

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Performance appraisal for the NRC/State of Arkansas Environmental
Monitoring Cooperative Agreement NRC-31-83-667

Facility Name: State of Arkansas Department of Health

Appraisal At: Little Rock, Arkansas

Appraisal Conducted: January 15-17, 1986

Appraisal Period: January 1 through December 31, 1984

Appraiser:

J. Blair Nicholas

Blair Nicholas, Senior Radiation Specialist
Facilities Radiological Protection Section

2/27/86
Date

Approved:

Blaine Murray

Blaine Murray, Chief, Facilities Radiological
Protection Section

2/27/86
Date

Appraisal Summary

Appraisal Conducted on January 15-17, 1986 (Report: 99990004/86-02)

Areas Appraised: Adherence to the requirements of the cooperative agreement including: organization and management support, sample collection and analytical procedures, facilities, counting instrumentation, staffing and qualifications, laboratory quality assurance, and followup corrective action taken on previously identified deficiencies. The appraisal involved 21 appraiser-hours onsite by one NRC appraiser.

Results: The state's overall performance satisfies the general requirements of the cooperative agreement regarding sample collection and analyses. Several minor deficiencies are discussed in paragraph 3. Based on the state's performance, it is recommended that the cooperative agreement be continued.

DETAILS

1. Persons Contacted

Arkansas Department of Health (ADH)

- *F. Dobbins, Assistant Director, Bureau of Environmental Health
- *F. Balding, Chemist II, Radiochemistry Section
- *G. Dicus, Assistant Director, Division of Radiation Control & Emergency Management
- *J. Henry, Chemistry Supervisor, Radiochemistry Section
- *R. Horn, Director, Division of Public Health Laboratories
- *M. Smith, Chief, Licensing and Environmental Surveillance Section
- T. Taylor, Health Physicist, Licensing and Environmental Surveillance Section
- D. Wise, Chemist, Hazardous Materials Specialist

*Denotes those present during the exit briefing on January 17, 1986.

2. General

The purpose of this appraisal was to evaluate the State of Arkansas' compliance with the cooperative agreement conditions and review corrective actions taken on the deficiencies reported in the appraisal conducted May 10-11, 1984.

3. Summary and Conclusion

The state's effort, since the previous appraisal conducted in May 1984 has shown improvement; however, several deficiencies still exist. These include:

- a. Procedures have been written, but not approved by management, for use in the field and in the radiochemistry laboratory. See paragraph 9 for details.
- b. Counting geometries and/or calibration standards for the air particulate filter monthly composite, soil, vegetation/food products, and fish needs to be improved. See paragraph 10 for details.
- c. Gross beta analyses of weekly air particulate filters were performed at different decay times than the licensee causing problems in comparing data. See paragraph 11.a(2) for details.
- d. Data for some state and licensee weekly airborne samples were not included in the 1984 annual report. See paragraph 11.a(3) for details.

- e. Licensee data for airborne particulate monthly composites were not available. See paragraph 11.a(4) for details.
- f. Quarterly tritium analyses of surface water samples were not performed during the first and second quarters of 1984. See paragraph 11.b(1) for details.
- g. Data for some licensee surface water samples were not reported in the 1984 annual report. See paragraph 11.b(2) for details.

Even though several minor deficiencies still need to be corrected, it is recommended that the cooperative agreement be continued.

4. Management Support

The state has a comprehensive environmental monitoring program in addition to the samples and analyses required by the cooperative agreement. The environmental monitoring program is conducted by the Division of Radiation Control and Emergency Management with the support of the Division of Public Health Laboratories. The program is administered by qualified personnel who have experience in environmental monitoring and take a concerned interest in the performance of the environmental monitoring program and the cooperative agreement. The environmental monitoring program and radiochemistry laboratory are funded with adequate budgets to support and accomplish the sampling and analyses workload and to maintain radiochemistry laboratory equipment and supplies. The NRC appraiser noted that funds for procurement of new and updated technical equipment for the radiochemistry laboratory had not been budgeted in FY-1984 and FY-1985.

5. Organizational Structure

The NRC appraiser reviewed the State of Arkansas' Bureau of Environmental Health Services staff assignments and responsibilities. The organizational structure and reporting sequence are the same as reported in the NRC Appraisal Report 99990004/82-06 issued in November 1982 with two exceptions: (1) the Division of Environmental Health Protection has been renamed the Division of Radiation Control and Emergency Management, and (2) the Emergency Preparedness and Environmental Analysis Section, which administers the cooperative agreement, has been reorganized and named the Licensing and Environmental Surveillance Section (L&ESS).

