B. Ralph Sylvia
Senior Vice President

Detroit Edison

6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-4150

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NRC-89-0298

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) Detroit Edison Letter to NRC, NRC-88-0173, "Proposed Technical Specification Change (License Amendment) - Noninterruptible Control Air System", dated August 5, 1988

3) Detroit Edison Letter to NRC, NRC-89-0076, "Withdrawal of Application for Technical Specification Change (License Amendment) - Noninterruptible Control Air System", dated April 4, 1989

4) Detroit Edison Letter to NRC, NRC-89-0273, "Proposed Technical Specification Change (License Amendment) - Containment Isolation Valves", dated January 26, 1990

Subject: Proposed Technical Specification Change (License Amendment) - Noninterruptible Control Air System

Pursuant to 10CFR50.90, Detroit Edison Company hereby proposes to amend Operating License NPF-43 for the Fermi 2 plant by incorporating the enclosed change into the Plant Technical Specifications. The proposed change adds a new Specification, numbered 3/4.7.10, for the Noninterruptible Control Air System. A proposed Bases is also included.

Detroit Edison has evaluated the proposed Technical Specifications against the criteria of 10CFR50.92 and determined that no significant hazards consideration is involved. The Fermi 2 Onsite Review Organization has approved and the Nuclear Safety Review Group has reviewed the proposed Technical Specifications and concurs with the enclosed determinations. In accordance with 10CFR50.91, Detroit Edison has provided a copy of this letter to the State of Michigan.

These changes were previously requested in Reference 2. In Reference 3, the Reference 2 application was withdrawn because additional

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justification was required for some aspects of the proposal. This proposal includes the needed additional justification.

If you have any questions, please contact Mr. Glen Ohlemacher at (313) 586-4275.

Sincerely,

B Ralph Sylvia

Enclosure

cc: A. B. Davis
R. W. Defayette
W. G. Rogers
J. F. Stang
Supervisor, Advanced Planning and Review Section,
Michigan Public Service Commission

I, B. RALPH SYLVIA, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

B. RALPH SYLVIA
Senior Vice President

On this 26th day of January, 1990, before me personally appeared B. Ralph Sylvia, being first duly sworn and says that he executed the foregoing as his free act and deed.

Notary Public
SHIRLEY L. CARLSON
Notary Public, Wayne County, MI
My Commission Expires Jan. 28, 1991

INTRODUCTION

The Fermi 2 station and control air systems provide the plant with a reliable source of clean, dry, compressed air for plant operation. These systems are the source of compressed air for use in routine maintenance operations, in equipment process cycles such as demineralizer backwashing, and as an instrument and control media.

The station air system normally provides control air at 100 psig for operation and control of various plant systems that are safety related as well as those that are nonsafety related. The control air distribution system is divided into two distinct parts: interruptible and noninterruptible. Noninterruptible control air (Noninterruptible Air Supply or NIAS) supplies through two separate distribution systems (Divisions I and II) equipment in the Standby Gas Treatment System (SGTS), Control Room Emergency Filtration System (CREFS), Main Steam Isolation Valve Leakage Control System (MSIVLCS), Primary Containment Monitoring System (PCMS), Emergency Equipment Cooling Water System (EECW), Primary Containment Pneumatic Supply System, Reactor Building - Suppression Chamber vacuum breaker testability feature, Reactor Building - Suppression Chamber vacuum breaker isolation valves, and Reactor Building Railroad Car Airlock Door Seals. In addition, Division I NIAS provides control air for the primary containment isolation valves on the drywell equipment and floor drain sump pump discharge lines, Suppression Chamber narrow range level indicating and alarm instrumentation isolation valves, and a backup supply for Division I nitrogen pneumatic supply to the Primary Containment. Division II NIAS supplies, in addition, air operated valves in the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems. All other control air users are connected to the Interruptible Control Air distribution system that is supplied separately by the station air system. A simplified diagram is attached.

During normal plant operation, the source of noninterruptible and interruptible control air is through interconnections between the station and control air systems. Compressed air from the station air system is supplied through one of these interconnections to the Division I and II noninterruptible control air compressor discharge headers. The air then flows from each header through its divisional 100 percent-capacity filter and dryer. After leaving the filter/dryer, the noninterruptible control air flows to its divisional control air receiver from which it eventually flows to its point of use through its divisional noninterruptible control air distribution system.

