

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Report: 50-382/82-12

Docket: 50-382

Construction Permit No. CPPR-103

Licensee: Louisiana Power and Light Company
142 Delaronde Street
New Orleans, Louisiana 70174

Facility: Waterford-3
Taft, Louisiana

Inspection Conducted: May 3-7, 1982

Inspector: J. Blair Nicholas 9/1/82
Blair Nicholas, Radiation Specialist Date

Approved: Blaine Murray 9/1/82
Blaine Murray, Chief, Facilities Radiation Protection Date
Section

Inspection Summary

Inspection Conducted May 3-7, 1982 (Report 50-382/82-12)

Areas Inspected: Routine, unannounced initial inspection of the licensee's chemistry/radiochemistry program including: organization; staffing; qualifications; training; facilities and equipment; instrumentation; laboratory instrument calibration and quality controls of analytical measurements; audits; and procedures. The inspection involved 34 onsite hours by one NRC inspector.

Results: No violations or deviations were identified. Fifteen open items are discussed in Section 3.

DETAILS1. Persons ContactedLouisiana Power and Light Company (LP&L)

- *D. B. Lester, Plant Manager
- *S. A. Alleman, Assistant Plant Manager
- *D. E. Adams, Nuclear Project Support Group, Technical Services, Chemistry/Radiochemistry
- *C. R. Booth, Secondary Chemistry Engineer
- G. Dolese, Radiochemistry Supervisor
- *T. F. Gerrets, QA Manager
- K. R. Iyengar, Nuclear Project Support Group, Technical Services, Engineering Supervisor - Nuclear
- R. W. Kenning, Health Physics Superintendent
- M. Llewellyn, Acting Secondary Chemistry Supervisor
- *D. Lowe, Training Supervisor - Nuclear
- *W. M. Morgyn, QA Engineer
- *W. N. Perry, Chemistry Engineer
- Z. A. Sabri, Training Director - Nuclear
- C. J. Toth, Training Manager - Nuclear
- *J. Woods, QC Engineer

Others

- *G. L. Constable, NRC Senior Resident Inspector
- *B. Murray, Chief, Facilities Radiation Protection Section

*Denote those present during the exit interview on May 7, 1982.

The NRC inspector also interviewed several other Waterford-3 (WF-3) station personnel during the inspection.

2. Scope of Inspection

This inspection covered an initial review of the licensee's chemistry/radiochemistry program.

3. Open Items Identified During This Inspection

(Open) Open Item (382/8212-01): Corporate Chemistry/Radiochemistry Organization - The licensee had not: completed staffing of corporate group; developed a corporate chemistry/radiochemistry program; developed position qualifications and job descriptions; developed procedures governing activities; or defined responsibilities and interface with the onsite Chemistry/Radiochemistry Department. See Section 4.a for additional details.

(Open) Open Item (382/8212-02): Onsite Chemistry/Radiochemistry Organization - The licensee had not: completed staffing of onsite group; developed job descriptions; defined responsibilities and interface with the corporate organization; or implemented procedures governing functional area assignments. See Section 4.b for additional details.

(Open) Open Item (382/8212-03): Chemistry/Radiochemistry Organization Qualifications - The licensee had not developed selection and qualification criteria for corporate and onsite chemistry/radiochemistry personnel. See Section 5 for details.

(Open) Open Item (382/8212-04): Chemistry/Radiochemistry Training Program - The licensee had not: implemented an official training program for chemistry/radiochemistry personnel; hired a qualified chemistry training coordinator and chemistry instructor; or completed qualification training of all chemistry/radiochemistry personnel. See Section 6 for additional details.

(Open) Open Item (382/8212-05): Primary Chemistry (Radiochemistry) Program - The licensee had not completed the necessary procedures to implement a radiochemistry program as committed to in the FSAR. See Section 7 for additional information.

(Open) Open Item (382/8212-06): Secondary Chemistry Program - The licensee had not completed the necessary procedures to implement a secondary chemistry program as committed to in the FSAR. See Section 8 for additional information.

(Open) Open Item (382/8212-07): Chemical Inventory Program - The licensee had not completed stocking or implementing a chemical inventory program for the station laboratories. See Section 9 for additional details.

(Open) Open Item (382/8212-08): Primary Chemistry Sampling System - The licensee had not: installed the primary sample panel; developed sampling procedures for primary chemistry samples; or calibrated the gas analyzer system and process instrumentation. See Section 10 for additional details.

(Open) Open Item (382/8212-09): Secondary Chemistry Sampling System - The licensee had not: developed sampling procedures for secondary chemistry samples; completed installation of secondary sampling panel; or completed installation and calibration of process instrumentation. See Section 11 for additional details.

(Open) Open Item (382/8212-10): Post Accident Sampling System - The licensee had not completed construction of the proposed system or sampling procedures. See Section 12 for additional information.

(Open) Open Item (382/8212-11): Controls for Effluent Releases - The licensee had not developed a program for controlling the release of gaseous and liquid effluents. See Section 13 for details.

(Open) Open Item (382/8212-12): Facilities - The construction of the laboratory facilities had not been completed and the licensee had not taken occupancy. See Section 14 for details.

(Open) Open Item (382/8212-13): Chemistry/Radiochemistry Analytical Instrumentation - The licensee had not: taken delivery of all instrumentation; placed instruments in their final operational locations; developed all necessary operating, calibration, and calibration check procedures; or implemented an instrument calibration check program. See Section 15 for additional details.

(Open) Open Item (382/8212-14): Audits and Review - The licensee had not established an audit and review program for the station Chemistry/Radiochemistry Department activities. See Section 16 for details.

(Open) Open Item (382/8212-15): Procedures - The licensee had not completed all procedures necessary to implement a complete chemistry/radiochemistry program. See Section 17 for additional details.

4. Chemistry/Radiochemistry Organization

The NRC inspector examined the licensee's corporate and onsite organizations regarding chemistry/radiochemistry activities to determine compliance with the Final Safety Analysis Report (FSAR) commitments.

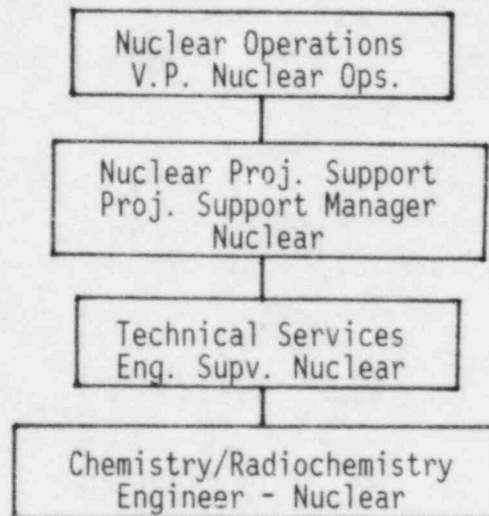
Documents Reviewed

- . FSAR Section 13.1, "Organizational Structure of Applicant"
- . DL-82-164-80, Job Description for Chemistry Department Head Engineer - Nuclear, (Draft), dated April 22, 1982
- . DL-82-164-104, Job Description for Radiochemist Utility Engineer - Radiochemistry, (Draft)
- . DL-82-164-106, Job Description for Radiochemistry Supervisor Chemical Supervisor - Nuclear, (Draft)
- . DL-82-164-107, Job Description for Radiochemistry Technical Specialist - Nuclear, (Draft)

- . DL-82-164-108, Job Description for Radiochemistry Technician - Nuclear, (Draft)
- . DL-82-164-103, Job Description for Chemist Utility Engineer - Nuclear, (Draft)
- . DL-82-164-105, Job Description for Secondary Chemistry Supervisor Chemical Supervisor - Nuclear, (Draft)
- . DL-82-164-109, Job Description for Secondary Chemistry Technical Specialist - Nuclear, (Draft)
- . DL-82-164-102, Job Description for Secondary Chemistry Technician - Nuclear, (Draft)

a. Corporate Chemistry/Radiochemistry Organization

The following chart shows the Louisiana Power and Light (LP&L) corporate chemistry/radiochemistry organization for Waterford-3:



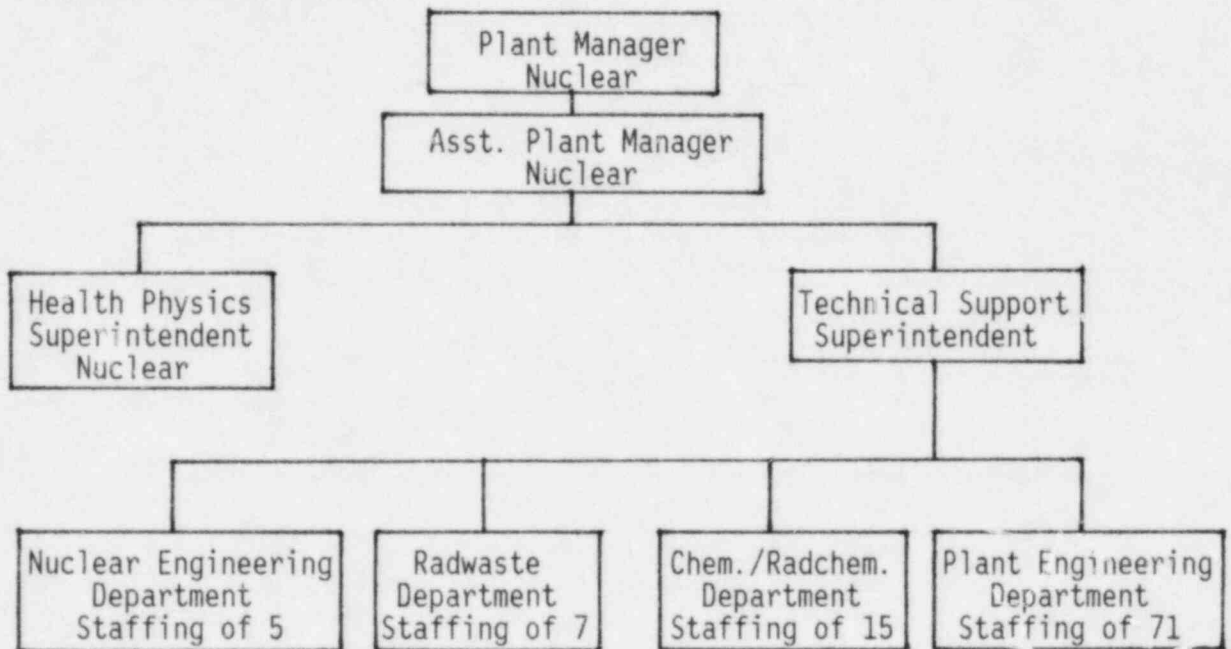
The corporate chemistry/radiochemistry organization was still in the development stage and staff subgroup positions have not been completely filled. The corporate Chemistry/Radiochemistry Engineer was actively recruiting to fill remaining positions with qualified personnel. The corporate Chemistry/Radiochemistry Engineer meets ANSI N18.1-1971 qualifications. The duties of the corporate Chemistry/Radiochemistry Engineer were not developed. There were no job descriptions available for the corporate Chemistry/Radiochemistry Engineer or his staff. A corporate Chemistry/Radiochemistry program description was in development. The NRC inspector was concerned that the corporate chemistry/radiochemistry organization regarding job descriptions, staffing, assignment of responsibilities, and implementing procedures governing areas of respons. lities were only in the planning stage.

