in the future.

V. Management Meetings

The NRC convened a meeting with GPU Nuclear management personnel in the Region I office on April 30, 1997, to discuss the licensee's root cause evaluation of the March 5 exercise weaknesses. Mr. E. Frederick summarized the root cause evaluation findings and Mr. A. Rone summarized the licensee's short term and long term corrective actions, as well as the senior management evaluation of the root cause evaluation findings (Enclosure 2). Of particular note were the conclusions that management oversight and involvement in EP was not sufficient, and that management expectations for support of the EP program must be clearly defined, communicated, and continuously reinforced.

X.1 Exit Meeting

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on May 15, 1997. The licensee was informed of the following:

- There were no exercise weaknesses identified and performance was much improved over the March exercise performance.

- The weakness identified during the April, 1995 exercise concerning weak ability to assess and predict offsite radiological consequences was adequately demonstrated and is closed.

- The unresolved item identified during the April, 1995 exercise concerning the PAR logic methodology not conforming to Federal guidance, was reviewed and the licensee's changes were satisfactory. Therefore, this item is closed.

- The four weaknesses identified during the March, 1997 exercise were adequately demonstrated. However, two were closed (inadequate technical analysis by TSC staff and incorrect analysis of steam generator tube leakage) and two will remain open pending possible enforcement action (failure to recognize and classify a GE, and failure to assess the need for a PAR beyond the 10-mile EPZ).

- The exercise critique was much improved over the March exercise critique, identified most NRC items, and was assessed as good.

- The inspection team identified an EP audit inadequacy in that an ERO qualification issue was identified in multiple audits, and not corrected. This item was unresolved.

The licensee acknowledged the inspection findings.

A formal exit meeting was conducted on May 28, 1997, at the Three Mile Island Training Center, which was open for public observation. The NRC inspection team leader presented the inspection findings to Mr. J. Langenbach and other members of the GPU Nuclear staff. The licensee was informed that:

- The four weaknesses identified during the March, 1997 exercise were adequately demonstrated from a performance standpoint. However, two of those weaknesses were being considered for enforcement action (failure to recognize and classify a GE, and failure to assess the need for a PAR beyond the 10-mile EPZ).

- The issue concerning the EP audit inadequacy which was previously unresolved, was, after further review, assessed as a violation.

- The issue concerning the lapse in ERO qualifications was ongoing since 1994, and is a violation.

- The issue concerning inadequate documentation of dose assessment computer codes and user manuals for those codes were important problems, and is unresolved.

The licensee acknowledged these findings.

Mr. J. Grisewood, the Three Mile Island EP Manager, presented a summary of the licensee's actions to close out Confirmatory Action Letter 1-97-011, dated March 12, 1997 (Enclosure 3). The licensee stated that it had also provided this information to the NRC in writing.

The licensee was subsequently notified by telephone on June 18, 1997, that the issue concerning inadequate documentation of dose assessment computer codes is a violation.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

N. Brown, Lead Emergency Planner
D. Ethridge, Acting Director, Radiological Controls/Occupational Safety
R. Finicle, Corporate Emergency Planner
E. Frederick, NSA/Human Performance
R. Goodrich, Site Security Manager
J. Grisewood, Emergency Preparedness Manager
R. Hess, Manager, Training
L. Karinch, GPU Nuclear Spokesperson
A. Knoche, Senior Emergency Planner
J. Langenbach, Vice President and Director, TMI
A. Miller, Regulatory Affairs
J. Moore, Nuclear Safety Compliance Committee
W. Ressler, Manager, Environmental Affairs
M. Ross, Director, Operations and Maintenance
G. Skillman, Director, Configuration Control
M. Slobodien, Director, Radiological Health and Safety
C. Smythe, Manager, Nuclear Safety Assessment
J. Wetmore, Manager, Regulatory Affairs
J. Whitehead, Senior Emergency Planner
W. Wilkerson, Manager, System Engineering

Commonwealth of Pennsylvania

R. Janati, Bureau of Radiation Protection
S. Maingi, Nuclear Engineer, Bureau of Radiation Protection
J. Rives, Pennsylvania Emergency Management Agency

