September 29, 2003

Mr. Lew W. Myers
Chief Operating Officer
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION
NRC INTEGRATED INSPECTION REPORT 50-346/03-17

Dear Mr. Myers:

On August 20, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Davis-Besse Nuclear Power Station. The enclosed inspection report documents the inspection findings which were discussed on August 28, 2003, with Mr. Mark Bezilla, Davis-Besse Site Vice President, 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. For the entire inspection period, the Davis-Besse Nuclear Power Station was under the Inspection Manual Chapter (IMC) 0350 Process. The Davis-Besse Oversight Panel assessed inspection findings and other performance data to determine the required level and focus of followup inspection activities and any other appropriate regulatory actions. Even though the Reactor Oversight Process had been suspended at the Davis-Besse Nuclear Power Station, it was used as guidance for inspection activities and to assess findings.

In addition to documenting the results of the inspection activities conducted by inspectors at Davis-Besse during this time period, this integrated resident inspection report will be used to document the closure of Davis-Besse Restart Checklist Items 2.c.1, 3.d, 3.h, and 6.g. The Davis-Besse Oversight Panel has reviewed and discussed these Checklist Items and approved their closure. These items were discussed and closed in this report, as documented in Section 4OA5:

- Restart Checklist Item 2.c.1, "Emergency Core Cooling System and Containment Spray System Sump"
- Restart Checklist Item 3.d, "Boric Acid Corrosion Management Program"
- Restart Checklist Item 3.h, "Radiation Protection Program"

- Restart Checklist Item 6.g, “Request to Relocate High Pressure Injection and Low Pressure Injection Subsystems Flow Balance Testing from Technical Specifications 4.5.2.h to Updated Safety Analysis Report Technical Requirements Manual”

This report documents one self-revealing violation of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. The finding did not present an immediate safety concern. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a Non-Cited Violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the Non-Cited Violation in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region III, 801 Warrenville Road, Lisle, IL 60532-4351; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-001; and the NRC Resident Inspector at Davis-Besse.

Since the terrorist attacks on September 11, 2001, NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. The NRC issued Temporary Instruction 2515/148, “Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial power nuclear power plants during calendar year 2002 and the remaining inspection activities for Davis-Besse Nuclear Power Station are scheduled for completion in September, 2003. The NRC will continue to monitor overall safeguards and security controls at Davis-Besse Nuclear Power Station.

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/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

John A. Grobe, Chairman
Davis-Besse Oversight Panel

Docket No. 50-346
License No. NPF-3

Enclosure: Inspection Report 50-346/03-017

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-346
License No:	NPF-3
Report No:	50-346/03-017
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Davis-Besse Nuclear Power Station
Location:	5501 North State Route 2 Oak Harbor, OH 43449-9760
Dates:	July 1, 2003, to August 20, 2003
Inspectors:	S. Thomas, Senior Resident Inspector J. Rutkowski, Resident Inspector J. House, Senior Radiation Specialist D. Nelson, Radiation Specialist N. Shah, Resident Inspector, Braidwood K. Coyne, Operations Engineer, NRR
Approved by:	Christine A. Lipa, Chief Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000346/2003-017; 7/01/2003 - 8/20/2003; Davis-Besse Nuclear Power Station; Event Followup.

This report covers a seven week period of resident inspection. The inspection was conducted by resident, regional, and headquarters based inspectors. The significance of most findings is indicated by the color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

This report also covered special inspection of licensee activities associated with four items on the NRC's Restart Checklist, Revision 3, dated July 2, 2003. As documented in Section 4OA5.5, these four items have been reviewed and closure was approved by the Davis-Besse 0350 Panel.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Barriers

- Green. A self-revealing violation of Technical Specification 3.6.4.1, "Hydrogen Analyzers," was identified when it was discovered that the plant had operated in Mode 1 and Mode 2 in excess of the allowed outage time, with two hydrogen analyzers inoperable. This impacted the operator's capability to monitor containment hydrogen concentration, post accident.

  The finding is greater than minor because it: (1) involved the configuration control attribute of the Barrier Integrity Cornerstone; and (2) affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. This finding is unrelated to structures, systems and components (SSCs) that are needed to prevent accidents from leading to core damage. The inspectors used Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Appendix H, Containment SDP. Based on this evaluation, the finding has very low safety significance. (Section 4OA.3.4)

B. Licensee-Identified Findings

None

REPORT DETAILS

Summary of Plant Status

The plant was shutdown on February 16, 2002 for a refueling outage. Following scheduled inspections of the control rod drive mechanism nozzles and subsequent repair of leaking nozzles, significant degradation of the reactor vessel head was discovered. As a direct result of the need to resolve many issues surrounding the Davis-Besse reactor vessel head degradation, NRC management decided to implement IMC 0350, "Oversight of Operating Reactor Facilities in a Shutdown Condition With Performance Problems." The fuel was removed from the reactor on June 26, 2002, and the plant remained shut down. The plant entered operational Mode 6 on February 19, 2003 and fuel reload was completed on February 26, 2003. The plant entered operational Mode 5 on March 12, 2003. For the entire inspection period, the Davis-Besse Nuclear Power Station was under the IMC 0350 Process. As part of this Process, several additional team inspections continued. The subjects of these inspections included: System Health Assurance, Management and Human Performance, and Corrective Action Program. The status of these inspections will not be included as part of this inspection report, but upon completion, each will be documented in a separate inspection report which will be made publicly available on the NRC website.

On August 14, 2003, while in the process of reducing the water inventory of the reactor coolant system for scheduled work, the essential electrical busses were automatically separated from the offsite preferred power supply due to degraded and deteriorating electric grid voltage conditions. The emergency diesel generators started as designed and picked up loads on the essential busses. The local degraded grid condition was part of an event that affected electrical grids from Michigan to Connecticut and caused temporary blackouts in large segments of the United States upper eastern midwest and adjacent areas of Canada. Normal plant offsite electrical power supplies were restored by about 1500 hours on August 15, 2003. The plant declared an Unusual Event (UE) at 4:23 p.m. on August 14 and remained in the UE until 7:42 p.m. on August 15, 2003. (Section 4OA3.1).

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity.

1R04 Equipment Alignment (71111.04Q)

a. Inspection Scope

The inspectors verified equipment alignment to identify any discrepancies that impacted the function of system components and increase the risk. The inspectors also verified that the licensee had properly identified and resolved any equipment alignment problems that would cause initiating events or impact the availability and functional capability of the mitigating system. Specific aspects of this inspection included reviewing plant procedures and drawings to determine the correct system lineup and evaluating any outstanding maintenance work requests on the system or any deficiencies that would affect the ability of the system to perform its function. A majority

of the inspector's time was spent performing a walkdown inspection of the system. Key aspects of the walkdown inspection included:

- electrical power was available as required;
- major system components were correctly labeled;
- essential support systems were operational;
- ancillary equipment or debris did not interfere with system performance; and
- tagging clearances were appropriate.

During the walkdown, the inspectors also observed the material condition of the equipment to verify that there were no significant conditions not already identified in the licensee's work control system. One system was inspected:

- 250/125 VDC Station Power

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on the availability, accessibility, and condition of fire fighting equipment, the control of transient combustibles, and the condition and operating status of installed fire barriers. The inspectors selected fire areas for inspection based on their overall contribution to internal fire risk, as documented in the Individual Plant Examination of External Events, their potential to impact equipment which could initiate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed at the end of this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use, that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits, and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition.

The following two areas were inspected:

- low voltage switchgear room - F bus and battery room B (fire zone X); and

- radwaste, fuel handling, purge exhaust ventilation equipment rooms (fire zone EE).

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed one sample, the data from the inspection and cleaning of component cooling heat exchanger 1-2, physically examined portions of the tube cleaning process, and reviewed Condition Reports (CRs) associated with thermal performance of the component cooling water heat exchangers. Through these activities, through discussions with engineers responsible for the maintenance rule and the service water system, and through review of applicable system descriptions, the inspectors verified that:

- as-found conditions were appropriately recorded in work order packages and conditions requiring corrective action were being documented in CRs;
- the as-found condition of the heat exchanger was reviewed against maintenance rule functional failure criteria;
- visual service water side inspections and service water system flow testing were used in conjunction with periodic thermal performance tests to assess overall component cooling heat exchanger condition; and
- the work scheduled and completed had returned the component cooling water heat exchanger 1-2 to a visually clean condition.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope

On July 22, 2003, the inspectors observed one operating crew during a steam generator tube rupture training session conducted on the simulator using the scenario guide listed in the Attachment. The inspectors evaluated crew performance in the areas of:

- clarity and formality of communications;
- ability to take timely actions;
- prioritization, interpretation, and verification of alarms;
- procedure use;
- oversight and direction from supervisors; and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the Davis-Besse procedures listed in the Attachment.

The inspectors verified that the crew completed the critical tasks listed in the simulator guide. The inspectors observed the licensee evaluators to verify that issues noted were discussed by them or the operating crew in the critique at the end of the session.

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 response to risk significant activities. These activities were chosen based on their potential impact on increasing overall plant risk. The inspection was conducted to verify the planning, control, and performance of the work was done in a manner to reduce overall plant risk and minimize the duration where practical, and that contingency plans were in place where appropriate. The licensee's daily configuration risk assessments, observations of shift turnover meetings, observations of daily plant status meetings, and the documents listed at the end of this report were used by the inspectors to verify that the equipment configurations had been properly listed, that protected equipment had been identified and was being controlled where appropriate, and that significant aspects of plant risk were being communicated to the necessary personnel. Four risk significant activities were evaluated by the inspectors.

- The licensee conducted work activities within the emergency core cooling system (ECCS) rooms with decay heat pump #1 running including periods of time when decay heat pump #2 was not available. During the latter half of July 2003, the licensee commenced activities associated with installing a minimum recirculation line for high pressure injection pumps when pumping water from the containment recirculation sump. Since the modification activities were to cover several weeks and some activities would be in close proximity to the running decay heat pump, the licensee developed a written contingency plan. The inspectors reviewed the contingency plan and periodically verified actual ECCS room activities.

- On July 30, 2003, the licensee entered orange risk conditions by working on a manual valve (MU 209) which required isolating the injection path to the reactor coolant system (RCS) from makeup pump 2. The scheduled work required isolating the valve, removing the bonnet, and seal welding a leak off connection. The inspectors reviewed the contingency plan and attended the job briefing.

- On August 13, 2003, the licensee entered orange risk conditions by removing from service one additional reactor coolant system makeup path through makeup pump 2. The actual work involved wiring thermal overloads into the electrical circuits of the oil lubrication system of the makeup pump. The inspectors reviewed the contingency plan, attended the job briefing, and observed a portion of the setup for the physical work.

- On August 14, 2003, the licensee entered orange risk conditions upon commencing draining of the reactor coolant system from filled and vented conditions to an eventual level of about 54 inches above the center of the reactor vessel loop nozzles. The purpose of the drain was to facilitate the removal of the

resistance temperature detectors (RTD) which monitored the reactor coolant pump seal package temperatures and to subsequently cap those penetrations. The draining was halted at approximately 28 feet above the nozzle centerline because of the loss of offsite power that occurred and is described in Section 4OA3.1 of this report. The drain was recommenced on August 20, 2003.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions (71111.14)

a. Inspection Scope

The inspectors attended one of the required infrequently performed pre-job briefings, and on the morning of August 21, 2003, observed control room operations personnel performance during the drain and venting of the RCS in preparation for removing and plugging the reactor coolant pump seal package RTDs. The license had identified the draining evolution as placing the plant in an orange risk condition, had classified the evolution as an infrequently performed operation, and had developed a contingency plan for the period of time spent in an orange risk plant configuration. The RCS had previously been drained to approximately 80 inches above the centerline of the RCS hot leg loop. Work on the RTDs required draining to 54 inches or less and venting the reactor coolant pump seal package to break the vacuum created in reactor coolant pump to minimize potential adverse siphon effects that could be caused by the vacuum.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors selected for review CRs which discussed potential operability issues for risk significant components or systems. These CRs were evaluated to determine whether the operability of the components or systems was justified. The inspectors compared the operability and design criteria in the appropriate sections of the Technical Specifications (TSs) and Updated Safety Analysis Report (USAR) to the licensee's evaluations presented on the issues listed below to verify that the components or systems were operable. Where compensatory measures were necessary to maintain operability, the inspectors verified that the measures were in place, would work as intended, and were properly controlled.