This item is considered open (382/8212-01) pending:

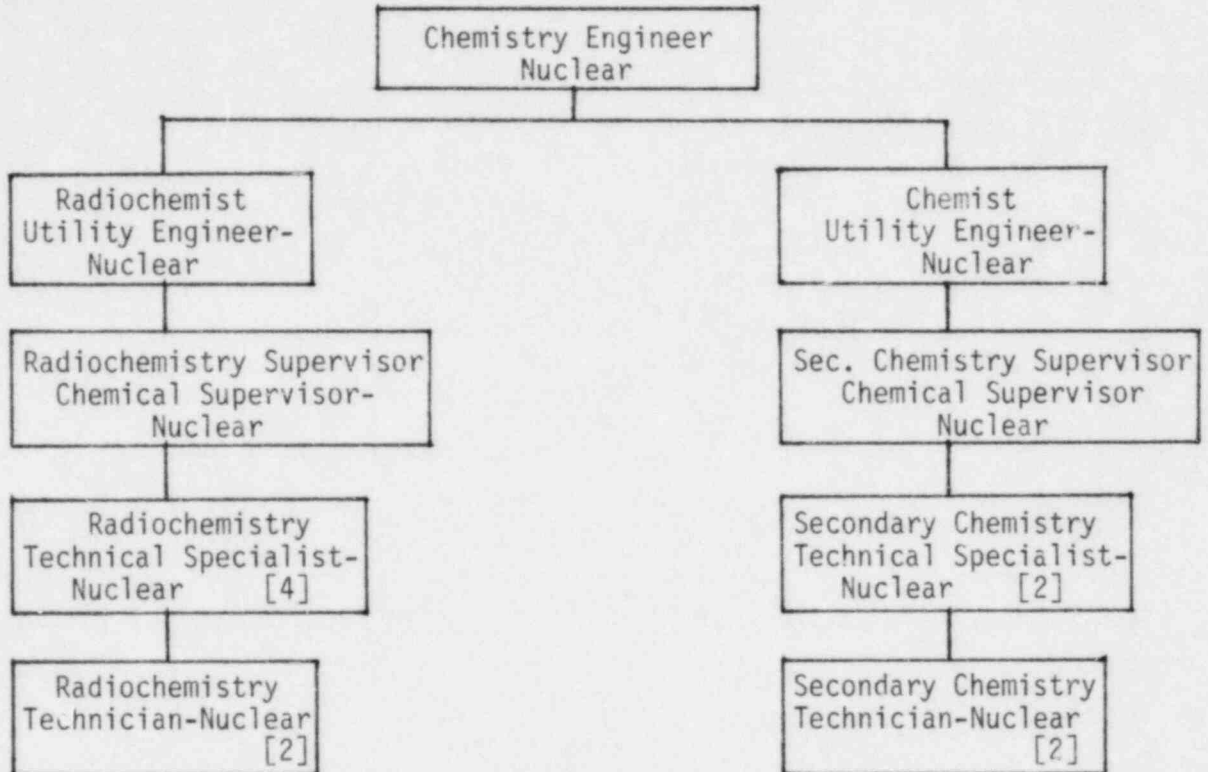
- . Development of a corporate chemistry/radiochemistry program description.
- . Development of position qualifications and job descriptions.
- . Completion of corporate chemistry/radiochemistry group staffing.
- . Defining the responsibilities and interface with the onsite chemistry/radiochemistry department.
- . Development of procedures governing activities within the assigned areas of responsibility.

b. Onsite Chemistry/Radiochemistry Organization

The following chart shows the existing station management organization as it pertains to the onsite Chemistry/Radiochemistry Department activities:



The following chart shows the current onsite Chemistry/Radiochemistry Department organization:



The numbers in brackets denote the staffing authorized.

The NRC inspector was concerned regarding the present onsite management organization, in that job descriptions, staff qualification requirements, and implementing procedures for functional area assignments had not been completed and approved.

At the time of the inspection 12 of the 15 onsite Chemistry/Radiochemistry Department staff positions had been filled. The station Chemistry Engineer was actively recruiting to fill the remaining positions with qualified personnel. The number of chemistry/radiochemistry personnel indicated on the staffing charts appears to be sufficient to meet staffing requirements for routine operation. However, to facilitate back-shift chemistry coverage, additional shift technicians may have to be considered.

This item is considered open (382/8212-02) pending:

- Approval of job descriptions.

- . Defining the responsibilities and interface with the corporate chemistry/radiochemistry organization.
- . Staffing of the Chemistry/Radiochemistry Department.
- . Implementation of chemistry/radiochemistry job descriptions and procedures governing functional area assignments.

5. Chemistry/Radiochemistry Personnel Qualifications

The NRC inspector reviewed the qualifications of the chemistry/radiochemistry personnel including corporate and onsite to determine agreement with commitments in the FSAR and the recommendations of Regulatory Guide 1.8, ANSI N18.1-1971, and NUREG-0731.

Documents Reviewed

- . Chemistry/Radiochemistry Department personnel training records and experience resumes
- . Corporate Chemistry/Radiochemistry Engineer training and experience resume
- . ANSI N18.1-1971, "Standard for Selection and Training of Nuclear Power Plant Personnel"
- . FSAR, Section 13.1, "Organizational Structure of Applicant"

a. Corporate

The NRC inspector determined that the corporate Chemistry/Radiochemistry Engineer (Corporate Radiochemist) meets the FSAR commitments, which follow the recommendations of NUREG-0731. The licensee had not filled all staff positions in the corporate chemistry/radiochemistry organization (see open item 382/8212-01) and had not established procedures providing definitive guidance on evaluation of personnel training and experience for determination of qualification to at least ANSI N18.1-1971 recommendations.

b. Onsite

Table I illustrates the education and experience background information on personnel currently assigned to the Chemistry/Radiochemistry Department. The licensee had committed to, in the FSAR, the qualification requirements recommended in ANSI/ANS 3.1-1978 (not currently adopted by the NRC), which are more

stringent than those contained in (and endorsed by the NRC) ANSI 18.1-1971. The NRC inspector noted that 2 out of the 12 chemistry/radiochemistry staff listed in Table I do not appear to meet the experience qualification recommendations for chemistry/radiochemistry personnel as outlined in Sections 4.3 and 4.4 of ANSI N18.1-1971. The NRC inspector noted that the licensee had not implemented procedures which would provide definitive guidance for the determination of acceptable chemistry/radiochemistry experience for station personnel.

This item is considered open (382/8212-03) pending:

- . Review of all resumes of the corporate and onsite chemistry/radiochemistry personnel.
- . Development of selection and qualification criteria for both corporate and onsite chemistry/radiochemistry personnel.
- . Incorporation of at least minimum ANSI 18.1-1971 personnel qualifications for specific positions into the respective job descriptions.

TABLE I

ON-SITE CHEMISTRY/RADIOCHEMISTRY DEPARTMENT
PERSONNEL QUALIFICATIONS

Name	Title	Degree Above High School	Total Nuclear Exp. (yrs' mo's)	Total* Commercial Nuclear Exp. (yr's mo's)	Commerical Nuclear Operating Plant Exp. (yr's mo's)	Resume Reviewed
W. N. Perry	Chem. Eng.	BS-Physics	11yrs. 0mo.	3yrs. 0mo.	0yr. 8mos.	yes
C. Hawkins	Radiochemist	MS-Chem	2yrs. 6mos.	0yr. 0mo.	0yr. 0mo.	yes
C. R. Booth	Sec. Chemist	BS-Biology	1yr. 0mo.	1yr. 0mo.	0yr. 0mo.	yes
G. Dolese	Rad. Chem. Sup.		12yrs. 0mo.	4yrs. 0mo.	0yr. 2mos.	no
M. Llewellyn	Sec. Chem. Sup.		10yrs. 6mos.	4yrs. 6mos.	0yr. 1mo.	no
R. Conatser	Tech. Spec.	BS-Chemistry	3yrs. 0mo.	3yrs. 0mo.	3yrs. 0mo.	yes
S. Bradford	Tech. Spec.	AS (2yrs.)	1yr. 0mo.	1yr. 0mo.	0yr. 0mo.	no
C. Edwards	Tech. Spec.	BS-Biology	2yrs. 0mo.	2yrs. 0mo.	1yr. 0mo.	no
B. Falqoust	Chem. Tech.	BA-Agri.	0yr. 2mos.	0yr. 2mos.	0yr. 0mo.	no
J. Shipman	Chem. Tech.	AS (2yrs.)	2yrs. 0mo.	1yr. 0mo.	0yr. 0mo.	no
H. Williams	Chem. Tech.	BS-Biology	3yrs. 0mo.	3yrs. 0mo.	2yrs. 0mo.	no
M. McGarry	Chem. Tech.	BS-Biology	3yrs. 3mos.	3yrs. 3mos.	0yr. 0mo.	no

*Experience associated with design, construction, and preoperational activities of commercial nuclear plants.

