

U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

IE Inspection Report No. 50-313/76-04

Docket No. 50-313

Licensee: Arkansas Power and Light Company (AP&L)  
Sixth and Pine Streets  
Pine Bluff, Arkansas 71601

License No. DPR No. 51

Category: C

Facility: Arkansas Nuclear One (ANO-1)

Location: Russellville, Arkansas

Type of Licensee: PWR Power Reactor, 2568 Mwt

Type of Inspection: Routine, unannounced, emergency planning,  
analytical measurements

Dates of Inspection: March 3 and 4, 1976

Dates of Previous Radiological and Environmental  
Protection Inspection: October 28-30, 1975

Inspector: Blaine Murray  
Blaine Murray, Radiation Specialist

3/19/76  
Date

Accompanying Personnel: None

Reviewed By: J. B. Baird  
for Glen D. Brown, Chief  
Fuel Facility and Material Safety Branch

3/19/76  
Date

8004160346

SUMMARY OF FINDINGS

I. Enforcement Action

A. Items of Noncompliance Identified by the Inspector

None

B. Items of Noncompliance Identified by the Licensee

None

II. Licensee Action on Previously Identified Enforcement Matters

Calibration Control of Portable Survey Instruments

A procedure has been written and approved which establishes the calibration frequencies for portable survey instruments. This item is considered closed. (See DETAILS, paragraph C.1.)

III. New Unresolved Items

76/04-1 Stack Monitor

The procedure for determining stack releases during an emergency situation does not designate which stack monitor is to be used. (See DETAILS, paragraph D.5)

IV. Status of Previously Identified Unresolved Items <sup>1/</sup>

A. Environmental Surveillance

Four unresolved items, 75/13-1, 75/13-2, 75/13-3, and 75/13-4, involving environmental matters were identified in IE Inspection Report 50-313/75-13. The status of these items were not reviewed during this inspection. However, these items will be examined during the next environmental inspection.

B. 74/14-03 Radiation Levels in Reactor Containment

Corrective action related to radiation levels inside containment which exceed the design basis has not been completed. This item remains open. (See DETAILS, paragraph C.2.f.)

(continued)

<sup>1/</sup> IE Inspection Report No. 50-313/75-13

C. 75/01-1 Effluent Monitoring System Tests

The status of this item was not reviewed during this inspection. This item remains open. (See DETAILS, paragraph C.2.e.)

D. 75/05-1 Radiation Levels at the Restricted Area Fence

Survey procedures have been changed to include routine radiation measurements at the restricted area fence. This item is considered closed. (See DETAILS, paragraph C.2.a.)

E. 75/05-2 Air Sampler Flow Rates

Air sampler flow rates have not been established. This item remains open. (See DETAILS, paragraph C.2.b.)

F. 75/05-3 Whole Body Counter Calibration Procedures

Calibration procedures have not been completed for the whole body counting system. This item remains open. (See DETAILS, paragraph C.2.c.)

G. 75/05-5 Laboratory Counting Equipment Calibration Procedures

Calibration procedures have not been completed for laboratory counting equipment used to analyze health physics air and contamination surveys. This item remains open. (See DETAILS, paragraph C.2.d.)

V. Unusual Occurrences

None

VI. Other Significant Findings

None

VII. Management Interview

At the conclusion of the inspection, the inspection findings were discussed with the following AP&L personnel.

Mr. J. W. Anderson, Plant Superintendent  
Mr. C. H. Halbert, Technical Support Engineer  
Mr. R. G. Carrol, Health Physics Supervisor  
Mr. J. L. Bates, Radiochemist  
Mr. L. Alexander, QC Engineer  
Mr. H. Miller, Assistant Plant Superintendent

(continued)

The items discussed and the licensee's position with respect to these items, as applicable, follow:

A. Scope of Inspection

The inspector outlined the areas covered during the inspection.

B. Items of Noncompliance

The inspector stated that no items of noncompliance were identified.

C. Status of Previously Reported Unresolved Items

The licensee provided a status report on outstanding unresolved items. (See DETAILS, paragraph C.)