The four issues evaluated were:

- Operability Evaluation 2003-0014, seismic adequacy of control room flourescent lights;

- Operability Evaluation 2003-0017, non-qualified fittings (sockolets) installed in the emergency diesel generator air start piping;
- Operability Evaluation 2003-0019, emergency diesel generator fuel oil transfer pump 1-2 motor low insulation readings; and
- Operability Evaluation 2003-0018, non-qualified replacement used for emergency diesel generator 1B lube oil sightglass.

b. Findings

No findings of significance were identified. The inspectors discussed with the licensee some examples where the level of detail and the rigor of the analysis in the operability evaluations were less than sufficient. (Section 4OA2.2).

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed post-maintenance testing activities to ensure that the testing adequately verified system operability and functional capability with consideration of the actual maintenance performed. The inspectors used the appropriate sections of the Technical Specifications, as well as the documents listed at the end of this report, to evaluate the scope of the maintenance and verify that the work control documents required sufficient post-maintenance testing to adequately demonstrate that the maintenance was successful and that operability was restored. In addition, the inspectors reviewed CRs to verify minor deficiencies identified during these inspections were entered into the licensee's corrective action system. The inspectors observed and evaluated test activities associated with the following one sample:

- Emergency Diesel Generator 1-2 Air Start Modification and Piping Replacements post modification/post maintenance testing activities, July 24 - 25, 2003.

1R22 Surveillance Testing (71111.22)

.1 Containment Spray Pump 1-1 Quarterly Test

a. Inspection Scope

The inspectors, on July 3, 2003, witnessed the containment spray pump 1-1 quarterly test and evaluated test data to verify that the equipment tested met TSs, USAR, and licensee procedural requirements, and also demonstrated that the equipment was capable of performing its intended safety functions. The inspectors used the documents listed at the end of this report to verify that the test met the TS frequency requirements; that the test was conducted in accordance with the procedures, including establishing the proper plant conditions and prerequisites; that the test acceptance criteria were met; and that the results of the test were properly reviewed and recorded.

b. Findings

No findings of significance were identified.

.2 Station Battery 2N Modified Performance Test

a. Inspection Scope

The inspectors, on July 15, 2003, witnessed the initiation of the station battery 2N modified performance test and evaluated test data to verify that the equipment tested met TSs, USAR, and licensee procedural requirements, and also demonstrated that the equipment was capable of performing its intended safety functions. The inspectors used the documents listed at the end of this report to verify that the test met the TS frequency requirements; that the test was conducted in accordance with the procedures, including establishing the proper plant conditions and prerequisites; that the test acceptance criteria were met; and that the results of the test were properly reviewed and recorded.

b. Findings

No findings of significance were identified. An issue related to the completion of this surveillance test was further discussed in Section 4OA5.

.3 Service Water Train 2 Flow Balance

a. Inspection Scope

On August 5 and August 12, 2003, the inspectors witnessed the briefing and preparations for the service water train 2 flow balancing test. Additionally, on August 12, 2003, the inspectors accompanied operations personnel for a portion of the valve alignment for the test and reviewed other equipment status by a walkdown of service water pump rooms, service water tunnel, and the flow measuring test equipment location. The inspectors reviewed test data from portions of the test. The flow balance testing was rerun several times because of difficulties meeting test acceptance criteria for flow through the number 2 component cooling water heat exchanger. The inspectors discussed the potential reasons for the failures and potential plans for addressing the test failures. The inspectors verified that the test failures had been appropriately documented in CRs. At the end of the inspection period the investigation into the cause of the failures and development of corrective action had not been completed. Both trains of service water must meet the flow balancing acceptance prior to entry into Mode 4. The inspectors used the documents listed at the end of this report to verify that the test met the TS frequency requirements, that the test was conducted in accordance with the procedures, including establishing the proper plant conditions and prerequisites; and that the results of the test were properly reviewed and recorded.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 Review of Licensee Performance Indicators for the Occupational Exposure Cornerstone

a. Inspection Scope

The inspectors reviewed the licensee's performance indicator (PI) for TS High Radiation areas to determine whether or not the conditions surrounding the PI had been evaluated, and identified problems had been entered into the corrective action program for resolution.

b. Findings

No findings of significance were identified.

.2 Plant Walkdowns and Radiation Work Permit Reviews

a. Inspection Scope

The inspectors identified three radiologically significant work areas within radiation areas, high radiation areas (HRA) and airborne radioactivity areas in the plant and reviewed work packages which included associated licensee controls and surveys of these areas to determine if radiological controls including surveys, postings and barricades were acceptable. These work areas were walked down and surveyed (using an NRC survey meter) to verify that the prescribed radiation work permit (RWP), procedures, and engineering controls were in place, that licensee surveys and postings were complete and accurate, and that air samplers were properly located.

The inspectors reviewed the RWPs and work packages used to access these and other high radiation work areas, to identify the work control instructions and control barriers that had been specified. Technical specification HRA and locked high radiation area (LHRA) requirements were used as the licensee's standards for the necessary barriers. Electronic dosimeter alarm set points for both integrated dose and dose rate were evaluated for conformity with survey indications and plant policy. Workers were interviewed to verify that they were aware of the actions required when their electronic dosimeters noticeably malfunctioned or alarmed.

The inspectors reviewed the available RWPs for airborne radioactivity areas to determine if there was a potential for individual worker internal exposures of >50 millirem committed effective dose equivalent. Barrier integrity and engineering controls performance such as high efficiency particle (HEPA) ventilation system operation were evaluated. Work areas having a history of, or the potential for, airborne transuranics were evaluated to verify that the licensee had considered the potential for transuranic isotopes and provided appropriate worker protection. The adequacy of the

licensee's internal dose assessment process for internal exposures >50 millirem committed effective dose equivalent was assessed.

b. Findings

No findings of significance were identified.

.3 Problem Identification and Resolution for Access Control to Radiologically Significant Areas

a. Inspection Scope

The inspectors reviewed selected self assessments, audits, Licensee Event Reports (LERs), and Special Reports related to the access control program to verify that identified problems were entered into the corrective action program for resolution. This included 15 corrective action reports related to access controls and 3 high radiation area radiological incidents (non-PIs identified by the licensee in high radiation areas <1Rem/hr). Staff members were interviewed and corrective action documents were reviewed to verify that follow-up activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk based on the following:

- initial problem identification, characterization, and tracking;
- disposition of operability/reportability issues;
- evaluation of safety significance/risk and priority for resolution;
- identification of repetitive problems;
- identification of contributing causes;
- identification and implementation of effective corrective actions;
- resolution of non-cited violations (NCVs) tracked in the corrective action system; and
- implementation/consideration of risk significant operational experience feedback.

The inspectors evaluated the licensee's process for problem identification, characterization, prioritization, and verified that problems were entered into the corrective action program and resolved. For repetitive deficiencies and/or significant individual deficiencies in problem identification and resolution, the inspectors verified that the licensee's self-assessment activities were capable of identifying and addressing these deficiencies.

The inspectors reviewed licensee documentation packages for all PI events occurring since the last inspection to determine if any of these PI events involved dose rates >25 Rem/hr at 30 centimeters or >500 Rem/hr at 1 meter. Barriers were evaluated for failure and to determine if there were any barriers left to prevent personnel access. Unintended exposures >100 millirem total effective dose equivalent (or >5 rem shallow dose equivalent or >1.5 rem lens dose equivalent), were evaluated to determine if there were any regulatory overexposures or if there was a substantial potential for an overexposure.

b. Findings

No findings of significance were identified.

.4 Job-In-Progress Reviews

a. Inspection Scope

The inspectors selected three jobs being performed in radiation areas, airborne radioactivity areas, or high radiation areas for observation of work activities that presented the greatest radiological risk to workers. This involved work that was estimated to result in the highest collective doses, and included work areas (vessel head) where radiological gradients were present.

The following jobs were observed during the Supplemental Inspection and Radiation Protection Program Effectiveness Review, Report No. 50-346/03-08(DRS).

> RWP # 2003-5556, Associated ALARA Plan and Radiation Surveys; Replace RCP 1-1-1 and 1-1-2 Motors and Associated Work to Include Removal of RCP Seal Packages; Revision 1
>
> RWP # 2003-5305, Associated ALARA Plan and Radiation Surveys; Install Diaphragms and Manway Covers; Revision 0
>
> RWP # 2003-5306, Associated ALARA Plan and Radiation Surveys; Remove Nozzle Dams and Nozzle Dam FME Covers and Equipment from Steam Generators; Revision 0

The inspectors reviewed radiological job requirements including RWP requirements and work procedure requirements, and attended “as-low-as-is-reasonably-achievable” (ALARA) job briefings. Job performance was observed with respect to these requirements to verify that radiological conditions in the work area were adequately communicated to workers through pre-job briefings and postings. The inspectors also verified the adequacy of radiological controls including required radiation, contamination and airborne surveys for system breaches; radiation protection job coverage which included audio and visual surveillance for remote job coverage; and contamination controls.

Radiological work in high radiation work areas having significant dose rate gradients was reviewed to evaluate the application of dosimetry to effectively monitor exposure to personnel and to verify that licensee controls were adequate.

b. Findings

No findings of significance were identified.

.5 High Risk Significant, High Dose Rate High Radiation Area (HRA) and Very High Radiation Area (VHRA) Controls

a. Inspection Scope

The inspectors reviewed the licensee's performance indicators for high risk, high dose rate and HRAs, and for all VHRAs to verify that workers were adequately protected from radiological overexposure. Discussions were held with the Radiation Protection Manager concerning high dose rate HRA and VHRA controls and procedures including procedural changes that had occurred since the last inspection in order to verify that any procedure modifications did not substantially reduce the effectiveness and level of worker protection.

The inspectors discussed controls, that were in place for special areas that have the potential to become very high radiation areas during certain plant operations, with RP supervisors to determine if these plant operations (fuel transfer operations) required communication beforehand with the RP group, so as to allow corresponding timely actions to properly post and control the radiation hazards. During plant walkdowns, the posting and locking of entrances to high dose rate HRAs and VHRAs were verified to be adequate.

b. Findings

No findings of significance were identified.

.6 Radiation Worker Performance

a. Inspection Scope

During job performance observations (Sections 2OS1.4 and 2OS2.4), the inspectors evaluated radiation worker performance with respect to stated radiation protection work requirements and verified that workers were aware of the significant radiological conditions in their workplace, the RWP controls and limits in place, and that their performance had accounted for the level of radiological hazards present.

Radiological CRs that identified radiation worker errors as the cause for an event were reviewed to determine if there was a common cause for the worker errors and if this was identified by the licensee's corrective action program. These problems, along with planned and taken corrective actions were discussed with the Radiation Protection Manager.

b. Findings

No findings of significance were identified.

.7 Radiation Protection Technician Proficiency

a. Inspection Scope

During job performance observations (Sections 2OS1.4 and 2OS2.4), the inspectors evaluated radiation protection technician performance with respect to radiation protection work requirements and verified that they were aware of the radiological conditions in their workplace, the RWP controls and limits in place, and that their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities.

Radiological CRs that identified radiation protection technician errors as the cause for an event were reviewed to determine if there was a common cause for the technician errors and if this was identified by the licensee's corrective action program.

b. Findings

No findings of significance were identified.

2OS2 As Low As Is Reasonably Achievable Planning And Controls (ALARA) (71121.02)

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed plant collective exposure history, current exposure trends, ongoing and planned activities in order to assess current performance and exposure challenges. This included determining the plant's current three-year rolling average collective exposure in order to provide a perspective of significance for any resulting inspection finding assessment.

