

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Report: 50-313/82-38
50-368/82-28

License: DPR-51
NPF-6

Docket 50-313
50-368

Licensee: Arkansas Power and Light Company (AP&L)
P. O. Box 551
Little Rock, AR 72203

Facility Name: Arkansas Nuclear One (ANO), Units 1 and 2

Inspection at: Russellville, AR

Inspection Conducted: October 4-8, 1982

Inspectors: *Ronald Baer* 12/17/82
Ronald Baer, Radiation Specialist Date

Wesley Le Holley 12/17/82
Wesley Holley, Radiation Specialist Date

Approved by: *Blaine Murray* 12/17/82
Blaine Murray, Chief, Facilities Radiation Date
Protection Section

Inspection Summary

Inspection on October 4-8, 1982 (Reports 50-313/82-3a and 50-368/82-28)

Areas Inspected: Routine, unannounced inspection of the licensee's radiation protection program during refueling operations including: procedures; advanced planning and preparations; training; exposure control; posting and control; surveys; notifications and reports; audits; ALARA; and NUREG 0737 items. The inspection involved 82 hours onsite by two NRC inspectors.

Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

- *J. M. Levine, General Manager, ANO
- *T. C. Baker, Technical Analysis Superintendent
- *M. J. Bolanis, Health Physics Superintendent
- C. Burchard, Health Physics Supervisor
- *L. J. Dugger, Manager, Special Projects
- M. Durst, Administrative Technical Support Training Supervisor
- *E. C. Ewing, Manager, Engineering & Technical Support
- G. Fiser, Radiochemistry Supervisor
- M. Frala, Assistant Radiochemistry Supervisor
- R. Green, Alara Support Supervisor
- W. Hada, Health Physics Supervisor
- D. Helm, Alara Engineer
- *L. W. Humphrey, Administrative Manager
- I. Mosquito, General Employee Trainer
- T. Nichols, Health Physics Supervisor
- R. Poole, Assistant Radiochemistry Supervisor
- T. Rolniak, Alara Specialist
- D. R. Russell, Electrical Engineer
- *L. W. Schempp, Manager, Nuclear Quality Control
- D. Wagner, Lead Health Physics Supervisor
- *L. J. Callan, Senior Resident Reactor Inspector, USNRC

The NRC inspectors also interviewed several other licensee and contractor employees including health physics, administrative, and maintenance personnel.

*Denotes those present at the exit interview October 8, 1982.

2. Licensee Action on Previous Inspection Findings

(Closed) Open Item (368/8122-02): Health Physics Department Job Descriptions - This item was discussed in NRC Inspection Report 50-368/81-22 and involved the lack of job/position descriptions for health physics personnel. The licensee had developed a position description for the health physics superintendent, position number 0331; health physics supervisor, position number 0334; health physics specialist, five levels, position numbers 0237.1-5; and a general description for health physics technicians. Health physics technicians are designated either apprentice (two levels) or grade 1-3. A "Confidential Memorandum," dated September 15, 1981, defines the requirements for each technician classification. This item is considered closed.

(Closed) Open Item (313/8020-04 and 368/8020-04): Health Physics Shift Coverage - This item was discussed in NRC Health Physics Appraisal Reports 50-313/8020 and 50-368/8020, and required by NUREG 0654, Table B-1, "Minimum Staffing Requirements for NRC Licensees for Nuclear Power Plant Emergencies." The licensee initiated health physics shift coverage on August 30, 1982, with two health physics technicians, one ANSI 18.1 qualified, per shift. This item is considered closed.

(Closed) Open Item (313/8107-02): Respirator User Qualitative Fit Test - This item was discussed in NRC Inspection Report 50-313/81-07 and involved the lack of plant procedures requiring the use of a challenging atmosphere to provide a qualitative fit test prior to each use. The licensee had revised procedure 1000.32, "Respiratory Protection Manual," to require a qualitative fit test prior to each use. Personnel receive instruction on qualitative fit testing in training course AG-10070-001, "Respiratory Protection Training." This item is considered closed.

(Closed) Open Item (313/8107-01): Correlation of Airborne Radioactivity Surveys to SWP/RWP's - This item was discussed in NRC Inspection Report 50-313/81-07 and involved the lack of documentation of information to correlate airborne radioactivity surveys to SWP/RWP's. The licensee revised the airborne radioactivity survey data form to include information for the SWP/RWP being supported and specific location information. In addition, the licensee has initiated a cross-check log which records survey results and SWP/RWP requirements. This item is considered closed.

(Closed) Violation (313/7722-01): Failure to Adhere to Radiological Control Procedure Requirements - This item was identified in NRC Inspection Report 50-313/77-22, and involved five contractor workers who did not wear respirators as required by the SWP. The licensee revised the health physics indoctrination training program and implemented a quiz to determine the individuals' comprehension of material presented. Additionally, the licensee presently has incorporated a practical factors training segment where individuals are required to demonstrate knowledge of material presented in the health physics indoctrination training. This item is considered closed.

