

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 50-298/82-27

License: DPR-46

License: Nebraska Public Power District
P. O. Box 499
Columbus, NE 68601

Facility: Cooper Nuclear Station

Inspected at: Cooper Nuclear Station, Brownville, Nebraska

Inspection Conducted: October 4-8, 1982

Inspector: J. Blair Nicholas 12/1/82
J. B. Nicholas, Radiation Specialist Date

Inspector: Russell Wise 12/1/82
Russell Wise, Radiation Specialist Date

Approved by: Blaine Murray 12/6/82
Blaine Murray, Chief, Facility Radiation Protection Section Date

Inspection Summary

Inspection conducted during the period of October 4-8, 1982
(Report 50-298/82-27)

Areas Inspected: Routine, announced inspection of the licensee's radiochemistry program including organization, staffing, training program, sample collection, sample treatment and analysis, chemistry analytical procedures, laboratory instrument calibration and quality controls of analytical measurements, licensee audits of radiochemistry activities, and independent confirmatory measurements using the Region IV mobile counting laboratory for onsite comparisons of split sample results. The inspection involved a total of 86 hours onsite by two NRC inspectors.

Results: No violations or deviations were identified. Nine open items are summarized in Section 4.

DETAILS1. Persons ContactedNebraska Public Power District (NPPD)

- *L. C. Lessor, Station Superintendent
- *J. V. Sayer, Chemistry and Health Physics Supervisor
- V. L. Wolstenholm, Quality Assurance Supervisor
- J. R. Warren, Chemist
- R. J. McDonald, Health Physicist
- G. W. Ketner, Lead Chemistry Technician
- K. Fike, Chemistry Technician
- D. L. Snyder, Chemistry Technician
- M. C. Wright, Chemistry Technician
- J. H. Kuttler, Lead Health Physics Technician

Others Contacted

- *D. L. DuBois, NRC Resident Inspector, Cooper Nuclear Station

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

The NRC inspectors also interviewed several other Cooper Nuclear Station personnel during the inspection.

2. Scope of Inspection

The purpose of this inspection was to review the licensee's radiochemistry instrument calibration and quality control program for the period July 1, 1981, through September 30, 1982, radiochemistry organization, staff training, licensee audits of radiochemistry activities, and perform confirmatory measurements on selected plant radioactive effluent samples. The previous quality control inspection of analytical measurements and confirmatory measurements was performed during June 15-19, 1981.

3. Licensee Action on Previous Inspection Findings

(Closed) Open Item 298/8111-01: TN-11 Gamma Spectrometer Calibration - This item was discussed in NRC Inspection Report 50-298/81-11 and involved the fact that the licensee was using only single isotope standards for calibration of the TN-11 Gamma Spectrometer System rather than multi-isotope standards which have been used routinely in the industry for calibration of GeLi detector systems.

The licensee had purchased an NBS traceable multi-isotope standard which has gamma ray energies from low to high in the energy range of interest

and had used this multi-isotope standard to prepare calibration standards for the TN-11 Gamma Spectrometer System for all counting geometries and recently recalibrated the gamma spectrometer system using the prepared standards. This item is considered closed.

(Closed) Unresolved Item 298/8111-01: High Percentage of Disagreements on Confirmatory Measurements Off-Gas Sample - This item was discussed in NRC Inspection Report 50-298/81-11 and involved several disagreements between NRC and the licensee's confirmatory measurement results. The licensee had recalibrated the TN-11 Gamma Spectrometer System with a new off-gas counting geometry standard traceable to the National Bureau of Standards. Results of analyses performed on off-gas samples following the recalibration were in agreement with measurements performed by the NRC inspectors. The new calibration is being used routinely in performing off-gas sample analyses. This item is considered resolved.

4. Open Items this Inspection

(Open) Open Item (298/8227-01): Radiochemistry and Health Physics Organization - The licensee had not developed management approved job/position descriptions for radiochemistry and health physics personnel or implemented procedures governing functional area assignments. See Section 5 for details.

(Open) Open Item (298/8227-02): Radiochemistry Personnel Qualifications - The licensee had not developed a selection and qualification criteria for radiochemistry personnel. See Section 6 for details.

(Open) Open Item (298/8227-03): Radiochemistry Training - The licensee had not summarized, in an organized manner, all training completed by radiochemistry personnel. The licensee had not developed a formal training and retraining program for radiochemistry personnel. See Section 7 for details.

