U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-237; 50-249
License Nos:	DPR-19; DPR-25
Report No:	50-237/98007(DRS), 50-249/98007(DRS)
Licensee:	Commonwealth Edison Company
Facility:	Dresden Generating Station, Units 2 and 3
Location:	6500 North Dresden Road Morris, IL 60450-9765
Dates:	February 12 through March 5, 1998
Inspector:	Gerard F. O'Dwyer, Reactor Inspector
Approved by:	John Jacobson, Chief Lead Engineering Branch Division of Reactor Safety

EXECUTIVE SUMMARY

Dresden Generating Station, Units 2 and 3
NRC Inspection Report 50-237/98007(DRS); 50-249/98007(DRS)

An announced regional initiative inspection that reviewed portions of the M&TE calibration control program and issues related to Dresden Station's response to a hypothetical failure of the Dresden Dam.

- Overall the inspection concluded that the M&TE calibration control program was effective. M&TE storage controls were adequate and plant temperature instrumentation was properly calibrated. One violation of NRC requirements was identified. (Section M1.1, VIO 50-237/249-98007-01(DRS))

- Various scenarios were identified concerning dam failure both with and without a LOCA, as described in the UFSAR, which the station may not be able to accommodate. (Section E3)

Report Details

II. Maintenance

M1.1 Measuring and Test Equipment (M&TE) Control Program

a. Inspection Scope (IP 61725)

The inspector reviewed portions of the M&TE control program, M&TE calibration records, Technical Specifications and M&TE vendor information.

b. Observations and Findings

The inspector reviewed selected Problem Identification Form (PIF) packages related to the M&TE program initiated during 1997 and 1998 and found the PIFs appropriately initiated and dispositioned.

Temperature-initiated safety-related automatic actions were actuated by temperature switches that were calibrated appropriately to the necessary accuracy to meet the TS requirements. The control room operators indicated that safety-related manual actions (e.g., Emergency Operating Procedure actions) were taken based on the outputs of annunciators and computer alarms which were also calibrated with appropriate accuracy.

The M&TE storage controls were found to be adequate. The storage requirements for the M&TE were very broad, e.g., the vendor-recommended storage range for a Gordon model 5060 meter was from -40°F to 140°F with no restriction on humidity. The temperature in the M&TE storage areas was controlled between 60 and 90°F by normal ventilation.

Calibration lab personnel were required to be trained on the procedures that were used to calibrate the M&TE. The training records indicated that the calibration lab personnel had the appropriate training.

Technical Specification 6.8.A.1 required the implementation of certain Regulatory Guides and American National Standards Institute (ANSI) standards including ANSI N45.2.9-1974, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants." Appendix A of ANSI N45.2.9-1974 required that M&TE calibration records be retained as quality records for five years. However, the licensee identified that prior to December 22, 1997, the Master Records Retention Schedule of General Procedure GP 136, dated September 15, 1995, "Retention of Company Records," failed to designate M&TE calibration records as quality assurance (QA) records and the procedure allowed the calibration records to be disposed after three years. This was a severity level IV violation of TS 6.8.A.1 (VIO 50-237/249-98007-01 (DRS)); however, safety consequences were minimal because the licensee had not needed to retrieve any calibration records older than three years. Also, all M&TE was calibrated at least once a year, creating a more recent

calibration record so the potential to need an older record was reduced each year. On January 19, 1998, the Dresden Central File Supervisor approved a change to the Master Record Retention Schedule to require the M&TE calibration records to be retained as QA records for at least five years. The M&TE supervisor informed the inspector that: 1) the Master Schedule was for all ComEd sites and changes sometimes required an extensive time to be implemented, therefore the Dresden Nuclear Power Station Record Retention Schedule had been created; 2) the change still had to be approved and implemented on the Master Schedule by ComEd corporate personnel; and 3) while the Master schedule was being corrected, the Dresden schedule had already been changed to meet the requirements. When responding to the violation, the licensee should specify when the change to the Master schedule will be implemented.

c. Conclusions

The M&TE calibration control program was effective in maintaining plant temperature instrumentation properly calibrated. PIFs related to M&TE were properly dispositioned. Failure to designate and maintain M&TE calibration records as QA records for five years was a severity level IV violation of TS 6.8.A.1. (VIO 50-237/249-98007-01 (DRS))

III. Engineering

E3.1 Updated Final Safety Analysis Report (UFSAR) Section 9.2.5.3.2 Review

a. Inspection Scope (IP 37550)

