



Douglas R. Gipson
Senior Vice President
Nuclear Generation

Fermi 2
6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-5249

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NRC-95-0050

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

- References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43
- 2) NRC letter, EA 95-050, "NRC Enforcement Conference (Report No. 50-341/95007 [DRP]) and Notice of Violation (Report No. 50-341/95005 [DRP]), dated April 18, 1995
- 3) NRC Inspection Report No. 50-341/95005, dated March 29, 1995
- 4) Detroit Edison letter, NRC-95-0020, Licensee Event Report [LER], No. 95-001, dated March 13, 1995

Subject: Reply to a Notice of Violation [Inspection Report
No. 50-341/95007 (DRP)]

Enclosed is Detroit Edison's reply to the Notice of Violation contained in Reference 2. Immediate and short term corrective actions have been completed or are underway as discussed in this response and at the Enforcement Conference. Work on the broader issues is in progress.

The lessons learned from the event are important enough that they will be shared with all groups on-site. One of the Enforcement Conference attendees is attending each of the meetings to ensure that the issues and concerns discussed at the Enforcement Conference are effectively communicated to each group. Topics covered include discussion about:

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- Team work - to ensure all the right resources are used at the front end of a project,
- Communication - the importance of raising questions and addressing questions,
- Work performance - the need for procedure compliance, and
- Managing a project so that the sense of urgency does not lead people into performing an inappropriate action.

The following actions discussed in this response will be tracked as specific commitments.

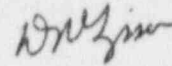
- 1) Lessons learned meetings are being conducted for all departments on-site to address the specific event and broad lessons learned.
- 2) Benchmarking visits will be made to other plants to discuss procedures and practices for electrical monitoring. Following the visits, appropriate information will be incorporated into Fermi 2 programs and procedures.
- 3) A training lesson plan has been developed and will be provided to Fermi 2 Systems Engineering, Plant Engineering, Operations, Maintenance and corresponding planning staff by December, 1995.
 - understanding the appropriate use of test equipment,
 - understanding the controls applied to test equipment,
 - when the controls should be applied, and
 - how to properly apply them.
- 4) Procedures have been revised to distinguish between measuring and monitoring to ensure that connection of test equipment is governed by appropriate controls.

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Detroit Edison believes the actions being taken will definitely prevent recurrence of this type of event. The actions in progress and those under development to address the broader issues will improve work performance at Fermi 2.

If there are any questions, please contact Lynne S. Goodman, Director of Licensing at (313) 586-4097.

Sincerely,



Enclosure

cc: T. G. Colburn
J. B. Martin
M. P. Phillips
T. Vogel
Region III

STATEMENT OF VIOLATION [1]

10 CFR 50.59, "Changes, tests and experiments" allows a licensee to conduct tests not described in the updated final safety analysis report (UFSAR) without Commission approval unless the proposed test involves a change in the technical specifications incorporated in the license or an unreviewed safety question. A proposed test is deemed, in part, to involve an unreviewed safety question (1) if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased; (2) if the possibility for an accident or malfunction of a different type than evaluated previously in the safety analysis report may be created; or (3) if the margin of safety as defined in the basis for any technical specification is reduced.

10 CFR 50.59 also requires, in part, that the licensee maintain records of changes in the facility and these records must include a written safety evaluation which provides the bases for the determination that the proposed change does not involve an unreviewed safety question.

Fermi UFSAR Section 7.5.1.4.2.1 describes the function of the reactor water level instrumentation and Section 7.5.1.4.2.2 describes the function of the reactor pressure instrumentation. The UFSAR states that redundancy and independence or diversity are provided in all information systems used for the basis of operator controlled safeguards actions.

Contrary to the above, on February 10 and 11, 1995, the licensee used two Data Acquisition System (DAS) units simultaneously to monitor both reactor water level and pressure divisional instrument loops without performing safety evaluations to provide the bases that these tests did not constitute an unreviewed safety question. Both DAS units were powered by the same non-safety power source, creating the potential for a common mode failure to affect both divisions of the Reactor Protection System.

REASON FOR THE VIOLATION

The violation occurred because the individuals planning the test did not use the appropriate procedures. The reason for this was the prevailing belief that this test was non-intrusive and therefore, did not need to be performed under the controls imposed by procedure FIP-OP1-02, "Temporary Modifications". This belief was based on the fact that the Data Acquisition System (DAS) was characterized by a high input impedance and was therefore considered to be electrically isolated from the monitored loops. Furthermore, this test evolution was viewed as a short term equipment troubleshooting mechanism vice gathering data for an engineering evaluation or plant parameter baselining. Therefore, FIP-CT1-03, "Preparation and Performance of Diagnostic, Special Tests, and Infrequently Performed Tests and Evolutions" (SOE) was also not considered.

