December 6, 2001

Mr. M. Reddemann
Site Vice President
Kewaunee and Point Beach Nuclear Plants
Nuclear Management Company, LLC
6610 Nuclear Road
Two Rivers, WI 54241

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT
NRC INSPECTION REPORT 50-305/01-14

Dear Mr. Reddemann:

On November 8, 2001, the NRC completed an inspection at your Kewaunee Nuclear Power Plant. The enclosed report documents the inspection results which were discussed on November 7, 2001, with you, Mr. K. Hoops, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green). This issue was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this Non-Cited Violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Kewaunee facility.

Based on the results of this inspection, the inspectors also identified one finding for which the safety significance was still to be determined. This issue pertained to your staff's identification that higher than expected service water flows to the nonsafety-related turbine building header may have resulted in less than acceptable flows to safety-related systems and components. This condition could possibly have rendered one of the facility's service water system trains inoperable for a period of greater than 30 continuous days. At the end of this inspection, both your staff and the NRC were still evaluating the service water system flow demands. The issue will be considered an unresolved item pending completion of those reviews. A preliminary NRC review of the risk significance of the finding determined that it was at least of very low safety significance (Green).

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

***/RA/***

Roger D. Lanksbury, Chief
Branch 5
Division of Reactor Projects

Docket No. 50-305
License No. DPR-43

cc w/encl: K. Hoops, Manager, Kewaunee Plant
D. Graham, Director, Bureau of Field Operations
Chairman, Wisconsin Public Service Commission
State Liaison Officer

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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| Docket No: | 50-305 |
| License No: | DPR-43 |
| Report No: | 50-305/01-14 |
| Licensee: | Nuclear Management Company, LLC |
| Facility: | Kewaunee Nuclear Power Plant |
| Location: | N 490 Highway 42<br>Kewaunee, WI 54216 |
| Dates: | October 1 through November 8, 2001 |
| Inspectors: | J. Lara, Senior Resident Inspector<br>Z. Dunham, Resident Inspector<br>D. Jones, Reactor Engineer<br>D. Nelson, Radiation Specialist<br>W. Slawinski, Senior Radiation Specialist<br>R. Schmitt, Radiation Specialist |
| Approved By: | Roger D. Lanksbury, Chief<br>Branch 5<br>Division of Reactor Projects |

## SUMMARY OF FINDINGS

IR 05000305-01-14, on 10/01-11/08/2001, Nuclear Management Company, LLC, Kewaunee Nuclear Power Plant. Access Control to Radiologically Significant Areas.

The inspection was conducted by resident inspectors, radiation specialists, and a regional reactor engineer. During this inspection, there was one finding identified which was also as a Non-Cited Violation. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the Significance Determination Process does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

A. Inspector-Identified Findings

**Cornerstone: Occupational Radiation Safety**

Green. A Non-Cited Violation of Technical Specification 6.13 was identified for the failure to barricade three ladders that provided entry to high radiation areas (less than 1000 millirem/hour) located on steam generator/pressurizer platforms.

This finding was determined to be of very low safety significance because unauthorized entry into the inadequately controlled high radiation areas did not appear to occur and a substantial potential for an overexposure did not exist. (Section 2OS1)

B. Licensee-Identified Findings

**Cornerstone: Mitigating Systems**

TBD. The inspectors evaluated the licensee's notification, pursuant to 10 CFR 50.72, that the plant had been operating in an unanalyzed condition. Specifically, due to higher than previously considered service water flow to the nonsafety-related turbine building header, less than acceptable flow may not have been available to the safety-related service water system components. This may have resulted in some safety systems and components not having sufficient cooling to ensure system operability. Which safety systems were impacted and for how long was still being evaluated at the end of the inspection report period. This condition was identified following service water system flow testing conducted in September 2001 and had existed for a period of greater than 30 days.

The finding was of at least very low safety significance (Green) based on the results of a Significance Determination Process Phase 2 analysis. However, based on the number of core damage sequences involved in this analysis, the significance of this finding could be greater. Accordingly, a Phase 3 evaluation was being performed. (Sections 4OA3.1)

## Report Details

Summary of Plant Status

The plant was shut down during the entire inspection period for the facility's 2001 refueling outage and steam generator replacement (SGR) project.

## 1. REACTOR SAFETY

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness**

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

During the week of October 1, 2001, the inspectors walked down various containment penetrations and containment isolation valves to verify that containment integrity was properly established and maintained prior to and during refueling activities that were taking place. The inspectors reviewed logic diagrams associated with various motor-operated containment isolation valves, the facility's Updated Safety Analysis Report (USAR), Technical Specifications (TSs), and Operations Procedure Checklist N-FH-53-CLB, "Refueling - Containment Integrity CL [checklist], S/G [steam generator] Secondary Side Open," Revision E, to establish acceptance criteria for the inspection.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Fire Zone Inspections

a. Inspection Scope

The inspectors reviewed the Kewaunee Nuclear Power Plant Fire Protection Program Analysis, Revision 4, Procedure FPP 08-08, "Control of Transient Combustibles," Revision A, and Procedure FPP 08-07, "Control of Ignition Sources," Revision E, to ascertain the requirements for fire loading, control of combustible materials, and control of ignition sources. The inspectors walked down the accessible portions of the areas listed below to assess the licensee's control of transient combustibles and ignition sources during hot work activities. Additionally, fire hoses, sprinklers, portable fire extinguishers, and fire detection devices were inspected, where applicable, to verify that they were installed at their designated locations, were in satisfactory physical condition, and were unobstructed. The following listed areas were walked down by the inspectors due to the large number of hot work activities taking place during the licensee's refueling outage:

- Auxiliary Building, October 5, 2001
- Containment, October 10, 2001
- Containment, October 31, 2001