(Closed) Violation (313/7801-01): Bioassay Results Reporting - This item was identified in NRC Inspection Report 50-313/78-01 and involved radiation exposure termination reports for individuals which did not include bioassay (whole body) results. The licensee has revised their procedure for recording terminating employees and the termination letter to include HP Form 129, "Record of Individual Whole Body Count." This item is considered closed.

(Closed) Violation (313/7801-02): Forwarding of Bioassay Reports to Employees - This item was identified in NRC Inspection Report 50-313/78-01 and involved radiation exposure termination reports not being sent out

within the required time. The licensee has transferred recordkeeping functions to the administrative support staff, which had been instructed as to when to terminate personnel. This item is considered closed.

(Closed) Violation (313/7814-04): Terminated Employees Exposure Reporting - This item was identified in NRC Inspection Report 50-313/78-14 and involved failure to provide reports of personnel exposure on termination of employment or work. The licensee sent reports to the individuals identified. To prevent recurrence the employee checkout sheet is routed through, the records clerk. This item is considered closed.

(Closed) Violation (313/8109-01 and 368/8109-01): Radiation Survey Records - This item was identified in NRC Inspection Report 50-313/81-09 and 50-368/81-09 and involved the failure to document a radiation survey made on March 9, 1981, of the Unit 1 gas decay tank enclosure. The licensee performed and documented a radiation survey of the Unit 1 gas decay tank enclosure on March 12, 1981. This radiation survey indicated a general area level of 10 to 30 millirem per hour (mRem/hr) around tank T-17; a hot spot of 400 mRem/hr was identified on the bottom of the tank. Tanks T-16 and T-18 A-D were less than 2 mRem/hr. This item is considered closed.

(Closed) Open Item (313/8221-01 and 368/8218-01): Surveys - This item was discussed in NRC Inspection Report 50-313/82-21 and 50-368/82-18, and involved the documentation of airborne radioactivity survey and beta radiation surveys. The licensee has initiated a cross check log which documents both airborne survey results and SWP/RWP requirements and provides the health physics technicians with guidance on performing beta radiation surveys in contaminated areas. This item is considered closed.

(Closed) Open Item (313/8221-02 and 368/8218-02): Radiation Protection Instrument Control - This item was discussed in NRC Inspection Report 50-313/82-21 and 50-368/82-18, and involves the designation of an individual to be responsible for the control of storage, issue, and return of health physics instruments during the offshifts. The licensee initiated offshift coverage with two health physics technicians, a senior level, and junior level, on duty at all times. The junior level technician has been assigned the responsibility for performance of response checks, control of storage, and issuance of health physics instruments. This item is considered closed.

(Closed) Open Item (313/8214-22 and 368/8211-22): Radiation Qualification of Safety-Related Equipment - This item was discussed in NRC Inspection Report 50-313/82-14 and 50-368/82-11 and involved the review by NRC regional inspectors of the radiation qualifications of the safety-related equipment discussed in NUREG 0737, Item II.B.2. A memorandum (see paragraph 13.a.(1)(c)) states the USNRC Regions do not have review responsibility for this portion of NUREG 0737, Item II.B.2. This item is considered closed.

(Closed) Open Item (313/8214-10 and 368/8211-10): Agreement to Perform Analysis on Backup Grab Samples - This item was identified in NRC Inspection Report 50-313/82-14 and 50-368/82-11, and involved the contract that the licensee had made with Oak Ridge National Laboratory to perform the radiochemistry analysis of backup grab samples made during an emergency situation. The NRC inspectors reviewed the agreement and found it adequate. This item is considered closed.

(Closed) Open Item (313/8214-21 and 368/8211-21): Ventilation Exhaust System of the PASS Facility - This item was discussed in NRC Inspection Report 50-313/82-14 and 50-368/82-11 and involved an incomplete review by the NRC inspectors of the ventilation exhaust system for the PASS facility. During the current inspection the NRC inspectors completed the review of this item and determined that the PASS facility's ventilation exhaust system was filtered properly. This item is considered closed.

(Closed) Open Item (313/8214-19 and 368/8211-19): Preoperational Calibration of Containment High-Range Radiation Monitors - This item was discussed in NRC Inspection Report 50-313/82-14 and 50-368/82-11 and involved the lack of documentation to determine if these monitors had initially been calibrated adequately. During this inspection, the NRC inspectors determined that preoperational calibration was performed properly. This item is considered closed.

(Closed) Open Item (313/8214-14 and 368/8211-14): ANO Unit 2 Containment High-Range Radiation Monitor Locations - This item was identified in NRC Inspection Report 50-313/82-14 and 50-368/82-11, and involved the inability of the licensee to find the necessary documents that described the location of the containment high-range radiation monitors in Unit 2. The licensee produced the necessary drawings, and the NRC inspectors visually inspected the monitors' locations during a refueling outage. This item is considered closed.

