

October 23, 2001

Mr. Gary Van Middlesworth
Site Vice-President
Duane Arnold Energy Center
Nuclear Management Company, LLC
3277 DAEC Road
Palo, IA 52324

SUBJECT: DUANE ARNOLD ENERGY CENTER
NRC INSPECTION REPORT 50-331/01-07(DRP)

Dear Mr. Van Middlesworth:

On September 30, 2001, the NRC completed an inspection at your Duane Arnold Energy Center. The enclosed report documents the inspection findings which were discussed on September 24, 2001, with Mr. R. Anderson and other members of your staff.

This inspection examined activities conducted under your license as they relate to reactor 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 the inspection, the inspectors identified one finding of very low safety significance (Green). The issue has been entered into your corrective action program and is discussed in the summary of findings and in the body of the attached inspection report.

Since September 11, 2001, Duane Arnold Energy Center has assumed a heightened level of security based on a series of threat advisories issued by the NRC. Although the NRC is not aware of any specific threat against nuclear facilities, the heightened level of security was recommended for all nuclear power plants and is being maintained due to the uncertainty about the possibility of additional terrorist attacks. The steps recommended by the NRC include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with local law enforcement and military authorities, and limited access of personnel and vehicles to the site.

The NRC continues to interact with the Intelligence Community and to communicate information to Alliant, IES Utilities Inc. In addition, the NRC has monitored maintenance and other activities which could relate to the site's security posture.

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 (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/

Bruce L. Burgess, Chief
Branch 2
Division of Reactor Projects

Docket No. 50-331
License No. DPR-49

Enclosure: Inspection Report 50-331/01-07(DRP)

cc w/encl: E. Protsch, Executive Vice President -
Energy Delivery, Alliant;
President, IES Utilities, Inc.
Robert G. Anderson, Plant Manager
State Liaison Officer
Chairperson, Iowa Utilities Board
The Honorable Charles W. Larson, Jr.
Iowa State Representative

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-331
License No: DPR-49

Report No: 50-331/01-07(DRP)

Licensee: Alliant, IES Utilities Inc.

Facility: Duane Arnold Energy Center

Location: 3277 DAEC Road
Palo, Iowa 52324-9785

Dates: August 17 through September 30, 2001

Inspectors: P. Prescott, Senior Resident Inspector
C. Miller, Senior Operator Licensing Examiner
M. Kurth, Resident Inspector
R. Schmitt, Radiation Protection Specialist
D. Schrum, Regional Reactor Inspector

Approved by: Bruce L. Burgess, Chief
Branch 2
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000331-01-07(DRP), on 08/17-09/30/2001, IES Utilities, Inc, Duane Arnold Energy Center. Routine safety inspection.

This report covers a 6 week routine inspection. The inspection was conducted by resident inspectors, a senior operator licensing examiner, and a region based reactor inspector and radiation protection specialist. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). 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/NRC/OVERSIGHT/index.html>. Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violations.

A. Inspector Identified Findings

Green. An accumulation of alga grass from the river water intake structure and stilling basin clogged a strainer during a surveillance of the "B" residual heat removal service water (RHRSW) system and was declared inoperable. Divers identified a large amount of alga grass accumulated on the floors and walls of the river water intake pits and the stilling basin. The finding was considered to be more than minor and was viewed as a precursor to a more significant event because the amount of alga grass, if liberated from the floors and walls of the river water intake pits and stilling basin, would inhibit the system's ability to remove decay heat from the reactor vessel and suppression pool during transient conditions.

The finding was determined to be of very low safety significance because the "B" RHRSW train with a clogged strainer still met its minimal Technical Specification and Updated Final Safety Analysis Report flow values and the opposite train was available if needed. (Section 1R22.2)

B. Licensee Identified Findings

No findings of significance were identified.

Report Details

Summary of Plant Status

The licensee operated the plant near or at full power during the report period. One exception was on August 29, 2001, between 11:14 am and 3:21 pm, when the licensee reduced power by 20 MW_e to sequentially remove cooling tower fans from service to measure their effects on condenser back pressure.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

The inspectors performed a partial walkdown of accessible portions of the system listed below to verify system operability. Items reviewed in the inspectors' walkdown included the following: verification of the correct valve position of all the valves in the primary system flowpath using the system piping and instrumentation drawings (P&IDs) and system mechanical checklist; verification of breaker alignments using the system electrical checklist; observation of instrumentation valve configurations and appropriate meter indications; verification of lubrication and cooling of major components by direct observation of the components; observation of proper installation of hangers and supports during the walkdown; and verification of operational status of support systems by direct observation of various parameters. Control room switch positions for the system were observed. The inspectors also evaluated other conditions such as adequacy of housekeeping, the absence of ignition sources, and proper component labeling. The walkdowns were performed while maintenance was being conducted on the corresponding train. The following system was selected for a walkdown:

- High Pressure Coolant Injection (HPCI) System

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors walked down the following risk-significant areas looking for any fire protection degraded conditions. Open fire protection impairment requests were reviewed to prioritize the plant area fire plan (AFP) zones inspected and discussions were conducted with the fire protection program engineer. During the walkdowns, emphasis was placed on the following items: control of transient combustibles and

ignition sources; area material condition; operational lineup and operational effectiveness of the fire protection systems, equipment, and features; and the material condition and operational status of fire barriers used to prevent fire damage or fire propagation.