Federal Emergency Management Agency

A. Henryson, Region III

NRC

D. Barss, EP Specialist, NRR
P. Eselgroth, Chief, Division of Reactor Projects Branch 7
S. Hansell, Resident Inspector, TMI
M. Modes, Chief, Emergency Preparedness and Safeguards Branch
J. Wiggins, Director, Division of Reactor Safety

INSPECTION PROCEDURES USED

82301:	Evaluation of Exercises for Power Reactors
82302:	Review of Exercise Objectives and Scenarios for Power Reactors
92904:	Followup - Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-289/97-04-01	VIO	Lack of computer code documentation and procedures for dose assessment
50-289/97-04-02	IFI	Additional guidance necessary for steam generator leakrate calculation tool
50-289/97-04-03	VIO	Personnel on ERO duty roster who were not qualified
50-289/97-04-04	VIO	EP audit program inadequate to correct deficiencies

Closed

50-289/95-05-01	URI	PAR logic methodology not conforming with federal guidance
No number	Weakness	Inadequate off-site dose assessment and projection
50-289/97-02-02	IFI	inadequate technical analysis by TSC staff
50-289/97-02-03	IFI	incorrect analysis of steam generator tube leakage

Discussed

50-289/97-02-01	EEI	failure to recognize and classify a GE
50-289/97-02-04	EEI	failure to assess need for PAR beyond 10-mile EPZ

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
EAL	Emergency Action Level
ECC	Emergency Control Center
ED	Emergency Director
EDCM	Emergency Dose Calculation Manual
EEI	Escalated Enforcement Item
EMC	Emergency Maintenance Coordinator
EOF	Emergency Operations Facility
EP	Emergency Preparedness
EPIP	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERF	Emergency Response Facility
ERO	Emergency Response Organization
ESD	Emergency Support Director
FMT	Field Monitoring Team
GE	General Emergency
GLR&EC	Group Leader Radiological and Environmental Controls
GPM	Gallons Per Minute
IFI	Inspector Follow-up Item
KI	Potassium Iodide
LPI	Low Pressure Injection
NRC	Nuclear Regulatory Commission
NUMARC	Nuclear Management and Resources Council
OC	Operations Coordinator
OSC	Operations Support Center
PAG	Protective Action Guideline
PAR	Protective Action Recommendation
PDR	Public Document Room
PPM	Plant Performance Monitor
QA	Quality Assurance
QDR	Quality Deficiency Report
RAC	Radiological Assessment Coordinator
RCC	Radiological Controls Coordinator
RCS	Reactor Coolant System
RESE	Radiological Engineering Support Engineer
R-S	Reuter-Stokes
SAE	Site Area Emergency
SRO	Senior Reactor Operator
SS	Shift Supervisor
TMI	Three Mile Island
TSC	Technical Support Center
TSCC	TSC Coordinator
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation

ATTACHMENT 1

Emergency Response Procedures Reviewed

Document	Document Title	Revision(s)
EPIP-TMI-.02	Emergency Direction	10
EPIP-TMI-.03	Emergency Notifications and Call Outs	21
EPIP-TMI-.06	Additional Assistance and Notification	23, 24
EPIP-TMI-.27	Emergency Operations Facility	9, 10
EPIP-COM-.44	Thyroid Blocking	2
EPIP-COM-.45	Classified Emergency Termination/Recovery	1

ENCLOSURE 2

TMI-1
EMERGENCY PREPAREDNESS
ROOT CAUSE UPDATE
AND
PROGRESS REPORT

GPU NUCLEAR

APRIL 30, 1997

Agenda

• Background	A. H. Rone
• Short Term Corrective Actions	A. H. Rone
• HPIP Root Cause Evaluation	E. R. Frederick
• Senior Management Evaluation and Long Term Corrective Actions	A. H. Rone
• Conclusions	A. H. Rone