(Closed) Open Item (313/8214-15 and 368/8211-15): Design and Qualification Criteria of Containment High-Range Radiation Monitors - This item was identified in NRC Inspection Report 50-313/82-14 and 50-368/82-11, and involved the inability of the licensee to find the necessary documents that would demonstrate the monitors meet required design and qualification criteria. During this inspection the licensee produced the necessary documentation for the NRC inspectors to verify that these monitors meet the design and qualification criteria as set forth in NUREG 0737, Item II.F.1, Attachment 3. This item is considered closed.

(Closed) Open Item (313/8214)/(368/8211)-(20): ANO NUREG 0737 Management Responsibility Assignment - This item was identified in NRC Inspection Report 50-313/82-14 and 50-368/82-11, and involved the lack of assigned responsibility within the licensee's organization for NUREG 0737 items. During the current inspection, the NRC inspectors determined that the responsibility for NUREG 0737 items had been assigned to a specific individual. This item is considered closed.

(Open) Open Item (368/8122-01): Health Physics Department Personnel Training - This item was discussed in NRC Inspection Report 50-368/81-22, and involved the initial training and retraining program for station health physics personnel. The licensee conducted a training program on health physics procedures for health physics technicians which was completed on August 31, 1981. The training and counseling department developed and initiated a training course on health physics system training in August 1982. This course involves 80 classroom hours and has been presented to 12 technicians. A formal initial training and retraining program, Procedure 1063.14, Revision 0, has been approved. The licensee has not developed a long-range training schedule or frequency for retraining. This item is considered open pending completion of the training schedule and frequency for retraining.

3. Radiation Protection Procedures

The NRC inspectors reviewed the implementation of licensee procedures relating to maintenance and refueling activities. The licensee had experienced problems with Radiation Work Permits (RWP); personnel occasionally failed to correctly sign an RWP or signed the wrong RWP. The health physics department was aware of the problem and working on corrective measures.

The NRC inspectors noted that the record radiation survey data on the RWP did not indicate the date the survey was performed or the radiation levels specified stating the type of radiation measured. The licensee's representative stated they would review this and incorporate additional information with the RWP.

No violations or deviations were identified.

4. Advanced Planning and Preparations

a. Health Physics Staffing

The licensee's health physics organization for the refueling outage is depicted in Figure 1. The station staff of 35 health physics technicians were augmented by 34 contractor-supplied health physics technicians. Station supervisory personnel provided overview of contractor-supplied personnel.

The NRC inspectors reviewed the resumes, training records, and test results of 28 of the 34 contractor-supplied health physics technicians.

b. Instruments, Equipment and Supplies

The NRC inspectors made observations in the field, and interviewed licensee representatives to verify that a sufficient quantity of instruments, equipment, and supplies were available to support the outage.

No violations or deviations were identified.

5. Training

An NRC inspector attended selected portions of the radiation worker training program provided to employees, supplemental work force personnel, and contractor-supplied personnel, and reviewed the program against the requirements of 10 CFR 19.12, "Instructions to Workers." The licensee had initiated a "Practical Factors" training session during the outage which requires personnel to sign on an RWP; properly suit up, including respiratory protective equipment; remove all protective equipment; and perform a body frisk for radioactive contamination.

One of the radiologically significant activities during this refueling outage involved steam generator entries incident to eddy current testing, tube cutting, and plugging operations. Vendor personnel involved with steam generator activities were specifically trained onsite with a mockup. Health physics personnel also received special training involving this activity.

No violations or deviations were identified.

6. Exposure Control

a. External

All personnel entering the radiologically controlled area (RCA) were routinely issued a thermoluminescent dosimeter (TLD) and self-reading

dosimeter (SRD). These devices were assigned to individuals to comply with the requirements of 10 CFR Part 20.202(a). Additional dosimetric devices, such as high range SRD's or extremity TLD's, may be required in certain areas such as the steam generators, or as specified on a radiation work permit (RWP).

The licensee administratively limits radiation exposures to 1250 millirem (mRem) per calendar quarter. Authorization to exceed this limit is granted after the licensee has a current Form NRC-4 for the individual, as required by 10 CFR Part 20.102. The licensee limits radiation exposures to 300 mRem per week; authorization by managerial personnel is required to exceed this limit. The inspectors examined Forms NRC-4 for 11 individuals. Eight had received authorization to receive exposures in excess of 300 mRem per week, none had exceeded the 1250 mRem per calendar quarter limit. The appropriate "Authorization for Increased Exposure," Form 1622.011A, was examined for adherence to the requirements of Procedure 1622.011, "Exposure Limits and Monitoring Techniques."

b. Internal

The NRC inspectors reviewed the calibration of the whole body counter (WBC). The licensee was in the process of completing the calibration procedure. The licensee had calibrated the WBC at 1 percent and 10 percent of the maximum permissible organ burden (MPOB) for the radioisotopes of Iodine-131, Cobalt 58, Cobalt 60, and Manganese 54. The licensee had not calibrated above 10 percent MPOB because of the availability of standards with sufficient activity levels. The licensee planned to order radioisotope standards which would enable calibrations to be performed in the range of 100 percent MPOB.

