

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

IE Inspection Report No. 50-313/78-14

License No. DPR-51

Licensee: Arkansas Power and Light Company
Sixth and Pine Streets
Pine Bluff, Arkansas

Docket No. 50-313

Facility: Arkansas Nuclear One, Unit 1 (ANO-1)

Location: Russellville, Arkansas

Inspection Conducted: August 14-18, 1978

Inspector: *Blaine Murray* 9/13/78
Blaine Murray, Radiation Specialist Date

Approved by: *Glen D. Brown* 9/13/78
Glen D. Brown, Chief, Fuel Facility and Date
Material Safety Branch

Inspection Summary

Inspection on August 14-18, 1978 (Report No. 50-313/78-14)

Areas Inspected: Routine unannounced inspection of the licensee's: (1) radiation protection; (2) analytical measurements programs including the radiation protection organization; licensee audits; radiological protection procedures; instruments and equipment; exposure control; posting, labeling and control; surveys; radioactive shipments; notification and reports; and confirmatory measurement results. The inspection involved thirty-four (34) on-site hours by one NRC inspector.

Results: Four (4) items of noncompliance (Infractions: (1) failure to control high radiation areas. See paragraph 9.a; (2) improper radioactive shipment. See paragraph 12. Deficiencies: (1) failure to label radioactive material container. See paragraph 9.b; (2) failure to furnish termination exposure reports. See paragraph 11.) and one unresolved item (See paragraph 15.) were identified.

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DETAILS

1. Persons Contacted (AP&L)

- *L. Alexander, QA Supervisor
- J. L. Bates, Radiochemistry Supervisor
- *R. G. Carrol, Health Physics Supervisor
- *C. H. Halbert, Technical Support Engineer
- *G. H. Miller, Plant Manager
- *M. M. Nichols, Assistant Health Physics Supervisor
- *C. S. Petzel, Licensing
- D. Trimble, Training Coordinator

*Denotes those present during exit interview.

2. Scope of Inspection

The purpose of this inspection was to review the licensee's radiation protection and analytical measurement programs for the period April 1, 1978, through August 16, 1978.

3. Radiation Protection Organization

The inspector reviewed the licensee's radiation protection organization to determine compliance the Technical Specifications and FSAR commitments. Three (3) Health Physics Technicians have been recently added to the staff. The present staff consists of 10 technicians to handle activities at both units.

No items of noncompliance or deviations were noted.

4. Licensee Audits

The inspector examined audits performed by the licensee to determine compliance with Technical Specification 6.5.2. The plant QA staff had performed audits of Health Physics activities on the following dates:

April 25 - May 1, 1978
January 5 and 6, 1978
August 11-15, 1978

A licensee representative stated that the Safety Review Committee (SRC) had performed an audit during July 1978. Copies of the SRC audit had not been distributed at the time of this inspection.

It was noted that timely corrective action was completed for those items identified in the licensee's audits.

No items of noncompliance or deviations were noted.

5. Radiological Training

The inspector examined the licensee's training program to determine compliance with 10 CFR 19.12 and FSAR requirements. The following areas were reviewed:

- Scope and content of training
- Initial training
- Refresher training
- Training of contractor personnel
- Documentation of training

Training records were examined for four (4) new AP&L employees, thirteen (13) contract personnel, and twenty-one (21) permanent plant employees.

No items of noncompliance or deviations were noted.

6. Radiological Protection Procedures

The inspector reviewed changes made to radiological protection procedures to determine if the changes were consistent with Technical Specification requirements. It was noted that several changes have been made since the previous inspection. All changes were properly reviewed and approved.

No items of noncompliance or deviations were identified.

7. Instruments and Equipment

The inspector examined monitoring instruments and equipment to verify that they are operable, have the proper alarm setting and are calibrated in accordance with procedures and Technical Specification requirements. The following types of equipment and instruments were examined:

- Portable survey instruments
- Fixed monitoring equipment (e.g. portal monitors, friskers, hand and foot counters)
- constant air monitors
- Portable air monitors
- Pocket dosimeters

- Personnel TLDs
- Area radiation monitors

No items of noncompliance or deviations were identified.

8. Exposure Control

The inspector reviewed selected records for permanent plant employees, transient workers, visitors, and terminated personnel to determine compliance with 10 CFR 20 and Reg. Guide 8.14.

