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**Detroit Edison**



*A DTE Energy Company*

10CFR50.90

February 21, 2002  
NRC-02-0002

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington D C 20555-0001

Reference: Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43

Subject: Proposed License Amendment for the Elimination of the  
Chlorine Detection Function from the Control Room  
Heating, Ventilation and Air Conditioning System

Pursuant to 10CFR50.90, Detroit Edison hereby requests the NRC approval of a proposed License Amendment to eliminate the chlorine detection function from the Control Room Heating, Ventilation and Air Conditioning (CCHVAC) system.

Enclosure 1 provides a description and an evaluation of the proposed license change. Enclosure 2 provides an analysis of significant hazards consideration using the standards of 10CFR50.92.

Detroit Edison has reviewed the proposed license change against the criteria of 10CFR51.22 for categorical exclusion of environmental review. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed license change meets the criteria provided in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

Detroit Edison has recently completed a study to evaluate the need for the chlorine detection system. The study included a survey to determine all chlorine sources in the vicinity of the plant. A probabilistic approach was utilized to evaluate the risk of

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incapacitating the control room operators from a chlorine release accident. The study concluded that the probability of a chlorine release having the potential to result in a significant concentration in the control room is below the threshold specified in Regulatory Guide 1.78, Revision 1, for considering chemical hazards in the evaluation of control room habitability. Therefore, the chlorine detection system and automatic isolation function are no longer necessary at Fermi 2.

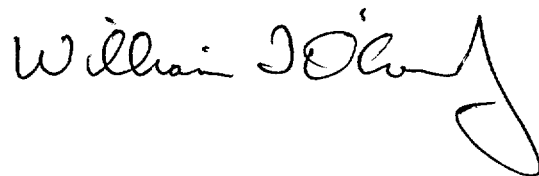
This License Amendment involves changes to the Fermi 2 Updated Final Safety Analysis Report (UFSAR) and Technical Requirements Manual (TRM) which is incorporated by reference in the UFSAR. Changes to the UFSAR are subject to the requirements of 10CFR50.59; however, these changes are being submitted for NRC review and approval since they involve the elimination of an automatic action. Nuclear Energy Institute (NEI) guidance document 96-07, Revision 1, indicates that NRC approval would be required for changes involving the permanent elimination of automatic actions for performing UFSAR-described design functions. Therefore, Detroit Edison believes this change cannot be performed under 10CFR50.59.

In recent years, the chlorine detection system reliability has been degrading. The chlorine detectors have frequently failed response time testing, and have been placed on an increased surveillance test frequency. The detectors have required extensive maintenance, and frequently required replacement or re-calibration. In addition, obsolescence issues made procurement of replacement or alternate parts very difficult. Similar problems have been experienced with chlorine detectors at other nuclear facilities.

Detroit Edison requests NRC approval of this License Amendment by May 24, 2002, with an implementation period of within 60 days following NRC approval.

Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.


Sincerely,



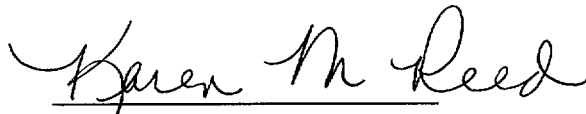
Enclosures

cc: T. J. Kim  
M. A. Ring  
NRC Resident Office  
Regional Administrator, Region III  
Supervisor, Electric Operators,  
Michigan Public Service Commission

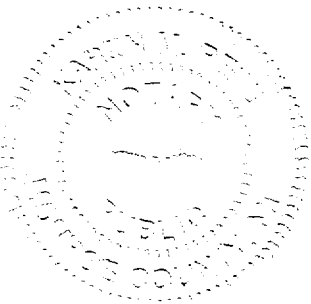
I, WILLIAM T. O'CONNOR, JR., do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

  
WILLIAM T. O'CONNOR, JR.  
Vice President - Nuclear Generation

On this 21<sup>st</sup> day of February, 2002 before me personally appeared William T. O'Connor, Jr., being first duly sworn and says that he executed the foregoing as his free act and deed.