The NRC inspectors reviewed the licensee's respiratory protection program. The program included requirements for medical certification and individual man-fit testing in a corn oil aerosol test booth. Individuals were allowed to use only those respirators for which they had passed the man-fit test. A service representative from Mine Safety Appliance Company trained personnel responsible for examining and performing maintenance on respirators.

No violations or deviations were identified.

7. Posting and Control

The NRC inspectors examined posting and control of radiation areas, high radiation areas, contaminated areas, and radioactive material areas

against the requirements of 10 CFR Parts 20.203 and 20.207, and the following plant procedures developed in accordance with Technical Specification 6.11.

1612.002, Access and Control of RCA's

1612.008, Special Requirements for High Radiation Areas

1622.003, Radiological Posting and Entry Requirements

1622.008, Marking and Handling of Radioactive Materials and Equipment

Several tours of the entire facility, including the RCA, were conducted. Radiation work permits were reviewed against licensee surveys and independent measurements made by the inspectors to determine whether they afforded an adequate level of protection to workers. Workers were observed for adherence to procedures and RWP requirements.

No violations or deviations were identified.

8. Radioactive and Contaminated Material Control

Radioactive material labeling and identification were examined against the requirements of 10 CFR Part 20.203(f). The NRC inspectors observed the licensee's control of contaminated tools and equipment during the outage. The licensee required that tools and equipment be surveyed by health physics personnel prior to release to uncontrolled areas. Within the RCA, several areas were dedicated to storage of radioactive tools, equipment, and components. Containers were marked with labels that identified the radioactive contents.

No violations or deviations were identified.

9. Surveys

The NRC inspectors reviewed licensee radiation, contamination, and airborne radioactivity surveys to determine compliance with 10 CFR Parts 20.103, 20.201, and 20.401. Selected radiation and contamination surveys for the period September 1 through October 4, 1982, were examined. The licensee had increased the number of beta radiation surveys over previously recorded surveys. Airborne radioactivity surveys were examined for the period September 16 through October 4, 1982. These surveys indicated the RWP number when they were performed to support an RWP.

No violations or deviations were identified.

10. Notifications and Reports

The NRC inspectors' review of select reports to individuals and to NRC pursuant to requirements of 10 CFR 19.13, 20.407, 20.408, and 20.409, did not identify any errors or omissions involving termination reports or other reports to any individual. Reports included bioassay information as required by Procedure 1622.012, "Personnel Exposure Records."

No violations or deviations were identified.

11. Audits

The NRC inspectors reviewed the inhouse quality assurance audit performed during the period May 7 through June 12, 1982, in accordance with Procedure QAP-3, "Health Physics." Procedure QAP-3 includes a listing of elements of the health physics program to be audited and the criteria for these elements. The inhouse audit team members did not include an individual with health physics experience. The inspectors also reviewed the audit performed during the period of July 13 through 23, 1982, by the corporate health physicist. The corporate audit included personnel dosimetry, whole body counting, internal dose calculations, radiological air sampling, and steam generator entries.

No violations or deviatons were identified.

12. ALARA

The NRC inspectors reviewed the licensee's ALARA program. The licensee has set goals for reduction of radiation exposures, surface contamination, personnel contamination incidents, respirator usage, noncompactible radioactive waste, and compactible radioactive waste during 1982. ALARA personnel are actively involved in planning and scheduling of maintenance activities during the refueling outage. All work functions are evaluated and jobs which are estimated to require an expenditure of greater than one man-rem receive an ALARA review. The licensee tracks both man-rem expended on each work function and the manhours required to complete the work, when the man-rem expended exceeds the estimated exposure by 50 percent, the work function is reevaluated to determine the cause of the increased exposure.

The ALARA engineer prepares a quarterly ALARA report to inform station management of progress toward attaining goals.

The NRC inspectors noted that the licensee implemented a comprehensive ALARA program.

No violations or deviations were identified.

13. NUREG 0737, Clarification of TMI Action Plan Requirements

The NRC inspectors reviewed the licensee's progress in addressing the open items concerning the post-TMI requirements contained in NUREG 0737. The open items were initially identified in Inspection Report 50-313/82-14 and 50-368/82-11.

The open items relate to the following NUREG 0737 items:

Item II.B.2, "Design Review of Plant Shielding and Environmental Qualification of Equipment for Spaces/Systems which may be used in Postaccident Operation."

Item II.B.3, "Postaccident Sampling Capability."

Item II.F.1, "Additional Accident Monitoring Instrumentation."

Attachment 2, "Sampling and Analysis of Plant Effluents."

Attachment 3, "Containment High-Range Radiation Monitor."