6. Staffing

The NRC appraiser reviewed the staff responsible for the requirements of the cooperative agreement. There had been one change in the radiochemistry laboratory technical staff since the previous appraisal in May 1984. The laboratory technician, L. Floyd, had retired in August 1985, and had been replaced by T. Sanders. There were two staff changes in the L&ESS. These changes involved the assignment of M. A. Smith as the L&ESS Chief and cooperative agreement administrator and principal investigator and the addition of T. M. Taylor, Health Physicist.

7. Training

The NRC appraiser reviewed offsite and on-the-job training received by the technical staff since the previous appraisal conducted in May 1984. No formal offsite training had been attended by any of the technical staff in support of the cooperative agreement. At the time of the appraisal, T. Sanders had been working in the radiochemistry laboratory for about five months and was undergoing on-the-job training including sample handling and analytical techniques. The NRC appraiser noted that on-the-job training records are not maintained that would indicate that supervision had reviewed and accepted employee proficiency for specific sampling and analytical tasks.

8. Facilities and Equipment

The NRC appraiser reviewed the L&ESS and radiochemistry laboratory equipment and facilities. There had been no changes in the laboratory facilities. The NRC appraiser noted that the L&ESS had requested to purchase a new TLD reader to upgrade existing out-dated equipment. The NRC appraiser determined that the L&ESS had an inventory of only three calibrated air samplers to service two air sampling locations. The air samplers are over eight years old and spare parts are difficult to obtain. The NRC appraiser discussed in the exit briefing the recommendation to purchase at least one new air sampler per year for the next three years so as to replace present equipment with modern up-to-date equipment. The L&ESS chief indicated he would consider this recommendation when making future technical equipment budget requests. The NRC appraiser discussed radiochemistry counting instrumentation upgrades with the radiochemistry laboratory supervisor. It was determined that a new liquid scintillation spectrometer and new germanium-lithium detector had been requested in 1984 and a new multichannel analyzer system had been requested in 1985, but all requests had been denied due to lack of capital equipment funds. These equipment upgrades were discussed in the exit briefing and the Director, Division of Public Health Laboratories, informed the NRC appraiser that the requested equipment upgrades will be given high consideration when funding equipment procurement for the laboratories in the next fiscal year budget.

9. Procedures

The NRC appraiser reviewed the state's current procedures for sample collection, sample control, sample preparation, sample analysis, calibration of counting instruments, and quality control of analytical counting instrumentation to determine the adequacy and status of approved procedures.

The NRC appraiser noted that the L&ESS was in the process of developing sampling procedures for environmental samples and had drafted a sample control procedure. The NRC appraiser reviewed the radiochemistry laboratory procedures and found them not written in a standard laboratory format which should include a title page indicating title, author, procedure number, revision number, date of issuance, and authorizing approval for laboratory use. Analytical procedures had been taken from Environmental Protection Agency (EPA) documents or the Health and Safety

Laboratory Procedures Manual, HASL-300, and incorporated into radiochemistry laboratory procedures. All procedures reviewed had not been approved by management for laboratory use. The NRC appraiser found the procedures located in various folders and files. The NRC appraiser discussed with the radiochemistry laboratory supervisor the possibility of consolidating all the radiochemistry laboratory procedures including sample handling, sample analyses, instrument calibration, and laboratory quality control into one laboratory document in a standardized format for the purpose of organization and ease of use. The NRC appraiser observed very little change or improvement in the radiochemistry laboratory procedures since the previous appraisal conducted in May 1984. The effort to improve the radiochemistry laboratory program needs to receive high priority especially in the area of program documentation.

10. Quality Assurance Program

The NRC appraiser reviewed the state's quality control program in conjunction with the radiochemistry laboratory counting instruments. The state participates in the EPA cross-check program. The state's performance during 1984 and 1985 was reviewed and found within the EPA acceptance criteria. A summary of the EPA cross-check program results were included in the 1984 annual report as required by the cooperative agreement.