(Open) Open Item (298/8227-04): Licensee's Internal Audits - The licensee had not included on the audit team, for radiochemistry audits, a member knowledgeable in radiochemistry procedures and activities at nuclear power facilities. See Section 8 for details.

(Open) Open Item (298/8227-05): Quality Control of Radiological Analytical Measurements - The licensee had not designated, in any procedure, who was responsible for managing and conducting the radiochemistry quality control program. See Section 9 for details.

(Open) Open Item (298/8227-06): Frequency of Quality Control of Radiological Analytical Measurements - The licensee had not clearly defined the frequency of calibration or performance check on specific counting room instruments. See Section 9 for details.

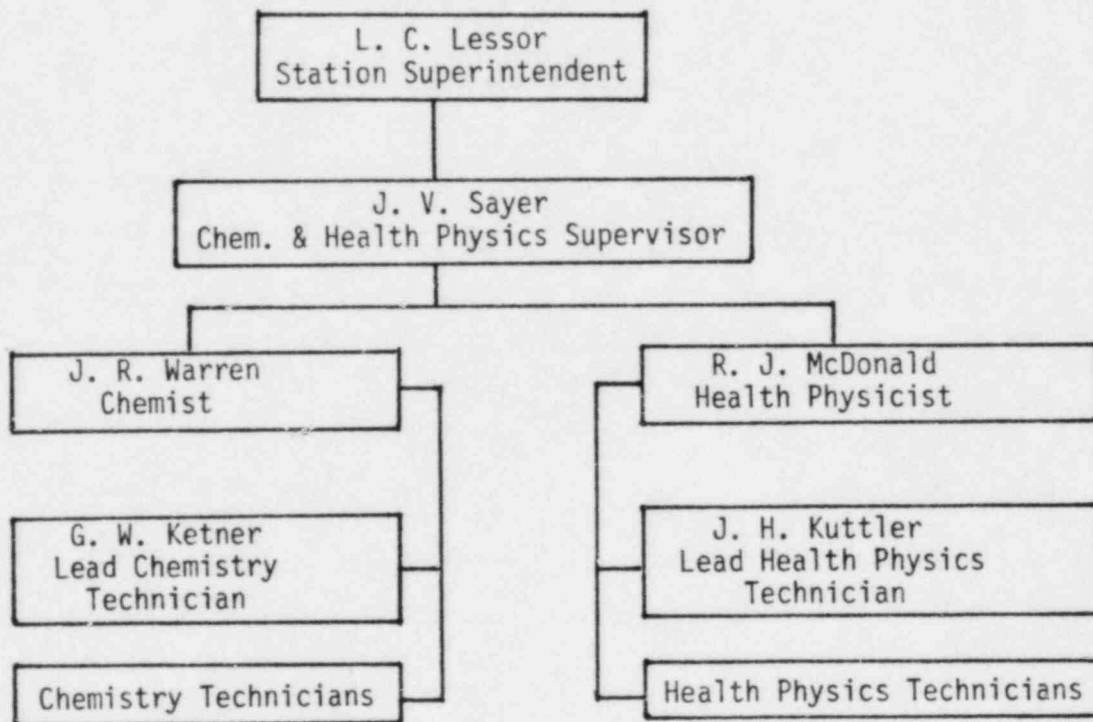
(Open) Open Item (298/8227-07): Instrument Calibration and Performance Checks - The licensee had not developed detailed radiochemistry and health physics analytical instrument calibration and performance check procedures. See Section 9 for details.

(Open) Open Item (298/8227-08): Radioactive Standard Preparation - The licensee had not developed detailed procedures for preparation of radioactive standards. See Section 9 for details.

(Open) Open Item (298/8227-09): Chemistry/Radiochemistry Sampling - The licensee had not developed detailed, written step-by-step sampling procedures for all chemistry/radiochemistry samples. See Section 10 for details.

5. Radiochemistry and Health Physics Organization

The NRC inspectors reviewed the Cooper Nuclear Station staff assignments in regard to radiochemistry and health physics responsibilities. The following diagram shows the present structure and assigned individuals:



The NRC inspectors were concerned regarding the present onsite management organization in that approved job/position descriptions, staff qualifica-

tion requirements, and implementing procedures for functional area assignments had not been developed.