6. Chemistry/Radiochemistry Training Program

The inspector reviewed the licensee's chemistry/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

- . PMD-TR-009, "Program Description for Nuclear Training Group Organization," (Draft) Revision 0, January 12, 1982
- . PMD-TR-002, "Program Description for General Employee Training," (Draft) Revision 0, January 15, 1982
- . PMD-TR-028, "Program Description for Chemistry Training," (Draft) Revision 0, January 7, 1982
- . CE-01-001, "Training and Qualification of Chemistry Department Personnel," (Draft) Revision 0, March 25, 1982
- . FSAR Section 13.2, "Training"
- . Course outline for LP&L-C&E Training Course, (Draft), not dated

At the time of this inspection the corporate Nuclear Training Division was being reorganized. As such, the roles and responsibilities for the corporate Nuclear Training Division and the onsite Chemistry/Radiochemistry Department concerning training activities were not well defined.

The NRC inspector discussed the proposed training program for chemistry/radiochemistry personnel with the Training Director-Nuclear. Training will be performed by instructors from the Nuclear Training Division when hired. At the time of the inspection, the Nuclear Training Division had not hired a qualified individual to be the instructor or Chemistry Training Coordinator for the Chemistry/Radiochemistry Department. Due to the absence of official program objectives, course schedule, lesson plans, and qualification criteria, the NRC inspector did not investigate further.

The onsite Chemistry/Radiochemistry Department had hired a consultant to conduct a 240 hour course for the chemistry/radiochemistry staff. The NRC inspector noted that 8 of the present 12 staff members had completed the course. The course schedule, lecture outlines, and written examinations were reviewed for content and applicability. The NRC inspector found the chemistry training course adequate to prepare the chemistry/radiochemistry staff for their technical duties.

The NRC inspector noted that the licensee did not have a technical library for members of the Chemistry/Radiochemistry Department and that there was no procedure established by which to route industry technical materials through the Chemistry/Radiochemistry Department.

The NRC inspector was unable to review individual chemistry/radiochemistry staff training records at the time of the inspection. These records will be reviewed during future inspections.

This item is considered open (382/8212-04) pending:

- . Hiring of a Chemistry Training Coordinator and/or Chemistry Instructor.
- . Implementation of an official training program for chemistry/radiochemistry personnel.
- . Completed qualification training of all chemistry/radiochemistry personnel.
- . Review of chemistry/radiochemistry individual personnel training records, including written exams and qualification records.

7. Primary Chemistry (Radiochemistry) Program

The NRC inspector reviewed the licensee's primary chemistry program to determine compliance with FSAR commitments, proposed Technical Specifications, and recommendations contained in CENPD-28 Combustion Engineering Chemistry Manual.

Documents Reviewed

- . FSAR, Chapter 16, proposed Technical Specifications
- . FSAR, Table 9.3-7, Reactor Coolant and Reactor Makeup Water
- . FSAR, Chemistry Section 9.3.4, Chemical and Volume Control System
- . CENPD-28, Combustion Engineering Chemistry Manual
- . PMD-CE-02, "Program Description for Primary Chemistry," (Draft) Revision 0, March 16, 1982
- . CE-01-002, "Log Keeping, Filing, and Record Storage," Revision 1, January 22, 1982
- . CE-01-003, "Reporting Chemistry Data to Operations Group," Revision 0, February 5, 1982

- . CE-01-008, "Inventory and Control of Chemicals and Reports," Revision 0, December 9, 1981
- . CE-02-007, "Maintaining Component Cooling Water Chemistry," Revision 0, January 7, 1982
- . CE-02-011, "Maintaining Spent Fuel Pool Chemistry," Revision 0, February 5, 1982
- . CE-02-020, "Maintaining Primary Water Storage Tank Chemistry," Revision 0, February 5, 1982
- . CE-03-008, "Use of the Process Conductivity Monitors," Revision 0, August 24, 1981
- . CE-03-009, "Use of the Process Dissolved Oxygen Monitors," Revision 0, August 12, 1981
- . CE-03-100, "Determination of Chlorides >10 ppm, Mercuric Nitrate Method," Revision 1, August 12, 1981
- . CE-03-101, "Determination of Chlorides <10 ppm, Mercuric Nitrate Method," Revision 0, August 27, 1981
- . CE-03-102, "Determination of Chlorides <10 ppm, Silver Nitrate Method," Revision 0, August 20, 1981
- . CE-03-103, "Determination of Chlorides <1.0 ppm, Specific Ion Electrode Method," Revision 0, August 12, 1981
- . CE-03-104, "Determination of Chlorides <10 ppm, Colorimetric Method," Revision 0, September 10, 1981
- . CE-03-105, "Determination of pH," Revision 0, August 20, 1981
- . CE-03-106, "Determination of Conductivity," Revision 0, August 27, 1981
- . CE-03-107, "Determination of Fluorides," Revision 0, October 27, 1981
- . CE-03-108, "Determination of Hydrazine (0-80 ppb)," Revision 0, August 27, 1981
- . CE-03-109, "Determination of Hydrazine," Revision 1, March 16, 1981
- . CE-03-111, "Determination of Ammonia," Revision 1, October 27, 1981
- . CE-03-112, "Determination of Ammonia in the Presence of Hydrazine >200 ppb, Distillation Method," Revision 0, August 27, 1981

- . CE-03-118, "Determination of Dissolved Oxygen >0.05 ppm, Winkler Method," Revision 0, August 27, 1981
- . CE-03-119, "Determination of Dissolved Oxygen, Indigo Carmine Method," Revision 0, August 27, 1981
- . CE-03-120, "Determination of Dissolved Oxygen, Meter," Revision 0, August 27, 1982
- . CE-03-121, "Determination of Boron," Revision 1, August 27, 1981
- . CE-03-122, "Determination of Boron, Titration Method," Revision 1, August 12, 1981
- . CE-03-123, "Determination of Boron, Curcumin Method," Revision 1, August 12, 1981
- . CE-03-127, "Determination of Suspended Solids," Revision 0, August 12, 1981
- . CE-03-303, "Gross Alpha Measurement," Revision 0, November 9, 1981
- . CE-03-700, "General Grab Sampling Techniques," Revision 0, January 7, 1982

Planned Procedures Not Available for Review

- . CE-01-004, "Periodic Analysis Scheduling Program," (Draft), in progress
- . CE-01-005, "Test Stand Calibration Scheduling Program," (Draft), in progress
- . CE-01-006, "Analytical and Process Equipment Calibration Scheduling Program," (Draft), in progress
- . CE-02-006, "Maintaining Reactor Coolant Chemistry," (Draft), in technical review
- . CE-02-009, "Maintaining Boron Management System Chemistry," (Draft), in technical review
- . CE-02-010, "Maintaining Safety Injection Tank Chemistry," (Draft), in word processing
- . CE-02-012, "Maintaining Boron Concentration During Refueling," (Draft), in word processing
- . CE-02-016, "Monitoring Gaseous Waste Management," (Draft), in technical review

- . CE-02-018, "Monitoring Liquid Waste Management," to be written
- . CE-02-025, "Maintaining Refueling Water Storage Pool Chemistry," (Draft), in technical review
- . CE-02-026, "Boron Concentration Prior To and During Initial Core Load," (Draft), in technical review
- . CE-02-100, "Chemistry Technical Specifications Surveillance Performance Coordination," (Draft), to be written
- . CE-03-006, "Use of the On-Line Hydrogen/Oxygen Analyzer," (Draft), in technical review
- . CE-03-300, "Preparation of Liquid Samples for Radiological Chemical Analysis," (Draft), in PORC review
- . CE-03-301, "Determination of Gross Beta Radioactivity," to be written
- . CE-03-302, "Determination of Gross Gamma Radioactivity," to be written
- . CE-03-305, "Sampling of Ventilation and Gaseous Waste Management Systems for Radioactive Effluents," to be written
- . CE-03-306, "Determination of the Average Beta-Gamma Energy of Reactor Coolant," (Draft), in technical review
- . CE-03-311, "Radiostrontium Analysis," to be written
- . CE-03-313, "Tritium Analysis," (Draft), in technical review
- . CE-03-320, "Gamma Spectroscopy Analysis," (Draft), in department review
- . CE-03-324, "Compositing Samples for Weekly, Monthly, and Quarterly Composites," (Draft), in technical review
- . CE-03-325, "Determination of Nitrogen, Hydrogen, Oxygen, and Gaseous Activities," (Draft), in progress
- . CE-03-400, "Use of the Plasma Emission Spectrometer, to be written
- . CE-03-703, "Tank Sampling Recirculation Times," to be written
- . CE-03-900, "Operation of the Post Accident Sampling System," to be written
- . CE-03-901, "Post Accident Sampling of Containment Atmosphere," to be written

- . CE-03-902, "Post Accident Boron Analysis," to be written
- . CE-03-903, "Post Accident Gamma Spectroscopic Analysis," to be written
- . CE-03-904, "Post Accident Hydrogen Analysis," to be written

The NRC inspector's review of the primary chemistry program indicated that the licensee's program was not fully established. It was noted that many of the implementing and analytical procedures had not been completed or approved.

The licensee had not developed procedures for the operation and calibration of the plasma emission spectrometer. Analytical procedures for determination of element concentrations in a sample using the plasma emission spectrometer had not been written.

The licensee had not developed procedures for the operation and calibration of the ion chromatograph. Analytical procedures for determination of ion concentrations in a sample using the ion chromatograph had not been written.

The licensee had not developed procedures for the preparation and accountability of instrument radioactive calibration standards.

The licensee had not developed procedures for the operation, calibration, and calibration check of the nuclear analytical instrumentation in the counting room.

The licensee had not developed detailed sampling procedures for all manually sampled systems in the primary chemistry area. Sample points had not been identified for all primary chemistry systems or tanks.

The licensee had not verified tank volumes for all potentially contaminated tanks or verified recirculation times required to produce representative samples.

The NRC inspector noted that the primary water storage tank is vented to the atmosphere and no dissolved oxygen specification is controlled. It will be difficult to maintain the dissolved oxygen concentration in the reactor coolant system at <0.1 ppm while being diluted with water from the primary water storage tank which is saturated with dissolved oxygen during hot functional testing or during a transition from cold shutdown to criticality of the reactor.