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

During the week of October 22, 2001, the inspectors observed the licensee clean and conduct eddy current inspections on the 'A' Component Cooling Water Heat Exchanger. The inspectors observed the condition of the heat exchanger internals both prior to and after the performance of the eddy current testing and cleaning to evaluate the as-found and as-left conditions of the heat exchanger. Additionally, the inspectors reviewed vendor supplied Procedure ANATEC-ET-10, "MIZ-18/MIZ-43 Eddy Current Examination," Revision 10, to verify that vendor contracted technicians performed the eddy current testing in accordance with the vendor approved procedure. The inspectors also reviewed the vendor documented test results dated October 29, 2001, to evaluate the acceptability of heat exchanger tube conditions. Lastly, the inspectors performed reviews to verify that the as-left number of plugged heat exchanger tubes was within the calculated allowed design basis for tube plugging.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the Maintenance Rule, 10 CFR 50.65, for the systems listed below. The inspectors reviewed recent maintenance rule evaluations to assess: (1) scoping in accordance with 10 CFR 50.65; (2) characterization of systems, structures, and components (SSCs) failures; (3) SSC safety significance classification; (4) 10 CFR 50.65(a)(1) or (a)(2) classification for the SSCs; and (5) performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). The inspectors also interviewed licensee staff and evaluated the licensee's monitoring and trending of performance data.

Specific systems evaluated were:

- Safety Injection, System 33
- Design Modification of Valves SW-4A and SW-4B, System 02

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation (71111.13)

a. Inspection Scope

The inspectors compared the activities listed below to the licensee's shutdown safety assessments to verify that appropriate compensatory measures were taken as required in Procedure GNP 08.04.01, "Shutdown Safety Assessment," Revision D. Additionally, the inspectors compared the assessed risk configuration against the actual plant conditions by walking down selected portions of the plant, and reviewing any in-progress evolutions or external events which could impact the safety assessment to verify that the assessment was accurate and complete.

- 'B' Diesel Generator Planned Overhaul, Week of October 22, 2001
- Maintenance Work Activities Scheduled for Week of October 29, 2001

b. Findings

No findings of significance were identified.

1R14 Non-Routine Evolutions (71111.14)

On October 5, the inspectors observed control room operators perform daily equipment status verifications following fuel movements as specified in Procedure N-FH-53-CLD, "Refueling Daily Checklist." Additionally, the inspectors evaluated the performance of and interactions between the reactor operators, control room supervisor, and shift manager. The inspectors also evaluated the licensee's adherence to communications and alarm response operations standards.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the facility's USAR, design basis information, vendor manuals, and TS requirements to verify the technical adequacy of the operability evaluations listed below and that system operability was properly justified. The inspectors also performed reviews to verify that the operability determinations were performed in accordance with the licensee's Procedure GNP 11.08.03, "Operability Determination," Revision A. The inspectors also reviewed the licensee's implementation of compensatory measures to verify operability, as appropriate.

- Kewaunee Assessment Process WO [Work Order] 01-13084, Actions Necessary to Consider AFW [Auxiliary Feedwater] Pumps Operable Prior to Exceeding 350 Degrees Fahrenheit
- Kewaunee Assessment Process WR [Work Request] 01-6810, Evaluate Adequacy of Actuator Sized for Service Water System Valves

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

.1 Component Cooling Water Pump 'B' Replacement

a. Inspection Scope

The inspectors reviewed design descriptions and drawings to determine the scope of Design Change 3128, which was approved to replace the 'B' Component Cooling Water pump. The inspectors reviewed the associated safety evaluations to verify proper consideration of USAR, TS, and 10 CFR 50.59 requirements. The inspectors also reviewed the associated post-modification testing results as documented in Procedure DC/PM 3128-4, Component Cooling Pump B Installation - Retest," Original Revision, to verify acceptable pump performance and compliance with test acceptance criteria.

b. Findings

No findings of significance were identified.

.2 Replace Condenser Air Ejector Radiation Monitor Channel R-15 and Add Main Steam Line N-16 Radiation Monitors R-42/R-43

a. Inspection Scope

The inspectors reviewed design descriptions and drawings to determine the scope of Design Change DC 3182, which replaced the station's current R-15 radiation monitor with a more sensitive detector. Monitor R-15 monitored the condenser air ejector for radioactivity which would be indicative of a steam generator tube leak or impending rupture. Additionally, Design Change DC 3182 also installed radiation Monitors R-42 and R-43 which will monitor the main steam lines for N-16 activity. Monitors R-42 and R-43 would also provide early indication of a steam generator tube leak or impending rupture. The inspectors reviewed the associated safety evaluations and observed portions of the design change installation. The design change had not been completed at the end of this inspection period.

b. Findings

No findings of significance were identified.

.3 Service Water (SW) Isolation to the Turbine Building

a. Inspection Scope

The inspectors reviewed design descriptions and drawings to determine the scope of Design Change Request 3338, "Service Water Isolation to the Turbine Building." The design change was being proposed to resolve concerns regarding inadequate SW system flow to safety-related loads. This issue was first identified by the licensee on October 9, 2001, as discussed in an event notification pursuant to 10 CFR 50.72. At the end of this inspection period, the licensee had not yet approved the proposed modification, although design drawings had been developed. The inspectors began a review of the proposed design change to evaluate the adequacy of the proposed design as reflected in the design drawings.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors observed the post-maintenance testing associated with the activities listed below to verify that the tests were adequate for the scope of the maintenance work which had been performed and that the testing acceptance criteria were clear and demonstrated operational readiness consistent with the design and licensing basis documents. The inspectors attended pre-job briefings, where applicable, to verify that the impact of the testing had been properly characterized; observed or reviewed the test to verify that the test was performed as written and all testing prerequisites were satisfied; and reviewed the test acceptance criteria. Following the completion of the test, the inspectors walked down the affected equipment to verify that the test equipment was removed and that the equipment was returned to a condition in which it could perform its safety function.