  
Notary Public

KAREN M. REED  
Notary Public, Monroe County, MI  
My Commission Expires 09/02/2005



**ENCLOSURE 1 TO  
NRC-02-0002**

**FERMI 2 NRC DOCKET NO. 50-341  
OPERATING LICENSE NO. NPF-43**

**REQUEST FOR LICENSE AMENDMENT:**

**ELIMINATION OF THE CHLORINE DETECTION  
FUNCTION FROM THE CONTROL ROOM HEATING,  
VENTILATION AND AIR CONDITIONING SYSTEM**

**DESCRIPTION AND EVALUATION OF  
THE PROPOSED CHANGE**

## **DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE**

### **DESCRIPTION**

Fermi 2 Technical Requirements Manual (TRM) currently includes Specification No. TR 3.3.10 for the operability requirements of two redundant chlorine detectors located in the normal ventilation air intake of the Control Center Heating, Ventilation and Air Conditioning (CCHVAC) system. Upon detection of chlorine gas, with CCHVAC operating in the Normal Mode, the detectors automatically place the system in the Chlorine Mode. In this mode of operation, all outside air intake and exhaust dampers are closed to prevent ingress of toxic gas into the Control Center. The TRM specification is applicable at all times, except when the Control Room Emergency Filtration (CREF) system is operating in the Recirculation Mode. Operation in the Recirculation Mode will not result in toxic chlorine levels since all air is passed through the Emergency Make-up and Recirculation filters before being discharged in the Control Center.

In the original plant design, it was assumed that a chlorine railroad tank car would be located on site for use in water treatment. Therefore, a chlorine detection system was added to the design of the CCHVAC system. The chlorine detection system was designed to protect the control room operators from toxic chlorine gas originating from a postulated chlorine leak. Instead of using a railroad tank car, twelve chlorine cylinders (1-ton each), located at the Circulating Water Pump House about 1000 feet from the control room, were used for on site chlorine storage. In 1992, the use of chlorine was discontinued. Since that time chlorine has not been stored at the Fermi site. The nearest significant source of an accidental chlorine release is from a postulated rupture of a 90-ton railroad tank car about 3.4 miles away from the plant. A re-evaluation of the need for the chlorine detection system has not been performed since the plant was originally licensed to operate.

Original plant operating license included Technical Specification (TS) 3.3.7.8, "Instrumentation – Chlorine Detection System" until it was relocated to the TRM per License Amendment No. 115, implemented on June 11, 1998. The basis for the relocation was NRC Generic Letter 95-10, "Relocation of Selected Technical Specifications Requirements Related to Instrumentation." The chlorine detection system was evaluated against the criteria in 10CFR50.36(c)(2)(ii) and it was determined that it did not meet this criteria for inclusion in the TS. The Fermi 2 TRM is incorporated by reference in the Updated Final Safety Analysis Report (UFSAR). A description of the chlorine detectors' automatic function and the abnormal operating procedures for the isolation of the control room, use of breathing apparatus and other protective measures, is included in UFSAR Sections 6.4, 7.3.5, 9.4.1, 12.2.2.1 and A.1.95. UFSAR Section A.1.95 states that the nearest source of an accidental chlorine release would be from the rupture of a 90-ton tank car on the railroad northwest of the plant.

In recent years, the chlorine detection system reliability has been degrading. The chlorine detectors have frequently failed response time testing, and have been placed on an increased surveillance test frequency. The detectors have required extensive maintenance, and frequently required replacement or re-calibration. In addition, obsolescence issues made procurement of replacement or alternate parts very difficult. Similar problems have been experienced with chlorine detectors at other nuclear facilities.

As a result, Detroit Edison has recently completed a new study to evaluate the need for the chlorine detection system. The study included a survey to determine all chlorine sources in the vicinity of the plant. A probabilistic approach was utilized to evaluate the risk of incapacitating the control room operators from a chlorine release accident. The study concluded that the probability of a chlorine release having the potential to result in a significant concentration in the control room is below the threshold specified in Regulatory Guide 1.78, Revision 1, for considering chemical hazards in the evaluation of control room habitability. Therefore, the chlorine detection system and automatic isolation function are no longer necessary at Fermi 2.

This License Amendment requests the NRC review and approval of the elimination of the chlorine detection system and associated automatic function. The chlorine mode of the CCHVAC system will remain available for use by the operators; however, it will no longer be initiated automatically by the chlorine detectors. The new chlorine accident evaluation demonstrates that the probability of control room chlorine concentration reaching toxic limits, assuming no automatic or manual action, is below the acceptable level of risk specified in RG 1.78, Revision 1. The Abnormal Operating Procedures for isolating the control room to minimize the ingress of toxic fumes, use of emergency breathing air system, evacuation of non-essential personnel, and orderly plant shutdown will remain in place.

The change described in this License Amendment complies with the Regulatory Positions in RG 1.78, Revision 1; however, it is being submitted to the NRC for approval because it involves the elimination of an automatic action. Nuclear Energy Institute (NEI) document 96-07, Revision 1, "Guidelines for 10CFR50.59 Implementation" indicates that NRC approval would be required for changes involving the permanent elimination of automatic actions for performing UFSAR-described design functions. NEI 96-07, Revision 1, has been endorsed by the NRC in RG 1.187.