This item is considered open (382/8212-05) pending:

- . Completion of administrative procedures, primary chemistry system procedures, surveillance procedures, radiochemistry analytical procedures, primary chemistry chemical control analytical procedures, and post accident primary chemistry procedures.

- . Development and implementation of detailed sampling procedures for every primary system to be sampled.
- . Verification of tank volumes and recirculation times to produce representative samples.
- . Determination of sampling times for each primary sample point to produce a representative sample.
- . Verification of all analytical procedures using known standards.

8. Secondary Chemistry Program

The NRC inspector reviewed the licensee's secondary chemistry program to determine compliance with FSAR commitments, proposed Technical Specifications, and recommendations contained in CENPD-28 Combustion Engineering Chemistry Manual.

Documents Reviewed

- . FSAR, Chapter 16, proposed Technical Specifications
- . FSAR, Section 10.3.5, Secondary Water Chemistry Monitoring Program
- . CENPD-28, Combustion Engineering Chemistry Manual
- . PMD-CE-003, "Program Description for Secondary Chemistry," (Draft) Revision 0, February 17, 1982
- . CE-01-002, "Log Keeping, Filing, and Record Storage," Revision 1, January 22, 1982
- . CE-01-003, "Reporting Chemistry Data to Operations Group," Revision 0, February 5, 1982
- . CE-01-008, "Inventory and Control of Chemicals and Reagents," Revision 0, December 9, 1981
- . CE-02-000, "Maintaining Auxiliary Boiler Chemistry," Revision 0, February 5, 1982
- . CE-02-004, "Maintaining Boze Filter Chemistry," Revision 0, October 27, 1981
- . CE-02-005, "Maintaining Makeup Demineralizer Chemistry," Revision 0, January 22, 1982
- . CE-02-007, "Maintaining Component Cooling Water Chemistry," Revision 0, January 7, 1982

- . CE-02-015, "Maintaining Turbine Building Cooling Water Chemistry," Revision 0, April 12, 1982
- . CE-02-017, "Maintaining Package Cooling Tower Chemistry," Revision 0, January 22, 1982
- . CE-02-019, "Maintaining Diesel Generator Jacket Cooling Water Chemistry," Revision 0, April 5, 1982
- . CE-02-021, "Systems Layup During the Construction Phase," Revision 0, December 9, 1981
- . CE-02-022, "Feed, Condensate, and Heater Drains Systems Chemistry Prior to Normal Operation," Revision 0, October 27, 1981
- . CE-02-023, "Reactor Coolant and Auxiliary Systems Chemistry Prior to Fuel Load," Revision 0, November 11, 1981
- . CE-02-024, "Steam Generator Chemistry Prior to Normal Operation," Revision 0, November 9, 1981
- . CE-02-028, "Maintaining Stator Coil Water Chemistry," Revision 0, January 22, 1982
- . CE-03-008, "Use of the Process Conductivity Monitors," Revision 0, August 24, 1981
- . CE-03-009, "Use of the Process Dissolved Oxygen Monitors," Revision 0, August 12, 1981
- . CE-03-010, "Use of Process Silica Monitors," Revision 0, October 1, 1981
- . CE-03-012, "Use of the Hach Surface Scatter 4 Turbidimeter," Revision 0, August 24, 1981
- . CE-03-013, "Use of the Hach Process Hardness Monitor," Revision 0, October 6, 1981
- . CE-03-014, "Use of the Process Hydrazine Monitor," Revision 0, August 27, 1981
- . CE-03-100, "Determination of Chlorides >10 ppm, Mercuric Nitrate Method," Revision 0, August 12, 1981
- . CE-03-101, "Determination of Chlorides <10 ppm, Mercuric Nitrate Method," Revision 0, August 27, 1981
- . CE-03-102, "Determination of Chlorides <10 ppm, Silver Nitrate Method," Revision 0, August 20, 1981

- . CE-03-103, "Determination of Chlorides <1.0 ppm, Specific Ion Electrode Method," Revision 0, August 12, 1981
- . CE-03-104, "Determination of Chlorides <10 ppm, Colorimetric Method," Revision 0, September 10, 1981
- . CE-03-105, "Determination of pH (Meter)," Revision 0, August 20, 1981
- . CE-03-106, "Determination of Conductivity," Revision 0, August 27, 1981
- . CE-03-107, "Determination of Fluorides," Revision 0, October 27, 1981
- . CE-03-108, "Determination of Hydrazine (0-80 ppb), Revision 0, August 27, 1981
- . CE-03-109, "Determination of Hydrazine," Revision 1, March 16, 1981
- . CE-03-111, "Determination of Ammonia," Revision 1, October 27, 1981
- . CE-03-112, "Determination of Ammonia in the Presence of Hydrazine >2 ppb, Distillation Method," Revision 0, August 27, 1981
- . CE-03-113, "Determination of Dissolved Silica <2 ppm," Revision 0, August 27, 1981
- . CE-03-114, "Determination of Dissolved Silica >2 ppm," Revision 0, August 27, 1981
- . CE-03-115, "Determination of Hardness (0-2 ppm)," Revision 1, September 28, 1981
- . CE-03-116, "Determination of Total Hardness >2 ppm," Revision 1, October 6, 1981
- . CE-03-117, "Determination of Calcium Hardness," Revision 1, August 12, 1981
- . CE-03-118, "Determination of Dissolved Oxygen >0.05 ppm (Winkler Method)," Revision 0, August 27, 1981
- . CE-03-119, "Determination of Dissolved Oxygen (Indigo Carmine Method)," Revision 0, August 27, 1981
- . CE-03-120, "Determination of Dissolved Oxygen (Meter)," Revision 0, August 27, 1981
- . CE-03-125, "Determination of Fluoride and Chloride Contamination (Patch Test Method "A")," Revision 1, August 20, 1981

- . CE-03-126, "Determination of Surface Chlorides and Fluorides (Patch Test Method "B")," Revision 1, August 12, 1981
- . CE-03-127, "Determination of Suspended Solids," Revision 0, August 12, 1981
- . CE-03-128, "Determination of Suspended Nonfilterable Solids," Revision 0, August 12, 1981
- . CE-03-129, "Determination of Surfactants, Methylene Blue Method," Revision 0, October 1, 1981
- . CE-03-130, "Determination of Solids (Membrane Comparison Chart)," Revision 0, August 12, 1981
- . CE-03-131, "Determination of Particulate Contamination in Liquids (Particle Count Method)," Revision 1, August 12, 1981
- . CE-03-132, "Determination of Total Phosphates (Amino Acid)," Revision 0, August 27, 1981
- . CE-03-133, "Determination of Copper (Cuprethol)," Revision 0, October 6, 1981
- . CE-03-134, "Determination of Copper (Neocuproine)," Revision 1, March 3, 1979
- . CE-03-135, "Determination of Sulfide (15-500 ppb)," Revision 0, July 7, 1981
- . CE-03-136, "Determination of Sulfates <200 ppm, Spectrophotometric Method," Revision 0, October 6, 1981
- . CE-03-137, "Determination of Sulfite," Revision 0, August 27, 1981
- . CE-03-138, "Determination of Turbidity (Turbidimeter Method)," Revision 0, August 12, 1981
- . CE-03-139, "Determination of Acidity (Titration Method)," Revision 0, August 27, 1981
- . CE-03-140, "Determination of Total Alkalinity Phenc phthalein and Methyl Orange," Revision 0, August 20, 1981
- . CE-03-141, "Determination of Baume and Percent Concentration of Aqueous Solution," Revision 0, August 20, 1981
- . CE-03-142, "Determination of Iron (0-100 ppb)," Revision 0, September 28, 1981

- . CE-03-144, "Determination of Hexavalent Chromium (4-200 ppb)," Revision 0, August 27, 1981
- . CE-03-145, "Determination of Sodium by Specific Ion Electrode," Revision 0, October 27, 1981
- . CE-03-146, "Determination of Nitrite (Titration Method)," Revision 0, August 27, 1981
- . CE-03-147, "Determination of Nitrite (Spectrophotometric Method)," Revision 0, September 10, 1981
- . CE-03-149, "Determination of Hydroxide Ion in Water," Revision 0, August 12, 1981
- . CE-03-500, "Determination of Free CO₂," Revision 0, October 6, 1981
- . CE-03-501, "Determination of Chlorine (Starch-Iodide Titration)," Revision 0, October 27, 1981
- . CE-03-503, "Determination of Total Free Chlorine (Comparator Method)," Revision 0, October 27, 1981
- . CE-03-505, "Determination of Biological Oxygen Demand," Revision 1, April 5, 1982
- . CE-03-600, "Determination of Oil and Grease in Liquid Solvent Extraction," Revision 1, October 27, 1981
- . CE-03-601, "Determination of Kinematic Viscosity of Liquid Petroleum Products," Revision 0, October 27, 1981
- . CE-03-602, "Determination of Water and Sediment in Oil (Centrifuge)," Revision 1, September 25, 1979
- . CE-03-603, "Determination of Water Content in Electric-Hydraulic Fluid," Revision 1, October 6, 1981
- . CE-03-604, "Determination of Mineral Oil in EH Fluid," Revision 1, October 6, 1981
- . CE-03-605, "Determination of Neutralization Number (Titration Method)," Revision 0, October 6, 1981
- . CE-03-700, "General Grab Sampling Techniques," Revision 0, January 7, 1982

Planned Procedures Not Available for Review

- . CE-01-004, "Periodic Analysis Scheduling Program," (Draft), in progress
- . CE-01-005, "Test Stand Calibration Scheduling Program," (Draft), in progress
- . CE-01-006, "Analytical and Process Equipment Calibration Scheduling Program," (Draft), in progress
- . CE-02-001, "Maintaining Steam Generator Chemistry," (Draft), in technical review
- . CE-02-002, "Maintaining Condensate and Feedwater Chemistry," (Draft), in technical review
- . CE-02-003, "Maintaining Wet Cooling Tower Chemistry," (Draft), in progress
- . CE-02-008, "Maintaining Condensate Storage Pool Chemistry, (Draft), in technical review
- . CE-02-013, "Maintaining Chill Water Chemistry," (Draft), in word processing
- . CE-02-014, "Maintaining Supplementary Chill Water Chemistry," (Draft), in word processing
- . CE-02-027, "Maintaining Condensate Storage Tank Chemistry," (Draft), in technical review
- . CE-03-007, "Operation of the Process pH Monitors," (Draft), in word processing
- . CE-03-011, "Use of Process Sodium Monitors," (Draft), in department review
- . CE-03-400, "Use of the Plasma Emission Spectrometer," to be written
- . CE-03-703, "Tank Sampling Recirculation Times," to be written

The NRC inspector's review of the secondary chemistry program indicated that the licensee's program was not fully established. It was noted that several of the implementing and analytical procedures had not been completed or approved.