Background

- Biennial, full participation, graded emergency preparedness exercise conducted March 5, 1997
- Scenario Summary
  - Exercise started with plant running followed by major leak in reactor coolant system resulting in declaration of SAE. This was accomplished successfully.
  - Plant shut-down was followed by damage to fuel clad. Damage class was correctly recognized
  - Calculation in TSC indicated primary to secondary leak > 50 gpm. This met EAL for declaration of GE.
  - Calculation done in TSC was incorrect. Drill controller halted GE declaration to maintain exercise time line commitments for offsite participants

- Decay Heat line rupture bypassed the containment building, thus breaching the third fission product barrier. This should have resulted in declaration of GE. ERO did not recognize GE condition, resulting in Drill Controller prompting to maintain exercise time line commitments to offsite agencies.
- Manual offsite dose calculation resulted in estimate of 60 rem dose at EPZ boundary. Discussions of need for expanding PAR beyond 10 mile EPZ was limited at EOF

- Exercise Results
  - ERO failed to recognize and declare GE when conditions warranted
  - ERO staff incorrectly evaluated steam generator tube leakage

- Technical analysis of simulated accident conditions was inadequate in TSC
- The EOF staff did not adequately assess need for PAR beyond the 10 mile EPZ

- CAL of March 12 confirmed GPUN commitments to remediate drill weaknesses and perform a root cause evaluation (RCE)
  - Initiate immediate corrective actions to address weaknesses noted above
  - Perform a root cause analysis by April 15 covering weaknesses along with ERO training, scenario development, simulator problems, controller activities, exercise critique process, and changes in EP and ERO staffing
  - Conduct a remedial exercise by May 15, 1997

- The purpose of this meeting is to advise you of the following:
  - Immediate corrective actions and their results
  - Results of the Root Cause Analysis
  - Future plans

Short Term Corrective Actions

- Root Cause Evaluation (completed April 15, 1997)
- TSC capability upgraded
  - Additional computers added
  - Tech Support Coordinators / Assistant position added
  - Expectations document issued on support to ECC and coordination with EOF
  - TSC Engineer assigned as "big picture" advisor (previous STA or SRO or equivalent qualification)

- ERO Training
  - Diagnosis of conditions and timely declaration of emergency conditions [ED, ESD, ED Assistant, ESD Assistant, RAC, Group Leader R&EC]
  - Use and limitations of analytical tools (on-going)
  - Diagnosis and analysis of primary to secondary leakage in steam generators
  - Intra-facility communications
  - Methodology and need for analyzing population doses beyond 10 mile EPZ and making of long range protective action recommendations

Short Term Corrective Actions

- Table top training for EOF, ECC, and TSC
- Communicate expectations for ESD and facility leaders
- Procedure upgraded for better quantifcation of primary to secondary leakage in steam generators and RCS leak rates
- Multi-disciplined team used to prepare and validate remedial exercise scenario

Short Term Corrective Actions

- Enhance exercise critique process by providing observers with objective evaluation criteria to use in assessing performance
- Meeting with Commonwealth of Pennsylvania and GPUN to review and clarify GPUN/state interface expectations, press releases at GE, PARs beyond 10 miles completed on April 25, 1997
- Mini drill scheduled for May 8, 1997
- Management Review of Root Cause Evaluation conducted April 25, 1997
- Remedial Exercise scheduled for May 13, 1997

HPIP
Root Cause Evaluation
of
March 5, 1997 Emergency Plan Exercise

E. R. Frederick
HPES Coordinator, TMI

HPIP Root Cause Evaluation Team

- E. R. Frederick, Root Cause Analyst (NSA) and Team Leader
- T. Blount, Manager Emergency Preparedness, Oyster Creek NGS
- R. Finicle, Corporate Emergency Planner
- D. Wilt, Instructor IV, Operator Training Department
- C. Husted, Simulator Analyst, TMI Training Department
- R. Rolph, Radiological Engineer, Radiological Health and Safety
- E. Showalter, Engineer Sr., System Engineering Department
- Dann Smith, HPE Coordinator (NSA), Oyster Creek NGS
- Don Smith, Senior Reactor Operator, PDMS Manager

Weakness No. 1: ERO Failed to Recognize a General Emergency when Warranted by Plant Conditions