Job descriptions had been developed for the various staff positions in conjunction with a salary evaluation performed in 1981. However, formal management-approved job descriptions for the radiochemistry and health physics staff had not been established. This item is considered open (298/8227-01) pending issuance of formal management-approved job descriptions for the radiochemistry and health physics staff and implementing procedures governing functional area assignments.

No violations or deviations regarding the radiochemistry and health physics organization were identified.

6. Radiochemistry Personnel Qualifications

The NRC inspectors reviewed the qualifications of the radiochemistry personnel to determine agreement with commitments in the FSAR and the recommendations of Regulatory Guide 1.8 and ANSI N18.1-1971.

The NRC inspectors noted that all radiochemistry personnel listed met the educational and experience qualification requirements committed to in the FSAR and recommended in ANSI N18.1-1971. However, the licensee had not developed procedures which would provide definitive guidance for the determination of acceptable radiochemistry experience for station personnel. This item is considered open (298/8227-02) pending development of selection and qualification criteria for radiochemistry personnel.

No violations or deviations regarding radiochemistry staff qualifications were identified.

7. Radiochemistry Training

The NRC inspectors reviewed the licensee's radiochemistry training program to determine compliance with FSAR commitments, 10 CFR 19.12 requirements, and the recommendations of ANSI N18.1-1971 and Regulatory Guide 1.8.

Documents Reviewed

- . FSAR, Chapter 13, Section 3
- . Individual Training File for each radiochemistry staff member
- . Chemistry Training Outline
- . Radiochemistry staff member's training checkoff list

The NRC inspectors reviewed the radiochemistry staff individual training records maintained by the educational specialist and the chemist. The records indicated that all of the staff had completed initial site training, general employee training, radiation protection training, administrative procedure training, emergency training, plant systems training, and specific course training conducted by members of the plant staff or vendor schools. A 2-week requalification radiochemistry course was conducted onsite at Cooper Nuclear Station by a General Electric representative during January 1982. All radiochemistry staff attended. The on-job-training (OJT) checkoff lists for the radiochemistry staff were reviewed and found not to be in order. Each staff member had several checkoff lists partially completed in his file. This made a review of completed training almost impossible. An individual's training was not compiled and summarized in an organized and readily-retrievable system so that individual qualifications were easily available. A written training program and requalification program which includes defined goals, objectives, schedules, lesson plans, and methods of evaluating the effectiveness of the training had not been developed at the time of the inspection. This item is considered open (298/8227-03) pending development of a formal training and retraining program for radiochemistry personnel.

No violations or deviations regarding the radiochemistry training program were identified.

8. Licensee's Internal Audits

The NRC inspectors reviewed the quality assurance organization and audit program to determine compliance with FSAR commitments, 10 CFR 50, Appendix B requirements, and the recommendations of ANSI N18.7-1976, and Regulatory Guide 1.33. Reports of audits conducted in the area of chemistry/radiochemistry during the period from July 1981 through September 1982 were reviewed for scope and followup action of problem areas identified during the audit.

Documents Reviewed

- . QAP Audit Schedule for 1981
- . QAP Audit Schedule for 1982
- . QAP-900, "Quality Assurance Plan for Chemistry, Health Physics, and Environmental Monitoring," Revision 6, October 3, 1980
- . QAP-900, Audit Report No. 81-17, June 22, 1981
- . QAP-900, Audit Report No. 82-11, May 12, 1982

The NRC inspectors reviewed Quality Assurance Procedure QAP-900, and the results of the audits performed under this procedure conducted in June 1981 and May 1982. The QAP-900 audit is scheduled annually. The audit procedure was designed to determine compliance with existing procedures. The audit scope did not include evaluations regarding the effectiveness of the chemistry/radiochemistry department, equipment, or recommended changes to the existing chemistry/radiochemistry program.

- a. Audit Report No. 81-17 was conducted in June 1981. Items covered in this audit include training records of chemistry personnel, calibration records of selected chemistry analytical equipment, and calibration records of selected radiochemistry counting instruments. Findings of this audit were: no specific procedure for reporting and documenting out-of-specification chemistry analytical results and followup action taken and housekeeping was lacking in certain areas of the radiochemistry laboratory. A followup audit conducted on July 15, 1981, showed these discrepancies to be corrected.
- b. Audit Report No. 82-11 was conducted in May 1982. Findings of this audit included: atomic absorption calibration data sheet not signed and Orion pH meter calibration data sheet not signed. These deficiencies were corrected in a timely manner.