The licensee uses NTA film and track etch dosimeters for personnel neutron monitoring. However, the energies of the neutrons in the plant have not been established. As a result, it has not been determined if the licensee's present monitoring program will satisfy Reg. Guide 8.14.

A licensee representative stated that an evaluation of neutron energies will be performed. Based on the evaluation results, it maybe necessary to update or supplement their present system. This item is considered unresolved pending the evaluation of the neutron energies. See paragraph 15.

9. Posting and Control

The inspector made several visits to selected plant areas to observe work activities and general plant conditions. Specific attention was given to the following items:

- Special Work Permit (SWP) and Radiation Work Permit (RWP) areas
- Housekeeping
- Visitor control
- Access control for restricted areas
- Identification and control of high radiation areas
- Identification and control of contaminated areas
- Radioactive materials storage areas
- Laundry facilities
- Health physics counting room
- First aid supplies
- Radioactive waste handling and storage areas
- Independent measurements made by the inspector

The above visits included a review of the licensee's program to determine compliance with the following requirements:

- 10 CFR 19
- 10 CFR 20

- SWP/RWP requirements
- Technical Specifications

The following items were noted:

- a. During a tour of the radwaste drumming room on August 16, 1978, the inspector identified whole body radiation levels up to 3 Rem/hr near two (2) spent resin shipping casks. A "Caution - High Radiation Area" sign was posted near the casks; however, the entrance to the drumming room was not under direct surveillance, equipped with a control device or locked.

Failure to control entrance to the high radiation area is an apparent item of noncompliance against 10 CFR 20.203(c)(2).

- b. Container Labelling

While reviewing the licensee's sealed source program, the inspector noted that a 39 mCi ^{137}Cs source, serial number 28S, used to response test the ANO-2 process monitors was not properly labelled. The source container did not bear the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL," activity, isotope, or date of assay.

Failure to properly label the source container is considered an apparent item of noncompliance against 10 CFR 20.203(f)(2).

10. Surveys

The inspector reviewed the license's survey program to determine compliance with plant procedures, 10 CFR 20.201, and 10 CFR 20.401(b).

No items of noncompliance or deviations were identified.

11. Notifications and Reports

The inspector review the licensee's records to determine compliance with the Technical Specifications and the following requirements:

- 10 CFR 19.13
- 10 CFR 20.402
- 10 CFR 20.403
- 10 CFR 20.405
- 10 CFR 20.408

The inspector reviewed the records for (12) AP&L employees that had terminated between August 1, 1977, and April 30, 1978. It was noted

that the required termination reports of personnel exposure for four (4) workers had not been furnished to the NRC or the individual.

Failure to furnish the required reports is considered an apparent item of noncompliance against 10 CFR 20.408 and 10 CFR 19.13(d).

12. Solid Radioactive Waste

The inspector examined the licensee's radioactive waste program to determine compliance with the Technical Specifications, Reg. Guide 1.21, and 10 CFR 71.

On May 12, 1978, RIV received notification from the State of South Carolina Department of Health that one of their licensees (Chem-Nuclear Systems, Inc., Barwell, South Carolina) had received a waste shipment containing liquid from ANO-1. The South Carolina representative stated the Chem-Nuclear's license prohibits the burial of liquid waste. The shipment consisted of nine (9) BIRM filters (TRI Nuclear Model DV-1490) identified by ANO-1 as shipment No. 23-78. The nine (9) filters had been banded together and shipped in a large Type B shipping cask. As the filters were being lifted from the shipping cask at the burial site, the bands broke causing the filters to drop. The inlet-outlet connections on one of the filters broke on impact causing the filter contents to be spilled. It was at this time that the filter was observed as containing about 3-5 gallons of liquid along with the spent resin. Further investigation revealed that the other eight (8) filters also contained liquid.

A BIRM filter, about the size of a household hot water heater, is a disposable demineralizer vessel used for clean-up processing of radioactively contaminated water. Collectively, the nine (9) filters contained about twelve (12) curies of transport group III material. The shipment, classified as LSA material, left ANO-1 via sole use vehicle on May 9, 1978. Prior to having the facility, the licensee certified that the shipment met DOT and 10 CFR 71 requirements.