The NRC inspector noted that the licensee had not developed detailed sampling procedures for all manually sampled systems in the secondary chemistry area. Sample points had not been identified for all secondary chemistry systems or tanks.

The licensee had not verified secondary chemistry tank volumes or recirculation times required to produce representative samples.

The licensee had not developed procedures specifically for the use of the analytical balance, B&L Spectronic 88, and laboratory centrifuge.

This item is considered open (382/8212-06) pending:

- . Completion of administrative procedures, secondary chemistry system procedures, surveillance procedures, chemistry analytical procedures, and secondary chemistry chemical control analytical procedures.
- . Development and implementation of detailed sampling procedures for every secondary chemistry system to be sampled.
- . Verification of tank volumes and recirculation times to produce representative samples.
- . Verification of all analytical procedures using known standards.

9. Chemical Inventory Program

The NRC inspector reviewed the licensee's chemical inventory and accountability program to determine compliance and support for FSAR commitments, proposed Technical Specifications, and recommendations contained in CENPD-28 Combustion Engineering Chemistry Manual.

Documents Reviewed

- . PMD-CE-006, "Program Description for Chemical Inventory," Revision 0, April 22, 1982
- . CENPD-28, Combustion Engineering Chemistry Manual
- . CE-01-008, "Inventory and Control of Chemicals and Reagents," Revision 0, December 9, 1981

The NRC inspector's review of the chemical inventory program indicated that the licensee's program had not been fully implemented. Based on a review of existing procedures, the NRC inspector determined that a program was under development which appeared to adequately monitor and control the receipt and use of chemicals to support plant operation.

This item is considered open (382/8212-07) pending:

- . Complete implementation of the proposed program.
- . Procurement of all chemicals necessary to support the primary and secondary chemistry programs.

- . Consideration of establishment of a computer program to handle inventory and accountability of chemicals.
- . Establishment of a safe area for storage of flammable chemicals other than laboratory amounts stored in the respective laboratories.
- . Establishment of a safe area for storage of bulk chemicals such as boric acid, hydrazine, and EHC fluid.

10. Primary Chemistry Sampling System

The NRC inspector reviewed the licensee's primary chemistry sampling system to determine compliance with FSAR commitments, proposed Technical Specifications, and recommendations contained in CENPD-28 Combustion Engineering Chemistry Manual.

Documents Reviewed

- . FSAR, Chapter 16, proposed Technical Specifications
- . FSAR, Section 9.3.2.2.1, Primary Sampling System
- . CENPD-28, Combustion Engineering Chemistry Manual

The NRC inspector visited the primary chemistry sampling area to be used by the radiochemistry staff in performing their various radiochemistry responsibilities. Little guidance is available to determine the adequacy of the sampling system. Inspection findings are based on the NRC inspector's judgement and comparison with facilities at other nuclear power plants.

The primary sampling system brings samples from the reactor coolant system and auxiliary systems to a common location in the primary sample room on the primary sampling panel located on the -4 foot elevation in the Reactor Auxiliary Building. Auxiliary systems sampled at the panel include Safety Injection System, Shutdown Cooling System, and Chemical and Volume Control System. Grab sample provisions are provided.

The automatic gas analyzer is a part of the primary sampling system and is located in a room adjacent to the primary sample room. At this analyzer panel, gas samples from various components of the BMS, CVCS, and WMS are automatically analyzed for potentially hazardous concentrations of oxygen and hydrogen. Grab samples may be collected and taken to the radiochemistry laboratory for further analysis.

The NRC inspector noted that there appears to be sufficient space for workers at the primary sample panel and gas analyzer panel. Both panels are conveniently located adjacent to the radiochemistry laboratory. At the time of the inspection the gas analyzer was installed but not operational and a new primary sample panel was ordered and the facility was waiting delivery and installation.

The NRC inspector observed that many of the sample lines which will be carrying contaminated liquids and gases were located in uncontrolled areas and also areas normally occupied continuously within the radiation controlled area causing a potentially high radiation area for many workers and high background readings in the health physics counting area. Sample lines and drain lines were found to be extensively long with many 90° bends. This situation is inconsistent with the ALARA program.

This item is considered open (382/8212-08) pending:

- . Installation and complete checkout of the primary sampling panel.
- . Completion of sampling procedures and valve lineups for use of the sampling panel.
- . Installation and complete calibration and checkout of the automatic gas analyzer panel.

11. Secondary Chemistry Sampling System

The NRC inspector reviewed the licensee's secondary chemistry sampling system to determine compliance with FSAR commitments, proposed Technical Specifications, and recommendations contained in CENPD-28 Combustion Engineering Chemistry Manual.

Documents Reviewed

- . FSAR, Chapter 16, proposed Technical Specifications
- . FSAR, Section 9.3.2.2.2, Secondary Sampling System
- . CENPD-28, Combustion Engineering Chemistry Manual

The NRC inspector visited the secondary chemistry sampling area to be used by the chemistry staff in performing their various chemistry responsibilities. Inspection findings are based on the NRC inspector's judgement and comparison with similar nuclear power plant facilities.

The secondary sampling system takes water and steam samples from the secondary cycle, makeup demineralizer, and condensate transfer pump discharge and brings them to a common location in the secondary chemistry laboratory located on the -4 foot elevation in the Reactor Auxiliary Building. Water quality analyses are performed to provide a basis for the control of the secondary cycle water chemistry.

The NRC inspector found the sample panel and process analyzer panel conveniently located to the secondary chemistry laboratory work area. There appears to be adequate working space around the sampling panels. Grab samples can be conveniently transported to the analysis areas of the laboratory. At the time of the inspection the process analyzers were not functional and the sampling panel line connections were not completed.

This item is considered open (382/8212-09) pending:

- . Installation and complete checkout of the secondary sampling panel.
- . Completion of sampling procedures and valve lineups for use of the sampling panel.
- . Installation and complete calibration and checkout of the process analyzers.

12. Post Accident Sampling System

The NRC inspector reviewed the licensee's post accident sampling system to determine compliance with FSAR commitments and the recommendations of NUREG-0660 and NUREG-0737.

Documents Reviewed

- . FSAR, Section 9.3.8 Post Accident Sampling System

The NRC inspector spent a limited amount of time reviewing the post accident sampling system. The licensee had not fully established a post accident sampling and analysis program at the time of this inspection. The licensee is in the process of completing construction of the system. Procedures to operate the system were proposed but were yet to be written. The system is expected to be operational prior to fuel loading.

The NRC inspector indicated that the post accident sampling and analysis system will be reviewed in detail during a subsequent inspection.

This item is considered open (382/8212-10) pending completion of the proposed system and procedures.

13. Controls for Effluent Releases

The NRC inspector reviewed the licensee's controls for effluent releases to determine compliance with FSAR commitments, proposed Technical Specifications, and the recommendations of Regulatory Guide 1.21.

Documents Reviewed

- . FSAR, Section 11.5, Process and Effluent Radiological Monitoring and Sampling Systems
- . FSAR, Chapter 16, proposed Technical Specifications

The NRC inspector was informed that the Health Physics Department had been assigned the responsibility of developing the liquid and gaseous effluent release permits and summary of release data. The licensee was unable at the time of the inspection to provide the NRC inspector with any procedures for effluent releases.

Based on the NRC inspector's judgement and experience with effluent releases at similar nuclear power plant facilities, the following items would be expected to be included in the effluent release permit procedures:

- . Radiochemistry isotopic analysis results
- . Chemical analysis results
- . Allowable release rate
- . Dilution flow rate
- . Technical Specification limits
- . Setpoints of gas/liquid radiation monitors
- . Function tests of gas/liquid radiation monitors
- . Function tests of effluent isolation valves
- . Valve lineup for tank released
- . Total curie amount of activity released
- . Total volume of gas/liquid released
- . Total dilution volume
- . Authorization signature

The NRC inspector will be reviewing the radioactive effluent release control procedures in detail during a subsequent inspection.

This item is considered open (382/8212-11) pending the development of radioactive effluent release control procedures.

14. Facilities, Equipment, and Supplies

The NRC inspector toured and inspected the facilities to be used by the chemistry/radiochemistry staff in performing their various chemistry support responsibilities. Inspection findings are based on the NRC inspector's judgment and experience at similar nuclear power plant facilities. The following facilities were inspected:

<u>Area</u>	<u>Location</u>	<u>Status</u>
Water plant laboratory	Makeup Water Demineralizer Building	Temporary, incomplete
Chemistry and Radio- chemistry Supervisor's office	-4ft. elevation RAB*	Completed, not equipped or occupied

Chemistry/Radiochemistry storage area	-4ft. elevation RAB	Proposed
Secondary Chemistry Laboratory	-4ft. elevation RAB	Incomplete, not equipped or occupied
Primary Chemistry Laboratory	-4ft. elevation RAB	Incomplete, not equipped or occupied
Radiochemistry Counting Room	-4ft. elevation RAB	Incomplete, not equipped or occupied
Primary Sample Room	-4ft. elevation RAB	Incomplete, waiting for new sample panel
Gas Analyzer Room	-4ft. elevation RAB	Completed, gas analyzer installed but not operational

*Reactor Access Building

The licensee had not completed construction of the designated space for chemistry/radiochemistry activities. The chemistry/radiochemistry work areas had not been occupied or put into operation. The room areas and general floor plan for the laboratories including sampling areas appear to be adequate. The laboratories were furnished with adequate furniture, storage space, fume hoods, sinks, utilities, and laboratory bench space. Each laboratory was furnished with a dishwasher, refrigerator, and storage cabinet for flammable chemicals and solvents. The laboratories were not supplied with chemicals or necessary labware to perform the required analytical procedures.