The inspectors reviewed the outage work scheduled during the inspection periods and associated work activity exposure estimates including the five work activities which were likely to result in the highest personnel collective exposures. Site specific trends in collective exposures and source-term measurements were determined. Procedures associated with maintaining occupational exposures ALARA and processes used to estimate and track work activity specific exposures were reviewed.

b. Findings

No findings of significance were identified.

.2 Radiological Work Planning

a. Inspection Scope

The inspectors evaluated the licensee's list of work activities ranked by estimated exposure that were in progress and selected the five work activities of highest exposure significance using the following criteria:

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements in order to verify that the licensee had established procedures, and engineering and work controls that were based on sound radiation protection principles in order to achieve occupational exposures that were ALARA. This also involved determining that the licensee had reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

The inspectors compared the results achieved including dose rate reductions and person-rem used with the intended dose established in the licensee's ALARA planning for these work activities. Reasons for inconsistencies between intended and actual work activity doses were verified. The interfaces between operations, radiation protection, maintenance, maintenance planning, scheduling and engineering groups were evaluated to identify interface problems or missing program elements. The integration of ALARA requirements into work procedure and RWP documents was evaluated to verify that the licensee's radiological job planning would reduce dose.

The inspectors compared the person-hour estimates, provided by maintenance planning and other groups to the radiation protection group, with the actual work activity time requirements in order to evaluate the accuracy of these time estimates. Shielding requests from the radiation protection group were evaluated with respect to dose rate reduction along with engineering shielding responses follow up. The inspectors verified that work activity planning included consideration of the benefits of dose rate reduction activities such as shielding provided by water filled components/piping, job scheduling, and shielding and scaffolding installation and removal activities. The licensee's post-job (work activity) reviews were evaluated to verify that identified problems were entered into the licensee's corrective action program.

b. Findings

No findings of significance were identified.

.3 Verification of Dose Estimates and Exposure Tracking Systems

a. Inspection Scope

The inspectors reviewed the assumptions and bases for selected aspects of the current annual collective exposure estimate including procedures, in order to evaluate the licensee's methodology for estimating work activity-specific exposures and the intended dose outcome. Dose rate and man-hour estimates were evaluated for reasonable accuracy.

The licensee's process for adjusting exposure estimates or re-planning work, when unexpected changes in scope or emergent work or higher than anticipated radiation levels were encountered, was evaluated. This included determining that adjustments to estimated exposure (intended dose) were based on sound radiation protection and ALARA principles and not adjusted to account for failures to control the work. The frequency of these adjustments was reviewed to evaluate the adequacy of the original ALARA planning process.

The licensee's exposure tracking system was evaluated to determine whether the level of exposure tracking detail, exposure report timeliness and exposure report distribution was sufficient to support control of collective exposures. RWPs were reviewed to determine if they covered too many work activities to allow work activity specific exposure trends to be detected and controlled. During the conduct of exposure significant work, the inspectors evaluated if licensee management was aware of the exposure status of the work and would intervene if exposure trends increased beyond exposure estimates.

b. Findings

No findings of significance were identified.

.4 Job Site Inspections and ALARA Control

a. Inspection Scope

The inspectors selected five work activities in radiation areas, airborne radioactivity areas, or high radiation areas for observation emphasizing work activities that presented the greatest radiological risk to workers. Jobs that were expected to result in the highest collective doses were observed and included work in areas that involved potentially changing or deteriorating radiological conditions.

The following jobs were observed during the Supplemental Inspection and Radiation Protection Program Effectiveness Review, Report No. 50-346/03-08(DRS), and Integrated Inspection Report 50-346/02-02(DRP).

RWP # 2003-5556, Associated ALARA Plan and Radiation Surveys; Replace RCP 1-1-1 and 1-1-2 Motors and Associated Work to Include Removal of RCP Seal Packages; Revision 1

RWP # 2003-5305, Associated ALARA Plan and Radiation Surveys; Install Diaphragms and Manway Covers; Revision 0

RWP # 2003-5306, Associated ALARA Plan and Radiation Surveys; Remove Nozzle Dams and Nozzle Dam FME Covers and Equipment from Steam Generators; Revision 0

RWP/ALARA Package 2002-5010; Primary Valve Maintenance Work

RWP/ALARA Package 2002-5109; CRD Nozzle Inspections, Repairs and Associated Work Activities

The licensee's use of ALARA controls for these work activities was evaluated using the following:

- The licensee's use of engineering controls to achieve dose reductions was evaluated to verify that procedures and controls were consistent with the licensee's ALARA reviews, that sufficient shielding of radiation sources was

provided for and that the dose expended to install/remove the shielding did not exceed the dose reduction benefits afforded by the shielding.

- Job sites were observed to determine if workers were utilizing the low dose waiting areas and were effective in maintaining their doses ALARA by moving to the low dose waiting area when subjected to temporary work delays.

- The inspectors attended work briefings and observed ongoing work activities to determine that workers received appropriate on-the-job supervision to ensure the ALARA requirements are met. This included verification that the first-line job supervisor ensured that the work activity was conducted in a dose efficient manner by minimizing work crew size, ensuring that workers were properly trained, and that proper tools and equipment were available when the job started.

- Exposures of individuals from selected work groups were reviewed to evaluate any significant exposure variations which could exist among workers and to determine whether these significant exposure variations were the result of worker job skill differences or whether certain workers received higher doses because of poor ALARA work practices.

b. Findings

No findings of significance were identified.

.5 Radiation Worker Performance

a. Inspection Scope

Radiation worker and radiation protection technician performance was observed during work activities being performed in radiation areas, airborne radioactivity areas, and high radiation areas that presented the greatest radiological risk to workers (Sections 2OS1.4 and 2OS2.4). The inspectors verified that workers demonstrated the ALARA philosophy in practice by being familiar with the work activity scope and tools to be used, by utilizing ALARA low dose waiting areas and that work activity controls were being complied with. Also, radiation worker training and skill levels were determined to be sufficient relative to the radiological hazards and the work involved.

b. Findings

No findings of significance were identified.

.6 Problem Identification and Resolution for ALARA Planning and Control

The inspectors reviewed the licensee's self assessments, audits, and Special Reports related to the ALARA program since the last inspection to verify that the licensee's overall audit program's scope and frequency for all applicable areas under the Occupational Cornerstone met the requirements of 10 CFR 20.1101(c).

The inspectors verified that identified problems were entered into the corrective action program for resolution, and that they had been properly characterized, prioritized, and resolved. This included dose significant post-job (work activity) reviews and post-outage ALARA report critiques of exposure performance. The inspectors also interviewed selected RP managers, staff and technicians in order to verify that the RP organization's management structure was proficient in the identification and resolution of RP issues.

Corrective action reports related to the ALARA program were reviewed, and staff members were interviewed to verify that follow-up activities had been conducted in an effective and timely manner commensurate with their importance to safety and risk using the following criteria:

- initial problem identification, characterization, and tracking;
- disposition of operability/reportability issues;
- evaluation of safety significance/risk and priority for resolution;
- identification of repetitive problems;
- identification of contributing causes;
- identification and implementation of effective corrective actions;
- resolution of non-cited violations tracked in the corrective action system; and
- implementation/consideration of risk significant operational experience feedback.

The licensee's corrective action program was also reviewed to determine that repetitive deficiencies and/or significant individual deficiencies in problem identification and resolution had been addressed.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

.1 Rescue Capabilities During Use of One-Piece Atmosphere Supplying Respiratory Protection Devices

a. Inspection Scope

The inspectors reviewed the licensee's respiratory protection and confined space entry procedures and discussed their implementation relative to the requirements of 10 CFR 20.1703(f) for standby rescue persons whenever one-piece atmosphere supplying suits, or any combination of respiratory protection and personnel protective equipment were used, from which the wearer may have difficulty extricating himself.

The inspectors discussed with RP management, proposals for enhancing the radiation work permit and the ALARA planning process and for developing safety plans for those jobs not performed in confined space atmospheres to formally address work provisions for standby rescuers.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Radioactive Waste System

a. Inspection Scope

The inspectors reviewed the liquid and solid radioactive waste system description in the Final Safety Analysis Report (FSAR) and the effluent release report for information on the types and amounts of radioactive waste (radwaste) generated and disposed. The inspectors reviewed the scope of the licensee's audit program with regard to radioactive material processing and transportation programs to verify that it met the requirements of 10 CFR 20.1101(c).

b. Findings

No findings of significance were identified.

.2 Radioactive Waste System Walkdowns

a. Inspection Scope

The inspectors performed walkdowns of selected parts of the liquid and solid radwaste processing systems to verify that these systems agreed with the descriptions in the FSAR and the Process Control Program, and to assess the material condition and operability of the systems. The inspectors reviewed the status of any radioactive waste process equipment that was not operational and/or abandoned in place. The inspectors also reviewed the licensee's administrative and physical controls to ensure that the equipment would not contribute to an unmonitored release path or be a source of unnecessary personnel exposure. The adequacy of any changes made to the radwaste processing system including any 10 CFR 50.59 reviews and any potential radiological exposure to the public was evaluated.

The inspectors 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.

.3 Waste Characterization and Classification

a. Inspection Scope

The inspectors reviewed the licensee's radiochemical sample analysis results for each of the licensee's waste streams, including dry active waste (DAW), spent resins, and filters. The inspectors 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 inspectors also reviewed the licensee's 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.

.4 Shipment Preparation

a. Inspection Scope

The inspectors observed aspects of the preparation of a shipment of the reactor head including the shipping documentation. The inspectors observed the surveying of the packaging loaded on the conveyance and the placarding and visual checks of the conveyance. The inspectors also observed the radiation worker practices of the workers performing the tasks to verify that the workers had adequate skills to accomplish each task. The inspectors 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.

.5 Shipping Records

a. Inspection Scope

The inspectors reviewed five non-exempted package shipment manifests/documents completed in 2003 to verify compliance with NRC and DOT requirements (i.e., 10 CFR Parts 20 and 71 and 49 CFR Parts 172 and 173).

The following packages were reviewed:

TR02-0041; LSA II Primary Resin (IP-2-Packaging)
TR03-0002; LSA II DAW
TR03-0011; LSA II DAW
RM03-0066; SCO II Contaminated Radioactive Material
TR03-0017; SCO II Reactor Head (Strong Tight Container)

b. Findings

No findings of significance were identified.

.6 Identification and Resolution of Problems for Radioactive Material Processing and Transportation

a. Inspection Scope

The inspectors reviewed selected Special Reports, audits, and self assessments related to the radioactive material and transportation programs performed since the last inspection to verity that identified problems were entered into the corrective action program for resolution. The inspectors selectively reviewed 2002 and 2003 CRs, that addressed radioactive waste and radioactive materials shipping program deficiencies, to verify that problems were identified, characterized, prioritized and corrected.

The inspectors also reviewed selected corrective action reports for the radioactive material and shipping programs since the previous inspection to verify that corrective actions had been implemented. This included a review of repetitive deficiencies or significant individual deficiencies to verify that the licensee's corrective action program was capable of identifying and addressing these deficiencies. Staff members were interviewed and documents were reviewed to verify that the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- initial problem identification, characterization, and tracking;
- disposition of operability/reportability issues;
- evaluation of safety significance/risk and priority for resolution;
- identification of repetitive problems;
- identification of contributing causes;
- identification and implementation of effective corrective actions;
- resolution of NCVs tracked in corrective action system(s); and
- implementation/consideration of risk significant operational experience feedback.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

.1 Extended Use of Overtime to Support Current Work Activities

a. Inspection Scope

Due to the extended length of the current plant outage and the number of challenges that the licensee must address prior to restarting the facility, the plant staff has been required to work extended hours for a protracted period of time. The inspectors reviewed the licensee's program for documenting overtime and their use of the corrective action program to document and correct personnel fitness-for-duty issues associated with extended work schedules. As part of this evaluation, the inspectors reviewed approximately 24 CRs, 130 overtime deviation request, and had discussions with representatives from Nuclear Quality Assessment and senior Davis-Besse management.

b. Findings and Observations

The licensee's overtime guidelines are contained in FENOC Procedure NOP-LP-1002, "Fitness for Duty Program." This procedure adequately captured the regulatory guidance, in regards to the affected staff and working hours, which was contained in Generic Letter 82-12, "Nuclear Plant Staff Working Hours," and Generic Letter 83-14, "Definition of Key Maintenance Personnel." The regulations are particularly focused on a specific segment of the licensee workforce, which is delineated in the NOP-LP-1002 as follows:

- "The following guidelines are applicable to personnel performing safety-related functions (e.g., licensed Senior Reactor Operators, Reactor Operators, Health Physicists, Auxiliary Operators, Perry Plant Attendants, and Key Maintenance Personnel)"; and

- "Key Maintenance Personnel are those personnel physically performing or immediately supervising the performance of maintenance, repair, testing, modification, or calibration of safety-related structures, systems, or components (this work includes those persons providing Health Physics coverage for safety-related work). This does not include those support personnel needed for such tasks as erecting scaffolding, staging parts and equipment, etc."