In reviewing matters related to the shipment, the inspector noted the following items:

a. DOT Type 7A Containers

The filters had been certified as DOT Type 7A containers by the vendor, TRI Nuclear Corporation, on March 27, 1978. It was noted that the certification specified bronze head castings for the inlet-outlet connections. However, the filters in the May 9, 1978, shipment were fitted with plastic connections.

Failure to use the proper shipping container is an apparent item of noncompliance against 10 CFR 71.5.

b. Absorbent Material

In order to satisfy shipping requirements, the nine (9) filters were placed in a single Type B container (Certificate of Compliance No. 6144, Revision 2). Item 8 of the certificate No. 6144 states:

"Liquid contents must be additionally contained within an inner containment vessel which is surrounded by sufficient absorbent material to absorb at least twice the volume of the liquid contents."

The May 9, 1978, shipment did not have the specified absorbent material.

Failure to meet the required shipping conditions is an apparent item of noncompliance against 10 CFR 71.5.

c. Follow-up Corrective Action

The licensee's procedures specify that each spent filter is to be back-flushed prior to shipment for the purpose of removing any residual liquid. Apparently, the liquid contained in the filters was the result of improper back-flushing. The licensee's records indicated that the problems associated with the shipment were discussed with the burial facility, DOT, and the filter vendor. However, the inspector was unable to find evidence that any corrective action associated with back-flushing operations was discussed to prevent future problems. A licensee representative stated that this problem will receive proper attention.

13. Health Physics Logs

The inspector reviewed radiological activities documented in the licensee's Health Physics Logs for the period January 1, 1978, through August 16, 1978. It appears that the licensee does not have a well established procedure for entries in a routine H.P. Log or the documentation of Health Physics incidents. A licensee representative stated that a program will be developed for documenting Health Physics incidents and follow-up corrective action. This same matter was discussed in IE Inspection Report No. 50-313/78-01.

No items of noncompliance or deviations were identified.

14. Analytical Measurements

Confirmatory measurements were performed on the following samples:

- a. Liquid waste
- b. Gaseous waste
- c. Stack charcoal cartridge
- d. Stack particulate filter

Confirmatory measurement tests consist of comparing measurements made by the licensee and NRC's reference laboratory, Idaho Health Service Laboratory (IHSL). IHSL's measurements are referenced to the National Bureau of Standards by laboratory intercomparisons. Confirmatory measurements are only made for those nuclides identified by IHSL as being present in concentrations greater than 10% of the respective MPCs for liquid and gas samples and above the Lower Limit of Detection (LLD) for stack samples. Stack charcoal cartridge and particulate filter comparisons are based on established LLDs for total activity per sample.

Attachment No. 1 contains the criteria used to compare results.

Attachment No. 2 lists the LLDs for stack samples.

The following tables show the comparison results:

a. Liquid (Monitor Tank T-16, Collected April 27, 1978)

<u>Nuclide</u>	<u>NRC Measurement</u>	<u>Licensee Measurement</u>	<u>Decision</u>
⁵⁷ Co	1.3 ⁺ _{-0.34E-06} uCi/ml	1.05 ⁺ _{-0.14E-06} uCi/ml	Agreement
¹²⁵ Sb	1.2 ⁺ _{-0.2E-05} uCi/ml	1.08 ⁺ _{-0.05E-05} uCi/ml	Agreement
¹³⁴ Cs	1.6 ⁺ _{-0.11E-05} uCi/ml	1.42 ⁺ _{-0.03E-05} uCi/ml	Agreement
¹³⁷ Cs	2.7 ⁺ _{-0.13E-05} uCi/ml	2.41 ⁺ _{-0.02E-05} uCi/ml	Agreement
⁹⁵ Zr	6.4 ⁺ _{-1.3E-06} uCi/ml	4.76 ⁺ _{-0.36E-06} uCi/ml	Agreement
⁹⁵ Nb	5.7 ⁺ _{-0.7E-06} uCi/ml	7.56 ⁺ _{-0.2E-06} uCi/ml	Agreement
⁵⁸ Co	8.8 ⁺ _{-0.31E-05} uCi/ml	1.09 ⁺ _{-0.005E-04} uCi/ml	Agreement
⁵⁴ Mn	1.1 ⁺ _{-0.9E-05} uCi/ml	1.22 ⁺ _{-0.002E-05} uCi/ml	Agreement
⁵⁹ Fe	4.2 ⁺ _{-1.6E-06} uCi/ml	6.13 ⁺ _{-0.3E-06} uCi/ml	Agreement
⁶⁰ Co	5.6 ⁺ _{-0.22E-05} uCi/ml	7.66 ⁺ _{-0.04E-05} uCi/ml	Agreement
¹²⁴ Sb	1.6 ⁺ _{-0.57E-06} uCi/ml	2.14 ⁺ _{-0.14E-06} uCi/ml	Agreement
beta	9.0 ⁺ _{-0.3E-05} uCi/ml	1.2 ⁺ _{-0.05E-04} uCi/ml	Agreement
³ H	2.8 ⁺ _{-0.02E-03} uCi/ml	3.16 ⁺ _{-0.04E-03} uCi/ml	Agreement