The NRC inspectors noted that the audit teams did not include a member with radiochemistry experience at nuclear power facilities. This item is considered open (298/8227-04) pending followup action by the licensee on audit team member selection in the future.

No violations or deviations regarding the licensee's audit program of chemistry/radiochemistry were identified.

9. Quality Control of Radiological Analytical Measurements

The NRC inspectors visited the radiochemistry counting room and health physics counting room and reviewed the program for quality control of radiological analytical measurements to determine compliance with Technical Specifications and recommendations of Regulatory Guide 4.15.

Documents Reviewed

- . CP-8.2.1, "Chemistry Analysis and Instrument Calibration Schedule," Revision 8, August 5, 1980
- . CP-8.2.4, "Split and Spiked Sampling," Revision 4, March 27, 1980
- . CP-8.5.2.2, "Beckman Wide Beta II," Revision 3, March 30, 1978

- . CP-8.5.2.3, "Beckman LS-100 Liquid Scintillation System," Revision 3, March 25, 1980
- . CP-8.5.2.4, "Harshaw Well Counter," Revision 5, December 17, 1980
- . CP-8.5.2.5, "Gamma Spectrometer (TN-11, GeLi)," Revision 1, March 30, 1978
- . HP-9.3.2.1, "Beckman Wide Beta II," Revision 4, October 4, 1981
- . HP-9.3.2.3, "Nuclear-Chicago Automatic Sample Changer Gas Flow Smear Counter," Revision 2, August 31, 1979
- . HP-9.3.2.5, "Baird Automatic Sample Changer Gas Flow Smear Counter," Revision 0, November 19, 1981

The NRC inspectors examined the licensee's radiochemistry counting room and health physics counting room quality control procedures, counting instrument calibration data, counting instrument performance check data, trend charts, and other documentation of instrument performance. Data for the period July 1981 through July 1982 were reviewed for the radiochemistry Wide Beta II, Beckman LS-100 Liquid Scintillation Spectrometer, and TN-11 Gamma Spectrometer, and the health physics Wide Beta II, Nuclear-Chicago Gas Flow Smear Counter, and Baird Gas Flow Smear Counter. The licensee's records were in order and indicated that an adequate quality control program was being maintained.

The NRC inspectors reviewed Procedure CP-8.2.1, "Chemistry Analysis and Instrument Calibration Schedule," Revision 8, August 5, 1980. The NRC inspectors noted that the procedure did not contain a section which assigned the responsibility of managing and conducting the radiochemistry quality control program to a specific staff position. This item is considered open (298/8227-05) pending the assignment of responsibility to manage and conduct the radiochemistry quality control program to a specific member of the plant staff.

The NRC inspectors noted, during review of the frequencies for the various instrument calibrations and performance checks, the following items of concern:

- a. The phrase "Prior to Use" could be misinterpreted and a more definitive phrase such as "Prior to Daily Use" may be more descriptive of what is actually intended.
- b. The use of two different frequencies associated with a single type of function, for example, "Daily or Prior to Use" causes confusion as to which is applicable. The phrase "Prior to Daily Use" may meet the intent of the function and be more definitive.

- c. The use of the phrase "As Required" for a calibration frequency is unacceptable and too open for conflict in interpretation. A definite time interval, such as semiannual or annual, is appropriate and acceptable.
- d. The Beckman LS-100 Liquid Scintillation System has a stated calibration frequency of "As Required" in Procedure CP-8.2.1 and a calibration frequency of every two years or when a detector is changed in Procedure CP-8.5.2.3. The frequencies between Procedure CP-8.2.1 and the individual instrument procedures must reflect the same information.

This item is considered open (298/8227-06) pending the licensee's evaluation of the inspection findings.

The NRC inspectors reviewed CP-8.2.4, "Split and Spiked Sampling," Revision 4, March 27, 1980. This procedure requires a semiannual spiked sample for cold chemistry to be analyzed by members of the chemistry staff, a semiannual split sample for cold chemistry to be analyzed by chemistry personnel and their results compared to an independent laboratory, and annual split samples used for confirmatory measurements with the NRC. The NRC inspectors have no concerns in this area at this time.