The state's radiochemistry laboratory also performs an internal quality control program. This program consists mainly of performance checks and calibrations of the counting instruments. The NRC appraiser reviewed the quality control data and calibration data for the radiochemistry laboratory counting instruments over the period 1984 and 1985 which had been performed with radioactive standards traceable to the National Bureau of Standards (NBS). It appeared that the state was performing adequate quality control tests to verify the performance of the radioanalytical counting instruments. However, the review of calibration data for the Canberra gamma spectroscopy system indicated that an air particulate filter composite standard for four filters had not been prepared according to procedure for the monthly composite requirement, the soil and silt standard had not been prepared according to procedure and was also being used as a standard for analyzing fish and vegetation samples, a standard for tissue and fish had not been prepared since 1982, a standard specifically for vegetation samples had not been prepared, and procedures had not been written to prepare standards for all analysis counting geometries identified on the list of counting geometries for the Canberra gamma spectroscopy system. Examples of these counting geometries which do not have preparation procedures include: one liter Marinelli beaker with one liter of solution, 100 ml beaker with 20 milliliters of solution, and one quart cubitainer with 750 milliliters of solution. Accurate standards traceable to the NBS should be prepared for each sample media to specifications which will meet the lower limits of detection (LLD) and analysis requirements of the cooperative agreement. The Canberra gamma spectroscopy system should be recalibrated using properly prepared standards in accordance with written approved procedures to meet the cooperative

agreement requirements as soon as possible and before the analysis of 1986 sediment, fish, and vegetation samples.

11. Cooperative Agreement Required Sample Collection and Analyses

The NRC appraiser reviewed the sample collection and analyses for the period January 1 through December 31, 1984, to determine agreement with Attachment 1 to the cooperative agreement. The licensee, Arkansas Power and Light (AP&L), conducts its own environmental sampling and analysis program in cooperation with the state. State personnel performed routine environmental sampling and sample splitting with the licensee's laboratory which was required by the cooperative agreement. State personnel performed all sample preparation and analyses for their samples in the state radiochemistry laboratory. The state's TLDs were also processed by state personnel. State personnel exchanged the TLDs associated with the NRC TLD monitoring network and sent them for processing of direct radiation measurements by NRC Region I personnel.

The following cooperative agreement sampling areas were evaluated and several observations and deficiencies were noted:

a. Airborne - Particulate and Radioiodine

The cooperative agreement requires two continuous air samplers: one air sampler in close proximity to the licensee's air sampler in a high calculated X/Q direction from the plant and another air sampler at a control location in close proximity to the licensee's air sampler. The state and the licensee have air samplers located about 0.7 miles east of the plant at the Arkansas Nuclear One (ANO) meteorological tower. The state's and licensee's control sample station is located about 21 miles southwest of the plant at the AP&L substation in Danville, Arkansas.

Airborne particulate and radioiodine samples were collected weekly by the state at its two sample locations. Gross beta, gamma isotopic, and ^{131}I analyses were performed in the state radiochemistry laboratory by state personnel.

The results reported in the 1984 annual report met most of the specific requirements of the cooperative agreement; however, the NRC appraiser noted the following observations and deficiencies:

- (1) The state and licensee gross beta results should be expressed in the same units and format to facilitate quick comparison of data.
- (2) The state's gross beta results were consistently less than the licensee's gross beta results. This may be due to the fact that the state and licensee do not have a constant time

interval for decay between the time of sampling and analysis. The state's analytical procedure for gross beta analysis of air particulate samples specifies a 48 hour decay time before analysis; however, a check of randomly selected analyses records of samples during 1984 showed decay times from 48 hours to five days. The differences in activities may be due to the lack of consistent decay times for the air particulate samples; therefore, not providing consistent decay of natural occurring radioactivity deposited on the air particulate filters. The state should take corrective action to analyze the air particulate samples allowing the same sample decay time as the licensee.

- (3) Several state airborne sample data were missing from the 1984 annual report. State representatives stated that the missing data were the results of turnover of the environmental monitoring program management resulting in samples not being taken, samples lost, and samplers found inoperable at time of collection.
- (4) No licensee data for gamma isotopic analysis of monthly composites for the months of April, October, and December were included in the 1984 annual report. State representatives stated that the data had not been provided by the licensee.

b. Surface Water

The cooperative agreement requires two surface water samples to be collected monthly: one sample from an immediate area of plant discharge and one sample from an upstream control location. A gamma isotopic analysis was required on a monthly frequency and a tritium analysis on a quarterly composite by location of the monthly samples. The state and licensee collected monthly samples from the lake into which the plant discharge flows and from an upstream control location at Big Piney Creek. The samples were split between the state and the licensee. The gamma isotopic and tritium analyses of the state samples were performed in the state radiochemistry laboratory by state personnel.