- 'A' Diesel Generator Outage Overhaul
- 'B' Control Room Post Accident Recirculation and Air Conditioning Design Change
- Reactor Head Vent Valves RC-45A and RC-45B Replacement

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage (71111.20)

.1 Licensee Control of Outage Activities

a. Inspection Scope

Periodically during this inspection period, the inspectors reviewed Procedure GNP 08.04.01, "Shutdown Safety Assessment," Revision D, to evaluate the licensee's shutdown safety assessments and to verify that the assessments accurately reflected plant shutdown conditions, that there was no unrecognized increase in plant risk, and that compensatory measures were implemented when appropriate. This evaluation included periodic walk downs of safety-related electrical power systems, spent fuel pool cooling while the core was off-loaded to the spent fuel pool, and containment closure when applicable. Additionally, prior to and during refueling activities, the inspectors walked down reactor coolant instrumentation to verify that refueling cavity level and temperature were properly monitored. The inspectors reviewed various operations department system lineup checklists and operating procedures, the facility's USAR, and TSs to determine the inspection acceptance criteria.

b. Findings

No findings of significance were identified.

.2 Refueling Activities

a. Inspection Scope

During the week of October 1, 2001, the inspectors periodically observed the licensee's fuel movement activities, which consisted of off-loading the entire core to the spent fuel pool to facilitate the licensee's SGR project. The inspectors reviewed appropriate sections of the facility's USAR; Procedure SP-53-079, "Refueling System Interlocks Test," Revision S; and Procedure RF-03.01, "Fuel Movement During a Refueling Outage," Revision E, to establish the inspection acceptance criteria. The inspectors also observed activities and interviewed personnel to verify that containment closure was properly set, that appropriate communications were established between the control room and the operating floor of containment, that a licensed Senior Reactor Operator was designated in charge of the refueling operations, and that other requirements of TS 3.8, "Refueling Operations," were met during the fuel movement. Additionally, the inspectors reviewed records to verify that the refueling system interlocks test results were satisfactorily completed. Finally, the inspectors observed the licensee's control of foreign material around the refueling cavity and the spent fuel pool.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

On October 11, 2001, the inspectors observed relief valve setpoint testing of the Residual Heat Removal (RHR) Relief Valve RHR-33-1 which provided for low temperature over-pressure protection of the reactor coolant system during shutdown conditions. The inspectors reviewed the test results and compared the results to applicable TS criteria to verify that the valve's relief setpoint was properly set. Additionally, the inspectors reviewed Procedure GMP-101-01, "Relief, Safety, and Safety Relief Valve Testing," Revision O, Procedure CMP-34-06, "RHR-Removal and Installation of RHR Loop and RHR to Reactor Coolant Hot Leg Safety Valves RHR 33 and RHR 33-1 (QA-1)," Revision A, and applicable portions of the 1989 Edition of American Society of Mechanical Engineers, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to verify that the relief valve testing methodology was consistent with industry requirements. Lastly, the inspectors observed testing and conducted reviews to verify that the test was performed as written, that all testing prerequisites were satisfied, and that the test data were complete, appropriately verified, and met the requirements of the testing procedure.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below to verify that the installation was consistent with design modification documents and that the modification did not adversely impact system operability or availability. The inspectors reviewed design modification documents to verify that configuration control of the modification was correct and reviewed post-installation testing to verify that it was appropriate. The inspectors reviewed the design modification documents and the 10 CFR 50.59 evaluation against the applicable portions of the USAR.

- Temporary Change Request 01-20, Increase Spent Fuel Pool High Temperature Alarm Setpoint
- Temporary Change Request 01-022, Remove Actuator and Fail-Open Valve SW-301B

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

**Cornerstones: Occupational Radiation Safety and Public Radiation Safety**

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 Plant Walkdowns and Radiological Boundary Verification

a. Inspection Scope

The inspectors conducted walkdowns of selected radiologically controlled areas within the plant to verify the adequacy of radiological boundaries and postings. Specifically, the inspectors walked down several radiologically significant work area boundaries (high and locked high radiation areas (HRAs)) in the containment and auxiliary buildings. The inspectors performed confirmatory radiation measurements to verify that these areas and selected radiation areas were properly posted and controlled in accordance with 10 CFR Part 20, licensee procedures, and TSs.

b. Findings

The inspectors identified a Green finding and an associated Non-Cited Violation (NCV) of TS 6.13 for the failure to properly control access to HRAs that existed on steam generator/pressurizer platforms.

During reactor building (containment) walkdowns on October 2, 2001, the inspectors identified two ladders accessible to workers from the reactor building basement (592' elevation) and one ladder accessible from the ground level of the reactor building (606' elevation) which provided access to posted HRAs on the ‘A’ and ‘B’ steam generator and pressurizer platforms. This condition had existed from September 25, 2001, when workers gained access to this general area. These ladders were not barricaded to obstruct inadvertent entry into these areas. In areas accessible to workers on the platforms, licensee survey data indicated that dose rates generally ranged from 140 to 350 millirem/hour and included an isolated area with radiation levels up to 900 millirem/hour. Following shielding installation, licensee survey data showed maximum radiation levels of 125 millirem/hour in accessible areas on those platforms.