Deviations from the overtime guidelines were requested by the worker's immediate supervisor and authorized by the Plant Manager or his designees using the TS Overtime Deviation Request Form DB-0047-2. The inspectors performed a focused evaluation of a sample of Deviation Request Forms for the activities of individuals that performed safety-related work. The information required by these forms included: requestor information, who would exceed overtime limits, what type of deviation was requested, the reasons for the deviation, the duration of the deviation, and the senior manager authorizing the overtime deviation. The inspectors had the following observations

regarding the implementation of the overtime deviation request process, which are listed below.

- A majority of the overtime deviation request forms listed more than one individual requesting an extension (one single deviation form listed 35 individuals).

  Procedure NOP-LP-1002, Step 4.14.6, stated "Supervisors requesting overtime deviation must be familiar with the condition of the individual involved to ensure that the additional overtime hours can be safely worked." Although some of the overtime deviation request forms that were reviewed documented what actions the supervisor would take to ensure fatigue did not become an issue (e.g., additional supervisory oversight, fitness for duty assessments of employees, face-to-face observations), this was the exception, not the norm.

  The inspector's concern was that since the supervisor requesting the overtime was responsible for evaluating the ongoing fitness for duty for the individuals he requested the overtime deviation for, having a large number of workers assigned to a single supervisor may challenge that supervisor's ability to effectively monitor those individuals for fatigue.

- The level of detail for why the overtime deviation was being requested varied significantly.

  Management's expectation, in regards to completion of overtime deviation request forms, was documented via intra-company memoranda from the Plant Manager dated April 24, 2003. The guidance stated "the person requesting the deviation shall provide the reason, which shall include, as a minimum:

  - the specific work performed;
  - why other individuals cannot be used; and
  - why the work cannot be rescheduled."

  Additionally, the guidance stated that "the person requesting the deviation documents on the form the number of hours requested, the start date of the deviation, and the end date of the deviation." Based on inspection review, these expectations were frequently not met.

  The inspector's concern was that even though management's minimum expectation for the level of detail required to be documented on an overtime deviation request form had been communicated to the staff, those minimum expectations were frequently not met.

- The reason that the deviation was requested often included or was limited to "to support critical path work."

  Again, this was contrary to managements expectation as specified in the April 24, 2003 memo, in that general statements such as "outage support" and "to meet the schedule" are not acceptable reasons (this applied to approximately

25 percent of the reviewed overtime deviation requests which originated from the Maintenance Department).

The inspector's concern was that the licensee staff often justified their overtime deviation request with reasons that management had deemed as not acceptable, contrary to management's expectations.

The licensee has recently revised their Overtime Deviation Request Form in an attempt to improve the consistency of how the deviation forms are completed.

The inspectors reviewed a sampling of several CRs which reported potential issues with fatigue or inattentiveness. These CRs were obtained from the licensee and through inspector searches of the licensee corrective action database. The conditions reports that were reviewed by the inspectors included CR 02-07813, "Possible Adverse Effects Caused By Work Hours and Schedule," CR 02-7525, "Assessment of Engineering Capability, and CR 03-0533, "Compliance with NOP-LP-1002, Fitness For Duty." A review of these CRs did not reveal any significant issues or trends associated with individuals whose overtime is restricted by regulation. The inspectors had the following observations regarding the effectiveness of existing licensee processes to monitor for fatigue issues and how the licensee addressed issues identified in the corrective action program:

- procedure NOP-LP-1002, "Fitness for Duty Program," does not clearly state that it is management's expectation that all site personnel are subject to the overtime restrictions outlined in the procedure; and

- initial Aberrant Behavior/Fitness for Duty Recognition training, and subsequent annual supervisor training, provided very little information regarding fatigue issues and overtime use restrictions.

The inspector's concern was that with the lack of clear procedural guidance on who was subject to overtime restrictions and a lack of definitive supervisor training specifically focused on recognizing signs of fatigue in employees, the staff may be challenged to effectively control the use of overtime at the facility. In response to CR 03-05533, "Compliance With NOP-LP-1002, Fitness For Duty," the Davis-Besse Site Vice President generated a letter, dated August 14, 2003, to the licensee staff that documented the expectation that the overtime rules outlined in NOP-LP-1002 were applicable to all site personnel and if those limits were to be exceeded, that the appropriate overtime deviation form be correctly filled out before the overtime was worked. Additionally, the Davis-Besse Leadership Team generated a letter, dated August 7, 2003, to the licensee staff which documented, in part, the expectation that employees are required to continue recording all hours worked on their timesheets.

Conclusions

Based on the information evaluated, the inspectors concluded that the licensee was meeting regulatory requirements in regards to the control of overtime for personnel during an extended outage. Although the inspectors found a number issues where management expectations were not being met, regarding the control of overtime or the

implementation of the overtime deviation process, they did not identify any significant issues that involved personnel performing safety-related functions.

.2 Operability Evaluation Quality

a. Inspection Scope

The inspectors reviewed the licensee progress toward the improvement of their process that generates Operability Evaluations. The inspectors accomplished this by evaluating three operability evaluations against design criteria documented in the appropriate sections of the TSs and USAR.

b. Findings and Observations

The inspectors identified the following deficiencies.

- Operability Evaluation 2003-0018 (non-qualified replacement used for emergency diesel generator 1B lube oil sightglass)

  Revision 0 for this operability evaluation did not document sufficient information regarding what criteria were used to verify that the non-qualified component would provide an appropriate replacement until the sight glass was replaced with a qualified component. Additionally, the operability evaluation discussed dedicating the existing sight glass, however, this action was not captured as a corrective action in the applicable CR (CR 03-06532). After the inspectors discussed these observations with the licensee, the licensee revised the CR and demonstrated operability.

- Operability Evaluation 2003-0019 (emergency diesel generator fuel oil transfer pump 1-2 motor low insulation readings)

  Revision 0 of this operability evaluation discussed measured insulation resistance, uncorrected to a standard reference temperature (40°C), with a statement on an acceptance value that was derived from an industry standard but was a value for readings corrected to the standard reference temperature. The net effect was to allow an implication that the measured value exceeded the standard by at least a factor of 2.5. The actual measured value, corrected to the reference temperature, was less than the derived acceptance value. Revision 1 of the operability evaluation provided a revised acceptance value and correctly referred to the measured value corrected for temperature.

- Operability Evaluation 2003-0017 (non-qualified sockolets installed in the air start lines for both EDGs)

  Revision 0 for this operability evaluation did not sufficiently document what criteria were used to verify that the non-qualified component would provide an appropriate replacement until the sockolet was replaced with a qualified component. After the inspectors questioned the information in the operability evaluation, the licensee revised it and demonstrated operability.

c. Conclusions

The inspectors engaged the licensee and, using these operability evaluations as examples, identified a potential adverse trend in the rigor and quality in recently approved operabilty evaluations. In response, the licensee promptly documented these issues in their corrective action program (CR 03-06779 and CR 03-06798) and submitted revisions to each operability evaluation which corrected the deficiencies noted by the inspectors.

.3 Cross-References to PI&R Findings Documented Elsewhere

Section 4OA5 of the report describes an inspector identified issue where the licensee failed to generate a CR to document the failure of a test.

4OA3 Event Followup (71153)

.1 Loss of Offsite Power due to Degraded Electric Grid Voltage

a. Inspection Scope

On August 14, 2003, a degrading voltage, as sensed on the essential electric busses, caused the essential busses to separate from the offsite power sources and be powered by the emergency diesel generators which had started automatically as designed. The cause of the degrading voltage was degraded offsite electrical grid conditions. The licensee declared an Unusual Event at 1623 hours based on Emergency Action Level 4.A.1, "Loss of Offsite Power." The licensee had restored normal power to all busses, verified to their satisfaction stable grid conditions, and exited the Unusual Event on August 15, 2003, at 1942 hours. NRC resident inspectors provided 24 hour inspection coverage for the duration of the unusual event.

Prior to the event, the licensee had been in the process of reducing reactor coolant inventory to 54 inches above the centerline of the reactor vessel nozzles to permit scheduled work activities. When the event occurred the licensee immediately stopped the activity. The water level in the reactor coolant system was at approximately 28 feet above the nozzle centerline and remained there for the duration of the unusual event. The major timeline elements were:

August 14, 2003

1608 Essential Bus Voltage Low
1608 Emergency Diesel Generator 2 powering associated essential busses
1609 Emergency Diesel Generator 1 powering associated essential busses
1610 Non essential busses low voltage, trouble, and danger alarms
1623 Unusual Event declared
1641 Decay heat cooling restored with starting of decay heat removal pump 2
1652 Report of large service water leak from end bell of component cooling water heat exchanger number 3
1710 Service water leak isolated

1712 Technical Support Center activated
1715 Joint Public Information Center activated
1845 Emergency Control Center Activated

August 15, 2003

0130 (approximate) Commenced restoring offsite power to non-essential busses
0253 Spent Fuel Pool cooling restored
0400 (approximate) All non-essential busses powered from offsite power
0600 Essential train 1 powered from offsite power
1407 Essential train 2 powered from offsite power
1942 Exited the Unusual Event

The licensee's initial critique of the transient concluded that all important equipment had functioned as designed. Subsequent to event exit, the licensee discovered that expansion bellows on the service water from the containment air coolers were deformed predominantly on the number 1 cooler. The licensee formed a problem solving team to review the extent of problem and to determine causes. That investigation was in progress at the conclusion of the inspection period (CR#03-0665).

b. Findings

No findings of significance were identified.

.2 Net Positive Suction Head Margin for Emergency Core Cooling System

a. Inspection Scope

As documented in NRC Inspection Report No. 50-346/03-06, the inspectors previously identified that the licensee failed to adequately verify the accuracy of certain emergency core cooling system (ECCS) design calculations. Specifically, the inspectors identified that net positive suction head (NPSH) calculation for the low pressure injection (LPI) and containment spray (CS) pumps did not adequately address the head loss through several system piping fittings and used a potentially non-conservative value for minimum containment water level. This issue was identified as NCV 50-346/03-06-01. To address concerns associated with the technical adequacy of the LPI and CS system NPSH calculations, the licensee revised calculation C-NSA-049.02-26, "NPSH Licensing Basis Analysis for Davis-Besse LPI and CS Pumps," and calculation C-NSA-059.01-019, "Water Level Inside Containment Post LOCA." Additionally, the licensee revised Engineering Change Request 02-0512-00, "Replace Containment Emergency Sump Strainer," to install rounded inlet flanges on each ECCS sump suction inlet to reduce system head loss. The inspectors performed a technical review of revised calculations C-NSA-049.02-26 and C-NSA-059.01-019 to determine if the licensee adequately addressed the technical issues associated with NCV 50-346/03-06-01. The scope did not include an evaluation of the design control measures that may have initially contributed to this issue.

b. Findings

No findings of significance were identified. The inspectors concluded that the licensee's re-evaluation of LPI and CS system NPSH margin during alignment to the emergency sump appropriately addressed and resolved the technical concerns associated with NCV 50-346/03-06-01.

