

I. APPENDIX A ITEMS

- Item 2A

Deficiency

Develop and implement a formal training program and schedules for corporate and offsite agency support personnel including health physics training for fire department and ambulance personnel. (Section 3.2)
(331/81-03-02)

Both the training program and implementation shall be completed by February 1, 1982.

Evaluation

The Inspectors reviewed the licensee's training program for corporate personnel and offsite agency support personnel. Examined were lesson plans, individual training records, written exams, and training schedules. In particular the inspectors reviewed the health physics training for the Palo Fire Department and Palo Ambulance Service. It was determined that the training was sufficiently formalized to adequately train corporate and offsite agency personnel. This item is closed.

- Item 2B

Deficiency

Provide specific training to emergency response personnel on what to expect under unusual plant conditions, such as components and areas with high radiation levels, magnitudes of radiation increases, and changed nuclide

composition. Include specific training for health physics technicians on plume monitoring techniques. (Section 3.2) (331/81-03-03)

Both the training program and implementation shall be completed by February 1, 1982.

Evaluation

EPIP 3.2 "Offsite Radiological Monitoring" and the Radiation Protection Procedures (RPP) were reviewed. Revisions appear to address the deficiency noted above.

Three Health Physics Technicians were interviewed with regard to their emergency responsibilities. All HP Techs indicated they had received a training course on mitigating core damage in November 1981. This course provided information on expected radiation levels in the plant during specific accident situations. All HP Techs interviewed also were knowledgeable in offsite monitoring techniques and their emergency duties-onshift and offshift.

Based on the above review, the licensee has responded adequately to this deficiency. The item is considered closed.

- Item 4G

Deficiency

Develop procedures for use by the Control Room Coordinator, Site Radiation Protection Engineer (SRPE), and Radiological Assessment Coordinator (RAC) to ensure that operational and radiological assessment parameters will be collected, recorded, and trend analysis performed. The procedures used by the SRPE shall include the prioritization of sampling vs. survey activities for inplant and onsite survey teams. Procedures shall also be developed to

allow the RAC and SRPE to determine whether PAGs may be exceeded by a potential release and to assess the offsite consequences due to an actual release. (Section 5.4.2) (331/81-03-12)

This shall be completed by February 1, 1982.

Evaluation

EPIP 2.2, "Activation and Operation of the Technical Support Center" and EPIP 5.3, "Radiological Assessment Procedure" were reviewed. Revisions to these procedures appear to address the concern regarding collecting, recording, and trending of operational and radiological assessment parameters during an emergency.

The licensee has not adequately developed a procedure to allow the Site Radiation Protection Coordinator and Radiological Assessment Coordinator to determine whether PAGs may be exceeded by a potential release. In other words, the licensee does not have a procedure for calculating offsite doses based on plant conditions. Much of the information necessary for inclusion in this procedure already exists such as Figures I-1 to I-4 in the Emergency Plan (p. I-15 to I-18) which can be used to estimate the total amount of activity available for release from containment based on high range containment monitor readings and time after shutdown. During dose assessment walk-throughs, when asked to calculate offsite doses based on containment monitor readings, one of the Site Radiation Protection Coordinators was aware of Figures I-1 through I-4 but did not know how to obtain a release rate and perform a dose calculation using them.

A procedure and associated training is needed in this area. The licensee is aware of the problem and has committed to developing a procedure

to relate containment radiation monitor readings to offsite doses (p. I-8 of Emergency Plan). This item is still open.

- Item 4H

- Deficiency

- Develop a technically accurate dose assessment procedure using the finite plume model for elevated releases and a dose assessment procedure for ground level releases. (Section 5.4.2) (331/81-03-13)

- The ground level release procedure shall be completed by October 28, 1981 and the finite plume model completed by December 14, 1981.

- Evaluation

- An interactive computer code has been developed to perform dose calculations. Technology for Emergency Corporation (Knoxville, TN) developed the code and provided the licensee with documentation. The code uses a straight-line Gaussian model for atmospheric dispersion, semi-infinite plume model for calculating doses from ground-level releases, and a finite plume model for elevated release dose calculations. The finite plume model is a numerical integration technique which considers dose from plume shine. Models used in the code appear to be technically accurate based on a review of the documentation.