In particular, the inspectors verified that all observed transient combustibles were being controlled in accordance with the licensee's administrative control procedures. In addition, the inspectors observed the physical condition of fire detection devices, such as overhead sprinklers, and verified that any observed deficiencies did not impact the operational effectiveness of the system. Included in the observations were the following items: the physical condition of portable fire fighting equipment, such as fire extinguishers, to verify that the equipment was located appropriately and that access to the extinguishers was unobstructed; the verification that fire hoses were installed at their designated locations and the physical condition of the hoses was satisfactory and access unobstructed; and the verification of the physical condition of passive fire protection features such as fire doors, ventilation system fire dampers, fire barriers, and fire zone penetration seals to ensure that the items were properly installed and in good physical condition. Using the Fire Plan Volume II, "Fire Brigade Organization," the following areas were inspected:

- AFP-4, "Reactor Building North CRD [Control Rod Drive] Module Area, CRD Repair and CRD Cable Rooms"
- AFP-5, "Reactor Building South CRD Module Area and Offgas Recombiner Rooms and Railroad Airlock"
- AFP-6, "Reactor Building RHR [Residual Heat Removal] Valve Room"

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the flow verification surveillance test for the heat exchangers supplied by the emergency service water (ESW) system. The data was compared against the Updated Final Safety Analysis Report (UFSAR) to ensure the system design flow rates were achieved and that the system met its design basis. Discussions were held with the project engineer responsible for the heat exchanger performance program.

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 requirements for the systems or components listed below. Documentation reviewed in performance of the inspection is also listed below. The systems or components were selected based upon recent performance problems and the risk significance classification of the systems in the maintenance rule program. The inspectors independently verified the licensee's implementation of the maintenance rule for these systems by verifying that these systems were properly scoped within the maintenance rule in accordance with 10 CFR 50.65; that all failed structures, systems, or components (SSCs) were properly categorized and classified as (a)(1) or (a)(2) in accordance with 10 CFR 50.65; the appropriateness of performance criteria for SSCs classified as (a)(2); and the appropriateness of goals and corrective actions for SSCs classified as (a)(1). The inspectors also verified that issues were identified at an appropriate threshold and entered in the corrective action program. The following systems were reviewed:

- Reactor Building Sump System
- General Service Water System
- Emergency Service Water System

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12B)

.2 Periodic Evaluation

a. Inspection Scope

The inspector verified that a periodic evaluation was completed within the time restraints defined in 10 CFR 50.65 (once per refueling cycle, not to exceed two years), ensuring that the licensee reviewed its goals, monitoring, preventive maintenance activities, industry operating experience, and made appropriate adjustments as a result of that review. In addition, the inspector verified that the licensee balanced reliability and unavailability during the previous refueling cycle, including a review of safety significant Structures, Systems and Components (SSCs) and that (a)(1) goals were met, corrective action was appropriate to correct the defective condition, including the use of industry operating experience, and (a)(1) activities and related goals were adjusted as needed. The inspector also verified that the licensee has established (a)(2) performance criteria, examined any SSCs that failed to meet their performance criteria, or reviewed any SSCs that have suffered repeated maintenance preventable functional failures including a verification that failed SSCs were considered for (a)(1).

The inspector examined the periodic evaluation report completed for the time period of May 1998 - December 1999. To evaluate the effectiveness of (a)(1) and (a)(2) activities, the inspectors examined a number of Duane Arnold Action Requests (ARs) (contained in the list of documents at the end of this report). In addition, the ARs were reviewed to verify that the threshold for identification of problems was at an appropriate level and the associated corrective actions were appropriate. Also, the maintenance rule program documents were reviewed.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's scheduling, configuration control, and performance of planned maintenance and emergent work activities, and the risk assessment of scheduled maintenance activities associated with work week 32 that included planned work on a 161 KV switchyard breaker, "A" train standby gas treatment system instrument air compressor, electric fire pump, and "D" well pump. Also, the risk assessment of scheduled maintenance activities associated with work week 35 were reviewed that included work on the reactor core isolation cooling (RCIC) system, "D" well water pump, and surveillance tests on both emergency diesel generators. In addition, a risk assessment was performed for work week 36 scheduled maintenance which included the standby transformer, auto-transformer and emergent maintenance which included the "B" residual heat removal service water (RHRSW) strainer inspection and cleaning.