D. Stack Monitor

A licensee representative stated that the emergency procedures used to determine release concentration will be revised to specifically identify the proper stack monitor. (See DETAILS, paragraph D.5.)

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DETAILS

A. Persons Contacted

1. AP&L

Mr. J. W. Anderson, Plant Superintendent  
Mr. H. Miller, Assistant Plant Superintendent  
Mr. C. H. Halbert, Technical Support Engineer  
Mr. L. Alexander, QC Engineer  
Mr. R. G. Carrol, Health Physics Supervisor  
Mr. J. L. Bates, Radiochemist  
Mr. T. Green, Assistant Training Coordinator  
Mr. R. T. Elder, Assistant I&C Supervisor

2. St. Mary's Hospital, Russellville

D. C. Rains, Administrator

3. Arkansas Health Department

D. Snelling, Director, Radiological Control

4. Arkansas Highway Patrol, Clarksville

Capt. I. T. Bartlett

5. Pope County Sheriff

W. N. Abernathy

6. Russellville Fire Department

D. Sacrey, Fire Chief

B. Scope of Inspection

The purpose of this inspection was to observe the licensee's annual emergency drill.

C. Licensee Action on Previously Reported Items

1. Items of Noncompliance

Calibration Control of Portable Radiation Survey Instruments

This item was reported in IE Inspection Report No. 50-313/74-14 and involved the need for a procedure which will establish

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calibration frequencies for survey instruments. A procedure titled: H.P. 1602.06 "Calibration Frequencies (HP Instruments)" has been written and approved. This item is considered closed.

2. Unresolved Items

a. 75/05-1 Radiation Surveys at Restricted Area Fence

This item was reported in IE Inspection Report No. 50-313/75-05 and involved determining radiation levels at the restricted area fence as part of routine radiation survey procedures. It was noted that procedure H.P. 1602.17 titled: "Instrument Monitoring and Survey Procedure" has been modified to include measurement at the restricted area fence. This item is considered closed.

b. 75/05-2 Flow Rates for Air Samplers

This item was reported in IE Inspection Report No. 50-313/75-05 and involved the measurement of flow rates for air sampling equipment. A licensee representative stated that the necessary test equipment has been purchased but actual measurements have not been completed. This item remains open.

c. 75/05-3 Calibration Procedure for Whole Body Counter

This item was reported in IE Inspection Report No. 50-313/75-05 and involved the development of a written procedure for calibration of the whole body counting system. A licensee representative stated that a draft procedure has been written. The draft will be submitted for final approval in the future. This item remains open.

d. 75/05-5 Calibration Procedure for Laboratory Counting Equipment

This item was reported in IE Inspection Report 50-313/75-05 and involved the development of a written procedure for calibrating the laboratory counting equipment used to analyze health physics air and contamination surveys. A draft procedure has been written. This item remains open.

e. 75/01-1 Effluent Monitoring System Tests

This item was reported in RO Inspection Report 50-313/74-14 and involved the comparison of laboratory analyses versus

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corresponding liquid and gaseous effluent monitor indications. The status of this item was not reviewed during this inspection. This item remains open.

f. 74/14-3 Radiation Levels Inside Reactor Containment

This item was reported in RO Inspection Report No. 50-313/74-14 and involved radiation levels in containment which exceed design bases. A licensee representative stated that present plans are to correct this problem during the first refueling outage. This item remains open.

D. Emergency Planning

1. Facilities and Equipment

a. Emergency Kits Inventories

The inventory of equipment maintained in the emergency kits located at the Emergency Assembly Area, Emergency Control Center, the Control Room, Emergency Control Office, and Site Ambulance was examined. The inventory of equipment to be maintained in the various kits is listed in Appendix J. of the ANO-1 Emergency Plan. The general condition of the emergency kits is checked each month and a detailed inventory conducted each quarter. Inventories are conducted in accordance with procedure H.P. 1602.14 titled: "Inventory of Emergency Kits."