- Computerized dose calculations can be made in the Control Room, TSC, and EOF. Should the computer system be inoperable, the licensee will rely on the manual calculation methods described in EPIP 3.3a (Initial Dose Projections) and EPIP 3.3b (Follow-up Dose Projections). Currently, the licensee is

revising procedures to allow input of data from their new high range effluent monitoring system. These revisions will be complete prior to startup.

Walkthroughs with one Radiological Protection Coordinator and two Site Radiation Protection Coordinators indicated an effective use of the computerized dose assessment method, and the ability to make timely protective action recommendations. Those interviewed noted that the manual backup methods would be time consuming (on the order of 30 minutes) to complete EPIP 3.3b.

Based on the above review, the licensee has responded adequately to this deficiency. The item is considered closed, however, the following items should be considered for improvement:

- Develop a simpler, less time consuming manual method for a backup. This could include the use of isopleths developed from the models currently used.
- Develop a procedure covering all aspects of dose assessment. This could include a description of the computer code and its use, a discussion of how to calculate offsite doses based on plant conditions, and a discussion of the use of the backup dose calculation method.

- Item 4I
Deficiency

Review, and revise as necessary, the Radiation Protection Procedures to be used during an emergency to include precautions, limitations, and guidance necessary under accident conditions, i.e., effects of elevated levels of noble

gases on measurement of radioiodine, potential for evolution of radioactive gases from liquid samples, effect of infusion of radioactive gases into ion chamber dose rate instruments, etc. (Section 5.4.3.1) (331/81-03-14)

This shall be completed by February 1, 1982.

Evaluation

The inspector reviewed EPIP 4.4, "Protective Action Guides and Exposure Limits," to determine if the procedure provided information concerning precautions, limitations, and guidance necessary for accident conditions. EPIP 4.4, Attachments 1 through 7 provided guidelines and criteria for protective actions against radiological hazards to onsite personnel, emergency workers, and the population at risk.

The inspector determined that the EPIP 4.4 attachments provided adequate information concerning precautions, limitations, and guidance necessary under accident conditions.

Based on the above findings, this portion of the licensee's program is acceptable. This item is closed.

- Item 4K

Deficiency

EPIP 1.2 shall be revised to include: notification of the Emergency Response and Recovery Director, full activation of the onsite organization for any Alert or greater classification, and planned messages to offsite agencies including all information specified in Criterion II.E.3 of NUREG-0654,

Revision 1. Messages shall include a recommendation on whether or not to activate the prompt notification system. (Section 5.4.1) (331/81-03-16)

This shall be completed by October 28, 1981.

Evaluation

The inspector reviewed Revision 2 of EPIP 1.2 to determine if the necessary changes were included to satisfy Appendix A, Item 4K. The procedure had been modified to clearly identify the following requirements: (1) notification of the Emergency Response and Recovery Director, (2) full activation of the onsite organizations for Alert or greater classification was included in paragraph 4.2, (3) planned messages to offsite agencies, which also included a recommendation on whether or not to activate the prompt notification system, was included as a part of the Initial Notification Message, Attachment 1.

A walkthrough was conducted with an Operations Shift Supervisor. The inspector determined that by following revised procedure EPIP 1.2, the necessary notification and classifications were performed efficiently.

Based on the above findings, this portion of the licensee's program is acceptable. This item is closed.

II. APPENDIX B ITEMS

- Item 1

Deficiency

The Technical Support Center (TSC) should be placed in operational state of readiness. The exact location for each individual who reports to the TSC should be easily identified, and should be included in the Duane Arnold Energy Center (DAEC) Emergency Plan and appropriate implementing procedure (EPIP 2.2). The use of the TSC for permanent office space should be in accordance with the licensee's submittal of January 3, 1980 (Section 4.1.1.2).

Evaluation

The licensee has identified locations for key individuals who report to the TSC. A map indicating these locations is found in the Emergency Plan (Figure H-2, p. H-16) and in EPIP 2.2 (Attachment 4, p. 17).

The licensee's response is adequate. This item is closed.