The NRC inspectors reviewed the above listed instrument procedures for content including the following items: instrument operation, instrument calibration, instrument performance checks, and analytical measurements and calculations. In general, all the procedures reviewed addressed these items in one form or another. However, the NRC inspectors were concerned that these items could be made more clear to the technicians by addressing each of the above topics in a separate stand-alone procedure for each instrument or at least place each of the topics in a separate titled section within a procedure for each instrument. Each function of instrument operation should contain sufficient detail so that the technician could perform each function independently of any other function. For example, an instrument calibration procedure should contain details on frequency of calibration, operation of the instrument, preparation of standards, specific sample geometries to be calibrated, methods of calculation for determining instrument parameters from analytical data, methods of plotting and verifying data, and acceptance criteria. This item is considered open (298/8227-07) pending the licensee's evaluation of operating, calibration, and performance check procedures for all radiochemistry counting room and health physics counting room analytical instrumentation.

The NRC inspectors noted while reviewing the calibration data for the TN-11 Gamma Spectrometer that several counting geometry efficiency curves were generated in May 1982 using an NBS multi-isotope standard. This closes open item (298/8111-01) discussed in Report No. 50-298/81-11.

The NRC inspectors were unable to determine precisely how the licensee prepared radioactive standards for calibration of the TN-11 Gamma Spectrometer, Wide Beta II, and the health physics smear counters. It should be noted that isotopic quantities used in the standards preparation were sufficiently documented; however, methods used in preparation were not documented. This item is considered open (298/8227-08) pending development of detailed procedures for preparation of radioactive standards for all types of counting configurations which are NBS traceable.

No violations or deviations regarding the licensee's radiochemistry and health physics quality control program were identified.

10. Chemistry/Radiochemistry Sampling

The NRC inspectors reviewed the licensee's routine chemistry/radiochemistry sampling procedures to determine compliance with FSAR and Technical Specification commitments.

Documents Reviewed

- . CP-8.2.2, "Process Sampling System," Revision 1, March 6, 1976
- . CP-8.2.3, "Table of Liquid and Gas Sample Points," Revision 3, August 20, 1982

The NRC inspectors noted that the licensee had not developed detailed step-by-step sampling procedures for all manually taken samples to provide guidance in the proper techniques for collection of specific samples. These procedures should include such items as sampling frequency, sample point valve identification, sample point location, valve lineups, tank recirculation times, health physics handling precautions, safety considerations, sample line flush time to provide a representative sample, sample quantity, and sample container labeling. This item is considered open (298/8227-09) pending development of detailed sampling procedures for all chemistry/radiochemistry samples.

No violations or deviations regarding the licensee's chemistry sampling program were identified.

11. Analytical Measurements

a. Confirmatory Measurements

Confirmatory measurements were performed on the following samples in the Region IV mobile laboratory at Cooper Nuclear Station during the inspection:

- (1) Elevated Release Point Particulate Filter

- (2) Elevated Release Point Charcoal Cartridge
- (3) Reactor Water
- (4) Off Gas
- (5) Liquid Waste
- (6) Health Physics Smear

The confirmatory measurements test consists of comparing measurements made by the licensee, NRC's mobile laboratory, and NRC's reference laboratory, Radiological and Environmental Sciences Laboratory (RESL) in Idaho Falls, Idaho. RESL's and the NRC's mobile laboratory measurements are referenced to the National Bureau of Standards by laboratory intercomparisons. Confirmatory measurements are made only for those nuclides identified by the mobile laboratory or RESL as being present in concentrations greater than 10% of the respective isotopic values for liquid and gas concentrations as stated in 10 CFR Part 20, Appendix B, Table II, and above the Lower Limit of Detection (LLD) for stack samples. Stack charcoal cartridge and stack particulate filter comparisons are based on established LLD's for total activity per sample.