Item III.D.3.4, "Control Room Habitability Requirements."

a. Item II.B.2, "Design Review of Plant Shielding and Environmental Qualifications of Equipment for Spaces/Systems which may used in Postaccident Operations"

(1) Documents Reviewed

Memorandum, September 1, 1982, to R. A. Clark, Chief, Operating Reactor Branch Number 3 from E. Tourigny, Lead PM, Plant Shielding Modifications.

(2) Discussion

The open items in Report 50-313/82-14 and 50-368/82-11 concerning NUREG 0737, Item II.B.2 dealt with the projected dose rates in the control room and the radiation qualification of safety-related equipment. NUREG 0737 states, "Any area which will or may require occupancy to permit an operator to

aid in the mitigation of or recovery from an accident is designated as a vital area. The control room, technical support center (TSC), sampling station, and sample analysis area must be included among those areas where access is considered vital after an accident. As a minimum, necessary modifications must be sufficient to provide for vital system operation and for occupancy of the control room, technical support center, sampling station, and sample analysis area. The design dose rate for personnel in a vital area should be such that the guidelines of GDC 19 will not be exceeded during the course of the accident."

In areas requiring continuous full-time occupancy during the course of an accident, the dose equivalent rate must be less than 15 mRem/h (averaged over 30 days).

(3) Conclusion

The NRC inspectors determined that dose rate calculations had not been made for the control room when the letdown and seal return systems are isolated and considered the main contributors to the dose rate. This item (313/8214)/(368/8211)-(08) remains open.

In Enclosure 4 of the memorandum, see paragraph 13.a.(1)(c), it is stated that the USNRC Regions do not have equipment qualification review responsibility for Item II.B.2 of NUREG 0737. Therefore, item (313/8214)/(368/8211)-(22) is considered closed.

b. Item II.B.3, "Postaccident Sampling Capability"

(1) Documents Reviewed

- (a) Drawing M2152 (Bechtel Corporation), "Heating Ventilating and Air Conditioning Postaccident Sampling Facility Air Flow Diagram"
- (b) Drawing M2269, sheet 3, Rev. N6, "Heating Ventilation and Air Condition Postaccident Sampling Facility Control Diagrams"

- (c) Letter, February 17, 1981, to J. E. Carr (Oak Ridge National Laboratory) from J. W. Griffin (ANO)
- (d) USDOE Materials and Services Order, O-010-A, January 6, 1981, agreement number ERD-81-116.

(2) Discussion

NUREG 0737 requires the licensee to establish an onsite radiological and chemical analysis capability to provide, within a 3-hour time frame, quantification of certain radionuclides in the reactor coolant, and containment atmosphere that may be indicators of the degree of core damage. Also, the quantification of dissolved gases and chloride, and boron concentration of liquids is required.

If inline monitoring is used for any of the sampling and analytical capability, the license shall provide backup sampling through grab samples and shall demonstrate the capability of analyzing the samples. Established planning for backup sampling shall be capable of providing at least one sample per day for seven days following onset of the accident and at least one sample per week until the accident condition no longer exists.

The ventiation exhaust from the PASS facility should be filtered with charcoal adsorbers and high-efficiency particulate in filters.

(3) Conclusion

The NRC inspectors reviewed the status of the postaccident sampling system (PASS) and the gaseous effluent radiation monitoring system (GERMS). It was determined that PASS is still not operational because the chloride sampling probes were not functioning properly and were being redesigned. The system is not able to give a valid measurement for boron below 100 ppm. The GERMS is still experiencing software problems in its computer system. Therefore, the open item (313/8214)/(368/8211)-(09) remains open pending:

- . PASS operational problems solved with the sampling and analysis of boron and chloride in the reactor coolant.
- . Solution of software problems in GERMS computer system.

The NRC inspectors reviewed the agreement that the licensee had made with Oak Ridge National Laboratory to analyze the backup grab samples in the event of an emergency situation which made the licensee's radiochemistry analytical facilities inoperative. The open item (313/8214)/(368/8211)-(10) is, therefore, considered closed.

The NRC inspectors reviewed the ventilation exhaust system of the PASS facility and determined that it was filtered properly. The filter system in the direction of flow consisted of a prefilter, HEPA, charcoal bed (4 inches thick), and HEPA filter. Therefore, the open item (313/8214)/(368/8211)-(21) is considered closed.

c. Item II.F.1, "Additional Accident Monitoring Instrumentation"

(1) Attachment 2, "Sampling and Analysis of Plant Effluents"

(a) Documents Reviewed

- i. Letter, September 26, 1980, to J. R. Marshall (ANO) from H. G. Sommer (Bechtel Power Corp.)
- ii. Letter, January 14, 1981, to R. Herd (Eberline Instrument Corp.) from H.G. Sommer (Bechtel Power Corp.)
- iii. Eberline Instrument Corporation, Normal Range Radiation Monitor (GERMS), "Typical Probe and Nozzle Details," SK-B1747, DCP-200, 11406-J2407AC-24-1
- iv. Drawing Number 11120-803, "NRRM Fuel Handling, Unit 2, Containment Purge Unit 1 and 2"

(b) Discussion

NUREG 0737 states that the sampling system design shall be such that plant personnel could remove samples, replace sampling media and transport the samples to the onsite analysis facility with radiation exposures that are not in excess of the criteria of GDC 19 of 5-rem whole-body exposure and 75 rem to the extremities during the duration of the accident.