- HPIP Root Cause
  - Training content did not specifically address job performance standards
- Corrective Actions
  - Train on methods for determining fission product barrier status
  - Develop expectations and priorities for ED and ESD to evaluate Emergency Action Levels

- Provide more detail in ECC EPIP
  - procedure change deferred - NUMARC EALs will resolve
- Develop expectations for ERF Leaders to solicit input from ERO members
- Meet with Pennsylvania BRP

Weakness No. 2: ERO incorrectly evaluated OTSG Tube Leakage

- HPIP Root Cause
  - Training content did not specifically address job performance standards
- Corrective Actions
  - hands-on training on TSC PC-based leak rate program addressing limitations with voided RCS and RCPs running
  - Provide information on limitations to selected ECC and EOF personnel

Weakness No. 3: Technical Analysis Provided to ERO by TSC was Inadequate

- HPIP Root Cause
  - Training content did not specifically address job performance standards
- Corrective Actions
  - Ensure ERF drills and additional training include the following:
    - role of TSC in emergency plan
    - expected resource allocations and control of activities in the TSC
    - communication techniques
    - TSC activation and table top exercises

Weakness No. 4: EOF did not assess the need for PARs outside the 10 mile EPZ

- HPIP Root Cause
  - Policy guidance / management expectations not well defined or understood
- Corrective Actions
  - Ensure procedures direct cross-check of in-plant survey data, offsite data, COLA input, and RAC Code inputs
  - Incorporate into RAC and Group Leader R&EC expectations and procedures for the need for PARs outside 10 mile EPZ
  - Establish requirements for and tools to evaluate performance of dose assessment before using data for PARs

Scenario Development: Insufficient input from Rad Con, Engineering, and Operations to Prevent Deviation from Time Line

- HPIP Root Cause
  - Insufficient manpower to support identified goal / objective
- Corrective Actions
  - Use multi-disciplined team to develop / validate scenario. Validate using sufficient resources to effectively represent ERO. Protect confidentiality
  - Develop method to understand how changes may disrupt key factors. Ensure all changes undergo adequate review and re-evaluation

Simulator Problems and Usage Issues: Insufficient attention given to warnings on avoidable problems. Driving Simulator beyond its capabilities. Use of uncontrolled software.

- HPIP Root Cause
  - Component not operated within its design parameters
- Corrective Actions
  - place auto offsite dose projection system within configuration control
  - move COLA assessment computer system to secure area
  - do not use real time meteorological data for drills and exercises
  - control simulation to minimize negative training

Drill Controller Activities: Controller activities can be overwhelming when drill takes direction not predicted. Meeting the time line is very important.

- HPIP Root Cause
  - Too many concurrent tasks assigned to worker
- Corrective Actions
  - reduce intervention required to meet scenario objectives
  - provide properly validated scenario that minimizes controller activities and has backup information so controllers can respond during system malfunctions

Critique Process was Unsatisfactory: Critique failed to identify CAL items 3 and 4

- HPIP Root Cause
  - Problem identification methods didn't identify need for change
- Corrective Actions
  - develop and implement a formal drill critique process

Changes in Emergency Preparedness Staffing: Corporate EP Manager position eliminated, EP Manager recently replaced, Planning staff reduced

- HPIP Conclusions
  - no measurable effect on outcome
- Corrective Actions
  - none

Changes in ERO Staffing: Role reversal of ED and Ops Coordinator, GL R&EC, EAC, RESE, TSR, OSCC filled by personnel not in previous exercises

- HPIP Conclusions
  - ED /OC role reversal may have had slightly negative effect
  - other positions: no noticeable effect
- Corrective Action
  - Do not deviate from established duty roster assignments for graded exercises

Effectiveness of Past Corrective Actions: Repeat items not captured in trend. Critique process did not identify some weaknesses

- HPIP Root Cause
  - Corrective action for previously identified problem or previous event was not adequate to prevent recurrence
- Corrective Actions
  - Utilize improved Critique Process in conjunction with CAP system. This will employ root cause evaluation and corrective action development and tracking

Management Evaluation Team

- A.H. Rone, VP Nuclear Safety and Technical Support (Chair)
- J. Langenbach, VP TMI
- M. B. Roche, VP Oyster Creek
- Gregory Kane, Independent General Office Review Board Member
- J. Curry, Acting Director Nuclear Safety Assessment
- E.R. Frederick, HPES Coordinator, TMI
- M.J. Slobodien, Director Radiological Health and Safety

Management Review Team Conclusions

A) The performance demonstrated by some members of the Emergency Response Organization was weak.