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

Attachment No. 2 lists the LLD's for stack samples.

b. Results

The following tables show the various sample comparison results:

(1) Elevated Release Point Particulate Filter
(Sampled 19:19 CDT, October 3, 1982)

<u>Nuclide</u>	<u>NPPD Result (uCi/sample)</u>	<u>NRC Result (uCi/sample)</u>	<u>NPPD/NRC Ratio</u>	<u>Decision</u>
^{91}Sr	3.44±0.31E-03	2.44±0.10E-03	1.41	Poss. Agreement
^{131}I	9.30±1.70E-05	6.02±0.54E-05	1.54	Agreement
^{133}I	1.53±0.27E-04	1.06±0.11E-04	1.44	Agreement
^{137}Cs	5.18E-05	3.14±0.49E-05	-	Disagreement ^{1/}
^{140}Ba	2.66±0.12E-03	2.53±0.05E-03	1.05	Agreement

^{140}La	$1.74 \pm 0.06\text{E-}03$	$1.74 \pm 0.04\text{E-}03$	1.00	Agreement
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^{1/} Licensee's peak confidence level for peak identification along with other analysis parameters had been established so as not to allow analysis of nuclides at sensitivity levels recommended for principal gamma emitters on effluent particulate filters as presented in Attachment No. 2 listing the lower limits of detection for total activity per sample.

(2) Elevated Release Point Charcoal Cartridge
(Sampled 19:19 CDT, October 3, 1982)

<u>Nuclide</u>	<u>NPPD Result (uCi/sample)</u>	<u>NRC Result (uCi/sample)</u>	<u>NPPD/NRC Ratio</u>	<u>Decision</u>
^{131}I	$3.29 \pm 0.02\text{E-}02$	$2.80 \pm 0.01\text{E-}02$	1.18	Agreement
^{133}I	$1.50 \pm 0.02\text{E-}02$	$1.27 \pm 0.01\text{E-}02$	1.18	Agreement
^{135}I	$6.00 \pm 0.35\text{E-}03$	$5.80 \pm 0.37\text{E-}03$	1.03	Agreement

(3) Reactor Coolant Liquid
(Sampled 10:07 CDT, October 5, 1982)

<u>Nuclide</u>	<u>NPPD Result (uCi/ml)</u>	<u>NRC Result (uCi/ml)</u>	<u>NPPD/NRC Ratio</u>	<u>Decision</u>
^{24}Na	$7.12 \pm 0.24\text{E-}04$	$6.35 \pm 0.14\text{E-}04$	1.12	Agreement
^{51}Cr	$9.04 \pm 0.18\text{E-}03$	$8.90 \pm 0.14\text{E-}03$	1.02	Agreement
^{54}Mn	$1.94 \pm 0.15\text{E-}04$	$1.60 \pm 0.10\text{E-}04$	1.21	Agreement
^{56}Mn	$8.73 \pm 0.84\text{E-}04$	$7.61 \pm 0.35\text{E-}04$	1.15	Agreement
^{58}Co	$3.35 \pm 0.17\text{E-}04$	$3.24 \pm 0.11\text{E-}04$	1.03	Agreement
^{60}Co	$1.78 \pm 0.10\text{E-}04$	$3.47 \pm 0.12\text{E-}04$	0.51	Disagreement
^{91}Sr	$4.10 \pm 0.67\text{E-}04$	$3.50 \pm 0.29\text{E-}04$	1.17	Agreement
^{92}Sr	$7.15 \pm 7.15\text{E-}03$	$9.11 \pm 0.24\text{E-}04$	7.85	Disagreement
^{99}Mo	$2.49\text{E-}04$	$3.31 \pm 0.64\text{E-}04$	-	<u>1/</u>
^{131}I	$4.91 \pm 1.51\text{E-}05$ ^{2/}	$3.03 \pm 1.01\text{E-}05$	1.62	Agreement

^{132}I	$1.34 \pm 0.04\text{E-}03$ ^{2/}	$1.25 \pm 0.02\text{E-}03$	1.07	Agreement
^{133}I	$3.88 \pm 0.19\text{E-}04$ ^{2/}	$4.84 \pm 0.10\text{E-}04$	0.80	Agreement
^{134}I	$6.13 \pm 0.13\text{E-}03$ ^{2/}	$3.09 \pm 0.04\text{E-}03$	1.98	Disagreement
^{135}I	$8.97 \pm 0.61\text{E-}04$ ^{2/}	$8.45 \pm 0.36\text{E-}04$	1.06	Agreement
^{138}Cs	Not Reported	$5.55 \pm 0.27\text{E-}04$	-	Disagreement ^{3/}
^{140}La	$1.74 \pm \text{E-}05$	$3.09 \pm 0.61\text{E-}05$	-	<u>1/</u>

^{1/} Licensee's peak confidence level for peak identification along with other analysis parameter had been established so as not to allow analysis of nuclides at sensitivity levels recommended for principal gamma emitters in liquid samples as presented in the draft standard technical specifications for boiling water reactors or at activity levels equal to or less than 10% of the isotopic values stated in 10 CFR Part 20, Appendix B, Table II, Column 2. No comparison was made.