The inspectors verified that scheduled and emergent work activities were adequately managed. This included observation of the licensee's program for conducting maintenance risk safety assessments and verification of the licensee's planning, risk management tools, and the assessment and management of online risk. Licensee actions to address increased online risk were verified during these periods, such as establishing compensatory actions, minimizing the duration of the activity, obtaining appropriate management approval, and informing appropriate plant staff. Finally, portions of the maintenance activities were observed to ensure proper management oversight and return to service of the risk significant SSCs in a timely manner.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the technical adequacy of operability evaluations to ensure that the system operability was properly justified and the system remained available, such that no unrecognized increase in risk occurred.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (OWAs) (71111.16)

a. Inspection Scope

The inspectors reviewed operator workarounds to identify any potential effect on the function of mitigating systems, or the operators' ability to respond to an event and implement abnormal and emergency operating procedures.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors observed the post-maintenance tests and reviewed test data. The inspectors verified that the post-maintenance tests observed demonstrated that the systems and components were capable of performing their intended safety function. Included in the review were the applicable sections of Technical Specifications (TS) requirements, the UFSAR, and plant procedures. Following the completion of the tests, the inspectors verified that the test equipment was removed and that the equipment was returned to a condition in which it could perform its safety function.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

.1 Various Routine Surveillance Tests

a. Inspection Scope

The inspectors observed surveillance testing on risk-significant equipment, verified that the SSCs selected were capable of performing their intended safety function and verified that the surveillance tests satisfied the requirements contained in TS, the

UFSAR, and licensee procedures. During surveillance testing observations, the inspectors verified the following items: the test was adequate to demonstrate operational readiness consistent with the design and licensing basis documents; the testing acceptance criteria was clear; the impact of the testing had been properly characterized during the pre-job briefing; the test was performed as written and all testing prerequisites were satisfied; and that the test data was complete, appropriately verified, and met the requirements of the testing procedure. Following the completion of the test, the inspectors verified that the test equipment was removed and that the equipment was returned to a condition in which it could perform its safety function.

b. Findings

No findings of significance were identified.

.2 "B" Residual Heat Removal Service Water Strainer Clogging During Surveillance Testing

a. Inspection Scope

On September 4, 2001, the inspectors observed portions of STP NS790701, "Continuous Service Water Tritium Sampling and Analysis," Revision 0. The inspectors verified that the surveillance test was performed as written; the testing acceptance criteria was clear; and the test data met the requirements of the testing procedure. The surveillance testing analyzes composite water samples, in part, from the emergency service water (ESW) systems and residual heat removal service water (RHRSW) systems. Therefore, the ESW and RHRSW pumps were started and operated to complete the surveillance. During the performance of the STP, the "B" RHRSW strainer became clogged with foreign debris that resulted in the strainer exceeding the vendor-recommended differential pressure design limit. The inspectors reviewed the licensee's actions following the strainer clogging incident.

b. Findings

Green. An accumulation of alga grass from the river water intake structure and stilling basin clogged the "B" RHRSW strainer. The licensee declared the "B" RHRSW system inoperable and, through the use of divers, identified a large amount of alga grass in the river water intake pits and the stilling basin. However, adequate RHRSW flow (minimal TS and UFSAR flow values) passed through the clogged strainer and the opposite division was available if needed.

The inspectors determined that sometime between March 2001, when the previous diving and cleaning activities occurred for the river water intake pits and the stilling basin, and August 2001, the alga grass accumulated on the walls and floor surfaces. A portion of the alga grass was liberated during a periodic surveillance test and clogged the "B" RHRSW system's strainer beyond the vendor recommended differential pressure condition of 15 psid. The division was declared inoperable. The licensee inspected the strainer internals and did not identify any negative effects from operating the strainer at the high differential pressure condition. The strainer was cleaned and reassembled.

Divers vacuum cleaned the foreign material from the walls and floors of the river water intake pits and stilling basin. The licensee initiated AR 27459 to evaluate the necessary corrective actions to prevent the accumulation of foreign debris in the service water pits and stilling basin.

This finding was considered to be more than minor and was viewed as a precursor to a more significant event. The loss of the RHRSW system was reasonably viewed as a precursor to a significant event because it would inhibit the ability to remove decay heat from the reactor vessel and the suppression pool during transient conditions. The amount of alga grass found in the river water intake pits and the pump house stilling basin could have plugged both divisions of RHRSW and ESW if sufficient quantities of the foreign material was liberated. This finding was, however, of very low safety significance (Green) because the water flow through the clogged strainer on the "B" RHRSW train still met minimal TS and UFSAR flow values. Also, the "A" RHRSW train and both ESW trains had normal flows during the surveillance test on September 4, 2001. In addition, the "A" RHRSW train and both ESW train strainers had normal differential pressures during the surveillance testing.

Also, the inspectors determined that on February 11, 1998, the licensee implemented a preventive maintenance (PM) change to increase the divers' inspection and possible cleaning of the river water intake pits, stilling basin, and the ESW and RHRSW pits from a 3-month to a 6-month frequency. The inspectors identified that the PM change request was part of a broader initiative that affected over 300 preventive maintenance activities, many of which were for other safety related systems. The majority of changes were implemented for various broad and general reasons which included ease of maintenance, necessity, combining of tasks, and insurance requirements. Refer to Section 4OA5, "Other," of this report for further discussion of this particular issue.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed one temporary modification package, safety evaluation, and installation work order. The inspectors verified revisions made to drawings and procedures and the installation of the temporary modification. The temporary modification was discussed with the system engineer.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Controls for Radiologically Significant Areas (71121.01)

.1 Plant Walkdowns, Radiological Boundary Verifications, and Radiation Work Permit Reviews

a. Inspection Scope

The inspector performed walkdowns of the radiologically controlled area (RCA) to verify the adequacy of radiological controls and postings. Specifically, the inspector performed confirmatory radiation measurements in selected portions of the Reactor, Turbine, and Radwaste Buildings to verify that these areas (radiation areas, high radiation areas (HRAs), and locked high radiation areas (LHRAs)) were properly posted and controlled in accordance with 10 CFR Part 20, licensee procedures and Technical Specifications. The inspector also reviewed radiation work permits (RWPs) for general tours, main condenser in-leakage testing, and the final disposition of waste control rod drive (CRD) "outer" filters to verify that work instructions and controls had been adequately specified and that electronic dosimeter set points were in conformity with survey indications.

b. Findings

No findings of significance were identified.