Initiation of the Control Air System Compressor operation and isolation of the noninterruptible Control Air System occurs automatically on detection of low control air header pressure (85 psig and 75 psig, respectively) or on loss of offsite power. In addition,

both Control Air Compressors start on a Loss of Coolant Accident (LOCA) signal. The LOCA signal comes from level 2 low reactor water level or high drywell pressure. Normally, the intertie between the Station Air System and noninterruptible Control Air System is open and the Control Air Compressors are not running.

Loss of NIAS to the RCIC, HPCI, and EECW systems does not affect their OPERABILITY. The remaining systems and components which are supplied NIAS become inoperable upon loss of control air.

The PCMS is affected by a loss of control air through the closure of system isolation valves. Affected monitoring functions include Drywell Hydrogen and Oxygen concentration, Drywell pressure, Suppression Chamber pressure and wide range water level, and, for Division I only, Primary Containment Atmosphere Gaseous Radioactivity.

During operation with the two NIAS subsystems cross-tied, the capacity of the single control air compressor is not sufficient to allow both divisions of the MSIVLCS to operate simultaneously. Each division of the MSIVLCS is manually initiated and one division is required to operate to successfully complete the system's function. Therefore, simultaneous operation of both MSIVLCS divisions is not a required function which must be supported by the single control air compressor. Appropriate procedural controls will be put in place to ensure that both MSIVLCS divisions are not operated simultaneously while supported by a single control air compressor.

When control air is lost to the Primary Containment Pneumatic Supply System, the supply of nitrogen to the system is lost. This loss leads to a loss of capability for manual operation of the Safety/Relief Valves (SRVs). The pressure relief safety function of the SRVs does not rely upon nitrogen pressure for operation. There are 7 SRVs supported by Division I and 8 SRVs supported by Division II. Five of the SRVs are those associated with the Automatic Depressurization System (ADS) and two of the SRVs are associated with the low-low set function. The ADS and low-low set SRVs each have a nitrogen accumulator to provide sufficient nitrogen for five cycles of SRV actuation. Two SRVs, which are supported by Division I pneumatic supply, are capable of being controlled from the Remote Shutdown Panel. One of these SRVs has an accumulator to allow five cycles of operation without the nitrogen pneumatic supply. However, the Remote Shutdown function requires multiple operation of both SRVs to reach Cold Shutdown. The loss of Division I pneumatics therefore leads to an inability to control the Remote Shutdown Panel SRVs as required for the Remote Shutdown function. It must be noted that this situation requires an extremely unlikely sequence of events which are beyond the Remote Shutdown System design basis. In addition, loss of Division I nitrogen pneumatic supply will result in closure of the inboard Main Steam Isolation Valves (MSIVs).

When Division I of control air is lost to the isolation valves on the drywell equipment and floor drain sump pump discharge lines these valves fail to the isolated position. Manual action to provide an alternative motive force to open these isolation valves is required to monitor Reactor Coolant System (RCS) leakage by monitoring Primary Containment sump flow rate per Specification 4.4.3.2.1.b. The isolation valves would be opened, and the ACTION provisions of Specification 3.6.3 entered, for intermittent short time periods necessary to pump the Primary Containment sumps. If RCS leakage monitoring surveillance requirements cannot be met, appropriate ACTION will be taken per Specification 3.4.3.2.

The Fermi 2 Control Air System design includes redundancy not normally found in divisional systems in that all control air requirements can be supplied by either division's air compressor. This added redundancy provides a safety benefit which justifies an extended out-of-service time for certain equipment, such as Control Air Compressors, whenever the two subsystems can be cross-tied. Should a Control Air Compressor fail, there is some likelihood that an extended time will be required for the repairs. Detroit Edison is therefore proposing a new Technical Specification (attached) for the Noninterruptible Control Air system in order to prevent unnecessary plant shutdowns in the event of a Control Air Compressor failure which requires extensive repairs.