^{2/} Analytical results were taken from the iodine analysis performed on the reactor water.

^{3/} Nuclide was not identified by the licensee because it was not included in the isotope library used for the routine analysis of this sample type.

(4) Off-gas Sample
(Sampled 13:54 CDT, October 5, 1982)

<u>Nuclide</u>	<u>NPPD Result</u> (<u>uCi/cc</u>)	<u>NRC Result</u> (<u>uCi/cc</u>)	<u>NPPD/NRC</u> <u>Ratio</u>	<u>Decision</u>
$^{85\text{m}}\text{Kr}$	$4.60 \pm 0.08\text{E-}03$	$4.63 \pm 0.02\text{E-}03$	0.99	Agreement
^{87}Kr	$1.45 \pm 0.03\text{E-}02$	$1.57 \pm 0.01\text{E-}02$	0.92	Agreement
^{88}Kr	$1.35 \pm 0.03\text{E-}02$	$1.56 \pm 0.01\text{E-}02$	0.87	Agreement
^{133}Xe	$7.18 \pm 0.16\text{E-}03$	$6.76 \pm 0.03\text{E-}03$	1.06	Agreement
$^{133\text{m}}\text{Xe}$	$9.97\text{E-}04$	$2.96 \pm 0.94\text{E-}04$	-	<u>1/</u>

^{135}Xe	Not Reported	$3.21 \pm 0.02\text{E-}02$	-	<u>2/</u>
^{138}Xe	Not Reported	$7.69 \pm 0.07\text{E-}02$	-	<u>2/</u>

1/ Licensee's peak confidence level for peak identification along with other analysis parameters had been established so as not to allow analysis of nuclides at activity levels equal to or less than 10% of the isotopic values stated in 10 CFR Part 20, Appendix B, Table II, Column 1. No formal comparison was made.

2/ Nuclide was not identified because the activity had decayed to below the lower level of detectability at the time of sample analysis by the licensee; therefore, no comparison was made.

(5) Liquid Floor Drain Storage Tank
(Sampled 09:00 CDT, October 6, 1982)

<u>Nuclide</u>	<u>NPPD Result</u> (<u>$\mu\text{Ci/ml}$</u>)	<u>NRC Result</u> (<u>$\mu\text{Ci/ml}$</u>)	<u>NPPD/NRC</u> <u>Ratio</u>	<u>Decision</u>
tritium	$6.88 \pm 0.08\text{E-}04$	$7.21 \pm 0.03\text{E-}04$ ^{3/}	0.95	Agreement
gross beta on (10/6/82)	$2.37\text{E-}04$	$1.99 \pm 0.03\text{E-}04$	1.19	Agreement
on (10/27/82)	$2.85 \pm 0.15\text{E-}04$	$2.46 \pm 0.08\text{E-}04$ ^{3/}	1.16	Agreement
^{89}Sr	$3.45 \pm 0.02\text{E-}05$	<u>1/</u>	-	<u>2/</u>
^{90}Sr	$8.57 \pm 0.39\text{E-}07$	<u>1/</u>	-	<u>2/</u>
^{24}Na	$1.80 \pm 0.20\text{E-}06$	$1.16 \pm 0.08\text{E-}06$	1.55	Agreement
^{51}Cr	$8.39 \pm 1.81\text{E-}06$	$6.26 \pm 0.98\text{E-}06$	1.34	Agreement
^{54}Mn	$1.67 \pm 0.05\text{E-}05$	$1.71 \pm 0.03\text{E-}05$	0.98	Agreement
^{58}Co	$5.33 \pm 0.35\text{E-}06$	$5.31 \pm 0.18\text{E-}06$	1.00	Agreement
^{60}Co	$7.24 \pm 0.07\text{E-}05$	$7.49 \pm 0.05\text{E-}05$	0.97	Agreement
^{92}Sr	$5.15\text{E-}07$	$2.10 \pm 1.03\text{E-}07$	-	<u>4/</u>
$^{110\text{m}}\text{Ag}$	$1.36\text{E-}06$	$8.37 \pm 2.14\text{E-}07$	-	<u>4/</u>