.3 (Closed) Licensee Event Report (LER) 50-346/02-010: Intake Gantry Crane Trolley Not Adequately Restrained for Tornado-Generated Winds.

The inspectors reviewed LER 2002-010, which documented an issue in which the potential existed for the Intake Gantry Crane Trolley, under the influence of certain tornado force winds, to separate from the gantry crane and impact the service water intake structure.

On July 24, 2003, the licensee submitted a letter to the NRC which canceled this event report. The reason for cancellation, the licensee stated, in part, was:

> "Further evaluation of this issue has determined that in the event the Intake Gantry Crane is overturned by tornado-generated winds, the trajectory of the unanchored trolley is such that it would not strike the roof of the Intake Structure. Additionally, the stresses resulting from a design-basis earthquake will not cause the crane gantry to collapse onto the Intake Structure. Accordingly, there would be no potential damage to the Service Water Pumps that are contained within the Intake Structure. Since the impairment in the ability of the equipment to perform its designed safety function in the event of a tornado, the Service Water Pumps remained operable, and this issue did not represent a condition prohibited by the TSs. Therefore, in accordance with the guidance of NURE-1022 Section 5.1.2, DBNPS LER 2002-010 is hereby canceled."

This LER and cancellation letter were reviewed by the inspectors and no findings of significance were identified. The licensee documented this issue in their corrective action program as CR 02-10425.

.4 (Discussed) Licensee Event Report (LER) 50-346/03-005-00: Containment Gas Analyzer Heat Exchanger Valves Found Closed Rendering the Containment Gas Analyzer Inoperable.

a. Inspection Scope

The inspectors reviewed LER 2003-005-00, which documented that the component cooling water (CCW) isolation valves on the inlet and outlet to the heat exchangers located in each of the two Containment Gas Analyzers Systems (CGAS) were found stuck shut. This condition rendered the CGAS incapable of performing its design function.

b. Findings

Introduction. A self-revealing violation of TS 3.6.4.1, "Hydrogen Analyzers," presented itself when it was discovered that the plant had operated in Mode 1 and Mode 2 in excess of the allowed outage time, with two hydrogen analyzers inoperable. The cause of the inoperability was that the component cooling water (CCW) isolation valves on the inlet and outlet to the heat exchangers located in each of the two Containment Gas Analyzers Systems (CGAS) were found stuck shut. This condition rendered the CGAS incapable of performing its design function.

Description. The Containment Hydrogen Control System was designed to control the concentration of hydrogen which may be released into containment following a Loss of Coolant Accident (LOCA). This system was comprised of four subsystems:

- Hydrogen Dilution System: This system controls the hydrogen concentration by the addition of air to containment, resulting in a pressurization of the containment and suppression of the hydrogen volume fraction.

- Hydrogen Purge System: Facilitates the release of air from containment through high efficiency particulate and charcoal filters to the station vent.

- Hydrogen Recombination System: The air from containment passes through a hydrogen recombiner which causes recombination of hydrogen and oxygen, by heating the air with electric heaters, to form water vapor. Hydrogen free effluent is returned to containment.

- Containment Gas Analyzer System (CGAS): Allows a means to sample, condition, analyze and return the sample to the containment atmosphere.

The implementation of these systems, post accident, was controlled by emergency procedure DB-OP-02000, "RPS [reactor protection system], SFAS [safety features actuation system], SFRCS [steam and feedwater rupture control system] Trip, or SG [steam generator] Tube Rupture," Revision 07.

On October 1, 2002, CR 02-07169, "LIR CCW [component cooling water] - Lack of CCW Flow Verification to Essential Components," identified that measurement of actual CCW flow to several small essential heat loads, which included the CGAS heat exchangers, for SFAS Level 3 or 4 conditions had never been performed. Corrective actions 1 and 2 for CR 02-07169 developed and implemented test procedures to verify flow to these small essential CCW heat loads. On May 2, 2003, with the plant in Mode 5, performance of specially developed flow verification tests revealed that there was no CCW flow to heat exchanger E197-1 [CGAS Train 1] or heat exchanger E197-2 [CGAS Train 2]. Further investigation revealed that CCW inlet and outlet isolation valves for each of the CGAS heat were stuck shut and, based on no evidence to the contrary, had been closed since plant startup in 1977.

The licencee documented the following root and contributing causes for this event:

- less than adequate control of vendor supplied components;
- less than adequate procedure preparation;
- failure to identify these isolation valves were in the closed position when first added to the appropriate procedures (approximately 1992); and
- failure to verify CCW flow to the CGAS cabinets.

Specific remedial and preventative actions to be performed by the licensee to address this issue include:

- remove the redundant failed heat exchanger isolation valves;
- replace CGAS heat exchangers E197-1 and E197-2;
- incorporate lessons learned into operator valve verification training; and
- establish an appropriate testing periodicity for measuring actual CCW flow to small essential heat loads.

Analysis. In accordance with IMC 0609, Appendix A, Attachment 1, the inspectors performed a SDP Phase 1 screening and determined that the issue affected the Reactor Safety Strategic Performance Area. The finding was more than minor because it: (1) involved the configuration control attribute of the Barrier Integrity Cornerstone; and (2) affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

This finding is unrelated to SSCs that are needed to prevent accidents from leading to core damage. To determine if this finding had an effect on large early release frequency (LERF), the inspectors used MC 0609, "Significance Determination Process," Appendix H, Containment SDP. The finding is characterized as a Type B finding (having no impact on core damage frequency (CDF)) and compared to Table 3 in Appendix H. The inspectors determined that the hydrogen analyzer had no impact on the containment-related SSCs listed in Table 3 (i.e. containment penetration seals, containment isolation valves or purge and vent lines) and would not influence LERF. Based on this, the finding has very low safety significance.

Enforcement. The performance deficiency associated with this event is the failure of the licensee to establish an appropriate operational test, for a time period to include original plant startup (1977) until May 2003, to ensure that sufficient cooling water flow is provided to the hydrogen analyzer heat exchangers during operational Modes that require the hydrogen analyzers to be operable. Technical Specification 3.6.4.1 requires two independent containment hydrogen analyzers shall be operable in Modes 1 and 2. With both hydrogen analyzers inoperable, at least one analyzer is required to be operable within 72 hour or be in at least Hot Standby within the next 6 hours. Contrary to the requirements of TS 3.6.4.1, the plant operated in Modes 1 and 2 for extended periods of time with both hydrogen analyzers rendered inoperable by lack of cooling water to the their respective heat exchangers. Because of the very low safety significance and because the issue has been entered into the licensee's corrective action program (CR 03-03398) it is being treated as a Non-Cited Violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 50-346/03-17-01).

This LER also discussed a second issue which involved a condition that would potentially render the moisture trap on the gas analyzer sample line in operable. At the time this report was issued, the licensee planned to provide a supplement to LER 2003-005 to document this condition. This affected the operation of the moisture trap and potentially impacted the operation of the hydrogen analyzer. LER 2003-005 remained open pending further evaluation of this issue by the inspectors.

4OA5 Other Activities

One of the key building blocks in the licensee's Return to Service Plan was the Management and Human Performance Excellence Plan. The purpose of this plan was to address the fact that "management ineffectively implemented processes, and thus failed to detect and address plant problems as opportunities arose." The primary management contributors to this failure were grouped into the following areas:

- Nuclear Safety Culture;
- Management/Personnel Development;
- Standards and Decision-Making;
- Oversight and Assessments;
- Program/Corrective Action/Procedure Compliance.

The inspectors had the opportunity to observe the day-to-day implementation that the licensee made toward completing Return to Service Plan activities. Almost every inspection activity performed by the resident inspectors touched upon one of those five areas. Observations made by the resident inspectors were routinely discussed with the Davis-Besse Oversight Panel members and were used, in part, to gauge licensee efforts to improve their performance in these areas on a day-to-day basis.

To better facilitate the inspection and documentation of issues not specifically covered by existing inspection procedures, but important to the evaluation of the licensee's readiness for restart, the Special Inspection for Residents Inspection Plan was developed and implemented. Inspection Procedure 93812, "Special Inspection," was used as a guideline to document these issues and remains in effect for future resident inspection reports until a time to be determined by the Davis-Besse Oversight Panel. The inspectors performed inspections, as required, to adequately assess licensee performance and readiness for restart in the following area:

- performance of plant activities, including maintenance activities;
- follow-up of specific Oversight Panel technical issues;
- attended and assessed selected licensee restart readiness meetings;
- evaluated licensee performance in categorizing, classifying, and correcting deficient plant conditions during the restart process;
- reviewed licensee controls, criteria, and assessed licensee performance at meetings associated with work backlogs, including the deferral of work orders, operator work arounds, temporary modifications, and permanent modifications; and
- reviewed activities associated with safety conscious work environment and safety culture.

The following issues were evaluated during this inspection period.

.1 Conduct of Maintenance Activities

a. Inspection Scope

The inspector reviewed a number of issues which involved continued maintenance procedure compliance issues. The inspectors also reviewed the corrective actions implemented by the licensee to correct each issue.

b. Findings and Observations

- Maintenance Worker Inappropriately Signed for a Safety Verification He Did Not Complete. On July 1, 2003, during preparation for working on Component Heat Exchanger 2, a mechanic was assigned the task of verifying the adequacy of the isolation for work on this component. The tasked involved verifying that two isolation valves were closed. It was later discovered the mechanic had initialed that he had verified the position of both valves, when in actuality had only physically checked one of the valves. The mechanic stated that he had used an alternate method of verifying that the work area was drained and depressurized. This was not an immediate safety issue and was determined to be of minor safety significance because, even though an inadequate isolation verification was performed, an adequate work isolation was in effect at that time to safely facilitate work.

  Procedure DB-DP-00007, "Control of Work," Attachment 2, step 4, states in part that, "the person performing the verification shall check the position or condition of each identified item and initial in the appropriate block on form DB-0068, indicating the item is in the correct position or condition." Contrary to this requirement, the mechanic assigned to perform the safety verification initialed and dated for checking the position of two isolation valves prior to verifying their required positions. Additionally, the mechanic decided not to check one of the required valves, even though he had already initialed for checking the valve. Although the event is a violation of TS 6.8.1, which required that written procedures, including those which control general maintenance activities, be established and implemented, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee applied corrective action and documented this issue in CR 03-05176.

- Maintenance Worker Inappropriately Operated Plant Equipment Without Specific Authorization. On July 28, 2003, preventative maintenance was performed on the control room chiller. As part of the post maintenance testing, the maintenance instructions directed the mechanic to "verify that when the compressor shuts down, the liquid solenoid valves close and that the compressor shuts down on low suction pressure." To facilitate this, the mechanic increased the setpoint on the temperature controller until the compressor secured, then repositioned the temperature controller to its original position. This action was performed even though the work instructions did not

provide instructions that allowed the mechanic to manipulate the temperature controller nor did the mechanic have specific permission from senior operations personnel to perform this action. This was not an immediate safety issue and was determined to be of minor safety significance because the brief manipulation of the temperature controller did not significantly impact the function of the control room chiller.

Procedure DB-MN-00307, "Conduct of Maintenance," Revision 10, requires, in part, that "during maintenance activities, maintenance personnel shall comply with DB-DP-00307 when manipulating plant equipment or components." Procedure DB-DP-00307, "Station Configuration Control," Revision 00, Step 6.4 provided the following specific instruction to mechanical maintenance personnel in regards to the operation of positional components.

- Mechanical Maintenance personnel may operate positional components as specifically directed by a Work Order. Permission to operate these components is given by approval of the Work Order to commence work.

- Mechanical Maintenance personnel may operate positional components not specifically directed by the Work Order to support maintenance activities provided Shift Manager of Control Room Supervisor permission is obtained

- Mechanical Maintenance personnel may operate positional components within the boundaries of a safety tagout provided Shift Manager or Control Room Supervisor permission is obtained.