EVALUATION

The proposed Limiting Condition for Operation (LCO) for the Noninterruptible Control Air System is:

> Two independent Noninterruptible Control Air (NIAS) system subsystems shall be OPERABLE with each subsystem:
>
> a. Consisting of one OPERABLE Control Air Compressor, Aftercooler, associated Dehydration and Filter Units, Air Receiver Tank, and associated control instrumentation.
>
> b. Capable of automatic isolation from nonsafety grade air systems.

This LCO defines the number of NIAS system subsystems required to be OPERABLE. For each subsystem, the required components are explicitly listed. Since each subsystem is normally connected to a nonsafety grade air system, the requirement of automatic isolation capability is explicitly given.

The LCO is proposed to be APPLICABLE in all OPERATIONAL CONDITIONS and when irradiated fuel is being handled in the secondary containment, during CORE ALTERATIONS, or during operations with a potential for draining the reactor vessel (OPERATIONAL CONDITION *). This

APPLICABILITY is consistent with the required APPLICABILITY of components which utilize the NIAS.

The ACTION requirements are stated separately for OPERATIONAL CONDITIONS 1, 2 and 3 and other OPERATIONAL CONDITIONS. In OPERATIONAL CONDITIONS 1, 2, and 3, the ACTION requirements are:

1) With one NIAS system subsystem inoperable due to an inoperable Control Air Compressor, Aftercooler, associated Dehydration or Filter Unit, or associated control instrumentation, cross-tie the NIAS system subsystem to the OPERABLE NIAS system subsystem within one hour. Restore the inoperable NIAS system subsystem to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. If the two NIAS subsystems are cross-tied under the above provisions, then components and systems which are supplied by the NIAS system do not become inoperable due to the inoperability of the NIAS system subsystem.

2) With one NIAS system subsystem otherwise inoperable or unable to be cross-tied under the provisions of 1) above:

   a. Verify that the NIAS system subsystems are not cross-tied within one hour.

   b. Declare the affected Remote Shutdown Panel SRV controls (Division I only), Accident Monitoring Instrumentation (Drywell Hydrogen and Oxygen concentration, Drywell pressure, and Suppression Chamber pressure and water level), Primary Containment Atmosphere Gaseous Radioactivity monitor (Division I only), MSIV Leakage Control System subsystem, Reactor Building - Suppression Chamber vacuum breaker isolation valve, Secondary Containment Railroad Bay Access Door, Standby Gas Treatment System subsystem, and Control Room Emergency Filtration System components inoperable and take the ACTIONS required by Specification 3.3.7.4, 3.3.7.5, 3.6.2.1, 3.4.3.1, 3.6.1.4, 3.6.3, 3.6.5.1, 3.6.5.3, and 3.7.2.

3) With both NIAS system subsystems inoperable be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

Action 1 applies to situations where it is possible to continue to supply control air to the inoperable NIAS subsystem from the opposite division subsystem. In these cases, the single control air compressor has sufficient capacity to supply all the required uses in both NIAS divisions.

Detroit Edison has conducted a study using Probabilistic Risk Assessment (PRA) methods to determine both the appropriate action to take (cross-connect as opposed to not cross-connect) and the appropriate out-of-service time for this situation. This study evaluated the impact of the possible configurations on the core damage frequency (CDF) computed by the Fermi 2 PRA model. The study also evaluated the impact on the availability of other systems supported by NIAS. The systems (such as SGTS, MSIVLCS, and CREFS), which are typically referred to as containment systems, are not currently included in the Fermi 2 PRA.

The availability of control air impacts the CDF through the effects of a loss of control air upon the Primary Containment Pneumatic Supply System. As described above, this loss impacts the ability to manually operate the SRVs and causes a closure of the inboard MSIVs if the Division I subsystem is lost.

Two configurations of NIAS were evaluated to determine their impact on the core damage frequency. One configuration assumed the normal plant line-up with one of the NIAS compressors out-of-service due to maintenance or otherwise declared inoperable. The other configuration was identical to the first except that the cross tie between the two divisions of NIAS is open. Operating with the first configuration results in a 1.0% increase in the core damage frequency over the normal mode of operation. This is to be expected since the failure probability of NIAS would be higher with one NIAS compressor unable to perform its function.

Operating with the second configuration results in less than a 0.1% increase in the core damage frequency relative to the normal mode of operation. This represents a noticeably smaller increase when compared to the first case. It is due to the fact that in the second case both divisions of NIAS can be successfully fed by one compressor. Following a loss of station air, starting and running the one available NIAS compressor assures the potential for success of the system.