^{131}I	$1.52 \pm 0.25\text{E-}06$	$1.11 \pm 0.13\text{E-}06$	1.37	Agreement
^{134}Cs	$2.61 \pm 0.11\text{E-}05$	$2.73 \pm 0.03\text{E-}05$	0.96	Agreement
^{137}Cs	$3.26 \pm 0.06\text{E-}05$	$3.53 \pm 0.03\text{E-}05$	0.92	Agreement
^{140}Ba	$7.75 \pm 1.01\text{E-}06$	$8.47 \pm 0.61\text{E-}06$	0.91	Agreement
^{140}La	$4.11 \pm 0.33\text{E-}06$	$4.18 \pm 0.15\text{E-}06$	0.98	Agreement

1/ Analytical results were not available at the time of the report. Formal documentation of these analyses will appear in the next confirmatory measurements inspection report.

2/ Analytical results were not available at the time of the report; therefore, no comparison was made.

3/ Analytical result as reported by the Radiological and Environmental Science Laboratory (RESL), Idaho Falls, Idaho.

4/ Activity concentration determined by the NRC was less than 10% of the isotopic value stated in 10 CFR Part 20, Appendix B, Table II; therefore, no comparison was made.

(6) Health Physics Hot Machine Shop Smear
(Sampled October 7, 1982)

<u>Analysis</u>	<u>H.P. Result</u> (dpm)	<u>Radchem. Result</u> (dpm)	<u>NRC Result</u> (dpm)
gross beta	26,500	17,881	13,888±62

The above tabulated gross beta data were the results from a smear taken in the hot machine shop and counted by health physics on a Baird smear counter, by radiochemistry on a Beckman Wide Beta II system, and by the NRC on a Harshaw TASC-12 system. All three counting instruments were calibrated for gross beta counting efficiency using the same ^{137}Cs smear standard furnished by the Cooper Nuclear Station health physics group. The ratio of the health physics result/NRC result equals 1.91 resulting in a disagreement decision per Attachment No. 1 criteria. The ratio of the radiochemistry result/NRC result equals 1.29 resulting in a possible agreement decision per Attachment No. 1 criteria.

Based on discussion between the licensee and the NRC inspectors, it was concluded that the discrepancies between the gross beta results may be due to differences in instrument beta energy

discriminator settings. It should be noted that the licensee's health physics and radiochemistry results were of a conservative value for reporting contamination levels. Therefore, gross beta analyses performed by the licensee would cause the licensee to require more restrictive health physics protective measures on their employees based on their measurements.

No violations or deviations were identified.

12. Facilities and Equipment

The NRC inspectors visited the licensee's radiochemistry counting room and health physics counting room. The counting facilities and nuclear analytical instrumentation were found acceptable and adequate. A licensee representative stated that negotiations were in progress to purchase additional gamma spectroscopy equipment for the radiochemistry counting room.

No violations or deviations were identified.

13. Exit Briefing

The lead NRC inspector met with the licensee representatives identified in Section 1 of this report at the conclusion of the inspection on October 8, 1982. The NRC inspector summarized the scope of the inspection, discussed the inspection findings, and informed the licensee of the results of the confirmatory measurements performed on various intercomparison samples.

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 judgment 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

LLD'S for Nuclides on Particulate and Charcoal Filters

<u>Nuclide</u>	<u>LLD (uCi/sample)</u>
^{51}Cr	1.0E-04
^{54}Mn	1.5E-05
^{58}Co	1.5E-05
^{59}Fe	3.0E-05
^{57}Co	2.0E-05
^{60}Co	3.0E-05
^{65}Zn	3.0E-05
^{89}Sr	1.0E-05
^{90}Sr	2.0E-07
^{131}I	2.0E-05
^{134}Cs	2.0E-05
^{137}Cs	2.0E-05
^{140}Ba	2.0E-05
^{140}La	4.0E-05
^{141}Ce	2.0E-05
^{144}Ce	1.0E-04