The design of the systems for the sampling of particulates and iodines should provide for sample nozzle entry velocities which are approximately isokinetic (same velocity) with expected induct or instack air velocities. For

accident conditions, sampling may be complicated by a reduction in stack or vent effluent velocities to below design levels, making it necessary to substantially reduce sampler intake flow rates to achieve the isokinetic condition. Reductions in air flow may well be beyond the capability of available sampler flow controllers to maintain isokinetic conditions; therefore, the NRC staff will accept flow control devices which have the capability of maintaining isokinetic conditions with variations in stack or duct design flow velocity of ± 20 percent. Further departure from the isokinetic condition need not be considered in the design.

Effluent streams which may contain air with entrained water, e.g., air ejector discharge, shall have provisions to ensure that the adsorber is not degraded while providing a representative sample, e.g., heaters.

(c) Conclusion

The NRC inspectors reviewed the procedures of the filter and cartridge removal, subsequent replacement in the SPING and transport of these to the radiochemistry laboratory for analysis to determine if plant personnel dose would not be in excess of the GDC 19 criteria in an accident situation. The procedures appeared to be adequate to meet the GDC 19 criteria, but the licensee has not completely written these procedures; therefore, open item (313/8214)/(368/8211)-(18) will remain open pending the completion of the written procedures.

The NRC inspectors reviewed the sampling of particulate and iodines and determined that the sampling was done isokinetically. The licensee's sampling system was ordered before the issuance of NUREG 0737; therefore, no consideration was given to designing the system so that isokinetic conditions could be maintained to ± 20 percent flow velocity of sampled air. Because this is required by NUREG 0737, open item (313/8214)/(368/8211)-(12) will remain open pending the modification of the sampling system.

The Units 1 and 2 emergency penetration room sampling lines have experienced moisture in the sampled air which has degraded the charcoal cartridges. The NRC inspectors found that the moisture is originating with the hydrogen purge system which is dumping moisture in the sampled air stream.

The licensee indicated that the hydrogen purge system would be undergoing modification to correct this problem. Open item (313/8214)/(368/8211)-(13) will remain open pending the alleviation of moisture in this sampling system.

(2) Attachment 3, "Containment High-Range Radiation Monitor"

(a) Documents Reviewed

- i. Drawing No. E-2874, "Conduit and Tray Layout Containment Building," Area 25, EL.357'
- ii. Drawing No. E-2878, "Conduit and Tray Layout Containment Building," Area 25, EL.426'6"
- iii. Drawing No. M-2655, "Radiation Zoning and Access Control Plan at EL.404'"
- iv. Drawing No. M-2652, "Radiation Zoning and Access Control Plan at EL.354'"
- v. General Atomic E-254-960, "Test Report Class I Design Qualification Testing of Analog High Range Radiation Monitor," December 15, 1980
- vi. General Atomic E-255-978, "Energy Response Test and Dose Rate Calibration of Model RD-23 High-Range Radiation Monitor Detector," May 1981, (ANO File No. 11406-J-2401 AC-21-2)
- vii. ANO I&C Periodic Tests 1304.133 Rev. 0, "Containment High-Range Radiation Monitor"
- viii. ANO I&C Periodic Tests 2304.133 Rev. 0, "Containment High-Range Radiation Monitor"

(b) Discussion

The following are some of the stipulations required by NUREG 0737 for the Containment High-Range Radiation Monitors:

REQUIREMENT - The capability to detect and measure the radiation level within the reactor containment during and following an accident.

RANGE - 1 rad/hr to 10^8 rads/hr (beta and gamma) or alternatively 1 R/hr to 10^7 R/hr (gamma only).

- RESPONSE - 60keV to 3MeV photons, with linear energy response \pm 20 percent) for photons of 0.1 MeV to 3 MeV. Instruments must be accurate enough to provide usable information
- REDUNDANT - A minimum of two physically separated monitors (i.e., monitoring widely separated spaces within containment).
- SPECIAL CALIBRATION - In situ calibration by electronic signal substitution is acceptable for all range decades above 10R/hr. In situ calibration for at least one decade below 10 R/hr shall be by means of calibrated radiation source. The original laboratory calibration is not an acceptable position due to the possible differences after in situ installation.
- SPECIAL ENVIRONMENTAL QUALIFICATIONS - Calibrate and type-test representative specimens of detectors at sufficient points to demonstrate linearity through all scales up to 1 E+06 R/hr. Prior to initial use, certify calibration of each detector for at least one point per decade of range between 1 R/hr and 1 E+03 R/hr.