Neither procedure provided a clear distinction between connection of diagnostic equipment for data collection or monitoring and taking measurements with test instruments. As a result, the individuals involved did not have a clear understanding of measurement vs. monitoring. The general practice at the time was to consider high impedance diagnostic equipment as non-intrusive. However, because the DAS was electrically connected to plant instrumentation, this test evolution should have been considered intrusive unconditionally in accordance with procedural guidance provided in the Temporary Modification procedure. Both the temporary modification procedure and the SOE procedure utilize the 10 CFR 50.59 process to determine if a safety evaluation is required and to ensure that required safety evaluations are performed.

CORRECTIVE STEPS TAKEN AND THE RESULTS ACHIEVED

Procedures FIP-CT1-03 and FIP-OP1-02 were revised on April 20, 1995 to clearly differentiate between measurement and monitoring of plant parameters. Monitoring performed under either of these procedures would require the use of the 10 CFR 50.59 process.

These procedures were reviewed against the appropriate IEEE standards to assure proper administrative control for measurements and proper control of test equipment regarding protection system integrity and function. The specifics of this review process are presented in Safety Evaluation 95-0015.

System Engineering conducted an ad hoc training session concerning these problems and some of the proposed corrective actions. This action was performed expeditiously in order to avoid any new occurrences of this type in the short term. This training included a presentation about conservative decision making and the need to utilize the 10 CFR 50.59 process.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

A training lesson plan has been developed and will be provided to Fermi 2 Systems Engineering, Plant Engineering, Operations, Maintenance and corresponding planning staff by December, 1995.

- understanding the appropriate use of test equipment,
- understanding the controls applied to test equipment,
- when the controls should be applied, and
- how to properly apply them.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Detroit Edison is currently in compliance. Actions described above will help ensure continued compliance.

STATEMENT OF VIOLATION [2]

10 CFR 50.55a(h) states that protection systems must meet the requirements set forth in the applicable editions or revisions of the Institute of Electrical and Electronics Engineers Standard IEEE-279, "Criteria for Protection Systems for Nuclear Power Generating Stations." Section 4.2 of IEEE Standard 279-1971, requires, in part, that any single failure within the protection system shall not prevent proper protective action. Section 4.6 of IEEE Standard 279-1971 requires, in part, that channels that provide signal for the same protective function shall be independent to accomplish decoupling of the effects of unsafe electrical transients. Section 4.20 of IEEE Standard 279-1971 requires, in part, that the protection system shall be designed to provide the operator with accurate, complete, and timely information pertinent to its own status and to generating station safety. The design shall minimize the development of conditions which would cause meters, annunciators, recorders, etc., to give anomalous indications confusing to the operator.

Contrary to the above, on February 10 and 11, 1995, during performance of measuring and testing activities, the licensee connected identical DAS units to each divisional testability cabinet simultaneously and powered both of them from a non-safety related source, thus allowing for a single failure of non-safety related power to affect both divisions of the protective system, and for the operators to be provided with anomalous indications on both divisions regarding reactor water level when power was turned off to the units.

REASON FOR THE VIOLATION

When the testing plan was developed, the overriding concerns were to fully investigate and understand the cause of spurious Reactor Core Isolation Cooling System (RCIC) level 8 Sequence of Events Recorder points received on main turbine trips to determine if bypass valve response had changed and to ensure that other process sensors were not similarly affected. This investigation required obtaining multiple reactor water level and pressure instrumentation response information during transient monitoring while testing the turbine. When the "game plan" for the test evolution was being developed, the perception existed that there could be as few as one turbine trip during which this data could be accumulated. In order to comprehensively evaluate the observed phenomenon, the individuals involved believed they needed information on both divisions.

The monitoring equipment consisted of two Diagnostic Data Acquisition System (DAS) computers. Two computers were used to provide a degree of separation intended to maintain the independence between both divisions. However, both computers were connected to a common non-safety related power supply without the full consideration of the potential consequences of a postulated single failure from that power supply.