The inspector reviewed section 9.2.5.3.2, "Dam Failure Coincident with a LOCA," of the UFSAR, Revision 2, docketed letter dated October 16, 1968, from the Atomic Energy Commission (AEC) staff to Dresden staff amendments 9 and 10 to the applications for the operating licenses for Unit 2 & 3, and docketed letter dated March 13, 1998, from the site vice president to the NRC.

b. Observations and Findings

The inspector noted that Section 9.2.5.3.2 stated that the Dresden Station could be safely shutdown if there was a catastrophic failure of the Dresden dam coincident with a design basis loss of coolant accident (LOCA) in either Unit 2 or Unit 3, without using any seismic Class II systems and with a loss of offsite electrical power (LOOP). The inspector determined that it could not be demonstrated that Section 9.2.5.3.2 could be met without using Class II systems for isolation condenser make up and the cognizant senior design engineer agreed. The inspector also determined that even if the Class II systems were assumed to be operational, the Containment Cooling Service Water (CCSW) system would not maintain the required 30 pounds per square inch differential (psid) greater than the low pressure coolant injection (LPCI) system and Part 100 limits may be exceeded. The Site Engineering Manager and the licensee's NRC Coordinator informed the inspector that the ComEd position was that this capability was not required by the license or the design basis. However, the inspector noted that by docketed letter,

dated October 16, 1968, the Atomic Energy Commission (AEC) staff had requested the Dresden staff to provide an evaluation to complete the application for the operating licenses for Units 2 & 3. The AEC required the evaluation to describe the effect of an earthquake which disabled the dam, all Class II systems, offsite power and caused a design basis LOCA in one of the two units. By docketed letter, dated February 28, 1969, Dresden answered, in amendments 9 and 10, to the applications for the operating licenses for Unit 2 & 3 that the station can safely shutdown after all those coincident events. Dresden also placed the evaluation in the FSAR. By docketed letter, dated March 31, 1998, the Dresden site vice president stated that a dam failure coincident with a LOCA was beyond the design basis of the Dresden Station and that clarifications to the UFSAR would be made through the 10 CFR 50.59 provisions.

c. Conclusions

It was not demonstrated that the station could shutdown per the UFSAR statements in Section 9.2.5.3.2 post dam failure coincident with a LOCA. This will be reviewed as part of a previously opened unresolved item. (URI 50-237/249-97021-01A (DRS))

E3.2 Review of UFSAR section 9.2.5.3.1, "Dam Failure During Normal Plant Operation"

a. Inspection Scope

The inspector reviewed UFSAR section 9.2.5.3.1, "Dam Failure During Normal Plant Operation."

b. Observations and Findings

The inspector noted that section 9.2.5.3.1 stated that the Dresden station could be safely shutdown after a dam failure with no LOCA, without using Seismic Class II systems and with a LOOP. The section discussed only methods of shutdown which relied on Class II systems that required special lineups to be powered from the Emergency Diesel Generators. The inspector noted that similar statements were in the AEC-requested evaluation discussed in section E3.1. The inspector determined that the Dresden station could not be safely shutdown by only Class I systems under the stated conditions because all Isolation Condenser Makeup methods used Class II systems and the containment cooling service water (CCSW) system would not function without Class II systems. The licensee stated that this requirement was not part of the design basis of the Dresden Station and that UFSAR clarifications will be made as discussed in paragraph E3.1.

Even if the Class II systems were assumed to operate, the Dresden station might still not be able to shutdown safely after a catastrophic dam failure that lowered the intake canal water level to the postulated 495' MSL. The inspector was concerned that the Unit 2 & 3 reactor vessels (RV) might not be adequately cooled. Section 9.2.5.3.1 stated that the isolation condensers (IC) would be used to cool the RVs. All Isolation Condenser makeup methods used Class II systems; however, the licensee assumed one would still function. The AEC-requested evaluation stated that there would be nine

million gallons available for IC makeup in the Ultimate Heat Sink (UHS) because the discharge canal level would fall to 498' MSL after a dam failure. The inspector identified that the discharge canal level would fall to 495' MSL which would result in six million gallons available in the UHS. Such a significant underestimation of UHS capacity might invalidate the ability of the Unit 2 & 3 ICs to cool the RV. The licensee stated that this UFSAR statement will be corrected by a 50.59 UFSAR change.