Contrary to this procedural requirement, a mechanic manipulated the temperature controller for the control room chiller without written guidance in the work document or specific permission from the Shift Manager or Control Room Supervisor. Although this is a violation of TS 6.8.1, which requires that written procedures, including those which control general maintenance activities, be established and implemented, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee applied corrective action and documented this issue in CR 03-06070.

- Maintenance Worker Did Not Complete All the Work Required Before Signing For the Work As Being Complete. On July 7, 2003, during the startup of station air compressor 2 following maintenance, it was discovered that an oil tube fitting was not tight, even though the step that documented that the tubing was clean and reassembled, in the controlling work document for the maintenance, had been signed by the mechanic. As a result of this loose fitting, approximately 1 gallon of oil was lost through the loose connection when the air compressor was started. This was not an immediate safety issue and was determined to be of minor safety significance because increased outage time for station air compressor 2 rework caused by this work deficiency did not cause the loss of a component required to be operable by TSs or significantly impact the operation of safety related equipment.

The maintenance on station air compressor was performed in accordance with Order 200040324. This work document required that all tubing, affected by the performed maintenance, be clean and reassembled. Technical Specification 6.8.1 requires that written procedures be established and implemented for maintenance that can impact safety related equipment. Contrary to this requirement, all the tubing affected by the maintenance performed in accordance with Work Order 200040324 was not properly verified to be reassembled, which resulted in the loss of approximately 1 gallon of lube oil when the compressor was started. Although this is violation of TS 6.8.1, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee applied corrective actions and documented this issue in CR 03-05346.

- Maintenance Workers Did Not Verify the Adequacy of an Electrical Clearance Prior to Commencing Work. On July 22, 2003, it was discovered that during the performance of Work Order 200037968, "Install Flood Barriers in Conduits, Room 51," work was commenced prior to satisfying all the prerequisite steps. There were several performance deficiencies associated with the work of this Order.

  - One step required the workers "verify that the cables in the conduit to be worked are deenergized (TIC tracer or equivalent)."
  - The clearance cover sheet for this work contained a statement that all clearances associated with the penetration work "have electricians verify no voltage at penetration after hanging the clearance."
  - All Safety Verification Checklists in the work package were signed off as having been verified that the individual clearance for each penetration to be worked was adequate.

  As a result, work was started on at least 2 penetration seals which contained energized cables passing through them. This condition was discovered after the work had commenced. Once the condition was discovered, work was stopped and the cables for each affected penetration were verified deenergized. This issue did not present an immediate plant safety issue. This issue was not more than minor because it presented no direct challenges to safety related equipment.

  Procedure DB-DP-00007, "Control of Work," Step 6.3.f, stated "ensure a safety verification is initiated for Orders that have clearances, in accordance with Attachment 2." Step 1 of Attachment 2, in part, stated "a safety verification is to ensure the energy has been removed from a system or equipment before performing maintenance and that the verification shall be performed after the clearance tags are hung and prior to starting work." Contrary to this, the conduits passing through the penetration seals being worked under Order 200037968 were not verified to be deenergized prior to the commencement of work. Although this is violation of TS 6.8.1, which requires that written procedures, including those which control general maintenance activities, be established and implemented, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with

Section IV of the NRC's Enforcement Policy. The licensee applied corrective actions and documented this issue in CR 03-06021.

- Non-Qualified Components Installed in each of the Emergency Diesel Generator Air Starting Systems On July 30, 2003, is was discovered that non-qualified components (2" x 1" sockolets) were installed in each air starting systems of the two emergency diesel generator. Although this error demonstrated poor implementation of the licensee's work planning process, the final verification that the appropriate component was installed in the system rests with the maintenance workers who installed the parts. The licensee performed an operability evaluation of the installed sockolets and determined that they were functionally equivalent, pending replacement with qualified components. At the time this inspection report was issued, the non-qualified components in the emergency diesel 2 air start system had been replaced. This issue was not an immediate safety concern because prompt corrective action was taken to replace the components for emergency diesel generator 2 and emergency diesel generator 1 has been successfully operated with the non-qualified components installed.

  Procedure DB-OP-00007, "Control of Work," Revision 04, Step 6.3 provides guidance for personnel performing work on how to document the use of qualified components. Contrary to these instructions, during the installation of the new air start piping on both emergency diesel generators, the maintenance workers did not perform the appropriate parts verification prior to installing non-qualified parts into each of the emergency diesel generator's qualified air start piping. This was a violation of TS 6.8.1, which requires that written procedures, including those which control general maintenance activities, be established and implemented. It constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee documented this issue in CR 03-6123.

- CR Not Generated to Document Failed Test On July 15, 2003, during the initiation of a performance test, there was a malfunction and an automatic shutdown of the test caused by an incorrect file setup of the portable computer controlling the test equipment. The technicians notified their supervisor and with technical assistance installed the correct files and recommenced the test. The initial start time of test was crossed out and initialed and a new start time, without additional clarifying notes, was entered in the record copy of the test procedure. A CR (03-05702) was initiated to request a change to the procedure that was used for the computer setup. The CR was coded as a procedure enhancement that was identified by the individual/work group. However, as required by DB-BP-00013, "Surveillance and Periodic Test Program," there was no CR generated to document the self-revealing malfunction. After discussions with the inspectors, the licensee initiated a CR (03-06539) to identify that the problem during the test was not documented in accordance with an existing procedure on test control.

  Although this is violation of TS 6.8.1, which required that written procedures, including those which control surveillance and test activities, be established and

implemented, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy.

c. Conclusions

Even though these examples documented unacceptable performance by the personnel involved, they were all identified by the licensee and strong corrective actions were taken to prevent recurrence. During this inspection period, the inspectors noticed improvements in the identification of issues and how the maintenance organization dealt with performance deficiencies that were identified. Specifically the inspectors noted:

- an increased rate of maintenance department CRs which documented issues with work instruction and maintenance procedures;
- increased shop level training on procedure use and compliance, conduct of maintenance, control of work and the execution of maintenance;
- detailed investigations were conducted when performance deficiencies occurred;
- developed and conducted training of maintenance personnel which covered the appropriate behaviors when confronted with uncertain directions in a work document; and
- proactive interaction with the resident staff to discuss performance deficiencies when they occurred, and the corrective actions put in place to prevent recurrence.

.2 Review of Licensee Accountability of Coatings Which are Located in Containment and are Not Rated for Design Basis Accident Conditions

a. Inspection Scope

The inspectors reviewed how the licensee determined the amount of unqualified coatings which remained in containment and the impact of those coatings, post accident, on the ECCS sump screen debris loading head loss component of the NPSH Licensing Basis Analysis for the low pressure injection pumps and containment spray pumps.

b. Findings and Observations

Calculation C-NSA-049.02-26, Revision 01, documents the NPSH licensing basis analysis for the low pressure injection pumps and the containment spray pumps. Of interest for this inspection, was the maximum NPSH margin allotted for ECCS strainer fouling. This calculation documented that the available margin for the most limiting component was 2.5 feet-water.

The current licensee inventory of Non-DBA qualified protective coatings located in containment was tabulated in calculation C-CSS-100.05-001, "Service Level 1 Non-DBA Qualified Protective Coating Application Inventory," Revision 03. This calculation documented the quantity of non-DBA qualified protective coating material present in containment and tracked that quantity against a permissible amount established by an ECCS sump debris loading analysis.

Calculation C-NSA-049.02-032, “Davis-Besse Emergency Sump Strainer Head Loss,” Revision 00, determined the pressure drop across the ECCS emergency sump screens due to the accumulation of debris following a postulated loss of coolant accident. The calculation described the limiting scenario as a hot leg break on top of the steam generator located in the east D-ring. The information provided, pertaining to unqualified coatings, for this scenario was:

- Inorganic Zinc 9260 square feet
- Epoxy 9260 square feet
- Alkyds 3500 square feet

Based on this information and additional information on other qualified material that would impact ECCS sump strainer head loss post accident (fiber, reflective metallic insulation, dirt/dust, rust flakes, and other miscellaneous material), a fouled screen head loss value of 1.6 feet-water was obtained at the maximum low pressure injection pump and containment spray pump flow rates. Since the fouled strainer head loss of approximately 1.6 feet-water was less than the limiting margin of 2.5 feet-water, the calculation concluded that adequate NPSH margin was provided to the low pressure injection and containment spray pumps with the new ECCS sump strainer installed.

Calculation C-CSS-100.05-001 was recently revised to include updated information regarding the non-DBA qualified inventory in containment. This reevaluation documented the following changes:

- Inorganic Zinc 0 square feet
- Powder Coating 199 square feet
- Epoxy 7170 square feet (two layers)
- Alkyd 4439 square feet

Additionally, the licensee has decreased the amount of fibrous insulation and increased the amount of reflective metallic insulation that was used as inputs for calculation C-NSA-049.02-032, “Davis-Besse Emergency Sump Strainer Head Loss,” Revision 00. At the time this report was issued, the revision to this calculation, which will incorporate the above changes, was in progress. The inspectors reviewed two letters prepared by the licensee contractor performing the calculation revision. These letters documented a preliminary assessment of the “impact of reduced fiber insulation debris on strainer head loss” and the “impact of revised unqualified coatings estimates on strainer head loss.” These letters stated, pending completion of the formal calculation, that the current calculation, in regards to fibrous insulation was conservative and that the NPSH margin may actually improve slightly due to the changes in unqualified coating estimates.

The inspectors determined that even though the current post accident NPSH margin that existed for the most limiting component was small (0.9 feet-water), the licensee’s methods used to quantify and evaluate the unqualified coatings that remained in containment were adequate. (Reference CR#03-6253)

.3 Classification, Categorization, and Resolution of Restart Related Issues

a. Inspection Scope

The resident inspectors continued to monitor the licensee activity related to properly classifying, categorizing and resolving their backlog of work orders, corrective actions, and modifications required to be completed prior to transitioning to Mode 4. To accomplish this, the inspectors:

- attended and assessed licensee management meetings;
- monitored the management of open Mode 4 and 3 restraints;
- evaluated the licensee classification of emergent deficient conditions; and
- evaluated closed mode restraints.

As part of this inspection, the inspectors attended selected meetings where classification of CRs, prioritization of work activities, and setting of work completion dates took place. Specifically:

- The inspectors attended several Plant Support Center Meetings. The purpose of these meetings was to status significant restart equipment issues and focus licensee resources to efficiently and effectively work activities to provide more realistic work completion schedules.

- The inspectors attended Corrective Action Review Board Meeting on July 7, 2003. The purpose of the meetings was to review results of root causes generated in response to problems identified in CRs.

- The inspectors attended two (2) work planning meetings on August 8, 2003. During the meetings there were discussions among the planners, workers and management on the approaches needed to ensure that the breaker overload heaters that were being installed would have the necessary reliability and repeatability in performance and operability tests.

b. Findings and Observations

No significant issues were identified.

.4 Safety Conscious Work Environment (SCWE) and Safety Culture Observations

a. Inspection Scope

The inspectors continued to evaluate, on a day-to-day basis, the impact that scheduling has on quality of work and safety conscience work environment. The inspectors attended the following meetings:

- Review of Operations concern with ECR 2-809/ACR 2-809A (HPI Minimum Recirculation) and associated 50.59 evaluation; July 21, 2003
- Town Hall Meeting, July 24, 2003
- Safety Conscious Work Environment Review Team, July 30, 2003

b. Findings and Observations

No significant issues were identified.

.5 Closure of Restart Checklist Items

The Davis-Besse Oversight Panel (0350 Panel) met to review the following Restart Checklist Items and approved their closure:

- Restart Checklist Item 2.c.1 (Containment Emergency Sump)

  On October 30, 2002, the Davis-Besse oversight panel issued an update to the Restart Checklist informing the licensee that issues concerning the containment sump modification would be added to the Restart Checklist. The licensee reported in LER 346/2002-005 deficiencies with the containment emergency sump to perform its function under certain accident scenarios due to clogging of the emergency core cooling and containment spray systems' sump screen by fibrous materials, unqualified coatings, and various other debris.