These results imply that if operating with the cross tie closed when one NIAS compressor is out-of-service is acceptable for 7 days (as currently allowed by Technical Specifications) then operating with the cross tie open under the same conditions should be acceptable for at least 70 days or about 10 times as long. This conclusion is reached by equating the increased risk of operating with only one NIAS compressor to the increase in CDF multiplied by the exposure time to that risk. In the case with the cross tie closed, for the incremental acceptable time of 7 days (0.019 years) for which the system is allowed to be in this configuration, a risk increase of 3.6E-9 events is obtained. With the cross tie open, the risk increase is at least an order of magnitude smaller so that the plant would have to operate

for more than 70 days before the same level of risk as with the closed cross tie would be realized.

However, Detroit Edison in this proposal is conservatively reducing the allowed time to 30 days from the potentially justifiable 70 days. About the same amount of risk is realized after operating with the cross tie open and one NIAS compressor out-of-service for 30 days as operating with one NIAS compressor out-of-service and the cross tie closed for 72 hours.

Another way of approaching this problem is to determine the impact that NIAS has on success of the containment systems. These play no part in the determination of CDF and become involved only if a core damage event were to occur during the time the given air compressor is out-of-service. A basic assumption is that either division of a containment system is adequate for the containment system's success.

A quantitative analysis, using failure rates typical for Fermi 2 was performed to determine which case (cross-tie open or cross-tie closed) should be favored when one NIAS control air compressor is inoperable. If the failure rate of the containment systems themselves were ignored then opening the cross-tie would result in a 4% reduction in containment system availability.

As soon as the failure rates for the containment systems are included, the open cross-tie case becomes the favored condition. The open cross-tie case was found to represent a 45% improvement in containment system availability. This obvious benefit results from the potential for either division offsetting a containment system failure in the other division when the air cross tie is open.

In the cross-tie open configuration, all of the components being supplied control air are in virtually the same situation. That is, they are receiving the normal non-safety grade air supply which is backed up by a single safety grade air supply. Detroit Edison believes that this configuration is sufficient to support the OPERABILITY of the affected equipment.

Detroit Edison believes the above considerations fully assess the impact of a loss of a single NIAS control air compressor and therefore, this proposal provides an appropriate ACTION requirement for this situation.

Action 2 covers the situation where the NIAS system subsystems must not or cannot be cross-tied. In this case, the ACTIONS specified in the Technical Specifications for the resulting inoperability of the supported systems are applied. The Primary Containment Atmosphere Gaseous Radioactivity monitor and the Remote Shutdown Panel SRV Controls are supported by only the Division I NIAS system subsystem; accordingly, notations to this effect are included.

In Reference 4, Detroit Edison proposed Technical Specification changes which revise the required actions for an inoperable Reactor Building-Suppression Chamber vacuum breaker isolation valve. Under the Reference 4 proposal the action requirement for an inoperable Reactor Building-Suppression Chamber vacuum breaker isolation valve will be contained in Specification 3.6.4.2. The reference to Specification 3.6.3 in proposed action 2.b should be changed to 3.6.4.2 if approval of the Reference 4 proposal precedes this proposal. If approval of this proposal precedes the Reference 4 proposal the reference should be changed when the Reference 4 changes are issued.

Action 3 requires a prompt plant shutdown if both NIAS system subsystems are inoperable. This is consistent with the required ACTION from the resulting inoperabilities.

In OPERATIONAL CONDITIONS 4, 5, OR * a similar philosophy is applied:

1) With one NIAS system subsystem inoperable due to an inoperable Control Air Compressor, Aftercooler, associated Dehydration or Filter Unit,or control instrumentation, cross-tie the NIAS system subsystem to the OPERABLE NIAS system subsystem within one hour. If the two NIAS subsystems are cross-tied under the above provisions, then components and systems which are supplied air by the NIAS system do not become inoperable due to the inoperability of the NIAS system subsystem.

2) With NIAS otherwise inoperable or with the subsystems unable to be cross-tied under the provisions of 1) above, declare the Standby Gas Treatment subsystem(s), Control Room Emergency Filtration System component(s) and Secondary Containment Railroad Bay Access Doors inoperable and take the ACTIONS required by Specifications 3.6.5.3, 3.7.2, and 3.6.5.1.