The inspectors identified that the failure to barricade the area around the ladders while HRAs existed on the platforms between September 25 and October 2, 2001, did not meet the HRA access control requirements of TS 6.13(a). This finding, if uncorrected, would become a more significant safety issue because the required barricades provide an important radiological barrier that obstructs inadvertent entry into an HRA to prevent unintended radiation exposure. Based on worker electronic dosimetry alarm data generated and reviewed by the licensee, it did not appear that unauthorized personnel entered the HRAs that existed on the platforms while the ladders were not barricaded. The inspectors evaluated the risk significance of this issue using the Occupational Radiation Safety Significance Determination Process (SDP) (Appendix C to NRC Manual Chapter 0609, “Significance Determination Process”) and determined that there was not a substantial potential for an overexposure, nor would the licensee’s ability to

assess worker dose be compromised should an individual have climbed up the ladder onto one of the platforms. Therefore, the issue was determined to be of very low safety significance (Green).

Technical Specification 6.13(a) requires that each HRA in which the intensity of radiation is greater than 100 millirem/hour but less than 1000 millirem/hour, be barricaded and conspicuously posted as an HRA and entrance thereto be controlled by requiring issuance of a radiation work permit. Contrary to this requirement, from September 25 to October 2, 2001, three ladders that led to HRAs on steam generator/pressurizer platforms were neither barricaded nor posted. However, because the licensee corrected the immediate problem when identified by the inspectors and subsequently placed this issue into its corrective action program (Kewaunee Assessment Process Work Request No. 01-006395), this violation is being treated as a Non-Cited Violation (NCV 50-305/01-14-01).

2OS2 As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls (71121.01 and 50001)

.1 ALARA Planning

a. Inspection Scope

The inspectors reviewed the station's collective exposure histories from 1998 to the present, current exposure trends for the ongoing refueling outage/SGR (1R25/SGR), and planned/completed radiological work activities for the outage/SGR to assess current performance and exposure challenges. The inspectors reviewed the licensee's processes for estimating job dose and the effectiveness of exposure tracking for the outage/SGR to verify that the licensee could identify problems with its collective exposure and take actions to address the problems.

Findings

No findings of significance were identified.

.2 Radiological Work Planning

a. Inspection Scope

The inspectors reviewed radiation work permits, radiation protection work instructions, and work-in-progress reviews to verify that the licensee had performed adequate pre-work evaluations, implemented associated dose mitigation techniques, derived reliable exposure estimates, and was trending actual outage/SGR performance. The inspectors attended pre-job briefings to evaluate the licensee's communication of ALARA work plans. The inspectors also assessed the integration of ALARA requirements into work packages. The inspectors reviewed ALARA plans to verify that the licensee had implemented consistent instructions for all work packages.

b. Findings

No findings of significance were identified.

.3 Review of Radiologically Significant Work, ALARA Controls, and Job Site Inspections

a. Inspection Scope

The inspectors selected the following high exposure, HRA work and recently completed job activities and evaluated the licensee's use of appropriate ALARA controls:

- Reactor Defueling Activities;
- Re-Stowage of Reactor Upper Internals; and
- Removal/Replacement of PS-2A and PS30 valves.

The inspectors reviewed radiation work permits and ALARA plan packages, attended pre-job briefings, and observed work activities that took place in HRAs during the inspection period. These activities were performed to verify the adequacy of surveys, radiological work controls, and exchange of work area radiological information and to assess radiation worker and radiation protection technician performance. Additionally, the inspectors reviewed ALARA plan packages for eight jobs that were either currently being performed or had recently been completed in HRAs or in other radiologically significant work environments to assess the overall radiological work performance and controls. The inspectors also reviewed the licensee's procedure and practices for dosimetry placement, including the use of multiple dosimetry for work in HRAs having significant dose gradients, to verify compliance with the requirements of 10 CFR 20.1201. The inspectors surveyed work areas to verify that radiation levels were consistent with the licensee's survey data and to verify that low dose areas were properly designated and appropriately used by workers. The inspectors evaluated the licensee's engineering controls at selected locations to verify that the controls were consistent with those specified in the ALARA plans. The inspectors also observed and questioned workers at each job location to verify that they had adequate knowledge of radiological work conditions and exposure controls.

b. Findings

No findings of significance were identified.

.4 Verification of Exposure Estimate Goals and Exposure Tracking System

a. Inspection Scope

The inspectors reviewed the methodology and assumptions used by the licensee for its 1R25/SGR exposure estimates and exposure goals. Actual job exposure data was compared with estimates to verify that the licensee could project and, thus, control radiological exposure. The inspectors also reviewed the licensee's exposure tracking system to verify that the level of exposure tracking detail, exposure report timeliness, and exposure report distribution were sufficient to support control of collective exposures. The inspectors reviewed the job dose history files and dose reductions

anticipated through lessons learned to verify that they were appropriately used to forecast outage doses. The inspectors evaluated how the licensee had identified problems with its exposure estimates for some jobs, the processes being utilized to revise dose estimates, and methods to improve its dose forecasting procedures to verify that the licensee could adequately track dose.

b. Findings

No findings of significance were identified.

.5 Source Term Reduction and Control

a. Inspection Scope

The inspectors evaluated the licensee's source term reduction program in order to verify that the licensee had an effective program in place and was knowledgeable of plant source term. Work control mechanisms for the SGR project were evaluated to verify that source term reduction plans were implemented appropriately. Areas of review included:

- Prioritizing/sequencing the installation of shielding packages to minimize exposure;
- Hot spot reduction program, via physical removal of high dose valves;
- System flushing; and
- Control of radiation levels around the steam dome regions of the steam generators by maximizing water levels on the secondary side.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation (71121.03)

Tests and Calibrations of Radiation Monitoring Instrumentation

a. Inspection Scope

The inspectors evaluated the radiological instrumentation associated with monitoring transient high and/or very HRAs and instruments used for remote emergency assessment to verify that the instrumentation had been calibrated consistent with industry standards and in accordance with station procedures. The inspectors confirmed that selected area radiation monitors (ARMs) were located as described in the Updated Safety Analysis Report. Specifically, the inspectors selectively reviewed calibration procedures and calendar years 2000-2001 calibration records for the following radiation monitoring instrumentation:

- Upper Steam Generator "A"/Steam Dome ARM;
- Upper Steam Generator "B"/Steam Dome ARM; and
- Spent Fuel Pool Area ARM.