The UFSAR discussed using the Service Water Pumps (SWPs) if the intake level dropped to 495 feet MSL after a dam failure. The inspector was concerned because the Hydraulic Institute Standards, ANSI/HI; 1994 Edition, Figure 1.66 contained the general recommendation of a minimum of five feet submergence to prevent excessive vortexing of a pump with 15,000 gpm rated capacity such as each SW pump. If intake level dropped to 495 feet, the SWPs would only have 1 foot 2.5 inch submergence. This might allow enough air-entraining vortexing for the SWPs to lose their prime and to not function. The licensee was generating calculations to demonstrate that the Dresden SWPs will operate adequately with intake at the postulated 495 feet level. If the SWPs do not function at full capacity, the SWPs might not be able to be used to cool the reactor building closed cooling water (RBCW) and achieve cold shutdown via the shutdown cooling heat exchangers as stated in the UFSAR. Also, the inspector identified that since the SWPs indirectly cooled the reactor recirculation pump (RRP) seals, the seals may eventually fail if the SWPs are at less than full capacity. Additionally, loss of CCSW, as discussed in Section E3.3, may impact long term cooling of the plant.

c. Conclusions

It was not demonstrated that Dresden station could be safely shutdown during normal operation following a dam failure as described in Section 9.2.5.3.1 of the UFSAR, using seismic Class I systems only. The licensee does not believe that this requirement is part of the design basis and intends to clarify the UFSAR. However, assuming no damage to Class II systems, the UHS inventory is less than that assumed in the evaluation and SWP performance at the 495' MSL has not been evaluated. These concerns will be reviewed as part of a previously opened unresolved item. (URI 50-237/249-97021-01B(DRS))

E3.3 Procedural Problems

a. Inspection scope (IP 37550, 92903)

The inspector reviewed the CCSW suction piping drawings and Procedure DOA 0010-01, Rev. 7, "Dresden Lock and Dam Failure."

b. Observations and Findings

The UFSAR stated that a CCSW pump would be put in-service after a LOCA coincident with a dam failure that lowered the intake water level to 495 feet MSL. The bottom of

the CCSW suction line was at 498 feet MSL, so the suction piping would drain and approximately 200 feet of horizontal piping for each pump would fill with air. The UFSAR stated that the CCSW intake bay would be sealed and the water level raised so that the CCSW intakes would be covered and the CCSW pumps could provide water for containment cooling. However, the inspector identified that there were no high-point vent valves to vent the air that would be trapped inside the piping when water level was restored. With the water level restored, the trapped air volume would prevent CCSW pump operation. Previous to December 1997, Procedure DOA 0010-01, Revision 7, "Dresden Lock and Dam Failure," did not have provisions for venting the trapped air.

The licensee revised Procedure DOA 0010-01 to cut holes in the top of the CCSW suction piping in the CCSW bay to vent the air. Since the holes would be at 500' MSL, the inspector was concerned that the CCSW bay water level might not be able to be restored high enough to prevent excessive air-entraining vortexing through the holes which may prevent the CCSW pumps from pumping adequate water.

The UFSAR stated that the CCSW intake bay would be sealed by installing stoplogs across the two openings to the bay. The licensee did not quantify the maximum leakage expected. The inspector was concerned that the stoplogs would leak excessively, further reducing the CCSW capacity. Evaluation of CCSW pump performance with vent holes cut in the suction piping and the stoplogs in place is considered an unresolved item. (URI 50-237/249-98007-02(DRS))

c. Conclusions

Prior to December 1997, Procedure DOA 0010-01 would not have supported CCSW pump operation after a dam failure as stated in the UFSAR. Furthermore, adequate pump performance with suction piping vents and intake bay stoplogs has not been demonstrated.

E3.4 Other UFSAR Discrepancies

a. Inspection scope (IP 37550, 92903)

The inspector reviewed UFSAR section 9.2.5.3.1, "Dam Failure During Normal Operations," PIF D1998-00455, "Suction of Unit 2 & 3 Diesel-Driven Fire Pump Uncovered Following Dam Failure," and interviewed the Diesel Fire Pump (DFP) System Engineer.

b. Observations and Findings

The UFSAR stated that the DFP's suction was at 492', the DFP took suction from the CCSW bay and the DFP would operate after a dam failure lowered CCSW bay level to 495' MSL. However; the inspector identified that the suction could not be at 492' because the CCSW bay floor elevation was at 493' 8" MSL. PIF D1998-00455 was initiated which stated that the vendor-recommended minimum intake water level was 498' 10." Engineering personnel stated that the CCSW bay level would not be restored

until two hours after a dam failure. The inspector was concerned because even if bay level was restored, the DFP would be competing with the CCSW pumps for water if the DFP was needed. The docketed letter dated March 31, 1998, from the site vice president stated that the license did not require the DFP to function after a dam failure. The licensee stated the DFP suction level specified in the UFSAR will be corrected by the UFSAR 50.59 change process. The NRC will review the safety evaluation for this change. (IFI 50-237/249-98007-03(DRS))

c. Conclusions

The DFP intake water level post dam failure may not be adequate to support DFP operation. The acceptability of a two hour delay and reduced performance for the DFP after a dam failure will be reviewed when the 50.59 evaluation is made available.