.2 Job-In-Progress Reviews, Observations of Radiation Worker Performance, and Radiation Protection Technician Proficiency

a. Inspection Scope

The inspector observed the following high exposure or high radiation area work activities performed during the inspection and evaluated the licensee's use of radiological controls:

- Main Condenser In-Leakage testing
- Final disposition of waste CRD "outer" filters

The inspector attended the pre-job briefing for the final disposition of the CRD "outer" filters. The inspector reviewed all radiological job requirements for each activity and observed job performance with respect to those requirements. The inspector reviewed required surveys, including system breach radiation, contamination, and airborne surveys; radiation protection job coverage; and contamination controls to verify that appropriate radiological controls were utilized. The inspector also reviewed surveys and applicable postings and barricades to verify their accuracy. The inspector observed radiation protection technician and worker performance during the work evolutions at the work site to verify that the technicians and workers were aware of the significance of the radiological conditions in their workplace, and the RWP controls/limits, and that they

were performing adequately, given the level of radiological hazards present and the level of their training.

b. Findings

No findings of significance were identified.

.3 Reviews of Licensee's Programmatic Controls for Highly Activated/Contaminated Materials

a. Inspection Scope

The inspector reviewed procedure ACP 1407.2, "Material Control in the Spent Fuel Pool and Cask Pool," to verify that all highly activated/contaminated materials were properly stored and controlled in the spent fuel pool. The inspector also discussed the licensee's programmatic controls over the highly activated/contaminated materials with the radiation protection (RP) personnel/staff.

.b Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The inspector reviewed licensee calendar year (CY) 2000-2001 Action Requests (AR), which focused on access control to radiologically significant areas (i.e., problems concerning activities in HRAs, radiation protection technicians performance, and radiation worker practices). The inspector also reviewed the 3rd and 4th Quarter 2000 and 1st and 2nd Quarter 2001 Action Request Radiological Occurrence Trend Reports. The inspector reviewed these documents to verify the licensee's ability to identify repetitive problems, contributing causes, the extent of conditions, and then implement other corrective actions in order to achieve lasting results.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation (71121.03)

.1 Source Tests and Calibration of Radiological Instrumentation

a. Inspection Scope

The inspector reviewed calibration and surveillance records for radiological instrumentation associated with monitoring transient high and/or very high radiation areas and instruments used for remote emergency assessment to verify that the calibrations were conducted consistent with industry standards and in accordance with station

procedures. The inspector reviewed the Updated Final Safety Analysis Report (UFSAR) and performed walkdowns to confirm that selected area radiation monitors (ARMs) at the spent fuel pool, transversing in-core probe (TIP) room, on-site storage facility, resin processing, transportation bay areas, and the drywell were operable and properly indicated area radiation levels. The inspector reviewed the licensee's alarm set points for selected ARMs to verify that the set points were established consistent with the UFSAR, Technical Specifications, and the station's Emergency Plan.

Specifically, the inspector reviewed calibration procedures and CY 2000 - 2001 calibration records for the following radiation monitoring instrumentation:

- Post Accident Sampling Station Room ARM (RE-8771)
- Reactor Building South ARM (RE-9169)
- Truck Loading Bay ARM (RE-9186)
- Reactor Water Clean-up Phase Separator Room ARM (RE-9177)

The inspector reviewed instruments stored in the licensee's calibration facility and verified that those "ready for use" had current calibrations, were operable, and were in good physical condition. The inspector observed RP staff source checking portable radiation survey instruments. The inspector reviewed the calibration procedures and selected calendar year 2001 calibration records to verify that the portable radiation survey instruments had been properly calibrated consistent with the licensee's procedures. The inspector observed the calibrations of an Eberline E-140 Count Rate Meter and the primary containment air sampling system instrumentation (drywell radiation monitors) to verify that the instruments were calibrated in compliance with the appropriate procedures.

The inspector discussed surveillance practices and reviewed CY 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 RCA. The inspector observed RP staff complete functional tests of selected personnel contamination monitors, portal monitors, and small article monitors to confirm that these instruments were source tested and calibrated as required by station procedures and industry standards.

Additionally, the inspector performed a walkdown of the post accident sampling system and reviewed quality control records to ensure that the system was capable of obtaining representative samples of the reactor coolant system.

b. Findings

No findings of significance were identified.