No discrepancies were noted.

b. Emergency Control Centers

The inspector visited the various emergency control centers identified in the Emergency Plan to verify that the specified equipment was available and operable.

No discrepancies were noted.

c. Emergency Communications Equipment

A list of available communications equipment appears in Section 4.4.6 and Appendix I of the Emergency Plan.

No discrepancies were noted.

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d. Changes in Emergency Equipment and Facilities

It was noted that the Emergency Plan had been amended since the last inspection. The licensee's records indicated that the amendments were reviewed and approved by the Plant Safety Committee. Copies of the amendments were sent to the appropriate support agencies.

2. Monitoring Instruments

a. Inventory

The instrumentation used to monitor radioactive releases was examined. The monitoring instrumentation consists of survey team equipment located in various emergency kits and the plant stack monitor.

Survey team equipment is located at the Emergency Control Center and Emergency Assembly Area. Each kit includes a GM type detector, a count rate meter, and a sample counting chamber.

The gross stack monitor includes a NaI detector, digital meter, and print chart recorder. The stack monitor read-out systems are located in the control room.

The inspector examined the various monitoring equipment and verified that the equipment was available and operable.

b. Calibration

(1) Survey Team Equipment

The survey team monitoring equipment located in the emergency kits are calibrated each quarter. The following procedures are involved:

<u>H.P. 1602.24</u>	"Portable Survey and Monitoring Instruments Operation"
<u>H.P. 1602.19</u>	"Air Monitoring with Portable Instruments"
<u>H.P. 1004.12</u>	"Operational Test Control"
<u>O.P. 1304.29</u>	"Portable Emergency Plant Radiation Instrument Monthly Check"

The licensee's records indicated that portable survey meters are calibrated at quarterly frequencies.

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(2) Gross Stack Monitor

Environmental Technical Specification 2.4.2.2 (Monitoring Requirements) requires that gas monitors be calibrated at least quarterly. The licensee's records indicated that RE-7400 was calibrated on the following dates:

March 17, 1975  
June 30, 1975

September 28, 1975  
December 18, 1975

The stack monitor is calibrated as per procedures 1304.26 titled: "Process Radiation Monitoring System Quarterly Calibration" and 1304.27 titled: "Process Radiation Monitoring System Annual Calibration."

(3) Other Gaseous and Liquid Monitors

In addition to reviewing RE-7400 records, the calibration record of other systems that monitor gaseous and liquid releases were also examined. The specific monitors examined were:

RE-7400	-	Gross Stack Monitor
RE-7400(S)	-	<sup>131</sup> I Stack Monitor
RE-1237	-	Fail Fuel
RE-2120	-	North Penetration Room Ventilation
RE-2130	-	South Penetration Room Ventilation
RE-2236	-	Intermediate Cooling Water Loop No. 2
RE-2237	-	Intermediate Cooling Water Loop No. 1
RE-2400	-	Reactor Coolant Leak
RE-3618	-	Discharge Flumes
RE-3632	-	Main Condenser
RE-3809	-	Decay Heat Loop No. 1
RE-3810	-	Decay Heat Loop No. 2
RE-3814	-	Service Water Loop No. 1
RE-3815	-	Service Water Loop No. 2
RE-4642	-	Liquid Rad. Waste
RE-4830	-	Gaseous Rad. Waste
RE-7441	-	H <sub>2</sub> Purge

The licensee's records indicated that all process monitors were calibrated at the same time using the same procedures as those listed in item D.2.b.(2) above.

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3. Medical

a. Treatment Facilities On-Site

The primary first aid room is located near ANO-2. First aid supplies are also available at selected locations within ANO-1.

b. Treatment Facilities Off-Site

The licensee has an agreement with St. Mary's Hospital, Russellville, to provide emergency medical treatment. The inventory of emergency supplies maintained at St. Mary's is listed in Appendix E of the Emergency Plan.

c. Qualified Physicians

A St. Mary's Hospital representative stated that the following physicians have received formal radiological emergency training

J. M. Carter, M.D.

K. O. New, M.D.

S. D. Teeter, M.D.

According to a hospital representative, all of the above physicians are presently on the St. Mary's staff.

d. Ambulance Service

The licensee maintains an ambulance at the site. An inventory of supplies and equipment to be maintained in the Ambulance Emergency Kit is listed in Appendix J-5 of the emergency plan.