(c) Conclusions

The NRC inspectors determined that General Atomic Corporation source calibrated the Containment High-Range Radiation Monitors at their facility prior to installation at 1 R/h, 10 R/h, and E+06 R/h. The licensee calibrated the monitors after installation at 1 R/h and 10 R/h using a Cs-137 source and performed an electronic response test at 100 R/h, E+04 R/h and E+06 R/h. Although these monitors were not calibrated at the E+03 R/h points as stipulated by NUREG 0737, enough points over the instrument range were checked to demonstrate linearity; therefore, the NRC inspectors consider open item (313/8214)/(368/8211)-(19) to be closed.

The NRC inspectors reviewed plant drawings and also observed physically the locations of the two Containment High-Range Radiation Monitors in ANO Unit 2 containment. These monitors were determined to be located in positions that will provide

a reasonable assessment of radiation conditions in containment during an accident situations. Therefore, the open item (313/8214)/(368/8211)-(14) is considered closed.

The design and qualification criteria of the licensee's Containment High-Range Radiation Monitors were reviewed by the NRC inspectors and determined to adequately meet the criteria of NUREG 0737, which requires these monitors to function in an accident environment. The open item (313/8214)/(368/8211)-(15) is considered closed.

It was determined by the NRC inspectors that the Containment High-Range Radiation Monitors could detect 60 keV gamma radiation and the linear energy response of ± 20 percent from 100 keV to 3 MeV gamma radiation. This meets the energy response requirement of NUREG 0737; therefore, open item (313/8214)/(368/8211)-(16) is considered closed.

With the closing of the previous open items, this NUREG Item II.F.1, attachment 3 is considered closed.

d. Item III.D.3.4., "Control Room Habitability Requirements"

(1) Documents Reviewed

(a) Letter, March 13, 1981, to D. G. Eisenhunt (USNRC) from D. C. Trimble (ANO)

(2) Discussion

NUREG 0737 requires for this item that the licensees shall submit the results of their findings from the accident-analysis, as well as the basis for these findings.

(3) Conclusion

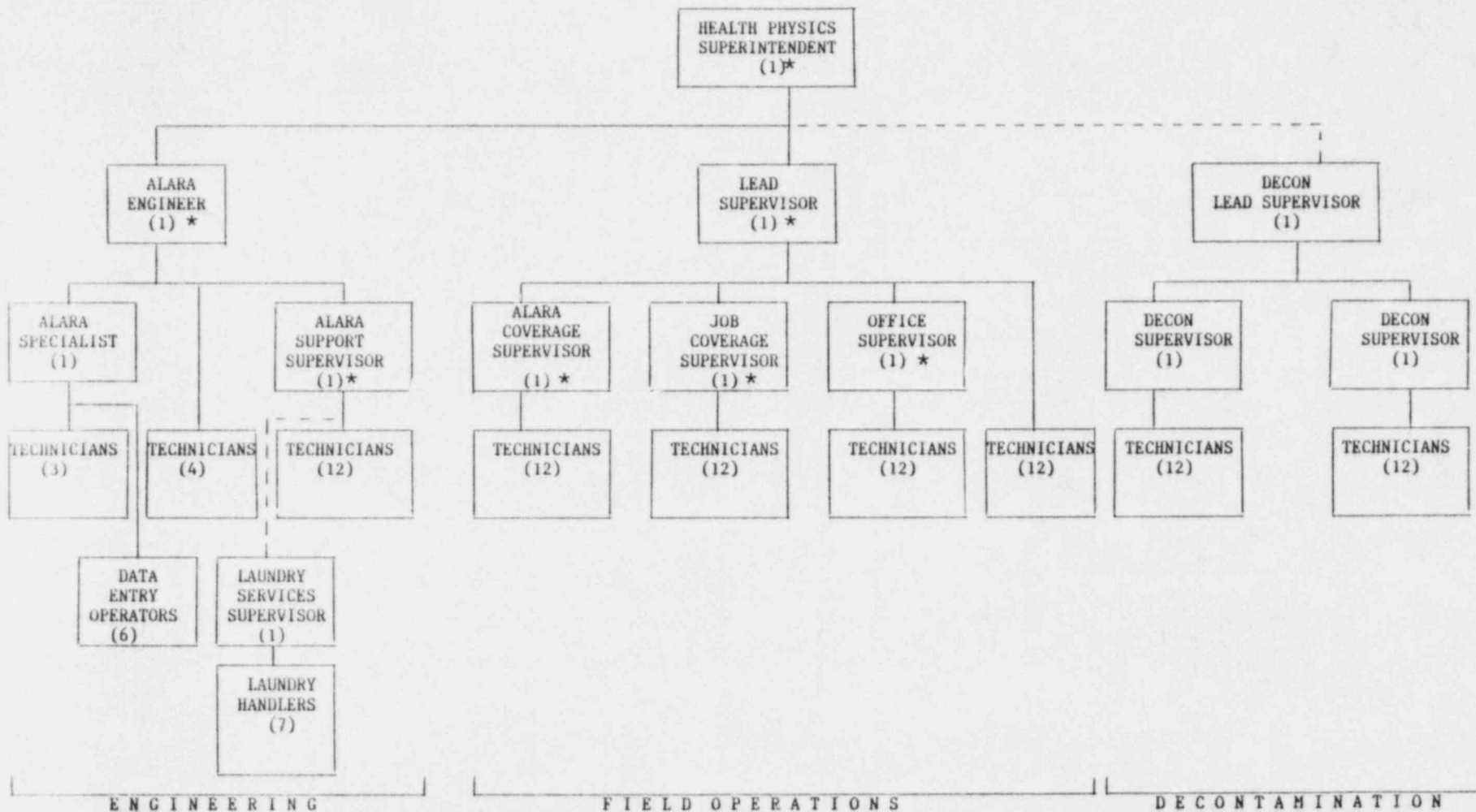
The licensee has provided the basis for an accident-analysis, but has not made an analysis, given any results, or made an evaluation. Therefore, open item (313/8214)/(368/8211)-(17) will continue to remain open pending completion of the necessary evaluation.