.2 Self-Contained Breathing Apparatus (SCBA) Program

a. Inspection Scope

The inspector reviewed aspects of the licensee's respiratory protection program for compliance with the requirements of Subpart H of 10 CFR Part 20, to ensure that

self-contained breathing apparatus (SCBA) were properly maintained and stored and to ensure that personnel required to don SCBAs were qualified. Specifically, the inspector reviewed the monthly testing records (CY 2000 - 2001) for SCBAs located in various areas within the site. The inspector also performed walkdowns of the SCBA storage locations and inspected a sample of the units to assess the material condition of the equipment. In addition, the inspector reviewed the licensee's current training and qualification records to verify that applicable emergency response, fire brigade, and control room personnel were currently trained and qualified for SCBA use, as required by the Emergency Plan, UFSAR, and plant procedures.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

The inspector reviewed CY 2001 ARs that addressed radiation instrument deficiencies to determine if any significant radiological incidents involving radiation instrument deficiencies had occurred during CY 2001. The inspector also reviewed the 3rd and 4th Quarter 2000 and 1st and 2nd Quarter 2001 Action Request Radiological Occurrence Trend Reports. The inspector reviewed these documents to verify the licensee's ability to identify repetitive problems, contributing causes, the extent of conditions, and implement corrective actions to achieve lasting results. Additionally, the inspector reviewed the 1st Quarter 2001 Nuclear Quality Assurance (QA) Department Audit Report, "Health Physics Instrumentation Program," to evaluate the effectiveness of the self-assessment process to identify, characterize, and prioritize problems and to verify that previous radiological instrumentation related issues were adequately addressed.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Cornerstone: Mitigating Systems

.1 Data Collection

a. Inspection Scope

The inspectors reviewed control room operator logs, monthly operating reports, licensee event reports, and performance indicator data for the first and second quarters of the year 2001 for Reactor Coolant System Specific Activity and Reactor Coolant System

Leakage. Appropriate licensee personnel responsible for data collection were interviewed.

b. Findings

No findings of significance were identified.

.2 Radiological Effluent Technical Specifications (RETS)/Offsite Dose Calculation Manual (ODCM) Radiological Effluent Occurrence Performance Indicator

b. Inspection Scope

The inspector reviewed licensee effluent release data for CY 2000-2001. The accuracy and completeness of the data was assessed against the criteria specified in Nuclear Energy Institute 99-02, Revision 0, "Regulatory Assessment Performance Indicator Guideline." The inspector interviewed members of the licensee's staff who were responsible for performance indicator data acquisition, verification and reporting, to verify that their review and assessment of the data was adequate. Additionally, the inspector reviewed the licensee's ARs for CY 2000-2001, and offsite dose calculations (November 2000 through August 2001) to ensure that there were no performance indicator (PI) occurrences that were not identified by the licensee.

b. Findings

No findings of significance were identified.

4OA5 Other

a. Inspection Scope

The inspectors reviewed data associated with a broad preventive maintenance frequency change that occurred in 1998 and affected greater than 300 preventive maintenance activities. The inspectors reviewed associated documents and interviewed licensee personnel responsible for the implementation of the broad change.

b. Findings

As discussed in Section 1R22.2, "Surveillance Testing," of this report, the inspectors determined that on February 11, 1998, the licensee implemented a preventive maintenance (PM) change to increase the time between the divers' inspection and possible cleaning of the river water intake pits, stilling basin, and the ESW and RHRSW pits from a 3-month to a 6-month frequency. The inspectors identified that the PM change request was part of a broader initiative that was documented in an October 14, 1997 memo that addressed over 300 preventive maintenance activities, many of which were for safety-related systems. The majority of changes were implemented for various general reasons which included ease of maintenance, necessity, combining of tasks, and insurance requirements.

Administrative Control Procedure 1408.3, "Preventive Maintenance Program," Revision 0, Section 3.3(1), required that valid reasons for revising a PM basis were accomplished by initiating a PMAR Input Request form and following the appropriate instructions. The instructions require, in part, a full description of the basis for change. For the over 300 PM change activities discussed above, a full description for the basis for change was not provided. Therefore, based on the amount of changes and the potential impact on safety related equipment performance, this issue was viewed as an unresolved item (50-331/01-007-01(DRP)) pending evaluation of the PM changes and completion of the significant determination process evaluation.

4OA6 Meeting

Exit Meeting

The resident inspectors presented the inspection results to Mr. R. Anderson and other members of licensee management on September 24, 2001. A radiation specialist inspector presented the Access Control to Radiologically Significant Areas and Radiation Monitoring Instrumentation inspection results to Mr. G. Van Middlesworth and other members of licensee management on September 28, 2001. Finally, a regional reactor inspector presented the Maintenance Rule inspection results to Mr. G. Van Middlesworth and other members of licensee management on August 24, 2001. For each of the inspections, 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.