The counting room had adequate space for the counting instrumentation and was located as far from the primary sampling area as physically possible but yet be convenient to the radiochemistry laboratory. The counting room is to be supplied with stabilized electrical circuits for operation of the sensitive counting instrumentation. Air conditioning and ventilation are to be provided in the laboratories and counting room.

The primary sampling room and gas analyzer room are conveniently located to the radiochemistry laboratory. However, if a ventilation problem should exist and the general laboratory area become airborne contaminated from leaks in the primary sampling system, a radiation problem could develop in the radiochemistry laboratory and counting room. It would be advisable for the laboratory and counting room to be on an isolated ventilation system.

The Chemistry and Radiochemistry Supervisor's office is small for two people and storage of their necessary support materials. This office area may have be modified to accommodate the people and equipment. Space should be made available to the laboratory technicians for handling of data, preparation of reports, and study of technical materials.

This item is considered open (382/8212-12) pending completion of construction and occupancy of the chemistry/radiochemistry facilities.

15. Chemistry/Radiochemistry Analytical Instrumentation

The NRC inspector reviewed the licensee's inventory of analytical equipment and supplies to be used in the counting room and laboratories. Since no guidance is available to determine the adequacy of such instrumentation, the inspection findings are based on the NRC inspector's judgment and experience at similar nuclear power plant facilities.

The following inventory of laboratory and counting equipment available during this inspection was as follows:

<u>Equipment</u>	<u>Model</u>	<u>Status</u>
Drying Oven	Blue M	One, onsite
Large Centrifuge	unknown	One, onsite
Electronic Analytical Balance	Mettler AK-160	One, onsite
Mechanical Analytical Balance	Mettler H-35AR	One, onsite
Top Loading Balance	Mettler PC-2000	Two, onsite
Triple Beam Balance	Ohaus	One, onsite
Conductivity Bridge	Leeds and Northrup	Two, onsite
Conductivity Bridge	Beckman RC-20	Two, onsite
pH Meter	Orion 701	Two, onsite
pH Meter	Corning 135	Two, onsite
pH Meter	Orion 307	One, onsite
Specific Ion Meter	Orion 407	Two, onsite
Turbidimeter	Hach 2100A	Three, onsite
Auto-titrator	Mettler	One, onsite
Plasma Emission Spectrometer	Beckman/Spectrometrics	One, onsite

<u>Equipment</u>	<u>Model</u>	<u>Status</u>
UV/VIS Spectrometer	Perkin-Elmer Lambda-3	Two, onsite
Spectrometer	Bausch & Lomb Spectronic 88	One, onsite
Gas Chromatograph	Carle	One, onsite
Ion Chromatograph	Dionex	One, on order
Gamma Isotopic Spectrometer	Nuclear Data 6620	One, onsite
Liquid Scintillation Spectrometer	Beckman LS-7000P	One, onsite
Gas Proportional Counter	NMC DC-3	One, onsite

The NRC inspector found the type and quantity of analytical instrumentation adequate to perform the analytical requirements of the respective laboratories and counting room.

This item is considered open (382/8212-13) pending:

- . Procurement of remaining instrumentation, supplies, and spare parts.
- . Final location of the analytical equipment in the respective work areas.
- . Completion of operating, calibration, and calibration check procedures for analytical instruments.
- . Verification of operability and calibration of analytical instruments.
- . Implementation of an instrument calibration check program.

16. Audits and Review

The NRC inspector reviewed the licensee's internal audit/review program regarding chemistry/radiochemistry activities to determine compliance with FSAR commitments, the requirements of 10 CFR Part 50, Appendix B, and the recommendations of ANSI N18.7-1976, Regulatory Guides 1.33, 1.144, 1.146, and 4.15.

Documents Reviewed

- . FSAR, Chapter 17
- . Safety Evaluation Report (NUREG-0787) Waterford Unit No. 3

LP&L Quality Assurance Manual

The NRC inspector was specifically interested in the existence of the audit/review program and the scope of this program as it relates to the following areas associated with the Chemistry/Radiochemistry Department:

- . Reviews performed by supervision within the Chemistry/Radiochemistry Department of such activities as staff effectiveness, work practices, adequacy of staff training, and procedural compliance
- . Reviews performed by the onsite Quality Assurance (QA) Department in the area of water plant water quality and secondary chemistry control of feedwater and steam generator water quality.
- . Reviews performed by the onsite QA Department in the area of environmental impact monitoring and NPDES chemical discharges to the environment.
- . Reviews performed by the onsite QA Department in the areas of controlling and reporting of liquid and gaseous effluent releases.
- . Reviews performed by the onsite QA Department in the area of Technical Specification requirements related to primary chemistry of the reactor coolant system
- . Reviews performed by the onsite QA Department in the areas of laboratory instrument operation, calibration, and calibration checks
- . Reviews performed by the onsite QA Department in the area of instrument radioactive calibration sources validity and their control
- . Reviews performed by the onsite QA Department in the area of chemistry and radiochemistry procedural accuracy
- . Corporate audits performed to ensure compliance with Technical Specifications, Code of Federal Regulations, and stated objectives.
- . Audit/Review format, including the existence of audit procedures and checklists, to provide an insight regarding the adequacy and scope of the proposed audit/review activities
- . Composition of audit/review teams to ensure that the team members possess the necessary expertise to properly evaluate the assigned areas

Corrective action program to provide timely resolution of identified deficiencies

The licensee stated that a detailed audit/review program covering the above areas of concern had not been developed. However, according to the licensee, it is his intention to develop and implement a comprehensive audit/review program.

This item is considered open (382/8212-14) pending the implementation of an audit/review program for chemistry/radiochemistry activities.

17. Procedures

The NRC inspector reviewed the licensee's Chemistry/Radiochemistry Department procedures to determine compliance with 10 CFR Part 20 requirements, FSAR commitments, and recommendations contained in Regulatory Guides 1.21, 1.33, 4.15; and ANSI N13.1-1969, N18.7-1976, N323-1978; and Combustion Engineering Chemistry Manual CENPD-28.

For documentation purposes, in this report, the licensee's procedures have been classified as either: (1) Approved Procedures that Appear to be Satisfactory, (2) Procedures with Problems, (3) Procedures to be Completed, and (4) Procedures not Identified Which Need to be Written. All procedural findings will appear under one open item. The NRC inspector noted that the licensee has approved and issued approximately 65 percent (82 procedures) of all planned chemistry/radiochemistry procedures, with approximately 44 procedures remaining to be approved and issued.

The NRC inspector was especially concerned about the lack of detailed sampling procedures, instrument performance check and calibration procedures, and the large number of procedures which were not completed in the area of radiochemistry and operation of radioanalytical instrumentation at the time of this inspection.

a. Approved Procedures that Appear to be Satisfactory

- CE-01-000, "Organization of the Chemistry Department," Revision 0, April 22, 1981
- CE-02-004, "Maintaining Boze Filter Chemistry," Revision 0, October 27, 1981
- CE-02-021, "Systems Layup During the Construction Phase," Revision 0, December 9, 1981
- CE-02-022, "Feed, Condensate, and Heater Drains Systems Chemistry Prior to Normal Operations," Revision 0, October 27, 1981
- CE-02-024, "Steam Generator Chemistry Prior to Normal Operation," Revision 0, November 9, 1981

- . CE-03-008, "Use of the Process Conductivity Monitor," Revision 0, August 24, 1981
- . CE-03-009, "Use of the Process Dissolved Oxygen Monitors," Revision 0, August 12, 1981
- . CE-03-012, "Use of the Hach Surface Scattler 4 Turbidimeter," Revision 0, August 24, 1981
- . CE-03-013, "Use of Hach Process Hardness Monitor," Revision 0, October 6, 1981
- . CE-03-014, "Use of the Process Hydrazine Monitor," Revision 0, August 27, 1981
- . CE-03-100, "Determination of Chlorides >10 ppm (Mercuric Nitrate Method)," Revision 1, August 12, 1981
- . CE-03-101, "Determination of Chlorides <10 ppm (Mercuric Nitrate Method)," Revision 0, August 27, 1981
- . CE-03-102, "Determination of Chlorides >10 ppm (Silver Nitrate Method)," Revision 0, August 20, 1981
- . CE-03-104, "Determination of Chlorides <10 ppm (Colorimetric Method)," Revision 0, September 10, 1981
- . CE-03-105, "Determination of pH (Meter)," Revision 0, August 20, 1981
- . CE-03-106, "Determination of Conductivity," Revision 0, August 27, 1981
- . CE-03-108, "Determination of Hydrazine (0-80 ppb)," Revision 0, August 27, 1981
- . CE-03-109, "Determination of Hydrazine," Revision 1, March 16, 1981
- . CE-03-112, "Determination of Ammonia in the Presence of Hydrazine >200 ppb (Distillation Method)," Revision 0, August 27, 1981
- . CE-03-114, "Determination of Dissolved Silica >2 ppm," Revision 0, August 27, 1981
- . CE-03-115, "Determination of Hardness 0-2 ppm," Revision 0, September 28, 1981

- . CE-03-116, "Determination of Total Hardness >2 ppm," Revision 1, October 6, 1981
- . CE-03-118, "Determination of Dissolved Oxygen >0.05 ppm (Winkler Method)," Revision 0, August 27, 1981
- . CE-03-120, "Determination of Dissolved Oxygen (Meter)," Revision 0, August 27, 1981
- . CE-03-125, "Determination of Fluoride and Chloride Contamination (Patch Test Method "A")," Revision 1, August 20, 1981
- . CE-03-126, "Determination of Surface Chlorides and Fluorides (Patch Test Method "B")," Revision 1, August 12, 1981
- . CE-03-127, "Determination of Suspended Solids," Revision 0, August 12, 1981
- . CE-03-129, "Determination of Surfactants (Methylene Blue Method)," Revision 0, October 1, 1981
- . CE-03-130, "Determination of Solids (Membrane Comparison Chart)," Revision 0, August 12, 1981
- . CE-03-131, "Determination of Particulate Contamination in Liquids (Particle Count Method)," Revision 1, August 12, 1981
- . CE-03-132, "Determination of Total Phosphates (Amino Acid)," Revision 0, August 27, 1981
- . CE-03-136, "Determination of Sulfates <200 ppm (Spectrophotometric Method)," Revision 0, October 6, 1981
- . CE-03-137, "Determination of Sulfite," Revision 0, August 27, 1981
- . CE-03-140, "Determination of Total Alkalinity (Phenolphthalein and Methyl Orange)," Revision 0, August 20, 1981
- . CE-03-141, "Determination of Baume and Percent Concentration of Aqueous Solution," Revision 0, August 20, 1981
- . CE-03-144, "Determination of Hexavalent Chromium (4-200 ppb)," Revision 0, August 27, 1981
- . CE-03-149, "Determination of Hydroxide Ion in Water," Revision 0, August 12, 1981
- . CE-03-501, "Determination of Chlorine (Starch-Iodide Titration)," Revision 0, October 27, 1981