E3.5 Canal Dikes

a. Inspection Scope (IP 37550)

The inspector performed a walkdown of some of the canals and reviewed portions of the safety evaluation of Hydrology SEP topics II.3.C, Safety Related Water Supply (Ultimate Heat Sink) contained in docketed letter dated June 21, 1982.

b. Observations and Findings

A dike is located at the south side of the hot canal to the Dresden lake near the intersection of Collins and Dresden roads. All the canal dikes were seismic Class II and assumed to fail after an earthquake strong enough to destroy the dam. It appeared that the failure of this dike might lower intake level to below 495' MSL. This failure did not appear to have been analyzed in the safety evaluation of Hydrology SEP topics II.3.C, Safety Related Water Supply (Ultimate Heat Sink). Review of the potential for dike failure to lower the intake level below the assumed 495' MSL is considered an unresolved item. (URI 50-237/249-98007-04(DRS))

c. Conclusions

The inspector identified a potential for dike failure to lower the intake bay below the 495' MSL. Evaluation of this potential could not be located during the inspection.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the final inspection results to members of licensee management at the conclusion of the inspection on March 5, 1998. During the meeting, the inspector questioned licensee personnel as to the potential for proprietary information being included or retained in the inspection report material as discussed at the exits. No proprietary information was identified as included or retained.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. Abrell, NRC Coordinator, Regulatory Assurance
R. Book, CAP Staff, Quality & Safety Assessment
A. Casillo, Mechanical Lead (M1), Design Engineering
P. Channel, Control Rod Drive System Engineer, Systems Engineering
M. Crowley, Circulating Water System Engineer, Systems Engineering
G. Feige, M&TE Supervisor
J. Fox, Senior Design Engineer, Design Engineering
R. Freeman, Site Engineering Manager, Dresden
W. Halcott, Auxiliary System Lead, Systems Engineering
J. Kish, CCSW System Engineer, Systems Engineering
K. Peterman, Supervisor, Configuration & Administration Management; DEAG Member
P. Planing, Superintendent, Systems Engineering
W. Poppe, Reactor Recirculation System Engineer, Systems Engineering
B. Shete, Mechanical Engineer, Design Engineering
F. Spangenberg, Regulatory Assurance Manager, Dresden
L. Weir, Superintendent, Design Engineering

LIST OF INSPECTION PROCEDURES USED

IP 37550:	Engineering
IP 61725	Surveillance Testing and Calibration Control Program
IP 92903	Follow up - Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-237/249-98007-01(DRS)	VIO	Improper M&TE record retention requirements
50-237/249-98007-02(DRS)	URI	CCSW Pump Operability, post dam failure
50-237/249-98007-03(DRS)	IFI	50.59 to evaluate DFP use during dam failure
50-237/249-98007-04(DRS)	URI	Evaluate effect of dike failure on intake bay level

Discussed

50-237/249-97021-01(DRS)	URI	UFSAR Dam Failure Discrepancies

LIST OF ACRONYMS

ATTN	Attention
ANSI	American National Standards Institute
BWR	Boiling Water Reactor
CCSW	Containment Cooling Service Water
CFR	Code of Federal Regulations
ComEd	Commonwealth Edison
DAP	Dresden Administrative Procedure
DES	Dresden Engineering Surveillance
DFP	Diesel Fire Pump
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
E&TS	Engineering and Technical Support
GL	Generic Letter
JSPLTR	ComEd (J.S. Perry) Letter
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Electrical Power
LPCI	Low Pressure Coolant Injection
LPM	Licensing Project Manager
MSL	Mean Sea Level
NEP	Nuclear Engineering Procedure
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NTS	Nuclear Tracking System
PDR	Public Document Room
PIF	Problem Identification Form
psid	pounds per square inch differential
Q&SA	Quality and Safety Assessment
RBCCW	Reactor Building Closed Cooling Water
RG	Regulatory Guide
SEP	Systematic Evaluation Program
SER	Safety Evaluation Report
SRI	Senior Resident Inspector
SW	Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
USQ	Unreviewed Safety Question
VIO	Violation

PARTIAL LIST OF DOCUMENTS REVIEWED

DOCUMENT NUMBER	DOCUMENT DESCRIPTION	REVISION OR DATE ISSUED
PIF # D1997-08290	NRC Concerns About CCSW System Performance After a Dam Failure Coincident With a LOCA	November 25, 1997
PIF # 227A-12-1997-012788	UFSAR Implied One CCSW Pump Operation After a Dam Failure Coincident With a LOCA	February 25, 1997