Because the prevailing belief was that this test was non-intrusive, based on the fact that the DAS was characterized by a high impedance, the individuals involved in the data acquisition did not believe that the above configuration compromised divisional integrity by introducing the possibility of a common mode failure. However, these individuals were unaware of the generic limitations of such equipment due to the design of the input circuitry. This resulted in an anomalous reading for the reactor water level on both divisions concurrently.

As discussed in violations 1 and 3, the connection of the DAS equipment should have been controlled under either "Temporary Modifications", FIP-OP1-02 or "Preparation and Performance of Diagnostic, Special Tests and Infrequently Performed Tests or Evaluations" (SOE), FIP-CT1-03. Had the SOE procedure been utilized then step 5.5 would have prevented the simultaneous connection of both divisions to the DAS units which were powered from a common source.

The temporary modification procedure specifically reviews a proposed temporary modification for conformance with electrical separation criteria. Additionally, On-Site Review Organization (OSRO) approval is required for all safety-related temporary modifications. Had this procedure been used for this evolution, then OSRO approval would have been required. Therefore, this test evolution would have been scrutinized by the OSRO members for any safety consequences including a review of the test evolution impact on divisional integrity.

Furthermore, Instrumentation and Control (I&C) and work control planning personnel were not involved in developing the "game plan" for this test evolution. Therefore, they did not have a role in the decision-making that took place during this stage. When the actual testing was to take place, I&C technicians and maintenance planners did voice concerns about using the DAS equipment on two divisions simultaneously. Had all the utility resources been used up-front, i.e. during initial planning, then these concerns may have likely been factored into the decision-making at this stage.

CORRECTIVE STEPS TAKEN AND THE RESULTS ACHIEVED

During a break in turbine testing activities on February 11, 1995, at approximately 1700 hours, the DAS units were manually de-energized but left connected to the test jacks on the testability panels. Approximately 5 minutes after the DAS units were de-energized, operators observed the reactor vessel level indication on the wide range recorder in the Main Control Room indicating a reactor water level ten (10) inches below the level shown on the narrow range indicators. As described further in Reference 4, Instrument and Control Shop (I&C) personnel were contacted and the DAS units were disconnected from the testability panels restoring all indications to normal.

Procedures FIP-CT1-03 and FIP-OP1-02 were revised on April 20, 1995 to clearly differentiate between measurement and monitoring of plant parameters. This ensures that connection of test equipment will be conducted under the controls provided in these procedures.

These procedures were reviewed against the appropriate IEEE standards to assure proper administrative control for measurements and proper control of test equipment regarding protection system integrity and function. The specifics of this review process are presented in Safety Evaluation 95-015.

System Engineering conducted an ad hoc training session concerning these problems and some of the proposed corrective actions. This action was performed expeditiously in order to avoid any new occurrences of this type in the short term. This training included a presentation about conservative decision making, flow of information, and improved interdepartmental communication, as well as the appropriate use of temporary modification and SOE procedures.

The individuals involved in the test evolution were very focused on the need to thoroughly diagnose the RCIC Level 8 problem and as a result, lost the "big picture" outlook on the possible consequences of the method used for this data acquisition. The industry has recognized this occurrence as a "Group Think" tendency, i.e. the tendency of a group to become so focused on their mission that they can either covertly or overtly override concerns voiced by individuals. Part of the focus of this training was to sensitize people to the cues that "Group Think" is happening. The end result will be a more open atmosphere such that an individual would be more willing to raise concerns and pursue their thorough resolution.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Individuals from Detroit Edison will visit other nuclear sites to discuss procedures and practices for electrical monitoring. Items such as test equipment characterization for failures, test controls and industry practices will be discussed. Detroit Edison will utilize this information to strengthen our programs in these areas.

A training lesson plan has been developed and will be provided to Fermi 2 Systems Engineering, Plant Engineering, Operations, Maintenance and corresponding planning staff by December, 1995.

- understanding the appropriate use of test equipment,
- understanding the controls applied to test equipment,
- when the controls should be applied, and
- how to properly apply them.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Detroit Edison is currently in compliance. Actions described above will help ensure continued compliance.

STATEMENT OF VIOLATION [3]

10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Procedure FIP-CT1-03, Rev.1, "Preparation and Performance of Diagnostic, Special Tests and Infrequently Performed Tests or Evolutions," prescribes the method for the preparation, approval, performance, documentation, return to service, and review of results for diagnostic Sequence of Events (SOEs). SOEs are defined in Section 2.1.1 as tests that involve the operation of structures, systems, or components within their normal operating parameters and design conditions to collect diagnostic data including: (1) operation of a system or component for troubleshooting purposes; (2) engineering evaluation and data collection to determine the need for repairs or modifications; and (3) testing to confirm the performance of plant modifications following installation.