KEY POINTS OF CONTACT

Licensee

R. Anderson, Plant Manager
J. Bjorseth, Manager, Engineering
T. Evans, Operations Manager
H. Giorgio, Manager, Radiation Protection
D. Curtland, Site Support Manager
B. Kindred, Security Manager
W. Simmons, Maintenance Superintendent
G. Van Middlesworth, Site Vice-President Nuclear
J. Kerrick, Nuclear Licensing
L. Kriege, Chemistry Supervisor
S. Nelson, Health Physics

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-331/2001-07-01 URI Evaluation of a Grouping of Greater than 300 Preventive Maintenance Changes Not Completed in Accordance With Administrative Procedures

Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

1R04 Equipment Alignment (71111.04)

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
P&ID M122	HPCI Steam Side	52
P&ID M123	HPCI Water Side	37

Procedure Checklist: Operating Instruction (OI) 152, Attachment 2	HPCI System Valve Lineup	1
1R05 <u>Fire Protection</u> (71111.05)		
AFP- 4	Reactor Building North CRD [Control Rod Drive] Module Area, CRD Repair and CRD Cable Rooms	23
AFP-5	Reactor Building South CRD Module Area and Offgas Recombiner Rooms and Railroad Airlock	22
AFP-6	Reactor Building RHR [Residual Heat Removal] Valve Room	22
1R07 <u>Heat Sink Performance</u> (71111.07)		
Equipment Monitoring Procedure (EMP) 1E053-HT	Emergency Diesel Generator 1E-53B Cooler Heat Transfer Test	5
UFSAR Section 9.2.3.2.2	Emergency Service Water	
1R12 <u>Maintenance Rule Implementation</u> (71111.12)		
	DAEC Performance Criteria Document, "Emergency Service Water System"	1
	DAEC Performance Criteria Document, "Reactor Building Sump System"	1
	DAEC Performance Criteria Document, "General Service Water"	1
	Control Room Operators Logs	
1R12 <u>Maintenance Rule Implementation</u> (71111.12B)		
	Maintenance Rule Program Cycle 16 Periodic Report May 1998 - December 1999	August 28, 2000
NUMARC 93-01	Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	Revision 3
Module 0	Maintenance Rule Program Overview	Revision 2
Module 1	Maintenance Rule Program Scoping	Revision 2

Module 2	Maintenance Rule Program Risk-Significance Determination	Revision 1
Module 3	Maintenance Rule Program Performance Criteria Development	Revision 2
Module 4	Maintenance Rule Program Monitoring Performance, Goal Setting, and EPIX Activities	Revision 6
Module 5	Maintenance Rule Program Preparation of Cyclic Report	Revision 3
Module 6	Maintenance Rule Program Monitoring of Structures	Revision 2
Memorandum	To: Dean Curtland, From: Terry Lane "Closure of Watertight Doors Between Reactor Building Corner Rooms and Torus Room"	July 21, 1998
UFSAR Table 8.3-1	Single Diesel Generator Loading Sequence and Response - Loss-of-Coolant Accident Plus Loss of Offsite Power	Revision 12
Calculation E-79-1	Diesel Generators IG21 and IG31 Loading and Response	Revision 0
ARP Panel 1C03B	Residual Heat Removal Heat Exchanger 1E-201A Tube-to-Shell Low Pressure	Revision 3
SUS 16.00	Performance Criteria Basis Document - Residual Heat Removal Service Water	Revision 3
SUS 23.00, 24.01, 24.02, 24.03	Performance Criteria Basis Document - Emergency Diesel Generators	Revision 2
SUS 49.00	Performance Criteria Basis Document - Residual Heat Removal	Revision 3
SUS 52.00	Performance Criteria Basis Document - High Pressure Coolant Injection System	Revision 2
AR 8366	Technical Specification Basis for RHRSW Flow	April 9, 1997
AR 10604	1P022A (A RHRSW Pump) in ASME Alert Range	January 16, 1998
AR 13404	High Vibration Found During Post Modification Testing of 1P022A (RHR Service Water Pump)	October 22, 1988
AR 12595	RHRSW Maintenance Rule RED 50.65(a)(1) Repetitive Failure	July 29, 1998
AR 12591	1P022D-M Tripped on Ground Overcurrent	July 3, 1998

AR14049	Perform Technical Assessment of RHRSW System to Remove From Maintenance Rule Red	February 10, 1999
AR 13156	SER 3-98: Recurring Event Flooding of ECCS Rooms	September 29, 1998
AR 8367	RHRSW Flow Required by EOP-2	April 9, 1997
AR 14402	Safe Shutdown Emergency Lights Failure Rate - Maintenance Rule	February 9, 1999
CWO A52098	Door Not Latching	November 17, 2000
CWO A55831	Closing Mechanism is Broke, Door Does Not Close by Itself	August 18, 2000
EOP 2	Primary Containment Control Guideline	Revision 6
Calc 466-M003	ESW Heat Loads	Revision 2
Calc MC-13A	RHRSW Pump TDH Requirement	Revision 2
BECH-M137	P & ID Radwaste Sump System	Revision 30
STP NS160002	RHR Service Water Operability Test	May 31, 2001
STP NS490003	RHR System Leakage Inspection Walkdown	August 11, 2001
	Thermal Performance Analysis of RHR Heat Exchangers 1E201 A/B	May 11, 2001
	Expert Panel Meeting Minutes 1998 to July 2001	
	Maintenance Rule Program Self-Assessment	July 30, 2001
	Changes to Performance Criteria July 1999 to August 2001	
	10 CFR 50.65(a)(1) Entries and Removals, Cycle 16, 17, and 18 - Goals and Corrective Actions	
	Current List of Maintenance Rule Systems Showing (a)(1) and (a)(2) Status	August 2001
	Latest Maintenance Rule Criteria Values	August 2001
	List of all Functional Failures, MPFFs, and RMPFFs for the Past Two Years	August 2001
	MR System Parameter Information	August 2001