  The licensee performed comprehensive and extensive corrective actions. The actions included installation of a larger emergency sump strainer, field walk-downs of potential debris which could potentially clog the emergency sump, and evaluations on potential debris left in containment. Additionally the licensee has analyzed the emergency core cooling system and containment spray system recirculation functions with respect to the potentially adverse post-accident debris blockage effects to confirm compliance with 10 CFR 50.46(b)(5) and all other existing applicable regulatory requirements.

  The NRC conducted inspections and evaluations to verify that the containment sump deficiencies had been adequately resolved. The NRC reviewed the licensee's corrective actions, including the design modification for the new sump, field installation, and compliance with regulatory requirements. The NRC inspections are documented in Inspection Report 50/346-03-06 and in this Inspection Report. (4OA5.2)

  On September 2, 2003, the Davis-Besse Oversight Panel met to discuss this issue and concluded that Restart Checklist Item 2.c.1 is closed.

- Restart Checklist Item 3.d (Boric Acid Corrosion Management Program)

  On August 16, 2002, the Davis-Besse oversight panel issued the Restart Checklist informing the licensee that issues concerning the boric acid corrosion management program would be added to the Restart Checklist. The NRC Augmented Inspection Team Report and Augmented Inspection Team Followup Reports (NRC Inspection Reports 50/346/02-03 and -08) discussed boric acid corrosion management weaknesses, including potential corrective action violations for boric acid buildup on the reactor head, boric acid accumulation on containment air coolers, and contaminant clogging of radiation element filters.

The reports also discussed inadequate procedures and failure to follow existing procedures for boric acid corrosion control.

The NRC conducted two special inspections associated with identifying and evaluating the effects of boric acid corrosion of components and systems within containment. The inspections are documented in NRC Inspection Reports 50/346/02-09 and -12. The results of the inspections initially found weaknesses. For example, the inspectors identified that the licensee failed to adequately train personnel for VT-2 certification to perform containment area extent-of-condition walk-downs. Also, the licensee lacked visual inspection acceptance requirements, and some components with corrosion and boric acid were identified by the NRC staff were not identified by the licensee.

The licensee implemented corrective actions and subsequent NRC inspection found that the licensee satisfactorily resolved the lack of inspection quality and thoroughness associated with implementation of their extent-of-condition plan for assessing and resolving boric acid issues. The licensee also completed a detailed, systematic evaluation of the boric acid corrosion control program. The NRC reviewed the licensee's programmatic improvements as documented in NRC Inspection Reports 50-346/03-09 and 02-11, and found that the licensee's programmatic boric acid issues were properly resolved. However, the issues were not well documented in engineering evaluations. The inspectors reviewed the licensee's planned actions to address the documentation issues and concluded that the licensee's planned actions to address the documentation issues before restart was satisfactory.

On July 22, 2003, the Davis-Besse Oversight Panel met to discuss this issue and concluded that Restart Checklist Item 3.d is closed.

- Restart Checklist Item 3.h (Radiation Protection Program)

  On October 30, 2002, the Davis-Besse oversight panel issued an update to the Restart Checklist informing the licensee that issues concerning the radiation protection program would be added to the Restart Checklist. Several contract workers who installed steam-generator nozzle dams during this current extended outage were found to have left the Davis-Besse site with residual contamination in the form of "discrete radioactive particles." Further investigation found that these individuals had a substantial potential for internal uptakes of alpha-emitting isotopes. Because of this and other radiation protection program issues, the Panel was concerned with the effectiveness of the radiation protection program.

  In 2002 the NRC completed inspections into the uncontrolled release of radioactive material and the intake of radioactive material by steam generator workers. The inspections are documented in NRC Inspection Reports 50/346/02-16 and -06. The NRC also conducted a supplemental inspection to evaluate the licensee's root cause investigation and corrective actions into the radiation protection program deficiencies. The supplemental inspection is documented in NRC Inspection Report 50/346/03-08. The inspectors concluded that the licensee's completed and planned corrective actions were appropriate.

Because there has been a series of changes in radiation protection management personnel during the outage, the inspectors evaluated the effectiveness of management oversight of the radiation protection program. The inspectors concluded that management oversight of radiation protection had improved and was capable of supporting plant restart as documented in this Inspection Report.

On July 22, 2003, the Davis-Besse Oversight Panel met to discuss this issue and concluded that Restart Checklist Item 3.h is closed.

- Restart Checklist Item 6.g (Licensee Amendment)

  The licensee submitted a request for license amendment on May 21, 2003. The NRC approved and issued the license Amendment by letter dated August 12, 2003. The Amendment relocates to the Technical Requirements Manual the TS surveillance requirement pertaining to flow balance testing of ECCS subsystems following system modifications that alter subsystem flow characteristics. The Amendment also adds an ECCS pump operability requirement to the TS.

  On August 21, 2003, the Davis-Besse Oversight Panel met to discuss this issue and concluded that Restart Checklist Item 6.g is closed.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. M. Bezilla, and other members of licensee management on August 28, 2003. The licensee acknowledged the findings presented. No proprietary information was identified.

.2 Interim Exit Meetings

- Access Control, ALARA and Radwaste/Transportation with Mr. L. Myers on July 18, 2003.

- Radwaste/Transportation with Mr. B. Geddes on August 5, 2003.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Bezilla, Site Vice President
D. Blakely, Staff Engineer, Nuclear
G. Dunn, Outage Manager
R. Fast, Director, Organizational Development
J. Grabnar, Manager, Design Engineering
K. Ostrowski, Manager, Regulatory Affairs
W. Marini, Regulatory Interface Team
L. Myers, Chief Operating Officer, FENOC
J. Powers, Director, Nuclear Engineering
M. Roder, Manager, Plant Operations
R. Schrauder, Director Support Services
M. Stevens, Director, Maintenance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-346/03-17-01	NCV	TS 3.6.4.1, Containment Hydrogen Analyzers

Closed

50-346/02-005-00	LER	Intake Gantry Crane Trolley Not Adequately Restrained for Tornado-Generated Winds

Discussed

50-346/03-006-01	NCV	Failure to adequately verify the accuracy of ECCS design calculations
50-346/03-005-00	LER	Containment Gas Analyzer Heat Exchanger Valves Found Closed Rendering the Containment Gas Analyzer Inoperable

LIST OF DOCUMENTS REVIEWED

1R04 Equipment Alignment

DB-OP-06321; 250/125 VDC Station DC Switching Procedure, Revision 02

OS-060 Sh 1; Operational Schematic, 250/125V DC and 120V Instrument AC System, Revision 12

OS-060 Sh 2; Operational Schematic, 250/125V DC and 120V Instrument AC System, Revision 11

1R05 Fire Protection

Fire Hazards Analysis Report

Fire Protection Drawings A-224F, A-225F,

1R07 Heat Sink Performance

WO 200008574; Clean and Inspect Component Cooling Water Heat Exchanger 1-2

System Description 016; Component Cooling Water System, Revision 4

CR 03-03207; Component Cooling Water Heat Exchanger #2 Tube Fouling

Davis Besse Performance Monitoring Heat Exchanger Program, Revision 01

1R11 Licensed Operator Requalification Program

Simulator Guide ORQ-SIM-S111; Tc Inst Failure, High Activity in the RCS, An OTSG Tube Rupture, and a MFW Line Break, Revision 02

DBBP-OPS-0001; Operations Expectation and Standards, Revision 04

DB-OP-0000; Conduct of Operations, Revision 06

1R13 Maintenance Risk and Emergent Work

Contingency Plan 13RFO-33; Work with Decay Heat Pump #1 Running with work on HPI Pump and Minimum Recirculation Modification in ECCS Room #1, Revision 01

Contingency Plan 13RFO-21; Management Actions for Orange Risk Level During RCS Draining Activities and Draining Below 80 inches and remaining above 50 inches for RCP RTD Removal, Revision 01

Contingency Plan 13RFO-34; Contingency Plan for Entering Orange Risk Due to Having Only One Available RCS Makeup Source

Contingency Plan 13RFO-37; Contingency Plan for Entering Orange Risk Due to Having Only One Available RCS Makeup Source

WO 200003986; MU209, Repack Valve/Seal Weld

1R14 Personnel Performance During Nonroutine Plant Evolutions

DB-OP-06904; Shutdown Operations, Revision 14

DB-OP-06002; RCS Draining and Nitrogen Blanketing, Revision 08

1R15 Operability Evaluations

Operability Evaluation 2003-0014; Seismic adequacy of Control Room Flourescent Lights

Operability Evaluation 2003-0017; Non-Q Sockolets in Emergency Diesel Generator Air Start Piping

Operability Evaluation 2003-0019 ; Emergency Diesel Generator Fuel Oil Transfer Pump 1-2 Motor Low Insulation Readings

TS 3/4.8.1.1 and 3/4.8.1.2; Electrical Power Systems, AC Sources

Drawing OS 041.C; Emergency Diesel Generator Diesel Oil System

Instruction Manual for Crane Chempump, Series G

CR 03-06666; Unacceptably Low Insulation Resistance for MP195-2

DB-PF-05064; Electrical Machine Testing Using PDMA Motor Tester, Revision 02

IEEE Std 43-2000; IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery

WO 200004007; MP195-2 De-energized mtr testing

USAR Section 8.3. 1.1.4; Diesel Generators

USAR Section 9.5.4; Diesel Generator Fuel Oil Storage and Transfer System

CR 03-04806; Control Room Lighting Fixtures Have Not Been Determined to Be Seismic

WO 200002091; Inspect and Replace Ceiling Tile in the Control Room

WO 200008477; Perform Thorough Cleaning of Area Above the Control Room Ceiling Tile

WO 200045366; EDG Air Start Piping - a non-Q 2" X 1" Sockolet Was Installed Upstream of DA-109

NG-DB-0018; Operability Determinations, Revision 04

Operability Evaluation 2003-0018; Non-Q Replacement Used for Emergency Diesel Generator 1B Lube Oil Sight glass.

1R19 Post Maintenance Testing

WO 200011725; Diesel Generator and Auxiliaries, Time Delay Relay Ch 2

WO 200036752; EDG Air Start Rust Reduction Modification, Electrical Implementation Support

1R22 Surveillance Testing

DB-SP-03337; CS Train 1 Quarterly Pump and Valve Test, Revision 04

DB-DP-0013; Surveillance and Periodic Test Program, Revision 08

NG-DB-00225; Procedure Use and Adherence, Revision 01

CR-03-05702; PCR: DB-ME-0929

CR-03-06539; Problem During Testing 2N Batteries not Properly Addressed

DB-ME-09209; BCT-2000 Operating Guide, Revision 00

DB-ME-03002; Order 200037513; Test Package for Station Battery 2N Performance Discharge Test

DB-SP-03001; Service Water Loop 2 Integrated Flow Balance Procedure, Revision 01

CR 03-06509; Unable to meet SW Train 2 Flow Acceptance Criteria for CCW HX #2

13RFO-35; Contingency Plan for SW1395 De-energized for F12A/F12B Tie modification while SW1399 is inoperable, Revision 0

TS 3/4.7.4; Service Water System

2OS2 ALARA Planning and Controls

CR 03-03317; Radiation Workers Performing Work In Area Not Briefed Or Surveyed

CR 03-03268; Errors Discovered On An RP Preliminary Internal Dose Assessment

CR 03-02964; Training Not Updated

CR 03-02974; Found Low Level Radioactive Material Outside RRA

CR 03-02997; Contamination Monitor Used Without An Approved Calibration Or Source Check

CR 03-03086; Radiation Protection Field Assessment

CR 03-03147; Violation Of DB-HP-01702

CR 03-03188; Procedure Compliance For WB Counting Per DB-HP-01320

CR 03-03220; The WBC Quality Control Checks Exceeded Action Levels

CR 03-03854; RP Expectations Not Being Communicated To Plant Personnel

CR 03-03856; Poor Radworker Practice

CR 03-03991; Contaminated Clothing Found Outside the Restricted Area

CR 03-04227; Field Change Not Completed For RWP 2003-5540

CR 03-04333; Improve Coordination Of Rad Worker Training and Radiation Worker Exercise