- . CE-03-503, "Determination of Total Free Chlorine (Comparator Method)," Revision 0, October 27, 1981
- . CE-03-505, "Determination of Biological Oxygen Demand (BOD)," Revision 1, April 5, 1982
- . CE-03-600, "Determination of Oil and Grease in Liquid Solvent Extraction," Revision 1, October 27, 1981
- . CE-03-601, "Determination of Kinematic Viscosity of Liquid Petroleum Products," Revision 0, October 27, 1981
- . CE-03-602, "Determination of Water and Sediment in Oil (Centrifuge)," Revision 1, September 25, 1979
- . CE-03-605, "Determination of Neutralization Number (Titration Method)," Revision 0, October 6, 1981

b. Procedures with Problems

The procedures listed below had minor deficiencies, such as, referencing nonapproved procedures and/or not agreeing or complying with various requirements, commitments, or recommendations.

- . CE-01-002, "Log Keeping, Filing, and Record Storage," Revision 1, January 22, 1982
Findings: Chemistry/Radiochemistry log sheets need to be developed per Attachment 6.1.
- . CE-01-003, "Reporting Chemistry Data to the Operations Group," Revision 0, February 5, 1982
Findings: The primary coolant system analysis summary should include all five iodine isotope specific activities and all gaseous isotope specific activities.
- . CE-01-008, "Inventory and Control of Chemicals and Reagents," Revision 0, December 9, 1981
Findings: Bulk chemical storage needs to be provided. Computer chemical inventory control needs to be developed and implemented.
- . CE-02-000, "Maintaining Auxiliary Boiler Chemistry," Revision 0, February 5, 1982
Findings: Sample point is not identified and no detailed sampling procedure is available. Auxiliary Boiler Chemistry Log Sheet needs to be developed.

CE-02-005, "Maintaining Makeup Demineralizer Chemistry,"
Revision 0, January 22, 1982

Findings: Procedure references nonapproved support procedures. Water Treatment Plant Log Sheet needs to be developed.

CE-02-007, "Maintaining Component Cooling Water Chemistry,"
Revision 0, January 7, 1982

Findings: Procedure references nonapproved support procedures. Sample point is not identified and no detailed sampling procedure is available. Component Cooling Water System Log Sheet needs to be developed.

CE-02-011, "Maintaining Spent Fuel Pool Chemistry," Revision 0,
February 5, 1982

Findings: Procedure references nonapproved support procedures. Sample point is not identified and no detailed sampling procedure is available. Spent Fuel Pool Chemistry Log Sheet needs to be developed. Turbidity and gross beta/gamma activity analyses should be performed by laboratory techniques and not done solely by process monitors. Specification limits for operation for turbidity and gross beta/gamma activity should be established as well as corrective action for out-of-limit conditions.

CE-02-015, "Maintaining Turbine Building Cooling Water
Chemistry," Revision 0, April 12, 1982

Findings: Procedure references nonapproved support procedures. No detailed sampling procedure is available. Package Cooling Tower Chemistry Log Sheet needs to be developed.

CE-02-017, Maintaining Package Cooling Tower Chemistry,"
Revision 0, January 22, 1982

Findings: Procedure references nonapproved support procedures. No detailed sampling procedure is available. Package Cooling Tower Chemistry Log Sheet needs to be developed.

CE-02-019, "Maintaining Diesel Generator Jacket Cooling Water
Chemistry," Revision 0, April 5, 1982

Findings: Procedure references nonapproved support procedures. Sample point is not identified and no detailed sampling procedure is available. Procedure for chemical additions is not available. Nitrite concentration specification should be changed from 1400-2000 ppm to 500-700 ppm. Diesel Generator Jacket Cooling Water Chemistry Log Sheet needs to be developed.

CE-02-020, "Maintaining Primary Water Storage Tank Chemistry,"
Revision 0, February 5, 1982

Findings: Procedure references nonapproved support procedures. Sample point is not identified and no detailed sampling procedure is available. Tritium and gross beta/gamma activity specifications are not established and corrective action for out-of-limit conditions of activity are not available. No dissolved oxygen specification is established. Primary Water Storage Tank Chemistry Log Sheet needs to be developed.

CE-02-023, "Reactor Coolant and Auxiliary Systems Chemistry,"
Revision 0, November 11, 1981

Findings: No dissolved oxygen specification is established for makeup water.

CE-02-028, "Maintaining Stator Coil Water Chemistry,"
Revision 0, January 22, 1982

Findings: Procedure references nonapproved support procedures. Sample points are not identified and no detailed sampling procedure is available. Stator Coil Water Log Sheet needs to be developed.

CE-03-010, "Use of Process Silica Monitors," Revision 0,
October 1, 1981

Findings: Paragraph 10.3 refers to conductivity in mhos/cm and should be changed to silica concentration in mg/l.

CE-03-103, "Determination of Chloride <1.0 ppm (Specific Ion
Electrode Method)," Revision 0, August 12, 1981

Findings: Calibration standard solution concentrations are in error. The total volume of solution was not considered in calculating the standard concentration. The calibration curve should be dated.

CE-03-107, "Determination of Fluoride," Revision 0, October 27,
1981

Findings: The 1.0 ppm fluoride standard should be prepared from 10.0 ml of 100 ppm fluoride standard diluted with 990.0 ml of demineralized water.

CE-03-111, "Determination of Ammonia," Revision 1, October 27,
1981

Findings: Calibration standard concentrations are a factor of 10 greater than indicated by procedure table.

CE-03-113, "Determination of Silica <2 ppm," Revision 0,
August 27, 1981

Findings: Polyethylene plastic labware should be used throughout the procedure instead of glass labware and should be incorporated into required materials. Silica standard solutions should be stored in polyethylene bottles. Analytical reagents should be added in reverse order when preparing a blank solution so as to eliminate any effect due to residual silica in the demineralized water.

CE-03-117, "Determination of Calcium Hardness," Revision 1,
August 12, 1981.

Findings: Concentration of calibration standard solution is not given in the procedure. Calibration acceptance criteria is not established in the procedure.

CE-03-119, "Determination of Dissolved Oxygen (Indigo Carmine Method)," Revision 0, August 27, 1981.

Findings: Procedure should consider the use of standard color wheel comparators for determination of dissolved oxygen.

CE-03-121, "Determination of Boron," Revision 1, August 27,
1981

Findings: The procedure should consider the use of nitric acid rather than hydrochloric acid for adjusting the sample pH as done in CE-03-122. An acceptable method of standardizing the NaOH titrant is against potassium acid biphthalate as a primary standard. A series of boron concentration determinations is not necessary for calibration if the normality of the NaOH titrant is checked and the pH meter is calibrated.

CE-03-122, "Determination of Boron (Titration Method),"
Revision 1, August 12, 1981.

Findings: An acceptable method of standardizing the NaOH titrant is against potassium acid biphthalate as a primary standard. An acceptable frequency for determining the normality of the NaOH titrant would be weekly if precautions are taken to avoid CO₂ absorption. The formula for determining the NaOH normality is in error. The equation for calculating the boron concentration is in error.

CE-03-123, "Determination of Boron (Curcumin Method)," Revision 1,
August 12, 1981

Findings: Boron concentration in the calibration check section of the procedure is in error.

- CE-03-128, "Determination of Suspended, Nonfilterable Solids,"
Revision 0, August 12, 1981
Findings: Units of filter weight are not specified in the
equation for calculating ppm suspended solids.
- CE-03-133, "Determination of Copper (Cuprethol)," Revision 0,
October 6, 1981.
Findings: Chemical compound formula for sodium acetate
trihydrate is in error. Attachment 12.2 is incomplete.
Copper concentration ranges should be determined for the
various spectrometer cell lengths.
- CE-03-134, "Determination of Copper (Neocuproine)," Revision 1,
November 11, 1981.
Findings: Attachment 12.2 is incomplete. Copper
concentration ranges should be determined for the various
spectrometer cell lengths.
- CE-03-135, "Determination of Sulfide (15-500 ppb),"
Revision 0, July 7, 1981
Findings: Procedure does not include method for preparing
the amine-sulfuric acid stock solution. Calibration
standards and calibration check standard are not prepared
the same. Calibration curve should be labeled and dated.
- CE-03-138, "Determination of Turbidity (Turbidimeter Method),"
Revision 0, August 12, 1981
Findings: Procedure does not have a calibration check
section.
- CE-03-139, "Determination of Acidity (Titration Method),"
Revision 0, August 27, 1981
Findings: Procedure has many typographical errors. The
equation for the calculation of normality of NaOH is not
clear.
- CE-03-142, "Determination of Iron (0-100 ppb)," Revision 0,
September 28, 1981
Findings: Iron concentration in the calibration check
section of the procedure is in error. Volume of standards
used for calibration and calibration check is not
specified in the procedure.
- CE-03-145, "Determination of Sodium (Specific Ion Electrode),"
Revision 0, October 27, 1981
Findings: Procedure does not have a calibration check
section. Calibration standard solution concentrations are
in error. The total volume of solution was not considered
in calculating the standard concentration. In the
precautions and limitations section of the procedure, a
warning to use gloves in handling labware should be made
so as to avoid contamination from skin moisture.