The inspectors reviewed calendar years 2000-2001 calibration records and procedures for selected radiation monitors used for assessment of internal exposure and for those instruments utilized for surveys of personnel and equipment prior to egress from the radiologically controlled area. The inspectors examined selected personnel contamination monitors, portal monitors, and a small article monitor to verify that these instruments were source checked and calibrated adequately, consistent with station procedures and industry standards. These instruments included:

- AMS-3 Air Monitoring System;
- PM-7 Portal Monitor;
- Whole Body Personnel Contamination Monitor (PCM-1C); and
- Small Articles Monitor (SAM-11).

The inspectors observed portable survey instruments maintained in the licensee's instrument calibration facilities and instrument issue area to verify that those instruments designated "ready for use" had current calibrations, were operable, and were in good physical condition. The inspectors observed radiation protection staff source check portable radiation survey instruments to verify that those source checks were adequately completed using appropriate radiation sources and station procedures.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Walkdown of Radioactive Waste Systems

a. Inspection Scope

The inspector reviewed the liquid and solid radioactive waste system description in the Updated Safety Analysis Report (USAR) and the most recent radiological effluent release report (2000) for information on the types and amounts of radioactive waste (radwaste) generated and disposed. The inspector performed walkdowns of the liquid and solid radwaste processing systems located in the Auxiliary Building to verify that the systems agreed with the descriptions in the USAR and the Process Control Program, and to assess the material condition and operability of the systems. The inspector reviewed the current processes for transferring waste resin into shipping containers to determine if appropriate waste stream mixing and/or sampling procedures were utilized. The inspector also reviewed the methodologies for waste concentration averaging to determine if representative samples of the waste product were provided for the purposes of waste classification in 10 CFR 61.55. During this inspection, the licensee was not conducting waste processing.

b. Findings

No findings of significance were identified.

.2 Waste Characterization and Classification

a. Inspection Scope

The inspector reviewed the licensee's radiochemical sample analysis results for each of the licensee's waste streams, including dry active waste (DAW), resins, and filters. The inspector also reviewed the licensee's use of scaling factors to quantify difficult-to-measure radionuclides (e.g., pure alpha or beta emitting radionuclides). The reviews were conducted to verify that the licensee's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20. The inspector also reviewed the licensees' waste characterization and classification program to ensure that the waste stream composition data accounted for changing operational parameters and thus remained valid between the annual sample analysis updates.

b. Findings

No findings of significance were identified.

.3 Shipment Preparation

a. Inspection Scope

Since there were no radioactive materials shipment during the inspection, the inspector reviewed the records of training provided to personnel responsible for the conduct of radioactive waste processing and radioactive shipment preparation activities. The review was conducted to verify that the licensee's training program provided training consistent with NRC and Department of Transportation (DOT) requirements.

b. Findings

No findings of significance were identified.

.4 Shipping Records

a. Inspection Scope

The inspector reviewed five non-excepted package shipment manifests completed in 2001 to verify compliance with NRC and DOT requirements (i.e., 10 CFR Parts 20 and 71 and 49 CFR Parts 172 and 173).

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspector reviewed the report of a focused self-assessment performed during August 6-20, 2001, on the radioactive material processing and transportation programs to evaluate the effectiveness of the self-assessment process to identify, characterize, and prioritize problems. The inspector also selectively reviewed 2001 Kewaunee Assessment Process (KAP) documents that address radioactive waste and radioactive materials shipping program deficiencies, to verify that the licensee had effectively implemented the corrective action program.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed the licensee's Performance Indicator data collection process and historical data for the period February 1 through September 30, 2001, to verify the accuracy of collected and submitted data. Additionally, the inspectors reviewed corrective action records, monthly operating reports, and control room logs to independently verify the data that the licensee had collected. The following Performance Indicators were evaluated:

- Safety System Unavailability - High Pressure Safety Injection
- Safety System Unavailability - Residual Heat Removal

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up

.1 SW System Capability to Perform Safety Function

a. Inspection Scope

The inspectors reviewed the licensee's event notification on October 9, 2001, pursuant to 10 CFR 50.72, which documented that the anticipated SW flow to one train of safety-related systems and components would be insufficient to ensure they were capable of performing their intended function. The scope of this review included test results; USAR Chapter 9.6.2, Service Water System; TS Section 3.3.e, Service Water System; and design information, including design drawings.

b. Findings

For a period exceeding 30 days, one train of the SW system may have been inoperable due to reduced SW flow available to the respective systems and components associated with the SW train. Pending completion of further licensee review and NRC completion of a Phase 3 SDP, this issue, which was evaluated to be at least of a very low risk significance (Green), is considered an Unresolved Item (URI). On October 9, 2001, the licensee reported to the NRC, pursuant to 10 CFR 50.72, the discovery that the anticipated SW flow to safety-related systems may be insufficient to ensure they are capable of performing their intended function. This condition was identified through flow measurements of the SW system demand.

The SW system provides cooling water to safety-related systems and components, including component cooling water heat exchangers, safety injection pump coolers, emergency diesel generators, containment fan coil units, RHR pump room coolers, and spent fuel pool heat exchangers. Additionally, one train of the SW system provides cooling water to turbine building loads. The SW system consists of four pumps (two per train). The turbine loads do not isolate from the safety-related loads under accident conditions. Current analysis indicated that all safety related and turbine building loads could be cooled with SW temperatures up to 80 degrees.

