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ComEd

August 24, 1996

JSPLTR: 96-0141

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Dresden Nuclear Power Station Units 2 and 3
Status of Ongoing EDSFI Items
NRC Docket Nos. 50-237 and 50-249

ComEd has been discussing six electrical issues which were raised in Electrical Distribution System Functional Inspection (EDSFI) in 1991 with Mr. Dave Butler of Region III. The six activities discussed are as follows:

1) 4kv Breaker Overduty Concern
2) Balance of Plant Electrical Load Monitoring (ELMS)
3) 480Vac Switchgear Coordination
4) Adequacy of Cable Ampacity
5) DC System Coordination
6) Overcurrent Protection of Unit Substation Transformers

Attachments A through F address each issue individually. These attachments give a brief history of each issue.

If your staff has any questions concerning this letter, please refer them to Frank Spangenberg, Dresden Station Regulatory Assurance Manager, at (815) 942-2920, extension 3800.

Sincerely,

D. A. Spangenberg

for J. Stephen Perry
Vice President
Dresden Nuclear Power Station

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cc: A. W. Beach, Regional Administrator - RIII
J. F. Stang, Project Manager - NRR
C. L. Vanderniet, Senior Resident Inspector - Dresden
Office of Nuclear Facility Safety - IDNS

Ongoing Issue:	**Short Circuit capacity of 350 MVA Vertical Lift Air Circuit Breakers**
Affected Buses:	**4160V Switchgear 21, 22, 31 and 32**
Deficiency:	**91-201-01**
NRC Report:	**237/91038**
NTS Items:	**237-100-91-20101**
	237-100-91-03801

History

During the EDSFI, the NRC identified that the 250MVA and 350MVA switchgear breakers could be subjected to faults in excess of their maximum interrupting and momentary ratings. This was determined by reviewing S&L calculation 8445-01-EAD-1. This was in violation of FSAR section 8.2.2.2 which stated, and still states, that circuit breakers are sized to withstand 3 phase faults.

The T.J. Kovach (ComEd) to USNRC letter dated November 4, 1991 listed six options to resolve the issue. The selected option was to refurbish the 350MVA gear by bus bracing and to replace the existing 250MVA gear with 350MVA SF6 gear.

During a follow-up inspection in December 1991, the NRC upgraded the deficiency to a deviation. As such, ComEd had to provide written response to the Notice of Violation (NOV). The response stated that ComEd was taking the following actions:

1) Refurbishment of 350MVA gear
2) Replacement of 250MVA gear with 350MVA SF6 breakers

ComEd provided a schedule for 350MVA work and an explanation of the 250MVA upgrade. NRC letter M.A. Ring (USNRC) to C. Reed (ComEd) dated February 11, 1992 indicated that the Staff had received our response and had no further questions. The NRC closed this issue based on Station Blackout (SBO) commitments for upgrading the 250MVA gear and refurbishing the 350MVA gear.

Commitments

1) Upgrade bus bracing in the Non -Safety 350 MVA switchgear - complete
2) Upgrade 250MVA to 350 MVA switchgear - complete

Follow Up Items

The analysis of the 350MVA switchgear determined that an over duty concern existed when two Reactor Feedwater pumps and two Reactor Recirculation Pump motor generator sets from switchgear 21 and 22 (31 and 32) were fed by one transformer. In this configuration, the breakers could be subjected to currents in excess of their ratings. General Electric was approached to determine if the breakers rating could be upgraded. The response was a downgrade of the rating. As such, motor time constants were determined and used to reanalyze the available short circuit current. The re-analysis determined that the available short circuit current was below the original breaker rating but in excess of the downgraded rating.