CR 03-04388; Primary Resin High Radiation Lift Work-Arounds

CR 03-04695; HRA Swing Gate And Posting Found Out Of position

CR 03-04751; Hot Spots In Mechanical Penetration Not Posted

CR 03-04785; Lessons Learned From RWP-2002-5194 and 2003-5194

CR 03-04790; Lessons Learned From RWP-2003-5123

CR 03-05013; Wrong RWP Used

CR 03-05050; Electronic Dosimetry Damaged While Welding In MU-3

CR 03-05191; Improper RWP Identification In RWP Log

CR 03-05259; Procedural Inconsistencies For Air Supplied Respirator And Auto-Air Filter Cart

CR 03-05355; Inadequate Evaluation Of CR 02-01255

CR 03-05357; Inadequate Evaluation Of CRs 02-00851 and 02-01224

CR 03-05366; Inadequate Evaluation Of CR 02-01398

CR 03-05370; Inadequate Evaluation Of CR 02-01008

CR 03-05397; Control Of Work At RRA Entrance

CR 03-05458; Unacceptable Staffing Levels Of Specialty Trained Personnel

CR 03-03133; Two Workers Received Facial Contaminations While EOC Cleaning in CB

DB-CH-06901; Radiochemistry Test Requirements; Revision 5

NOBP-LP-2007; CR Process Effectiveness Review; Revision 1

NOBP-LP-2008; Corrective Action Review Boards; Revision 1

DBBP-LP-2000; CR Process Expectations; Revision 1

NOBP-LP-2006; Collective Significance Review; Revision 0

NOP-LP-2001; CR Process; Revision 4

DB-C-03-01; Davis Besse Nuclear Quality Assessment Report; dated May 29, 2003
Day & Zimmermann Post-Mod Critique & Summary

Radiation Protection Effectiveness Survey

Radiation Protection Organization Chart

PR-IAP-3H-01; Radiation Protection Program: Restart Implementation Action Plan; Revision 1

RWP 2003-6049; CRD Nozzle Extractions; Revision 1

DB-0374-0; ALARA Pre-Job Checklist

DB-0379-1; Air Sample Record 03-0928

DB-0172-2; Formal ALARA Briefing Checklist

DB-0140-0; Radiological Survey Form: Reactor Head Survey

DB-0379-1; Air Sample Records

DB-HP-01454; Lapel Air Sample Data Sheets; Revision 4

RWP 2003-5577; Emergency Sump Strainer Modification Work In Incore Tunnel Only; dated January 3, 2003

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

RP-AA-440; Respiratory Protection Program; Revision 3

2PS2 Radioactive Material Processing and Transportation

CR 02-02252; Fed ex Costume Critical Truck Failed Shipment Inspection

CR 02-02268; Lack of Proper Training or Attention to Detail by the Driver

CR 02-02378; Vendor Found Two Laundry Carts Unsecured

CR 02-03121; Improper/Outdated Placards on Vendor Trailer for RAM shipment

CR 02-08965; RAM Receipt Survey Late at Warehouse

CR 02-09013; Incorrect Destination Communicated for Radioactive Material Shipment

CR 03-00973; Limited Quantity Shipment Exceeds Container Dose Rate Limits

CR 03-02693; Radwaste Reduction Enhancements

CR 03-05539; Database for Radioactive Material Shipments Does Not Contain Most Current Data

Training Tracking; FENOC Integrated Training System Successful Completions Report

RCC-MIS-1301; Radiation Protection Tester and Health Physics Servicemen 3rd Trimester 2001, Continued Training: Hazardous Material Transportation

DB-OP-01200; Reactor Coolant System Leakage Management; Revision 5

DB-HP-01316; Use of Low Pressure Breathing Air; Revision 6

DB-HP-01344; Source Term Determination; Revision 0

DB-HP-04024; 10 CFR 61 Sampling for Waste Classification; Revision 0

NOP-CC-4003; Fuel Reliability Monitoring and Assessment; Revision 0

NOP-OP-2002; Shipment of Radioactive Material/Waste; Revision 1

10 CFR 61 Sample Reports for DAW, July 11, 2003 Primary Filters and Spent Resin

Radioactive Material Shipping Logs; 2002 and 2003

TR02-0041; LSA II Primary Resin (IP-2 Packaging); dated December 30, 2002

TR03-0002; LSA II DAW; dated February 5, 2003

TR03-0011; LSA II DAW; dated June 11, 2003

RM03-0066; SCO II Contaminated Radioactive Material; dated July 17, 2003

TR03-0017; SCO II Reactor Head (Strong Tight Container)

DB-0296-0; Program Readiness Baseline Assessment for the Radioactive Material Shipping and Receiving Program; dated December 17, 2002

DBF 2003-2173; FENOC Observation Cards, Radwaste/Transportation; dated July 29, 2003

DBF 2003-2173; FENOC Observation Cards, Radwaste/Transportation; dated February 18, 2003

4OA2 Problem Identification and Resolution

Regulatory Issue Summary 2002-07: Clarification of NRC Requirements Applicable to Worker Fatigue and Self-Declaration of Fitness-For-Duty

Davis-Besse Course FEN-FD, "Aberrrant Behavior/Fitness for Duty Recognition," Revision 2

NOP-LP-1002, "Fitness for Duty Program," Revision 0

Intra-Company Memorandum DSP-03-00031, "Delegation and Expectations Regarding Signature Authority for Overtime Deviation Requests," Revision 01; dated June 11, 2003

Intra-Company Memorandum DSP-03-00016, "Overtime Deviation Request Form Processing Guidelines," dated April 24, 2003

Intra-Company Memorandum DSP-03-00015, "Expectations Regarding Signature Authority for Overtime Deviation Requests," dated April 24, 2003

CR 03-05533; Compliance With NOP-LP-1002, Fitness For Duty

Generic Letter 82-12; Nuclear Power Plant Staff Working Hours

Generic Letter 83-14; Definition of Key Maintenance Personnel

4OA3 Event Followup

CR 03-01318; Decay Heat Pump 2 Needs Evaluation t Determine Impact of Recent Impeller Replacement on Design Bases

CR 03-05136; NRC Identified that ECCS NPSH Calculation Methodology is Inconsistent with Section 6.3.2.1.4 of the USAR

C-NSA-049.02-26; NPSH Licensing Basis Analysis for Davis-Besse LPI & CS Pumps Revision 1

C-NSA-059.01-019; Water Level Inside Containment Post LOCA; Revision 3

Drawing M-033A; Piping and Instrument Diagram - High Pressure Injection; Revision 30

Drawing M-033B; Piping and Instrument Diagram - Decay Heat Train 1; Revision 39

Drawing M-033C; Piping and Instrument Diagram - Decay Heat Train 2; Revision 16

Drawing M-034; Piping and Instrument Diagram - Emergency Core Cooling System Containment Spray and Core Flooding Systems; Revision 55

Drawing M-0601; Plant Design Standard Piping Class Sheet; Revision 20

Drawing M-233B; Piping Isometric Emergency Core Cooling System; Revision 19

Crane Technical Paper No. 410; Flow of Fluids through Valves, Fittings, and Pipe

Flow Resistance: A Design Guide for Engineers; I.E. Idel'chik and E. Fried, Hemisphere Publishing Company; 1989

Engineering Change Request 02-0512-00; Replace Containment Emergency Sump Strainer; Revision 3

Safety Guide 1; Net Positive Suction Head For Emergency Core Cooling and Containment Heat Removal System Pumps; dated November 2, 1970

DB-PF-03237; Decay Heat Pump 2 Baseline Test; dated February 15, 2003

CR 02-07169; LIR CCW - Lack of CCW Flow Verification to Essential Components

CR 03-04871; Containment Gas Analyzer Moisture Trap Design

CR 03-03398; Containment Gas Analyzer Component Cooling Water Flow Isolated

Event Report 2003-005-00; Containment Gas Analyzer Heat Exchanger Valves Found Closed Rendering the Containment Gas Analyzer Inoperable

DB-OP-02000; RPS, SFAS, SFRCS Trip, of SG Tube Rupture; Revision 07

DB-OP-06502; Containment Hydrogen Dilution and Purge System; Revision 02

USAR; Section 6.2.5.3; Design Evaluation; Revision 22

C-CSS-009.03-004; Intake Gantry Crane Trolley Trajectory Calculation; Revision 00

LER 2002-010-00; Intake Gantry Crane Trolley Not Adequately Restrained for Tornado-Generated Winds

CR 02-10425; Gantry Crane Trolley Locking Device

FirstEnergy Nuclear Operating Company Letter; Serial Number 2966; Cancellation of Licensee Event Report 50-346/2002-010 for the Davis-Besse Nuclear Power Station, Unit 1

4OA5 Other Activities

Calculation C-NSA-049.2-28; Davis-Besse Debris Transport Logic Trees for Emergency Sump Strainer Loadings

Calculation C-NSA-049.2-29; Davis-Besse Containment Pool CFD Debris Transport; Revision 00

Calculation C-NSA-049.2-30; Davis-Besse Containment In-Core Tunnel CFD Debris Transport; Revision 00

Calculation C-NSA-49.2-32; Davis-Besse Emergency Sump Strainer Head Loss; Revision 00

Report DBE004-RPT-001; Determination of Post-LOCA Debris Generation for Design of Emergency Sump Strainer; Revision 00

Calculation C-CSS-100.05-001; Addendum A01; Service Level 1 Non-DBA Qualified Protective Coating Application Inventory; Revision 3

10 CFR 50.59 Evaluation 02-02112; Emergency Sump Strainer Modification for ECR 02-0512-00; Revision 00

Vendor Letter EXT-03-00289; Impact of Revised Unqualified Coatings Estimates on Strainer Head Loss; dated May 7, 2003

Vendor Letter EXT-03-00460; Impact of Reduced Fiber Insulation Debris on Strainer Head Loss; dated July 28,2003

C-NSA-049.02-26; NPSH Licensing Basis Analysis for Davis-Besse LPI & CS Pumps, Revision 1

CR 03-05176; Safety Verification Signed Off By Maintenance in Error

CR 03-06070; Question if Cycling Chiller Compressor is In Accordance With Station Configuration Control Procedure

DB-MN-00001; Conduct of Maintenance; Revision 10

DB-DP-00307; Station Configuration Control; Revision 00

CR 03-05346; Oil Leak on C140 During Startup

WO 200037968; Install Flood Barriers in Conduits, Room 51

DB-DP-00007; Control of Work; Revision 04

CR 03-06021; Order Operation Missed

CR 03-06123; EDG Air Start Piping

WO 200005242; General Work Order for Non-EWR 01-0298-00 for the Air Start System

LIST OF ACRONYMS USED

ADAMS	Agency-wide Document Access and Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
CCW	Component Cooling Water
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CGAS	Containment Gas Analyzers Systems
CR	Condition Report
CS	Containment Spray
DAW	Dry Active Waste
DOT	Department of Transportation
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
FENOC	FirstEnergy Nuclear Operating Company
FSAR	Final Safety Analysis Report
HEPA	High Efficiency Particle
HRA	High Radiation Area
IMC	Inspection Manual Chapter
IR	Inspection Report
LER	Licensee Event Report
LERF	Large Early Release Frequency
LHRA	Locked High Radiation Area
LOCA	Loss of Coolant Accident
LPI	Low Pressure Injection
NCV	Non-cited Violation
NFPA	National Fire Protection Association
NPSH	Net Positive Suction Head
NRC	United States Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
Radwaste	Radioactive Waste
RAM	Radioactive Material
RCS	Reactor Coolant System
RP	Radiation Protection
RFO	Refueling Outage
RTD	Resistance Temperature Detector
RWP	Radiation Work Permit
SCWE	Safety Conscious Work Environment
SFAS	Safety Features Actuation System
SDP	Significance Determination Process
SRB	Station Review Board
SSC	Structures, Systems, Components
TI	Temporary Instruction
TS	Technical Specifications
USAR	Updated Safety Analysis Report
VHRA	Very High Radiation Area
WO	Work Order