The licensee identified that the actual SW system demand to the turbine building was higher than previously assumed and analyzed (nominally 2000 gallons per minute). As a result, the higher flows to the turbine loads could result in lower flow to the safety-related loads. Approximate demand to the turbine building was measured to be 3200-3500 gallons per minute. As the licensee's event report stated, a lake water temperature of 55 degrees would be the maximum that would support the cooling of safety related loads with the previously analyzed turbine building header flow of 2000 gpm. Recorded lake water temperatures were above 55 degrees for most of the summer months.

SDP

The inspectors determined that one SW train may have been inoperable whenever the lake water temperature was above 55 degrees. This condition occurred for greater than 30 continuous days during the summer months. For example, between July 20 and August 31, 2001, the SW inlet temperature was greater than 55 degrees.

The inspectors used NRC Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, dated February 5, 2001, and Risk-Informed Inspection Notebook for Kewaunee Nuclear Power Plant, Revision 0. This finding was more than minor (Group 1 questions) because it had an credible impact on safety as a result of one SW train being unable to provide sufficient cooling to all safety-related components as designed. The finding affected the mitigating systems cornerstone (Group 2 questions) because it affected the availability of mitigating systems (e.g., SW, high pressure safety injection, and emergency power). As a result, the inspectors performed a Phase 1 SDP.

Using the SDP Phase 1 Screening Worksheet for the Mitigating Systems Cornerstone, the inspectors concluded that the SW inlet temperatures combined with higher than

acceptable turbine building flows resulted in one train of the SW system being unable to perform its safety function. This condition existing for greater than 30 continuous days during most of the summer months. This time exceeded the TSs allowed outage time of 72 hours. Based on this information, the inspectors determined that this finding was at least of very low safety significance (Green).

During the Phase 2 SDP assessment, the inspectors concluded that the affected initiating event categories included loss of offsite power, and medium- and large-break loss-of-coolant accident, with initiating frequencies of 1 per 10 to 100 years, 1 per 100 to 1000 years, and 1 per 1000 to 10,000 years, respectively. An exposure time of greater than 30 days was used. These factors resulted in an Estimated Likelihood Rating of "B," "D," and "E" in accordance with Table 1 of the inspection notebook.

The inspectors further evaluated the core damage sequences for the above initiating events. Based on the results of the SDP Worksheets, the inspectors concluded that the finding was of at least very low safety significance (Green). Which safety systems were impacted and for how long was still being evaluated at the end of the inspection report period. Pending completion of this evaluation and a Phase 3 SDP analysis, the safety significance of the finding is To Be Determined (TBD) and this issue is considered an Unresolved Item (URI 050-305/01-14-02, Unanalyzed Condition - Inoperable Service Water System Train, Phase 3 SDP). The issue is assigned to the Mitigating Systems cornerstone.

4OA5 Other

Radiation Protection Organization Support For The SGR Project: Contractor Staffing, Qualifications and Training (50001)

a. Inspection Scope

The inspectors reviewed the radiation protection organization's staffing plan for the SGR project and the qualification and selection criteria for contract radiation protection support personnel. The inspectors also assessed the training provided to contract radiation protection staff relative to commitments in the licensee's SGR Radiation Protection Plan and industry standards established in American National Standards Institute N18.1-1971 and American National Standards Institute N3.1-1978. In addition, the inspectors selectively reviewed SGR mockup training activity plans and mockup training qualification records and evaluated the adequacy of the mockups to provide workers with the necessary skills to effectively complete work tasks.

b. Findings

No findings of significance were identified.

## 4OA6 Meetings

### Exit Meeting Summary

On November 7, 2001, the inspectors presented the inspection results to Mr. M. Reddemann, Mr. K. Hoops, and other members of the Nuclear Management Company staff. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

### Interim Exit Meeting Summary

| | |
|---|---|
| Senior Official at Exit: | Mr. Thomas Taylor, Kewaunee Assistant Plant Manager for Operations |
| Date: | October 6, 2001 |
| Proprietary Information: | No |
| Subject: | Access Control to Radiologically Significant Areas<br>ALARA Planning and Controls<br>Radiation Monitoring Instrumentation<br>Steam Generator Replacement Inspection |
| Change to Inspection Findings: | No |

| | |
|---|---|
| Senior Official at Exit: | M. Reddemann, Site Vice President |
| Date: | November 2, 2001 |
| Proprietary: | No |
| Subject: | As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls and Radioactive Waste Processing and Transportation |
| Change to Inspection Findings: | No |

KEY POINTS OF CONTACT

Nuclear Management Company, LLC

S. Baker, Plant Radiation Protection Manager
M. Fencl, Security Manager
D. Farrell, Planning and Scheduling Manager
G. Harrington, Licensing
K. Hoops, Plant Manager, Kewaunee Plant
J. Jensen, Steam Generator Replacement Manager
M. Kwitek, Assistant Plant Manager, Maintenance
M. Reddemann, Site Vice President
J. Schweitzer, Manager, Engineering and Technical Support
J. Stoeger, Superintendent, Operations
T. Taylor, Assistant Plant Manager, Operations
M. Van Noy, Kewaunee Steam Generator Replacement Licensing Manager
T. Webb, Nuclear Licensing Director

Nuclear Regulatory Commission - RIII

R. Lanksbury, Branch Chief, DRP, Branch 5

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 50-305/01-14-01 | NCV | Failure to barricade three ladders that provided entry to high radiation areas (less than 1000 mrem/hour) located on steam generator/pressurizer platforms, as required by TS 6.13 (Section 2OS1) |
| 50-305/01-14-02 | URI | Unanalyzed Condition - Inoperable Service Water System Train, Phase 3 SDP (Section 4OA3.1) |