Procedure FIP-OP1-02, Rev. 6, "Temporary Modifications," prescribes administrative controls for temporary minor alterations made to plant equipment and components with respect to approved drawings and other design documents. Section 2.2.7, states that this procedure does not apply to the installation of temporary monitoring equipment provided the guidelines of Enclosure A are met. Enclosure A prescribes the conditions under which equipment may be installed and used without configuration controls. Such situations generally govern the use of non-intrusive equipment in which its presence or absence has no impact on an installed system's ability to perform its design basis functions nor whose failure would result in disruption of any kind of normal plant operations. Section 2.1.3 of Enclosure A states that plant monitoring equipment which is non-intrusive does not directly interface electrically or involve the plant systems controls of logic circuits. The failure of such monitoring equipment is not to have any adverse effect on the system being monitored.

Contrary to the above, on February 10 and 11, 1995, neither an SOE nor a temporary modification was used for the simultaneous monitoring of both divisions of reactor water level and pressure instrumentation with two DAS units associated with Work Request 0000Z951519, Rev. 1. The monitoring fulfilled the definition of an SOE and was intrusive. Both DAS units were connected to the same non-safety related power source allowing for a single failure to affect both divisions. Furthermore, deenergizing the units resulted in a change to their input impedance.

REASON FOR THE VIOLATION

The reason for the violation is failure to follow procedure. Additionally, procedures FIP-OP1-02 and FIP-CT1-03 did not clearly distinguish between measuring a parameter and unattended monitoring of equipment. This contributed to personnel misunderstanding procedure requirements for monitoring activities. Procedure FIP-OP1-02 was consulted by team members, but was interpreted to not require processing of a temporary modification for the planned monitoring. This interpretation was based on the fact that the DAS equipment was characterized by a high impedance and was therefore considered to be electrically isolated from the monitored loops. This was contrary to the words in Enclosure A of the procedure which did require a temporary modification to be processed if the monitoring equipment directly interfaces electrically with plant systems. Furthermore, this test evolution was viewed as a short term equipment troubleshooting mechanism vice gathering data for an engineering evaluation or plant parameter baselining. Therefore, FIP-CT1-03 was not considered. Additionally, the particular failure mode of the DAS equipment was not known to the team members or the manufacturer.

CORRECTIVE STEPS TAKEN AND THE RESULTS ACHIEVED

A Licensee Event Report (LER) lessons learned meeting was held with key people involved in the event and plant management. One of the key issues discussed was that testing was not in compliance with procedural requirements. Procedures and practices were reviewed and compared. Based on this review, procedures FIP-CT1-03 and FIP-OP1-02 were revised on April 20, 1995 to clearly differentiate between measurement and monitoring of plant parameters. Measurement now clearly falls under the scope of FIP-CT1-03 and is the attended use of test equipment. Measurement on protection systems is limited to a single point. Also the description of non-intrusive monitoring in FIP-OP1-02 was clarified. These procedure changes will make it easier for personnel to determine the appropriate controls for the activity being planned.

As discussed in Reference 3, plant engineers performed testing to thoroughly investigate how the data acquisition equipment affected plant circuitry. The vendor was also contacted. These activities resulted in an improved industry understanding of how the data acquisition system functions and its associated failure modes.

The procedure compliance violations associated with this event reinforce the need for improved procedure compliance identified recently by the Fermi 2 Nuclear Quality Assurance Department and the Deviation Event Report trend review for the second half of 1994. Actions taken to improve procedure compliance include communicating site wide why procedure adherence is important. This has been done via the weekly newsletter PLANTALK, by discussions in meetings, and by communicating the lessons learned from the event and enforcement conference to all departments on site. Staff meetings are being conducted to discuss the lessons learned from this event and completion is expected this month. The material being used for these meetings covers procedure compliance as a broad issue and discusses that individuals need to follow procedures.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Some actions taken to avoid further violations were discussed in the previous section. Additional actions are in progress or planned to focus attention on procedure compliance.

Strong attention was placed in the last year and a half on reducing personnel error. The trend in personnel errors improved significantly over the past year. Some of the same techniques, such as lessons learned meetings, rigorous and visible trending, and reviews of adverse trends will be used to establish higher expectations for procedural compliance.