The results reported in the 1984 annual report met, in part, those specific requirements of the cooperative agreement. However, the NRC appraiser noted the following deficiencies:

- (1) The state reported monthly tritium results for January through April instead of quarterly composite results as required for comparable data with the licensee. The state reported quarterly composite results for the third and fourth quarters of 1984.

- (2) Licensee monthly gamma isotopic data were not reported for the month of February for both sample locations and were not reported for the month of December for the upstream control location. State representatives offered no explanation as to the missing data.

c. Milk

The cooperative agreement requires one monthly sample of an offsite dairy located in the highest X/Q direction from the plant. This sample location had been determined to be the Arkansas Technical University Dairy which is located about 5 miles east of the plant. The state collected monthly samples which were split with the licensee. The gamma isotopic and low level radioiodine analyses of the state samples were performed in the state radiochemistry laboratory by state personnel.

The results reported in the 1984 annual report met the specific requirements of the cooperative agreement. The NRC appraiser noted that the May 1984 sample had not been collected by the state due to the turnover of the environmental monitoring program management resulting in the sample being overlooked.

d. Fish

The cooperative agreement requires one sample of a commercially or recreationally important species in the vicinity of the plant discharge to be sampled semiannually or in season. Gamma isotopic analysis of the edible portions is required. The state collected semiannual fish samples from the plant discharge canal. Fish from the catch were split between the licensee and the state for analysis. The gamma isotopic analyses of the state samples were performed in the state radiochemistry laboratory by state personnel. The results reported in the 1984 annual report met the specific requirements of the cooperative agreement.

e. Food Products

The cooperative agreement requires two samples to be split with the licensee of principal food products grown near a point having the highest X/Q, or grown in an area irrigated by water into which the plant discharges waste, or green leafy vegetables at a private garden or farm in the immediate area of the plant. Gamma isotopic analyses including radioiodine of the edible portions are required. The sample location had been determined to be at the C. Stewart residence garden which was located about 1 mile southeast of the plant. The state and licensee collected and split samples from the garden at the time of harvest. The gamma isotopic analyses of the state samples including radioiodine were performed in the state radiochemistry laboratory by state personnel. The results reported in the 1984 annual report met the requirements of the cooperative agreement.

f. Sediment from Shoreline

The cooperative agreement requires one annual sample split with the licensee for gamma isotopic analysis of shoreline sediment along a body of water into which plant discharge flows. The licensee collected and split a sample from the lake into which the plant discharge canal flows about 0.25 miles below the mouth of the ANO discharge canal. The gamma isotopic analysis of the state sample was performed in the state radiochemistry laboratory by state personnel. The results reported in the 1984 annual report met the requirements of the cooperative agreement.

g. Direct Radiation Levels

The state has established a TLD direct radiation monitoring network of 51 locations around the ANO site in conjunction with the licensee and the 40 location NRC TLD network established in December 1979. Sixteen of the licensee's TLD sites and 17 of the state's TLD sites are collocated with the NRC. The cooperative agreement requires the state personnel to exchange the NRC TLDs quarterly and send them for analysis by NRC Region I personnel. The results reported in the 1984 annual report met the requirements of the cooperative agreement.

h. LLD

The NRC appraiser reviewed the LLD table included in the 1984 annual report tabulating the lower limits of detection for each environmental sample media and analysis type required by the cooperative agreement. The LLDs reported for both the state and licensee met the requirements of the cooperative agreement.

12. Reports

The 1984 annual report was submitted by the state to the NRC Region IV office within the time period specified in the cooperative agreement.

13. Exit Briefing

At the conclusion of the appraisal on January 17, 1986, the NRC appraiser discussed the scope and findings of the appraisal with the individuals denoted in paragraph 1. The NRC appraiser discussed those items which did not meet the conditions of the cooperative agreement as outlined in paragraph 3 of this report. The state committed to review the NRC appraiser's findings and implement the necessary program improvements in order to comply with the cooperative agreement.