- Item 10

Deficiency

The Emergency Coordinator and his alternates should be trained in the availability of the portable chlorine concentration sampler and the conditions under which it should be used to determine EALs. (Section 4.2.1.3).

Evaluation

DAEC has eliminated the use of chlorine gas onsite for routine chlorination of plant service water. This item is closed.

- Item 11

Deficiency

The turbine building exhaust flow monitor should be properly labeled and the procedure should be changed to ensure proper flow units are recorded. (Section 4.1.1.7)

Evaluation

This item refers to the interim system and is no longer applicable as the permanent high-range effluent monitoring system will be fully operational prior to startup from the current outage. This item is closed.

- Item 12

Deficiency

Fire Brigade leadership should be under the direction of a Senior Reactor Operator (SRO). The Security Shift Supervisor should be relieved of this responsibility by July of 1982, when minimum shift staffing will include two SROs. (Section 5.4.8)

Evaluation

The B-operation Shift Supervisor (equivalent to SRO) is now the Fire Brigade Leader. This is included in the Fire Plan. This item is closed.

- Item 15

Deficiency

Telephones in the TSC and Control Room should be located in areas where assigned functions are to be implemented. (Section 5.6)

Evaluation

The licensee has located phones in the TSC and Control Room in areas where assigned functions are to be implemented. EPIP 2.2 (Attachment 3) shows locations of phones in the TSC.

The licensee's response is adequate. This item is closed.

- Item 21

Deficiency

The licensee should develop procedures for the onsite administration of, and establish supplies of, radio-protective drugs and include action levels for use, storage locations, and control. (Section 4.1.2.2)

Evaluation

The licensee has written EPIP 4.5 (Administration of Potassium Iodide) to address the concerns in Item 21. Sufficient supplies of KI were found in the OSC (first-aid facility). The licensee's response is adequate. This item is closed.

- Item 22

Deficiency

The licensee should establish specific assignments for functions required for radiation protection during emergencies not defined in the existing emergency plan; i.e., dosimetry, access control, etc. (Section 5.4.3.1)

Evaluation

EPIP 1.2 "Notification of the Emergency Response Organization and Offsite Agencies," under Notification List No. 2, was modified to include a dosimetry clerk.

EPIP 2.1 "Activation and Operation of the Operation Support Center," paragraph 4.7.3 was modified to include the Access Control Foreman's duties. This item is closed.

- Item 33

Deficiency

Radwaste sampling equipment should be obtained and procedures developed for handling elevated radwaste samples under accident conditions. (Sections 4.1.1.8 and 5.4.2.10)

Evaluation

The licensee has written a procedure in draft form on this subject. This procedure will undergo the necessary approvals and be included as a PASAP (Post Accident Sampling and Analysis Procedure). The licensee indicated that additional sampling equipment was unnecessary. This item is closed.

- Item 43

Deficiency

The remote switch for the high range noble gas scale should be properly labeled. (Section 4.1.1.7)

Evaluation

This item refers to the interim effluent monitoring system and is no longer applicable as the permanent system will be fully operational prior to startup from the current outage. This item is closed.

- Item 51

Deficiency

A procedure should be provided to assure the operability of emergency kit equipment and periodic replacement of limited life items such as batteries. (Section 5.5.1)

Evaluation

The licensee revised EPIP 6.3 (Maintenance of Emergency Facilities, Equipment and Supplies) to address the concerns listed above. This item is closed.

- Item 52

Deficiency

Face masks of emergency respirators should be bagged to maintain cleanliness and retard deterioration. (Section 4.2.1.1)

Evaluation

A spot check of emergency kits indicated emergency respirators were bagged. This item is closed.

• Item 53

Deficiency

A system should be provided to inform and assure the respirator user that the respirator has been inspected and surveyed. (Section 4.2.1.i)

Evaluation

The licensee informs workers at respirator training sessions that bagged respirators have been inspected and surveyed and are suitable for use. This item is closed.

III. APPENDIX D ITEMS

- Item 3

Deficiency

Installation and testing of the post-accident primary coolant and containment atmosphere sampling system is required. (Sections 4.1.1.5 and 4.1.1.6) (331/81-03-36)

Evaluation

The inspector reviewed and evaluated the Post-Accident Sampling System (PASS). The PASS is an approved General Electric system designed to remotely obtain highly radioactive gas, liquid, and particulate samples from the reactor primary coolant and containment atmosphere.