No discrepancies were noted.

4. Training

Section 5 of the Emergency Plan outlines the emergency training requirements.

The licensee's records indicated that the required training was provided to new employees, emergency teams, and off-site agencies. The following chart shows dates when various training

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and/or coordinating activities were provided between July 1, 1975 and February 29, 1976.

Emergency Radiation Team	10/2/75
	2/26/76
Medical and Decontamination Team	9/16/75
	12/75
	2/24/76
Emergency Duty Coordinators	9/12/75
Yell County Sheriff & Civil Defense	6/10/75
Johnson County Sheriff & Civil Defense	9/10/75
Logan County Sheriff & Civil Defense	11/18/75
Pope Ambulance	2/24/76
State Police	11/18/75
St. Mary's Hospital	2/6/76
Arkansas OES	2/12/76

New ANO-1 employees receive an emergency plan briefing as part of their initial training indoctrination.

#### 5. Procedures

The following procedures associated with emergency planning were reviewed.

<u>H.P. 1602.14</u>	"Inventory of Emergency Kits"
<u>O.P. 1304.29</u>	"Portable Emergency Plant Radiation Instrument Monthly Check"
<u>H.P. 1602.24</u>	"Portable Survey and Monitoring Instrument Operation"
<u>H.P. 1602.19</u>	"Air Monitoring with Portable Instrument"
<u>H.P. 1004.12</u>	"Operational Test Control"
<u>E.P. 1202.34</u>	"Personnel Response and Accountability"
<u>O.P. 1304.26</u>	"Process Radiation Monitoring System Quarterly Calibration"
<u>O.P. 1304.27</u>	"Process Radiation Monitoring System Annual Calibration"
<u>H.P. 1202.37</u>	"Determining Magnitude of Release"

In reviewing procedure H.P. 1202.37, it was noted that the procedure does not specify whether data from the  $^{131}\text{I}$  monitor or the gross monitor are to be used when calculating stack releases. The  $^{131}\text{I}$  monitor is set to count only that activity appearing under the  $^{131}\text{I}$  photo peak (0.364 Mev.) whereas the gross monitor looks at gross activity (0-3 Mev.).

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A licensee representative stated that data appearing in procedure 1202.37 are based on gross activity results. According to a licensee representative procedure 1202.37 will be modified to specify that the gross monitor data should be used when calculating emergency stack releases.

E. Emergency Drills

1. March 3, 1976 Plant Evacuation

The inspector observed an emergency drill which was conducted on March 3, 1976.

a. Drill Conditions

The drill consisted of a plant evacuation and subsequent accountability for all personnel. The drill did not include any simulated radioactive releases or personnel injuries. The drill started at 15:31 hours and terminated at 16:04 hours.

b. Post Drill Critiques

Post drill critiques were held with off-site agencies on March 3, 1976 and ANO-1 observers on March 4, 1976.

(1). Off-Site Agencies

A critique was held with off-site agencies immediately following the drill on March 3, 1976. ANO-1 personnel reviewed the Emergency Plan and invited questions from any of the attending off-site agencies. Representatives from the following agencies were present.

Arkansas Health Department  
Arkansas OES  
Russellville Fire Department  
Pope County Sheriff  
Pope County OES  
Yell County Sheriff  
Yell County OES  
Johnson County Sheriff  
Johnson County OES  
Logan County Sheriff  
Logan County OES  
Millard-Henry Clinic  
St. Mary's Hospital  
University of Arkansas Medical Center  
Pope County Judge

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(2) ANO-1 Observers

A critique was held on March 4, 1976 for the four ANO-1 personnel that were assigned to observe the drill. Each of the observers reviewed the problems they noted during the drill.

A licensee representative stated comments received from the observers will be examined and emergency procedures changes made where necessary.