Plant management is also exploring the underlying causes of procedure violations to ensure that appropriate actions are being taken to foster an environment conducive to and demanding of procedure compliance. Ideas are being solicited from all plant personnel through PLANTALK. These actions together with continuing management attention to procedure compliance and independent oversight by the Nuclear Quality Assurance Department will result in improved performance.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Compliance was achieved April 20, 1995. The actions in progress will help maintain continued compliance.

STATEMENT OF VIOLATION [4]

10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

The procedural requirements delineated in procedure, NPP-MA1-01, Revision 15, "Work Control," are for work request-related activities, including the requirements for the measuring/testing performed per work request (WR) 000Z951519, Rev. 0 & 1, for the connection of the DAS units to the reactor instrumentation system on February 10-11, 1995. Contrary to the above, as demonstrated by the following examples:

- A. Section 6.2.2.27.k of NPP-MA1-01 required that the Impact Statement and revisions thereof were to be reviewed and approved by a licensed operator.

However, the revised Impact Statement was not approved by a licensed operator prior to performing WR000Z951519, Rev. 1.

- B. Section 6.8.3 of NPP-MA1-01 required that the NSS ensure all work authorization reviews and requirements are met as described in Section 6.3.

However, the NSS failed to ensure all work authorization reviews and requirements were met as described in Section 6.3. Specifically, the NSS failed to identify that a licensed operator had not approved the revised Impact Statement for WR000Z951519, Rev. 1

- C. Section 5.11.3.5 requires that, at a minimum, the work request form contain parts to document a description of the work performed if procedures were not used or if the completed procedures do not provide an adequate description.

However, Part 6 of WR000Z951519, Rev. 1 erroneously stated that the output and input of trip unit B21N693A be monitored instead of B21N691A.

- D. Section 6.4.10.3 of NPP-MA1-01 required that upon completion of work, the Work Group Supervisor/Work Group must ensure the work is documented in detail in the "History" part of the work request or appropriate procedures, including reference to procedures, materials and test equipment used to complete the work.

However, Part 8 of WR000Z951519, Rev. 1, "History," failed to document the connection, removal, and verification of jack J2 to and from the calibration units. Also, the "Work Performed" section in the revised WR did not identify the work performed and results until a month later after licensee Quality Assurance prompting.

- E. Section 6.8.2.2 of NPP-MA1-01 required the Work Group Supervisor/Work Planner to provide a brief description and reason for the change on the Work Request Revision Form.

However, the reason for revision was not provided for Revision 1 of WR 000Z951519 on the Work Request Revision Form.

- F. Section 6.2.2.27.d of NPP-MA1-01 stated the following: "Prohibited Parallel Work - Identify plant systems/components on which no maintenance activities including surveillances shall be performed during performance of the Work Request. This will include related systems identified by a technical specification LCO, work in the opposite division, work on redundant instruments, channels, etc."

However, WR000Z951519, Rev. 1, was performed on both divisions of reactor water level and pressure simultaneously.

REASON FOR THE VIOLATION

The main reason for the violation was failure to follow procedure requirements. More attention needed to be placed on procedure understanding, knowledge and compliance. Regarding example F, some people questioned the monitoring of both divisions concurrently, but since they received credible answers, the questions were dropped. If all the involved groups had participated in the planning for the activity up front, the multiple questions could have been raised in the team setting and a different plan may have been developed initially to address team members' concerns.

CORRECTIVE STEPS TAKEN AND THE RESULTS ACHIEVED

The actions discussed in response to Violation 3, regarding procedure compliance apply to this violation. Additionally, Work Control supervision defined expectations on procedure compliance and job involvement to the work planners. The planners were told procedure compliance is demanded and expected.

The correctable discrepancies Nuclear Quality Assurance identified in the work request have been corrected.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The actions being taken regarding improving procedure compliance discussed in response to Violation 3 will also help avoid repetitive occurrences of this violation.

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All four of the broad issues being discussed in the site wide lessons learned meetings address contributors to this violation. The first broad issue discussed is the need to use all the right resources at the front end of planning an activity. The second issue is communications, including the importance of raising questions and understanding the follow-up. The third broad issue is procedure compliance. The fourth broad issue discussed in these lessons learned meetings is handling the sense of urgency and that quality cannot be compromised by the sense of urgency. Discussion of these issues site wide and continued reinforcement by management over time will help avoid further violations of this type.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Detroit Edison is currently in compliance. Actions described above will help achieve continued compliance.