b. Gaseous (Waste Gas Decay Tank, Collected April 27, 1978)

<u>Nuclide</u>	<u>NRC Measurement</u>	<u>Licensee Measurement</u>	<u>Decision</u>
^{133}Xe	$3^{+0.01E-02}$ uCi/cc	$5.75^{+0.003E-02}$ uCi/cc	Agreement
^{133m}Xe	$2.7^{+0.1E-03}$ uCi/cc	$1.45^{+0.01E-03}$ uCi/cc	Agreement
^{85}Kr	$4^{+0.02E-03}$ uCi/cc	$4.51^{+0.03E-03}$ uCi/cc	Agreement

c. Stack Charcoal Cartridge (Collected April 26, 1978)

<u>Nuclide</u>	<u>NRC Measurement</u>	<u>Licensee Measurement</u>	<u>Decision</u>
^{133}Xe	$3.6^{+0.14E-03}$ uCi/sample	$1.85^{+0.08E-03}$ uCi/sample	Agreement
^{131}I	$2.2^{+0.44E-04}$ uCi/sample	$3.9^{+0.3E-04}$ uCi/sample	Agreement
^{40}K	$3.3^{+0.34E-03}$ uCi/sample	$5.77^{+0.55E-03}$ uCi/sample	Agreement

d. Stack Particulate Filter

Concentration identified by IHSL were less than LLDs.

No items of noncompliance or deviations were identified.

15. Unresolved Item

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance or deviations. An unresolved item disclosed during this inspection is discussed in paragraph 8.

16. Exit Interview

At the conclusion of the inspection on August 18, 1978, the inspection findings were discussed with the individuals denoted in paragraph 1. The inspector reviewed the scope of the inspection and the inspection findings.

ATTACHMENT NO. 1

Criteria for Comparing Analytical Measurements

The following are the criteria used in comparing the results of capability tests and verification measurements. The criteria are based on an empirical relationship established through prior experience and this program's analytical requirements.

In these criteria, the judgement limits vary in relation to the comparison of the resolution.

$$\text{Resolution} = \frac{\text{NRC Value}}{\text{NRC Uncertainty}}$$

$$\text{Ratio} = \frac{\text{Licensee Value}}{\text{NRC Value}}$$

Comparisons are made by first determining the resolution and then reading across the same line to the corresponding ratio. The following table shows the acceptance values.

RESOLUTION	RATIO		
	Agreement	Possible Agreement A	Possible Agreement B
3	0.4 - 2.5	0.3 - 3.0	No comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is greater than 250 Kev.

Tritium analyses of liquid samples.

Iodine on adsorbers.

"B" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is less than 250 Kev.

⁸⁹Sr and ⁹⁰Sr Determinations.

Gross Beta where samples are counted on the same date using the same reference nuclide.

ATTACHMENT NO. 2

LLDs for Nuclides on Particulate and Charcoal Filters

<u>Nuclide</u>	<u>LLD (uCi/sample)</u>
51Cr	1E-04
54Mn	1.5E-05
58Co	1.5E-05
59Fe	3E-05
57Co	2E-05
60Co	3E-05
65Zn	3E-05
89Sr	1E-05
90Sr	2E-07
131I	2E-05
134Cs	2E-05
137Cs	2E-05
140Ba	2E-05
140La	4E-05
141Ce	2E-05
144Ce	1E-04