CE-03-146, "Determination of Nitrite (Titration Method),"
Revision 0, August 27, 1981

Findings: Calibration section of the procedure does not calibrate anything. The potassium permanganate titrant should be standardized. The procedure does not include a calibration check section to check the validity of the analytical reagents and prior calibration.

CE-03-147, "Determination of Nitrite (Spectrophotometric Method)," Revision 0, September 10, 1981

Findings: Calibration standard for 100 ppb nitrite should use 10 ml of 1.0 ppm nitrite standard diluted volumetrically with 90 ml of demineralized water.

CE-03-303, "Gross Alpha Measurement," Revision 0, November 9, 1981

Findings: Procedure references an efficiency calculation procedure on the ND 6620 system which is not an approved procedure. The equation presented in the procedure for calculation of MDA is not acceptable by the standards set forth in the standard Radiological Effluent Technical Specifications for PWR's, NUREG-0472, Revision 3, March 1979.

CE-03-500, "Determination of Free CO₂," Revision 0, October 6, 1981

Findings: Formula for calculating the normality of the NaOH titrant in the calibration section of the procedure is in error. The procedure does not include a calibration check section as referenced in Section 3.3 of the procedure.

CE-03-603, "Determination of Water Content in Electro-Hydraulic Fluid," Revision 1, October 6, 1981

Findings: Analytical results acceptance criteria must be established.

CE-03-604, "Determination of Mineral Oil in EH Fluid,"
Revision 1, October 6, 1981

Findings: Analytical results acceptance criteria must be established.

CE-03-700, "General Grab Sampling Techniques," Revision 0,
January 7, 1982

Findings: Procedure references nonapproved health physics support procedures. Sampling procedures specific to each system sampled need to be written and approved.

c. Procedures to be Completed

- . CE-01-001, "Training and Qualification of the Chemistry Department Personnel"
- . CE-01-004, "Periodic Analysis Scheduling Program"
- . CE-01-005, "Test Stand Calibration Scheduling Program"
- . CE-01-006, "Analytical and Process Equipment Calibration Scheduling Program"
- . CE-01-009, "Corbicula Infestation Evaluation of Safety Related Systems"
- . CE-01-016, "Control of Measuring and Test Equipment"
- . CE-01-900, "Chemistry Department Post Accident Response Plan"
- . CE-01-901, "Testing and Maintenance of Post Accident Sampling Systems"
- . CE-02-001, "Maintaining Steam Generator Chemistry"
- . CE-02-002, "Maintaining Condensate and Feedwater Chemistry"
- . CE-02-003, "Maintaining Wet Cooling Tower Chemistry"
- . CE-02-006, "Maintaining Reactor Coolant Chemistry"
- . CE-02-008, "Maintaining Condensate Storage Pool Chemistry"
- . CE-02-009, "Maintaining Boron Management System Chemistry"
- . CE-02-010, "Maintaining Safety Injection Tank Chemistry"
- . CE-02-012, "Maintaining Boron Concentration During Refueling"
- . CE-02-013, "Maintaining Chill Water Chemistry"
- . CE-02-014, "Maintaining Supplementary Chill Water Chemistry"
- . CE-02-016, "Monitoring Gaseous Waste Management"
- . CE-02-018, "Monitoring Liquid Waste Management"
- . CE-02-025, "Maintaining Refueling Water Storage Pool Chemistry"
- . CE-02-026, "Boron Concentration Prior to and During Initial Core Load"

- . CE-02-027, "Maintaining Condensate Storage Tank Chemistry"
- . CE-02-100, "Chemistry Technical Specifications Surveillance Performance Coordination"
- . CE-03-006, "Use of the On-Line Hydrogen/Oxygen Analyzer"
- . CE-03-007, "Operation of the Process pH Monitors"
- . CE-03-011, "Use of Process Sodium Monitors"
- . CE-03-300, "Preparation of Liquid Samples for Radiological Chemical Analyses"
- . CE-03-301, "Determination of Gross Beta Radioactivity"
- . CE-03-302, "Determination of Gross Gamma Radioactivity"
- . CE-03-305, "Sampling of Ventilation and Gaseous Waste Management Systems for Radioactive Effluents"
- . CE-03-306, "Determination of the Average Beta-Gamma Energy of Reactor Coolant"
- . CE-03-311, "Radiostrontium Analysis"
- . CE-03-313, "Tritium Analysis"
- . CE-03-320, "Gamma Spectroscopy Analysis"
- . CE-03-324, "Compositing Samples for Weekly, Monthly, and Quarterly Composites"
- . CE-03-325, "Determination of Nitrogen, Hydrogen, and Oxygen and Gaseous Activities"
- . CE-03-400, "Use of the Plasma Emission Spectrometer"
- . CE-03-703, "Tank Sampling Recirculation Times"
- . CE-03-900, "Operation of the Post Accident Sampling System"
- . CE-03-901, "Post Accident Sampling of Containment Atmosphere"
- . CE-03-902, "Post Accident Boron Analysis"
- . CE-03-903, "Post Accident Gamma Spectroscopic Analysis"
- . CE-03-904, "Post Accident Hydrogen Analysis"

d. Procedures not Identified Which Need to be Written

The NRC inspector noted that procedures for the following areas had not been identified by the licensee to be written:

- . Process Analytical Chemistry Instrumentation Calibration Checks
- . Nuclear Analytical Instrumentation Calibration Checks
- . Nuclear Analytical Instrumentation Calibration
- . Nuclear Analytical Instrumentation Operation
- . Nonnuclear Analytical Instrumentation Performance Checks, Calibration, and Operation for such instruments as pH meters, conductivity bridges, selective ion electrodes, analytical balance, gas chromatograph, ion chromatograph, UV/VIS spectrophotometer, and turbidimeter
- . Preparation of instrument radioactive calibration standards
- . Determination of Sodium other than by specific ion electrode (as an alternate procedure)
- . Determination of Lithium
- . Determination of Dissolved Hydrogen in the Reactor Coolant System
- . Determination of Dissolved Total Gas in the Reactor Coolant System
- . Determination of Radioiodine in the Reactor Coolant System (Extraction Method)
- . Determination of Iodine Equivalence in the Reactor Coolant System
- . Determination of Radiocesium in the Reactor Coolant System (Extraction Method)
- . Determination of Sulfuric Acid Concentration for Ion Exchange Resin Regeneration Process
- . Use of Analytical Balance
- . Use of Baush and Lomb Spectronic 88
- . Use of Centrifuge

- . Operation of Plasma Emission Spectrometer
- . Operation of Ion Chromatograph
- . Analytical procedures including calibration and calibration check for various elements analyzed by the plasma emission spectrometer
- . Analytical procedures including calibration and calibration check for various ions analyzed by the ion chromatograph
- . Detailed sampling procedures for all manually taken samples which include valve lineups, labeling, handling precautions, safety considerations, and flush times to provide representative samples

This item is considered open (382/8212-15) pending:

- . Licensee evaluation of findings presented in Section 17.b of this report.
- . Completion and approval of procedures referenced in Section 17.c of this report.
- . Licensee evaluation of procedures addressed in Section 17.d of this report.

18. Exit Interview

The NRC inspector met with the licensee representatives identified in Section 1 of this report at the conclusion of the inspection May 7, 1982. The NRC inspector discussed the scope and findings of the inspection. The NRC inspector stated that the open items identified in this report must be resolved before issuance of an operating license.

ATTACHMENT B

OPEN ACTION ITEMS LIST

Type Code: M=Miscellaneous
 O=Open Item
 R=Part 21 Report
 T=Temporary Instructions
 U=Unresolved Item
 V=Violation

A=Allegation
 B=Bulletin
 C=Circular
 D=Deviation
 E=50.55(e)
 L=LER

Type Code:

ocket No: 50-382
 (8)

Note - Max characters allowed for each entry shown in (1)

1	2	3	4	5	6	7	8
Type Item	Item No.	Report Paragraph	Responsible Section	Module	Description	Update/Closeout Report	Status Code
	8212-01	4.a	T-RP	84332B	(186) Licensee had not developed a corporate chemistry/radiochemistry program, defined responsibilities, developed procedures.	(30)	(1)
	8212-02	4.b	T-RP	84332B	Licensee had not completed staffing onsite chemistry group, developed job descriptions, defined responsibilities, implemented procedures.		
	8212-03	5	T-RP	84332B	Licensee had not developed selection and qualification criteria for chemistry/radiochemistry staff.		
	8212-04	6	T-RP	84332B	Licensee had not implemented an official training program for chem./radiochem. personnel.		
	8212-05	7	T-RP	84332B	Licensee had not completed primary chemistry program procedures.		

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Type Item	Item No.	Report Paragraph	Responsible Section	Module	Description	Update/Closeout Report	Status Code
(1)	(8)	(6)	(4)	(7)	(186)	(30)	(1)
O	8212-06	8	T-RP	84332B	Licensee had not completed secondary chemistry program procedures.		
O	8212-07	9	T-RP	84332B	Licensee had not completed chemical stocking or implementing a chemical inventory program.		
O	8212-08	10	T-RP	84332B	Licensee had not completed primary sample panel installation, developed Sampling procedures, calibrated gas analyzer & process instrumentation.		
O	8212-09	11	T-RP	84332B	Licensee had not completed secondary sample panel installation, developed Sampling procedures, completed installation & calibration of process instrumentation.		
O	8212-10	12	T-RP	84332B	Licensee had not completed construction of post-accident sampling system.		

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cket No: 50-382
 (8)

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1	2	3	4	5	6	7	8
Item No. (8)	Report Paragraph (6)	Responsible Section (4)	Module (7)	Description (186)	Update/Closeout Report (30)	Status Code (1)	
8212-11	13	T-RP	84332B	Licensee had not developed controls for release of gas & liquid effluents.			
8212-12	14	T-RP	84332B	Licensee had not completed construction of laboratory facilities.			
8212-13	15	T-RP	84332B	Licensee had not placed analytical instrumentation in final location, developed operating, calibration, & calibration check procedures.			
8212-14	16	T-RP	84332B	Licensee had not established an audit and review program for chem./radiochem. activities.			
8212-15	17	T-RP	84332B	Licensee had not completed all procedures for implementing Chem./radiochem. program.			