B) The emergency preparedness process for developing, validating, controlling, and critiquing the exercise scenarios and ERO performance requires a more systematic and rigorous approach.

C) Management expectations for support of the Emergency Preparedness program to achieve excellent performance must be clearly defined, clearly communicated, and continuously reinforced as indicated by the following weaknesses:

- Inadequate resources were applied to scenario development and validation. Management failed to detect this.
- Changes in ERO staffing and the reduction in experience level in the Emergency Preparedness organization may have contributed to some performance weaknesses. Management oversight and involvement was not sufficient
- Management did not take adequate actions to ensure completion of and continued attention to previously identified corrective action needs

Long Term Corrective Actions

- Reinforce management expectations for Emergency Preparedness program support e.g.
  - Number of resources devoted to EP program
  - Qualifications of personnel assigned to the ERO
  - Direct management involvement in evaluations of the EP program, and participation in EP drills and exercises to verify ERO member proficiency
- Perform Emergency Preparedness program benchmark study against known high quality performers
- Evaluate ERO training against benchmark plants

- Routinely use ERO for multi-disciplined scenario development, validation, observation, and performance assessment
- Bring offsite emergency dose calculation software into conformance with GPUN software configuration control procedures
- Utilize external resources to supplement self assessments and internal QA audit efforts

Conclusions

- The full participation biennial emergency preparedness exercise of march 5, 1997 revealed weaknesses in the following areas:
  - Scenario development, validation, and exercise control and performance assessment
  - Emergency Response Organization knowledge particularly in technical support and other analytical areas
  - Adequacy of GPUN management attention to the TMI emergency preparedness program
  - Internal self assessments of the quality of the emergency preparedness program

- Adequacy of the emergency preparedness program oversight by management including communication of expectations
- Prompt remedial actions have been taken to ensure effectiveness of the Emergency Preparedness program
- Long term management actions will ensure the on-going effectiveness of the Emergency Preparedness program
- The lessons learned from the recent efforts are being applied to the Oyster Creek Nuclear Generating Station emergency preparedness program

Response to:

Confirmatory Action Letter 1-97-011

May 28, 1997

by Jeff Grisewood

Emergency Preparedness Manager, TMI

GPU NUCLEAR

Confirmatory Action Letter

Item #1

Initiated immediate corrective actions to address the Biennial Exercise weaknesses and conducted training for the entire Emergency Response Organization.

Item #1

- ✔ Conducted Emergency Action Level training for all key positions
- ✔ Improved Primary to Secondary leakrate calculation methods
- ✔ Re-assessed technical staffing and made appropriate reassignments
- ✔ Modified procedures to ensure consideration of the Protective Action Recommendation process outside the 10-mile radius
- ✔ Conducted Emergency Response Facility coaching drills

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Confirmatory Action Letter

Item #2

Performed a root cause analysis.

- ✔ Used Human Performance Investigation Process
- ✔ Identified root causes associated with specific weaknesses and other Emergency Preparedness related issues
- ✔ Conducted a management review of the root cause analysis
- ✔ Presented results to the NRC at a public meeting on April 30, 1997

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Confirmatory Action Letter

Item #3

Conducted a remedial onsite exercise on May 13, 1997.

- ✔ Used a multi-discipline team to develop, validate, and evaluate the exercise
- ✔ Concluded that the corrective actions were effective

Confirmatory Action Letter

Item #4

Discussed proposed corrective actions in a formal exit meeting with the NRC Staff on March 17, 1997.

Confirmatory Action Letter

Item #5

Provided GPUN's view on the significance of the exercise weaknesses and why the corrective actions would be effective.

Conclusion