2. February 24, 1976 Medical Drill

The licensee's records indicated that a medical emergency drill was conducted on February 24, 1976. This drill involved transporting a contaminated accident victim from the plant to St. Mary's Hospital for treatment. A critique was held following the drill.

F. Coordination with Off-Site Agencies

The licensee's records indicated that the off-site support agencies listed in their Emergency Plan are contacted at least annually, either by phone or visit, for the purpose of reviewing and up-dating emergency procedures. The following items are routinely reviewed:

- Personnel Changes
- Phone Numbers
- Status of Written Agreement
- Emergency Plan Changes

The inspector contacted the following agencies:

- Arkansas State Department of Health
- Arkansas Highway Patrol
- Pope County Sheriff
- St. Mary's Hospital
- Russellville Fire Department

Representatives from each of the above agencies stated the ANO-1 had contacted them during the past year.

G. Analytical Measurements

Verification measurements were performed on the following samples:

1. Liquid Waste
2. Gaseous Waste
3. Stack Particulate Filter
4. Stack Charcoal Cartridge

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The verification tests consist of comparing measurements made by the licensee and NRC's reference laboratory, Idaho Health and Safety Laboratory (IHSL). IHSL's measurements are referenced to the National Bureau of Standards by laboratory intercomparisons. Verification comparisons are only made for those nuclides identified by IHSL as being present in concentrations greater than 10% of the respective MPC's for liquid and gas samples. Stack charcoal and particulate filter comparisons are based on total activity per sample.

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

The following table shows the comparisons.

1. Liquid Waste - Monitor Tank T-16, Collected 10/29/75

<u>Nuclide</u>	<u>NRC Measurement</u>	<u>ANO-1 Measurement</u>	<u>Decision</u>
$^{131}\text{I}$	$9^+E-06$ uCi/ml	$1.09E-05$ uCi/ml	Agreement
$^{134}\text{Cs}$	$1.1+0.2E-06$ uCi/ml	$1.25E-06$ uCi/ml	Agreement
$^{137}\text{Cs}$	$1.37+0.05E-05$ uCi/ml	$1.17E-05$ uCi/ml	Agreement
$^{58}\text{Co}$	$3.6+0.1E-05$ uCi/ml	$3.8E-05$ uCi/ml	Agreement
$^{54}\text{Mn}$	$1.7+0.1E-06$ uCi/ml	$1.53E-06$ uCi/ml	Agreement
$^{110m}\text{Ag}$	$7.6+0.3E-06$ uCi/ml	$8.09E-06$ uCi/ml	Agreement
$^{59}\text{Fe}$	$1.89+0.08E-05$ uCi/ml	$1.81E-05$ uCi/ml	Agreement
$^{60}\text{Co}$	$2.5+0.2E-06$ uCi/ml	$2.17E-06$ uCi/ml	Agreement
beta	$2.28+0.6E-05$ uCi/ml	$4.6E-04$ uCi/ml	Disagreement
$^3\text{H}$	$7.04+0.02E-02$ uCi/ml	$7.32E-02$ uCi/ml	Agreement

2. Off-Gas, Tank T-18, Collected 10/29/75

<u>Nuclide</u>	<u>NRC Measurement</u>	<u>ANO-1 Measurement</u>	<u>Decision</u>
$^{133}\text{Xe}$	$5.3+0.2E-02$ uCi/ml	$6.39E-02$ uCi/ml	Agreement
$^{133m}\text{Xe}$	$4.9^+E-04$ uCi/ml	$1.97E-04$ uCi/ml	Disagreement

3. Charcoal Cartridge

Nuclide concentrations identified by IHSL were less than statistical reliability limits. No comparison made.

4. Particulate Filter

Nuclide concentrations identified by IHSL were less than statistical reliability limits. No comparison made.

ATTACHMENT NO. 1

Criteria for Comparing Analytical Measurements

The following is 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.

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

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

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		
	<u>Agreement</u>	<u>Possible Agreement A</u>	<u>Possible Agreement B</u>
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.

<sup>89</sup>Sr and <sup>90</sup>Sr Determinations.

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