When the two NIAS system subsystems are cross-tied all the supported equipment have a safety-grade air supply. In these OPERATIONAL CONDITIONS, redundancy in a function is typically not required. Therefore, an unlimited period of time is proposed for this situation. This provision also allows for extended maintenance on one division's control air components.

The following Surveillance Requirements are proposed:

The Noninterruptible Control Air System shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that the cross-tie valves and each valve (manual, power-operated or automatic)

required for proper operation of the Control Air Compressors, Aftercoolers, Filter and Dehydration Units, and associated control instrumentation, that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 18 months by verifying that each automatic valve which isolates the NIAS system subsystem from nonsafety grade air systems actuates to its isolation position on each of the following automatic actuation test signals:

   1. Station air supply low pressure

   2. NIAS control air header low pressure

   3. Loss of offsite power

c. At least once per 18 months by verifying that each control air compressor capacity is greater than or equal to 100 scfm.

d. At least once per 18 months by verifying that each Control Air Compressor automatically starts on each of the following automatic actuation test signals:

   1. NIAS control air header low pressure

   2. Loss of Coolant Accident (Drywell Pressure-High and/or Reactor Vessel Level-Low Level 2)

   3. Loss of offsite power

These requirements ensure that system alignment is maintained and important aspects of system operation are functionally tested every 18 months. Detroit Edison believes that these Surveillance Requirements provide adequate assurance of proper system performance and are consistent with other Specifications for systems which fulfill a similar function.

SIGNIFICANT HAZARDS CONSIDERATION

In accordance with 10CFR50.92, Detroit Edison has made a determination that the proposed amendment involves no significant hazards considerations. To make this determination, Detroit Edison must establish that operation in accordance with the proposed amendment would not: 1) involve a significant increase in the probability or consequences of an accident previously evaluated, or 2) create the possibility of a new or different kind of accident from any accident previously evaluated, or, 3) involve a significant reduction in a margin of safety.

The proposed change to include Technical Specifications provisions for the Noninterruptible Control Air System (NIAS) do not:

1) Involve a significant increase in the probability or consequence of an accident previously evaluated. The new explicit requirements were previously implied through the effect of the NIAS upon the OPERABILITY of equipment included in Technical Specifications. The new Specification also provides new out-of-service times for modes of operation which are described in the Fermi 2 safety analysis report, but are not adequately addressed by the concept of OPERABILITY. Further, the new out-of-service times are based upon compensating design features present at Fermi 2. Thus the probability or consequence of any previously evaluated accident is unchanged since the proposed changes either do not represent actual changes in requirements or are based upon compensatory design features.

2) Create the possibility of a new or different kind of accident from any accident previously evaluated. The change does not modify plant design or operation and therefore creates no new accident modes. Operation with the two NIAS system subsystems cross-tied is provided for in the safety analysis report and thus does not represent an unevaluated accident mode.

3) Involve a significant reduction in a margin of safety. As discussed in 1) above, the new specification either provides explicit requirements which were previously implied or provides requirements to cover modes of operation previously not specifically addressed. Where the proposal restates explicitly previously implicit requirements, the margin of safety is unchanged since the actual requirement is unchanged. The Fermi 2 Noninterruptible Control Air System has unique design features in that the two subsystems can be cross-tied, and all required air uses can be supplied by a single air compressor. Studies using the Probabilistic Risk Assessment methodology have shown that operation with the two systems cross-tied present less risk than operation with no safety-grade control air for one division. Recognizing these unique features in Technical Specifications by specifying an appropriate allowable out-of-service time does not represent a reduction in the margin of safety.

Based on the above reasoning, Detroit Edison has determined that the proposed amendment does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT

Detroit Edison has reviewed the proposed Technical Specification changes against the criteria of 10CFR51.22 for environmental considerations. The proposed changes do not involve a significant hazards consideration, nor significantly change the types or significantly increase the amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed Technical Specifications do meet the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

CONCLUSION

Based on the evaluations above: 1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and 2) such activities will be conducted in compliance with the Commission's regulations and proposed amendments will not be inimical to the common defense and security or to the health and safety of the public.