The postulated fault condition is a three phase bolted fault at the bus. This is considered a low probability event. This identified concern affects only the non-safety related switchgear. The concern is mitigated during a design basis accident by the fact that the recirculation motor generator sets receive an automatic trip signal and would not contribute to the fault current. Furthermore, the over duty condition would only exist if the 350MVA buses were being fed by one transformer. This is an abnormal alignment which is controlled by the Technical Specifications. A plant shutdown is required after 7 days in this condition. Given this information, this is considered a low risk event with no impact on safety related systems.

Issue: **Data gathering to benchmark ELMSAC**
NRC Report: **N/A**
NTS Item: **237-100-91-03802B**

History

Although this item is not discussed in the EDSFI Report nor the ComEd response, it is related to Deficiency 91-201-02 of NRC Inspection Report 237/91038. To gain a more realistic representation of the Electrical Power Auxiliary system loading, a program was established to gather electrical voltage and current data for transformers, motors, and other loads during various plant operating conditions by actual field measurements. Evaluation of the data will provide the appropriate factors to be used in calibrating loading models in ELMSAC.

The remaining activities to complete this program are procurement of the measuring equipment required and collection of data. It is desirable to gather data during peak loading with maximum outside air temperatures.

Action Required

Continue data collecting activities during a dual unit run.

Issue: 480Vac Coordination
NRC Item #: 91-201-05
NTS #: 237-100-91-20105

Subject: Dresden Nuclear Power Station Units 2 and 3, Status of Replacement of EC Trip Devices on Safety Related 480 VAC Switchgear with RMS-9 Devices

References:
1) P. L. Piet (ComEd) to D. Butler (USNRC) letter dated March 18, 1992 regarding question #14, raised during March 5, 1992 meeting.

2) J.S. Perry (ComEd) to USNRC letter dated March 26, 1996 Dresden Nuclear Power Station Unit 2 Replacement of Safety Related Bus Overcurrent Trip Devices by Implementation of the RMS-9 Upgrade.

History

Our original commitment as stated in Reference 1 was to coordinate all safety related Switchgear with MCC's, loads and bus ties by the end of the D2R14 and D3R14 outages. Reference 2 provided the status of actions taken as of the end of the D2R14 Refueling Outage for Dresden Unit 2. Since the submittal of Reference 2, several actions have been taken with respect to both Units 2 and 3 during the D2F25 and D3F22 outages. These changes are summarized in the following paragraphs:

Action Performed to Date

In Reference 2, it was stated that all breakers on the Unit 2 safety related 480 VAC SWGR 28 have been upgraded with RMS-9 solid state trip units except for two which have environmental qualification concerns. These two breakers included the feed from SWGR 28 to MCC 28-1 and the main feed to SWGR 28 from Transformer 28. These breakers have the potential during certain postulated accident conditions of being subjected to harsh environments. Subsequent changes to Environmental Qualification zones which are forthcoming as a result of ongoing analysis of the effects of a High Pressure Coolant Injection (HPCI) system line break have necessitated the need to include the Main Feed to SWGR 29(39) and the feed from SWGR 29(39) to MCC 29-1 (39-1/9) in the Environmental Qualification program. Therefore, the trip devices on these breakers have been converted back to EC type trip devices. Engineering has analyzed the effects of this conversion on AC coordination and has determined that full coordination exists

between the SWGR 29(39) main feed, the feed to MCC 29-1(39-1/9), and downstream loads. This conversion does result in less than full coordination when using the divisional crosstie breakers between busses 28 and 29 and busses 38 and 39. Use of the divisional crossties results in the paralleling of divisions 1 and 2, thus these breakers are administratively maintained open during plant operations. Modification of the breaker settings on the divisional crosstie breakers between busses 28 and 29 and busses 38 and 39 will be performed after startup from the present forced outages but prior to D2R15 and D3R14. The closure of these items will be tracked by NTS. As stated previously in reference 2, the Main feed to SWGR 28(38) and the feed to MCC 28-1/4(38-1) also utilize EC trip devices which do not provide complete coordination.