Closed

| | | |
|---|---|---|
| 50-305/01-14-01 | NCV | Failure to barricade three ladders that provided entry to high radiation areas (less than 1000 mrem/hour) located on steam generator/pressurizer platforms, as required by TS 6.13 (Section 2OS1) |

Discussed

None

LIST OF ACRONYMS USED

| | |
|---|---|
| ALARA | As Low As Is Reasonably Achievable |
| ARM | Area Radiation Monitor |
| CFR | Code of Federal Regulations |
| DAW | Dry Active Waste |
| DOT | Department of Transportation |
| DRP | Division of Reactor Projects, Region III |
| HRA | High Radiation Area |
| KAP | Kewaunee Assessment Process |
| NCV | Non-Cited Violation |
| NRC | Nuclear Regulatory Commission |
| RHR | Residual Heat Removal |
| SDP | Significance Determination Process |
| SGR | Steam Generator Replacement |
| SSC | System, Structure, and Component |
| SW | Service Water |
| TS | Technical Specification |
| TBD | To Be Determined |
| URI | Unresolved Item |
| USAR | Updated Safety Analysis Report |

LIST OF DOCUMENTS REVIEWED

1R12 Maintenance Rule Implementation

| | | |
|---|---|---|
| GNP 08.20.2 | Maintenance Rule Data Evaluation | Revision B |
| GNP 08.20.4 | Maintenance Rule MRFF and MPFF Evaluations | Revision A |
| GNP-08.20.05 | Maintenance Rule (a)(1)/(a)(2) Evaluations | Revision A |
| | PRA Application #01-14 | May 17, 2001 |
| | Shift Manager Logs | January 1 - September 30, 2001 |

1R13 Maintenance Risk Assessment and Emergent Work Evaluation

| | | |
|---|---|---|
| Individual Plant Examination, Section 5 | Core Damage Frequency Quantification | |

1R15 Operability Evaluations

| | | |
|---|---|---|
| EOP FR-Z.2 | Response to Containment Flooding | Revision D |
| A-SW-02 | Abnormal Service Water System Operation | Revision Q |

1R17 Permanent Plant Modifications

| | | |
|---|---|---|
| Design Change 3128 | Replace Component Cooling Water Pumps | |
| Design Change 3182 | Replace Condenser Air Ejector Radiation Monitor Channel R-15 and Add Main Steam Line N-16 Radiation Monitors R-42/R-43 | |
| Design Change 3338 | Service Water Isolation to the Turbine Building | |
| Design Drawing ISIM-202-1 | ISI Flow Diagram | Revision M/3338-1 |
| Design Drawing E-1509 | Schematic Diagram-Solenoid Valves SV-33043,044 | Revision N/3338-1 |

1R19 Post-Maintenance Testing

| | | |
|---|---|---|
| SP 10-111-3 | Inspection of Diesel Generator A (Component Retest) | Revision E |
| SP 42-047A | Diesel Generator A Operational Test | Revision Q |
| DC 3048 | Design Description and Scope - Control Room Water Chiller Replacement | |

| | | |
|---|---|---|
| DC/PM 3048-6 | Control Room Air Conditioning Hydrostatic Test - Trains A/B | Original Revision |
| DC/PM 3048-4 | Testing and Startup of Control Room Service Water Cooling A/B | Revision 1 |
| DC/PM 3048-5 | Testing and Startup of Control Room Two Fan Operation | Original Revision |
| KAP WR 99-217306 | Valve Control - Rx Head Vent Train A | |
| SP 55-167-9 | Refueling Shutdown Valve Tests - IST | Revision AD |
| KAP WO 01-6640 | Perform Seat Leakage Test on Target Rock Solenoid Valves | |

1R22 Refueling and Outage Activities

| | | |
|---|---|---|
| N-FH-53-CLF | Head Lift and Pre-Rod Drive Unlatching Checklist | Revision H |
| N-FH-53-CLB | Refueling - Containment Integrity CL, S/G Secondary Side Open | Revision E |

1R23 Temporary Plant Modifications

| | | |
|---|---|---|
| TCR 01-20 | Increase Spent Fuel Pool High Temperature Alarm Setpoint | |
| TCR 01-22 | Remove Actuator and Fail Open Valve SW-301B | |
| OPERM 202-1 | Flow Diagram - Service Water | |
| OPERM 213-9 | Flow Diagram - Diesel Generator Startup Air Compressor A & B and Fish Screen Air | |
| E-1621 | Integrated Logic Diagram - Diesel Generator Mechanical System | |
| E-1633 | Integrated Logic Diagram - Service Water System | |

2OS1 Access Controls For Radiologically Significant Areas

| | | |
|---|---|---|
| TS 6.13 | High Radiation Areas | Amendment 122 |
| Kewaunee Assessment Process | Work Request No. 01-006395, Untitled | October 12, 2001 |
| Various Steam Generator Cavity Survey Data | September 24, 2001 - September 26, 2001 | |
| | KNPP 2001 Refueling Outage Handbook | July 11, 2001 |