The NRC approved similar probabilistic evaluations for the deletion of chlorine detection systems from the Technical Specifications for several nuclear facilities including Prairie Island Nuclear Generating Plant, Units 1 and 2 (TAC No. M82518 and M82519) and Shearon Harris Nuclear Power Plant, Unit 1 (TAC No. 71858). Other similar amendments have been approved for Grand Gulf Nuclear Station, Unit 1 (December 3, 1986) and Braidwood Station, Units 1 and 2 (March 4, 1987).

Upon NRC approval of this amendment, Detroit Edison will delete the chlorine detection specification from the TRM and follow up with a plant modification and an update of the UFSAR to reflect the change in plant design.

## **EVALUATION OF THE PROPOSED CHANGE**

Detroit Edison has recently performed a survey of the site and nearby industrial, commercial and transportation facilities in the vicinity of the Fermi 2 plant to determine stationary and mobile sources of chlorine. It was determined that no chlorine is stored on site and no significant amounts are stored in facilities within 5 miles of the site. The Berlin Wastewater Treatment facility near Trombly Road is the primary chlorine user within the 5-mile radius. This facility is located about 2 miles north of the Fermi 2 site. It receives and stores insignificant amount of chlorine in the form of up to four 150-pound cylinders. This amount of chlorine is easily screened out from further consideration based on the screening criteria in Regulatory Position 1.1 of Regulatory Guide (RG) 1.78, Revision 1.

The nearest railroad track to the Fermi site is the Canadian National Shore Line Subdivision (previously called Detroit and Toledo Shore Line Railroad) which passes approximately 3.4 miles from the plant at the closest point. Two other railroad tracks operated by the Norfolk Southern Railway (formerly Conrail or Penn Central Railroad) pass approximately 3.5 and 3.8 miles from the plant at their closest points. Liquid chlorine shipments typically involve about 485 railcars per year on the Canadian National Shore Line Subdivision railway, and about 350 railcars per year on the Norfolk Southern railways. The chlorine shipments utilize 90-ton railroad tank cars.

There is one chlorine packaging plant in Michigan, JCI Jones Chemicals, Inc. located in the city of Riverview about 12 miles north of the Fermi 2 site. It packages chlorine in 150-pound cylinders or one-ton containers. An accidental release of a one-ton container at the closest point of the nearby I-75 Interstate Highway (about 4.1 miles from the site) is easily screened out from further consideration based on the screening criteria in Regulatory Position 1.2 of RG 1.78, Revision 1.

There is no barge traffic within 5 miles of the plant on Lake Erie. The United States Coast Guard confirmed that cargo shipping lanes are more than 5 miles away from the plant.

Based on the results of the survey, the only viable risk of reaching toxic chlorine levels in the Fermi 2 control room is from an accident involving a 90-ton railroad car which results in the release a significant amount of chlorine and is carried over to the control center HVAC air intake by prevailing winds blowing toward the site. RG 1.78, Revision 1, encourages licensees to use risk evaluations for cases where hazardous chemical releases do not meet the screening criteria in the RG. A risk evaluation was performed to calculate the probability of significant control room chlorine concentrations as a result of this postulated railroad tank car accident.

NUREG/CR-6624, "Recommendations for Revision of Regulatory Guide 1.78" provides the railcar accident probability based on the most recent statistics as  $6.0E-07$  per railcar-mile. It also provides a conditional release (spill) probability of 0.15 for rail cars. The NUREG further states

that accidents involving a spill of less than 10 percent of the cargo would not represent a significant hazard to control room operators and recommends a probability of 0.5 for spills of at least 10 percent of the cargo. Based on these estimates, the probability of a significant spill was determined by combining the probability of a railcar accident with the conditional release probability and the probability for a spill of at least 10 percent of the cargo. This resulted in a probability of  $4.5\text{E-}08$  per railcar-mile.

In order for the Fermi 2 control room to be impacted, the winds must be blowing toward the site and airborne chlorine concentrations must be sufficient, upon arrival of the chlorine plume at the CCHVAC air intake, to cause toxic levels in the control room.

Meteorological data from the years 1997 to 2000 was used to determine wind speeds and directions. It was assumed that all chlorine rail traffic occurs on the closest railroad track. The railroad track length within the 5-mile radius of the Fermi site was divided into segments corresponding to the applicable 16 wind direction sectors. Using an average ambient air temperature of 90-degrees Fahrenheit at the time of the assumed release, it was determined that a maximum of 21.77 percent of the liquid chlorine in the 90-ton rail car would immediately flash to vapor. The 90-degree temperature is a very conservative estimate of the 95<sup>th</sup> percentile maximum area temperature. The diffusion equation for instantaneous puff release was used to calculate the chlorine concentrations at the Fermi 2 control room air intake. For conservatism, the air intake was assumed to be at ground level.