The NRC inspectors determined that Mr. Dan Howard, the Unit 2 Lead Licensing Engineer, is the responsible management individual for the NUREG 0737 items at ANO. This results in the open item (313/8214)/(368/8211)-(20) being closed.

14. Exit Interview

The NRC inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on October 8, 1982. The inspectors summarized the scope and findings of the inspection as presented in this report.

FIGURE 1



ANO HEALTH PHYSICS ORGANIZATION
(OUTAGE CONDITIONS)

() Indicates Manning

* Indicates ANO Supervisors

BAER RONALD E.

INSPECTOR'S REPORT
 Office of Inspection and Enforcement

REVIEWER

B. MURPHY

INSPECTORS

W. HOLLEY

LICENSEE/VENDOR	TRANSACTION TYPE	DOCKET NO. (8 digits) OR LICENSE NO. (BY PRODUCT) (13 digits)	REPORT		NEXT INSP. DATE	
			NO.	SEQ.	MO.	YR.
	I - INSERT	05000368	8228	A		
	M - MODIFY			B		
	D - DELETE			C		
	R - REPLACE			D		

PERIOD OF INVESTIGATION/INSPECTION						INSPECTION PERFORMED BY		ORGANIZATION CODE OF REGION/HQ CONDUCTING ACTIVITY (See IEMC 0530 Manpower Reporting - Weekly Manpower Reporting for code)		
FROM			TO			1 - REGIONAL OFFICE STAFF	OTHER	REGION	DIVISION	BRANCH
MO.	DAY	YR.	MO.	DAY	YR.	2 - RESIDENT INSPECTOR				
10	09	82	10	09	82	3 - PERFORMANCE APPRAISAL TEAM		4	B	A

REGIONAL ACTION (Check one box only)		TYPE OF ACTIVITY CONDUCTED (Check one box only)				
<input checked="" type="checkbox"/> 1 - NRC FORM 591	<input checked="" type="checkbox"/> 2 - REGIONAL OFFICE LETTER	<input checked="" type="checkbox"/> 02 - SAFETY	03 - INCIDENT	04 - ENFORCEMENT	05 - MGMT. AUDIT	06 - MGMT. VISIT
		07 - SPECIAL	08 - VENDOR	09 - MAT. ACCT.	10 - PLANT SEC.	11 - INVENT. VER.
					12 - SHIPMENT/EXPORT	13 - IMPORT
					14 - INQUIRY	15 - INVESTIGATION

INSPECTION/INVESTIGATION FINDINGS (Check one box only)				TOTAL NUMBER OF VIOLATIONS AND DEVIATIONS	ENFORCEMENT CONFERENCE HELD	REPORT CONTAIN 2790 INFORMATION	LETTER OR REPORT TRANSMITTAL DATE										
A	B	C	D	A	B	C	D	A	B	C	D	MO.	DAY	YR.	MO.	DAY	YR.
<input checked="" type="checkbox"/>				0	0												

MODULE INFORMATION												MODULE INFORMATION													
REC. ORD.	MODULE NUMBER INSP.				PRIORITY	DIRECT INSPEC. EFFORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL	REC. ORD.	MODULE NUMBER INSP.				PRIORITY	DIRECT INSPEC. EFFORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL
B	583	745	18	A	15	190						B	583	740	18	A	10								
				B												B									
				C												C									
				D												D									
B	592	706	18	A	12							B	583	741	18	A	15								
				B												B									
				C												C									
				D												D									
B	530	703	18	A	12											A									
				B												B									
				C												C									
				D												D									
B	525	549	18	A	28											A									
				B												B									
				C												C									
				D												D									

* CIRCLE SEQUENCE IF VIOLATION OR DEVIATION