2OS2 As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls

Procedures

| | | |
|---|---|---|
| HP-04.001 | ALARA Plan | Revision C |

Radiological Planning Documents

| | | |
|---|---|---|
| RWP 93 | Cutout and Replace PS-30 | Revision 0 |
| RWP 521 | SGR Project Temporary Shielding and Associated Activities | Revision 0 |
| | ALARA Review 01-001 | June 25, 2001 |
| | ALARA Review 01-014 | July 30, 2001 |
| | ALARA Plan #0-052, RCS Severance, Welding, and Associated Activities | July 24, 2001 |
| | ALARA Plan #01-053, Install and Remove Temporary RCS & RCP Restraints and Lower Support Feet | August 14, 2001 |
| | ALARA Plan #01-059, Temporary Shielding ALARA Plan | July 23, 2001 |
| | ALARA Plan #01-062, Containment Structural Modifications | August 16, 2001 |
| | ALARA Plan #01-063, Scaffolding ALARA Plan | August 9, 2001 |
| | ALARA Plan #01-064, Insulation ALARA Plan | August 16, 2001 |
| | Kewaunee Steam Generator Replacement Project, Radiation Protection Plan | Revision 0 |
| | Radiation Protection Work Instruction for Pipe End Decontamination | Revision 0 |
| | Work in Progress Review, ALARA Plan 01-063 | October 3, 2001 |

Self-Assessments

| | | |
|---|---|---|
| KAP 01-16191 | Apparent Cause Analysis-Outage/SGR Dose Estimates Exceeded | October 2, 2001 |

Miscellaneous Data

| | | |
|---|---|---|
| | Actual versus Estimated Exposures per RWP, Sorted by Task | October 2-6, 2001 |
| | Daily ALARA Reports | October 2-6, 2001 |

| | | |
|---|---|---|
| | Outage Total Exposure Charts | |
| | SGR Project Total Exposure Charts | |
| | SGR Group Outage Schedule | October 2, 2001 |
| | 2001 Estimated Dose Goals | September 27, 2001 |

2OS3 Radiation Monitoring Instrumentation

Miscellaneous Data

| | | |
|---|---|---|
| SP80-061 | RADIAC Calibration Worksheets, AM-2 Area Monitor, #160-0882, Steam Generator Steam Dome | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, AM-2 Area Monitor, #6694-1, Steam Generator Steam Dome | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, AM-2 Area Monitor, #232-990, Spent Fuel Pool | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, AMS-3 Air Monitoring System, #563 | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, SAM-11Small Article Monitor, #217A | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, PCM-1C Personnel Contamination Monitor, #309 | Revision 0 |
| SP80-061 | RADIAC Calibration Worksheets, PM-7 Portal Monitor, #460 | Revision 0 |

4OA1 Performance Indicator Verification

| | | |
|---|---|---|
| EPRI 99-02 | Regulatory Assessment Performance Indicator Guideline | Revision 1 |
| | Reactor Operator and Shift Manager Logs | February 1, through September 30, 2001 |

4OA3 Event Follow-up

| | | |
|---|---|---|
| 50.72 Notification | Discovery That Anticipated Flow May Result in Engineered Safety Feature Equipment Being Incapable of Performing Design Functions | October 9, 2001 |
| KAP WO 01-016436 | Service Water System Performance | |

4OA5.1 Radiation Protection Organization Support For The Steam Generator Replacement

| | | |
|---|---|---|
| T-RT-TP, Appendix A, (Rev 0) | RP [Radiation Protection] Contractor Training Guidelines | June 14, 2001 |
| 2001 Steam Generator Replacement Project | Listing of ANSI [American National Standards Institute] Qualifications For Numanco RP Support Staff | |
| Kewaunee Steam Generator Replacement | Radiation Protection Plan (Revision 0) | April 10, 2001 |
| RT-EX-01 G | Senior Contract Radiation Protection Technician Test | Lesson Plan CRT.LP.00.00.01 |
| Contract Radiation Protection Technician | Qualification Cards and Training Records | 1999 -2001 |
| Mock-Up Activity Plans and Qualification Sheets | Pipe End Decon, Severance Cut/Machine RCS and RCS Internal Pipe Shielding | September and October 2001 |

2OS2 As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls

| | | |
|---|---|---|
| HP-02.003 | Evaluation for Use and Issuance of Respiratory Protection Equipment | Revision E |
| HP-04.001 | ALARA Plan | Revision C |
| Work-In-Progress Reviews #01-015 | H.P./Chemistry | October 3, 2001 |
| Work-In-Progress Reviews #01-063 | Scaffold Installation, Modification, and Removal During the SGRP | October 3, 8, & 22, 2001 |
| Work-In-Progress Review #01-064 | Insulation | October 23, 2001 |
| | Radiological Performance Committee, Meeting Minutes | October 8, 18, & 27, 2001 |
| Observation Report #2001-004-02-012 | RP Program - Exposure Control Corrective Actions | October 10, 2001 |

2PS2 Radioactive Material Processing and Transportation (71122.02)

| | | |
|---|---|---|
| HP-09.011 | Waste Stream Analysis | Revision B |

| | | |
|---|---|---|
| NAD-01.16 | Solid Radioactive Waste Process Control Program (PCP) | Revision D |
| KSA-RP-01-07 | Focused Self-Assessment Report, Radioactive Material Processing and Transportation | October 23, 2001 |
| Surveillance Nos. 2001-414, 415, 416, 417, 418 | Quality Assurance Oversight of the Steam Generator Replacement Activities Reports | September 8 - October 28, 2001 |
| | Updated Safety Analysis Report | Revision 16 |
| | Report Of Analysis (10CFR61) | May 23, 2001 |
| Shipping Documents | LSA II DAW | June 5, 2001 |
| Shipping Documents | LSA II Filters | June 14, 2001 |
| Shipping Documents | LSA II Laundry | October 29 & 31, 2001 |
| Shipping Documents | LSA II Steam Generator Lower Assemblies | November 2, 2001 |
| KAP WR#01-004844 | Barrels for Radwaste Placed in Wrong Location | August 14, 2001 |
| KAP WR#01-006663 | Document KSA-RP-01-07 | October 20, 2001 |