The probability of an adverse control room impact was determined by combining the probability of certain wind speed and direction in a sector, adjusted for plume width, with the probability of a railcar chlorine spill multiplied by the railroad segment length and the annual traffic. This was integrated over all railroad segments, wind sectors, wind speeds, wind directions and atmospheric stability classes E, F and G.

The total overall probability of a chlorine railcar accident and spill resulting in a control room toxic concentration of 10 parts per million, as defined in RG 1.78, Revision 1, was calculated to be  $8.4\text{E-}07$  per year. The RG states that a release that has the potential to result in a significant concentration in the control room need not be considered for further detailed evaluation if the release is of low frequency of  $1.0\text{E-}06$  per year or less. Therefore, the railcar accident risk evaluation meets this criterion in Regulatory Position 2 of the RG.

In summary, the proposed modification is acceptable because the postulated chlorine accident has such a low probability of occurrence that it is not considered to be a credible event. This evaluation is based on several conservative assumptions and does not take credit for manual operator action to isolate the control room upon detecting chlorine odor or upon offsite notification. It also takes no credit for use of the emergency breathing air system by the operators in the control room.



**ENCLOSURE 2 TO  
NRC-02-0002**

**FERMI 2 NRC DOCKET NO. 50-341  
NRC LICENSE NO. NPF-43**

**REQUEST FOR LICENSE AMENDMENT:**

**ELIMINATION OF THE CHLORINE DETECTION  
FUNCTION FROM THE CONTROL ROOM HEATING,  
VENTILATION AND AIR CONDITIONING SYSTEM**

**10CFR50.92 SIGNIFICANT HAZARDS CONSIDERATION**

## **10CFR50.92 SIGNIFICANT HAZARDS CONSIDERATION**

In accordance with 10CFR50.92, Detroit Edison has made a determination that the proposed change of eliminating the chlorine detection function from the Control Room Heating, Ventilation and Air Conditioning (CCHVAC) system involves no significant hazards consideration. This change does not involve a significant hazards consideration for the following reasons:

1. The change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The chlorine detection system was originally added to the plant design when it was assumed that a chlorine rail car would be located on site for use in water treatment purposes; however, one-ton chlorine cylinders were used instead. In 1992, the use of chlorine for on site water treatment was discontinued. There is no chlorine stored on site and no significant amounts are stored at any other facility within the 5-mile radius of the plant. The only credible accident involving a chlorine release that could be carried into the control room is from a chlorine rail car accident on the three railroad tracks 3.4 to 3.8-miles away from the site. The probability of a rail car accident and spill of chlorine is not affected by the removal of the chlorine detectors located in the normal air intake for the CCHVAC system; therefore, only the consequences of the event must be addressed as a result of the proposed change.

The chlorine detectors in the control room ventilation air intake are intended to provide protection to the control room occupants in the event of an accidental offsite chlorine release. Detroit Edison has performed a probabilistic risk assessment to determine the probability of reaching toxic chlorine concentration levels of 10 parts per million in the control room as a result of a chlorine railcar accident and spill within 5 miles of the plant. The probability analysis took no credit for any automatic or manual action to isolate the control room. The results of the analysis show that the total probability of  $8.4\text{E-}07$  per year is below the  $1.0\text{E-}06$  threshold specified in Regulatory Guide (RG) 1.78, Revision 1. Therefore, since the probability analysis results meet the RG criteria, the elimination of the chlorine detection function will not significantly increase the consequences of an offsite chlorine release.

2. The change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The probabilistic risk assessment evaluation demonstrates that the likelihood of creating hazardous conditions in the control room as a result of a chlorine accident is very small. RG 1.78, Revision 1, states that events of such low frequencies do not need to be considered in the plant design because the resultant low levels of radiological risk are considered acceptable. The probabilistic assessment assumed no automatic or manual action to isolate the control room or to filter outside air before it is discharged in the control room. The

evaluation did not rely on any structure, system or component to perform a specific function; therefore, the elimination of the chlorine detection system does not create the potential for a new or different kind of accident from any accident previously evaluated.

3. The change does not involve a significant reduction in the margin of safety.

The elimination of the chlorine detection system will not affect the protection of the control room operators from the hazard of an offsite chlorine release. No significant amounts of chlorine are stored within 5 miles of the plant and the only chlorine accident risk is from a railroad car accident over 3 miles away. The probabilistic evaluation demonstrates the low risk associated with a chlorine accident that would incapacitate the operators such that their functions in mitigating a radiological event are impacted. Since the Regulatory Positions in RG 1.78, Revision 1 are satisfied, deletion of the chlorine detection system will not result in a significant reduction in the margin of safety.