Condition Reports Initiated as a Result of Inspection

AR 26597	Investigate Controls on Watertight Doors	August 24, 2001
AR 26974	EOP Guidance on Operating all Available Torus Cooling	August 24, 2001
AR 27339	RHR Corner Room Heatup Calculations - Torus Wall Heat Transfer during DBA LOCA	August 24, 2001
AR 27340	IPE Does Not Include All the Additional Risks Associated With Power Uprate.	August 24, 2001
AR 27341	RHR Corner Room Sump Backflow AOVs Not Scoped Into the MR	August 24, 2001
AR 27347	Unavailability of the RHR System During Torus Cooling Not Counted in the MR.	August 24, 2001
AR 27349	Differences Between EDG Loading Calculations and the UFSAR	August 23, 2001
AR 27452	No Surveillance to Test Two RHRSW Pump Flow/Pressure Requirements	August 29, 2001

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

Work Week 32 - Level 'A' and Other Significant Activities Summary

Work Week 35 - Level 'A' and Other Significant Activities Summary

Work Week 36 - Level 'A' and Other Significant Activities Summary

1R15 Operability Evaluations (71111.15)

AR 16214	Revised Operability Evaluation for Primary Containment Electrical Penetrations 1JX105B & D
AR 27434	HPCI Response Time Correction Factor Was Greater Than the Allowed 5.4 Seconds
AR 27459	Unknown Foreign Material Found in River Water Supply Stilling Basin
Automated Engineering Services Corporation Report TNV-01-041	Operability Evaluation of the Torus, Drywell, and Vent System Due to Non-Conforming Bellows Configuration

1R16 Operator Workarounds (OWAs) (71111.16)

AR 26120	Potential Seat Leakage Through Either/Both CV1579/CV1621 ("A/B" Feedwater Regulating Valve)	
AR 23477	Place Spurious (125 VDC) Signal Suppression Devices in Affected Annunciator Panels	
AR 24219	'B' RWCU [Reactor Water Cleanup] Bed Isolated While Placing "A" RWCU F/D [Filter/Demineralizer] Bed in Service	

1R19 Post-Maintenance Testing (71111.19)

CWO A55707	1S203, Control Indicating Flow for RCIC Pump Turbine Indicates Approximately 10 GPM [Gallons Per Minute] Rather Than 0 GPM	
CWO A51510	Inspect "B" RHRSW Strainer 1S090B Backwash Assembly and Replace Parts As Required	
CWO A35907	Replace DC Input Capacitor Bank on 125Volt DC Battery Backup Charger 1D120	
STP 3.5.3-02	RCIC System Operability Test	10
TS 3.7.1	Residual Heat Removal Service Water System	
UFSAR Section 6.2.1.3	Mass and Energy Release Analysis for Postulated LOCA's	
OI 416	RHR Service Water System	24
OI 302	125 Volt DC Power Distribution System	30

1R22 Surveillance Testing (71111.22)

AR 27459	Unknown Foreign Material Found in Pump House Stilling Basin	
STP 3.5.3-02	RCIC System Operability Test	10
STP 3.8.1-04	Standby Diesel Generators Operability Test (Slow Start From Normal Air Start)	9
STP 3.3.1.1-11	Discharge Volume High Water Level Functional/Calibration Test (RTD's)	3
STP NS790701	Continuous Service Water Tritium Sampling and Analysis	0

1R23 Temporary Plant Modifications (71111.23)

Temporary Modification Permit No. 01-053	De-energize by Lifting Leads to MO5716A & MO5728A to Maintain Valves Open to Ensure Cooling Water to 1VCC001A Drywell Cooler	
OI 760	Drywell Cooling System	16
UFSAR Section 6.2.2.2.3	Primary Containment Cooling System	
System Description SD 410	River Water System	2
Technical Basis Document #1	Release of Materials for Unrestricted Use	July 12, 2000

2OS1 Access Controls for Radiologically Significant Areas (71121.01)

Procedures

AR 17336	Worker Received ED Alarms While Erecting Scaffolding	April 10, 2001
AR 21742	Poor Radiological Work Practices While Working in Torus	April 21, 2001
AR 25125	Radiation Area Not Posted	April 29, 2001
AR 25642	Uncontrolled High Radiation Area Found During Resin Discharge	June 18, 2001
AR 25846	Worker Entered Area on Wrong RWP	May 11, 2001
AR 27272	Exit Door to Condenser Bay/1T-6 Tank Room Found in Poor Material Condition	August 20, 2001
ACP 1407.2	Material Control in the Spent Fuel Pool and Cask Pool	Revision 8
ACP 1411.13	Control of Locked High Radiation Areas	Revision 8
ACP 1411.22	Control of Access to Radiological Areas	Revision 9
HPP 3102.02	ALARA Job Planning	Revision 10
HPP 3104.01	Control of Access to High Radiation Areas	Revision 16
RWP #5, Step 1	Access to Radwaste Operations in Controlled Areas, Routine Work	Revision 21
RWP #5, Step 9	Access to Radwaste Operations in Controlled Areas, Processing HOT Materials	Revision 22