ComEd's actions to provide long term resolution of alternatives to using the EC type trip devices in Environmentally Qualified applications continues. To date no devices which exhibit the coordination characteristics of the RMS-9 are known to perform under the environmental conditions required for application to Dresden harsh environment zones.

In the interim, EC type trip devices will remain installed in the referenced 4 breakers in each unit. Although these do not provide total coordination throughout the entire range of postulated faults, they maintain the original plant design. The lack of selective coordination was not determined to be a design deficiency during the EDSFI but instead was considered a design weakness. Selective coordination is desirable but is a bounded condition by limiting single failure events, such as a bus fault.

Actions Required

Pursue long term resolution to replace remaining EC trip devices as explained above.

Commitments

Improve coordination by replacing EC trip devices with RMS-9 units.

Issue: **Adequacy of Cable Ampacity**
NTS Item: **N/A**
NRC Issue#: **91-201-06**

History

During the early 1990's an error was found in the portion of the SLICE database which calculates allowable ampacity for power cables in cable tray. The correction of this error lead to a significant amount of apparently thermally overloaded cables (i.e. allowable current less than load current). This problem was compounded by the fact that during database creation, actual load currents were not entered, but rather, default values based on cable size were used. This issue was initially identified during the Dresden EDSFI.

Actions Performed to Date

1) Field measurement - in an attempt to better determine a conservative means of quantifying geometric and system diversity, field measurements were taken and a revised SLICE ampacity model developed. This resolved approximately 30% of the apparent overloads.

2) Determination of actual load currents - As the database compares the calculated allowable current to an input value for load current, the lack of accurate load data in the database lead to a significant amount of overloads remaining (approximately 1550). By entering actual load current this number has been decreased to approximately 350 remaining cables.

Actions Required

Resolution of the remaining cables by a more detailed case-by-case basis is ongoing at this time. Scheduled completion is the end of 1997.

Issue: **DC System Coordination**

History

Analysis of the 125 Vdc and 250 Vdc system protective devices indicates that complete selective coordination does not exist for all buses and loads. The analysis does show however, that coordination exists to mitigate all design basis accident events. The lack of complete selective coordination is due to molded case breakers in series with other molded case breakers. In this situation, the system is usually not coordinated in the instantaneous region of the time current curves.

Actions Taken

The analysis to date has determined the available fault current at individual busses. The lack of complete selective coordination is based on the assumption that a fault occurs directly on the bus. This is a conservative assumption because of the low probability of this event. The most probable fault condition is a fault on a system load. Given the resistance of the cable feeding the load, it is expected that the fault current will be reduced to a level in which the protective devices are coordinated.

Follow Up Actions

Because non safety and safety related loads are, at times, fed from the same source, the concern exists that a fault on a non safety related load could render a safety related bus inoperable. However, as stated above, the resistance of the cable feeding the non safety related load is expected to reduce the fault current to acceptable levels. Analysis of non safety related loads is in progress and is expected to be completed by September 30, 1996.

Commitment

None

Issue: **Overcurrent Protection of Unit Substation Transformers**
NTS #: **237-100-91-20102**
237-100-91-20102A
NRC Report: 50-237/91-201
NRC Item #: Observation 91-201-01

History

During the EDSFI, the NRC made an observation regarding the inability of the 480V unit substation feed overcurrent relays to fully protect the substation transformer for faults on the secondary winding below 14,000A. This observation was not based on a noncompliance with design or licensing bases, but rather an electrical system design weakness. Never-the-less, follow-up action was assigned for development of a long term action plan.

Actions Taken

Follow up NTS item 2371009120102 was initiated to study options of addressing a lack of relay protection under transformer arcing ground (low magnitude) faults. These options included adding secondary side protective relays, a revision to existing relay settings, and finally, transformer replacement. None of these actions were considered feasible or cost effective. However, if the transformers are replaced at some future time, provisions for additional current transformers to facilitate arching ground fault relaying will be considered.

Actions Required

None.