Installation of the PASS hardware and preliminary testing of the various sampling capabilities were initiated by the licensee. Seven Chemistry Technicians have been trained to operate the PASS and some Rad-Waste Technicians are scheduled for training prior to reactor startup.

Post-Accident Sampling and Analysis Procedures (PASAP) 2.1, 2.2, 2.3, 2.4 and 2.5 were prepared to provide detailed instructions for collecting the various highly radioactive samples. Each procedure also includes a sample data sheet for recording the required data. Silver zeolite filters were used.

Based on the above findings, this portion of the licensee's program is acceptable. This item is closed.

- Item 4

Deficiency

Installation and testing of the post-accident gas, particulate, and radioiodine effluent sampling system is required. (Section 4.1.1.7)
(331/81-03-37)

Evaluation

The licensee's permanent high range effluent monitoring system was evaluated. The following documentation was reviewed: Section I.2.2.1 of the emergency plan, PASAP 5.0, "High/Intermediate Range Detector Source Calibration," and PASAP 6.0 "Operating Procedure for the Kaman High Range Effluent Monitoring System."

The system consists of 10 monitor units located in pairs at the turbine building vent stack, the three reactor building vent stacks, and the offgas stack. Each pair consists of a normal range monitor (1×10^{-7} to 3×10^{-1} $\mu\text{Ci/cc}$) and a high range monitor (5×10^{-2} to 1×10^5 $\mu\text{Ci/cc}$). The normal range monitor uses a β scintillation detector while the high range monitor consists of two Geiger-Mueller detectors. A microcomputer provides control over each monitor and converts pulse inputs into counts per minute and $\mu\text{Ci/cc}$. The system readouts are located in the Control Room and the Chemistry Lab.

All system components have been installed and calibrations completed. Initial calibrations were conducted by the vendor. Annual calibrations will be performed by the licensee using procedure PASAP 5.0.

The licensee indicated the system would be fully operational (all necessary approvals obtained) prior to startup from the current refueling outage. Based on the above review, the licensee has adequately responded to this item. The item is closed.

- Item 5

Deficiency

Installation, calibration, and development of EALs for the high range containment radiation monitor is required. (Section 4.2.1.2) (331/81-03-38)

Evaluation

The licensee's high range containment monitoring system was evaluated. The following documentation was reviewed: Section I.2.2.2 of the emergency plan, PASAP 1.0 "Radiation Calibration of Containment High Range Radiation Monitors Using Gamma Ray Source," and PASAP 7.2 "Containment High Range Radiation Monitors."

The system consists of four ion chambers, two located in the torus area and two located inside the drywell. Detectors have a range of 1 to 10^7 R/hr with readout in the Control Room

All detectors have been installed and calibrations complete. Electronic calibrations and radiation calibrations were performed initially. The licensee plans on doing annual calibrations in the future.

The licensee has included an EAL based on containment monitor readings in the July 1982 revision of the Emergency Plan. In addition, PASAP 7.3 provides

guidance on determining whether fuel failure has occurred, based on high range containment monitor readings.

The licensee indicated the system will be fully operational prior to startup from the current refueling outage. Based on the above review, the licensee has adequately responded to this item. The item is considered closed.

- Item 6

- Deficiency

- Procedures must be developed and training conducted in regard to the sampling and analysis of post-accident reactor coolant, station effluents, and containment atmosphere using the systems described in Sections 4.1.1.5 through 4.1.1.7. (Sections 5.4.2.4 through 5.4.2.9) (331/81-03-39)

- Evaluation

- The licensee has developed the following procedures regarding post-accident sampling and the high-range effluent monitoring system: PASAP 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 5.0, and 6.0. The procedures cover system operations, sample collection methods, analytical methods, and calibration methods.

- A review of training records indicated most training had been completed in this area. Presently, radwaste personnel are being trained in post-accident sampling techniques to allow coverage on backshifts. All training will be completed prior to startup from the current outage.

- Based on the above review, the licensee has adequately responded to this item. The item is closed.