RWP #6, Step 8	Routine Helper Duties	Revision 16
RWP #122	Condenser Bay Maintenance, At Power	Revision 14
STP NS810002	Physical Inventory of Special Nuclear Material	Revision 1

Miscellaneous Data

Contamination Control "PACE" Guideline	September 20, 2001
Daily Exposure Report	September 25, 2001
DAEC Agenda for Review: Week 39	September 20, 2001
DAEC, Personnel Contaminations, Listings by Individual Events and Causes	October 2000 to May 2001
DAEC, Personnel Contaminations, By General Locations, Area Types, Causes, and Group Codes	October 2000 to September 2001
Pre-Job Briefing "PACE" Guideline	July 31, 2001
Written Work Plans for Radwaste Activities	

Self-Assessments

CY 2000 Radiological Protection Self-Assessment Team Report	August 25, 2000
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2OS3 Radiation Monitoring Instrumentation

Procedures

ACP 114.5	Action Request System	Revision 28
ACP 1411.20	Respiratory Protection	Revision 11
AR #18709	Large Percentage of "Teletectors" Found to Be Frequently Out of Specification	March 28, 2000
AR #18712	Inadequate Corrective Actions for HP Instrumentation Trending Program	March 30, 2000
AR #20336	QC Program Needed for "Portable" Instruments	May 31, 2000

AR #22486	Need Improvements in Installing HP Instrumentation Cabling	October 11, 2000
AR #26018	Neutron Detection Instrument Out of Tolerance	May 29, 2001
AR #27744	Updated PCM Equipment Needed	September 26, 2001
HPP 3106.04	Inspection, Maintenance and Quality Assurance of Respiratory Protection Equipment	Revision 8
HPP 3108.04	Radiation Protection Instrumentation Operational Check and Quality Control Considerations	Revision 8
HPP 3110.05	Calibration of Eberline E-140 Count Rate Meter	Revision 4
HPP 3110.35	Calibration of National Nuclear Corporation Gamma-10 Portal Monitor	Revision 8
I.RIM-N305-02	NMC Model RAK-22IF Drywell Radiation Monitors	Revision 6
STP 3.4.5-03	Calibration of Primary Containment Air Sampling System Instruments	Revision 4
TBD #9	DAEC Portable Radiation Instrument Program Description	Revision 0

Miscellaneous Data

Area Radiation Monitors Computer Readout, RCA Access Point	September 25, 2001
Area Radiation Monitors Computer Readout, Plant Control Room	September 25, 2001
Comprehensive DAEC Instruments Listing, by Type, Calibration Due Date, and Calibration Procedures	September 26, 2001
DAEC Metrology Lab, Portable Instrument Calibration Records	January 2001 to September 2001
DAEC Personnel, SCBA Qualification Due Dates	September 20, 2001
Monthly SCBA Equipment Checks	January to September, 2001
Procheck 3 Test Results, Complete SCBA Test	August 2000 to June 2001

Radiation Monitor Surveillance and Preventative Maintenance Schedule

SCBA/Fire Brigade Qualification Training Rosters September 2000 to September 2001

Special Order #01-02, "Respiratory Qualifications" January 4, 2001

Self-Assessments

Quality Assurance Report, "Health Physics Instrumentation Program" 1st Quarter 2001

4OA1 Performance Indicator Verification

ACP 1402.4 "NRC Performance Indicator Collection and Reporting, Attachment #1 Performance Indicator Data Calculation, Review and Approval" Documentation Packets, CY 2000, 3rd and 4th Quarter(s), CY 2001, 1st and 2nd Quarter(s) Revision 0

4OA5 Other

ACP 1408.3 Preventive Maintenance Program, Section 3.3(1) 0

LIST OF ACRONYMS USED

AFP	Area Fire Plan
AR	Action Request
ARMs	Area Radiation Monitors
CFR	Code of Federal Regulations
CRD	Control Rod Drive
CV	Control Valve
CY	Calender Year
CWO	Corrective Work Order
DAEC	Duane Arnold Energy Center
DRP	Division of Reactor Projects
ESW	Emergency Service Water
GPM	Gallons Per Minute
HPCI	High Pressure Coolant Injection
HRA	High Radiation Area
IPOI	Integrated Plant Operating Instruction
IR	Inspection Report
LHRA	Locked High Radiation Area
LSA	Low Specific Activity
MW _e	Megawatts (Electric)
MWO	Modification Work Order
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
ODAM	Offsite Dose Assessment Manual
ODCM	Off-Site Dose Calculation
OI	Operating Instruction
OWA	Operator Workaround
PI	Performance Indicator
P&IDs	Piping and Instrumentation Drawings
PAR	Protective Action Recommendations
PCM	Personnel Contamination Monitor
PMAR	Preventive Maintenance Action Request
psid	Pounds per Square Inch Differential
PWO	Preventive Maintenance Order
QA	Quality Assurance
RCA	Radiologically Controlled Area
RCIC	Reactor Core Isolation Cooling
REMP	Radiological Environmental Monitoring Program
RETS	Radiological Effluent Technical Specification
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RWCU	Reactor Water Cleanup
RWP	Radiation Work Permit
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SSCs	Structure, System, or Components

STP	Surveillance Test Procedure
TIP	Transverse Incore Probe
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report