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William S. Orser
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April 30, 1992
NRC-92-0052

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

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

Subject: Annual Non-Radiological Environmental Operating Report

Pursuant to section 5.4.1 of the Environmental Protection Plan, please find attached the 1991 Annual Non-Radiological Environmental Operating Report for Fermi 2.

Should you have any questions or comments regarding this report, please contact Barbara Siemasz, Compliance Engineer, at (313) 586-1683.

Sincerely,

Enclosure

cc: T. G. Colburn
A. B. Davis
M. P. Phillips
S. Stasek
Region III

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1991 Annual Nonradiological Environmental Operating
Report for Fermi 2

(In accordance with Appendix B to Facility Operating
License No. NPF-43)

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Section I

Report

Report

In 1991, Fermi 2 generated power for over 248 effective full power days and had an overall capacity factor of 66.7 percent.

The Environmental Protection Plan (EPP) provides for protection of environmental values during any additional construction and the operation of Fermi 2. The principal objectives of the EPP are as follows:

1. Verify that Fermi 2 is operated in an environmentally acceptable manner, as established by the Final Environmental Impact Statement (FES) and environmental impact assessments.
2. Coordinate NRC requirements and maintain consistency with other Federal, State and local requirements for environmental protection.
3. Keep the NRC informed of the environmental effects of facility construction and operation and of actions taken to control those effects.

Environmental concerns identified in the FES which relate to water quality matters are regulated by way of Fermi's National Pollutant Discharge Elimination System (NPDES) permit. As such, water quality issues are not required to be addressed in this report.

The components of the EPP are:

1. A terrestrial monitoring program to detect long-term or sudden changes in vegetation due to operation of Fermi 2.
2. A program to establish the controlled use of herbicides on transmission rights-of-way.
3. A program to ensure that changes to Fermi's design or operation and potential tests or experiments are adequately reviewed prior to implementation to avoid adverse environmental impacts not previously evaluated. Changes in plant design, operation or the performance of tests or experiments which do not effect the environment or which are required to achieve compliance with other Federal, State or local environmental regulations, are not subject to the requirements of this EPP.
4. Routine monitoring for evidence of unusual or important environmental events.

Following startup of the Fermi 2 facility, a terrestrial monitoring program was conducted per the EPP to measure key terrestrial parameters for comparison with corresponding measurements obtained prior to startup. This study focuses on effects due to the operation of the cooling towers at Fermi 2. The EPP also requires aerial remote sensing during the first July-September period after the station has been in operation for one year. Because this type of study focuses on effects caused by the operation of the cooling towers at the Fermi 2 site, Detroit Edison's first post-operational survey was performed during the July-September 1987 period. Two of four required followup surveys were performed in 1988 and 1990. Additional followup surveys are required to be performed in 1992 and 1994. As such, aerial remote sensing was not required to be performed in 1991 and therefore was not conducted.

The use of herbicides at Fermi 2 must conform to the approved use of selected herbicides as registered by the Environmental Protection Agency, approved by State authorities, and applied in accordance with State requirements. Records are maintained at the site concerning herbicide use. These records include the following information: commercial and chemical names of material used, concentration of active material in formulations diluted for field use; diluting substances other than water; rates of application; method and frequency of application; location; and the date of application.

Before engaging in additional construction or operational activities which might affect the environment, Fermi 2 would prepare and record an environmental evaluation of such activity. If the evaluation should indicate that the proposed activity would involve an unreviewed environmental question, Detroit Edison would provide a written evaluation of the activity and obtain prior approval from the Director, Office of Nuclear Reactor Regulation. Activities are excluded from this requirement if all measurable, non-radiological effects are confined to the on-site areas previously disturbed during site preparation and plant construction.

During the period covered by this report, there was one change to station design which was evaluated to determine if an unreviewed environmental issue or question would have been created by the change. A third Circulating Water Decant Pump (10,000 gpm) was installed in July, 1991, to enhance circulating water reservoir water level control. An Environmental Evaluation was performed to determine if an unreviewed environmental issue existed (see Environmental Evaluation Record, Appendix 1). This issue was addressed in Fermi's NPDES Permit Application for Reissuance (see Annual Non-Radiological Environmental Monitoring Report, 1989, previously submitted). Fermi's NPDES Permit No. MI0037028 was reissued by the Michigan Department of Natural Resources (MDNR) effective July 19, 1990 (see NRC-90-0137, previously submitted). The reissued permit contains the flow provisions required to allow operation of a third decant pump (flow limitation for outfall 001 was increased from 30 million gallons per day to 45 million gallons per day). Appendix B to Facility Operating License No. NPF-43, Section 2.1 states that: "The NRC will rely on the MDNR for the protection of the aquatic environment from non-radiological operational impacts via the NPDES permit." Since operation of a third decant pump was previously reviewed and approved via Fermi's current NPDES Permit, no unreviewed environmental issue exists.

Any unusual occurrence or important event which indicates, or could result in, significant environmental impact causally related to plant operation is reported to the the NRC within 24 hours followed by a written report. The following are considered examples of unusual or important environmental events: excessive bird impaction events, onsite plant or animal disease outbreaks, mortality or unusual occurrence of any species protected by the Endangered Species Act, fish kills, and an increase in nuisance organisms or conditions.

No unusual or important environmental events occurred during the reporting period. Accordingly, no non-routine reports were submitted.

Fouling of raw water cooling systems by Zebra mussels continues to be an important industry concern. Monitoring and treatment of raw water cooling systems for *Corbicula* (Asiatic clams) and Zebra mussels continued in 1991. Though not required by the EPP, a summary of Fermi's Zebra mussel monitoring and control activities conducted during 1991 is included below:

Zebra mussels were first discovered in 1989, colonizing the General Service Water (GSW) intake structure and GSW cooled heat exchangers. Since that time, Zebra mussel populations at Fermi have steadily increased. Inspection of the GSW intake trash bars on October 14, 1991 revealed 5% coverage by Zebra mussels (west intake bay) and 5% coverage down to approximately 5 to 6 feet off floor where trash bars were 80 - 90% occluded (east intake bay). See Technical and Engineering Services Report 91C36-8, Appendix 3 for more information. These results coupled with results of the May, 1992 inspection will determine if mechanical cleaning of the GSW intake structure is warranted.

Chemical treatment of the GSW and Fire Protection systems using a non-oxidizing molluscicide continued in 1991. Betz Clam-Trol CT-1 was applied to these systems on July 28, 1991. Zebra mussel mortality due to treatment was estimated at 93%.

The Fermi 1 Potable Water Plant was inspected by Technical and Engineering Services (T&ES) divers on April 24, 1991. Video probe inspection of the 8 inch supply line revealed approximately 24% coverage of pipe walls with zebra mussels. T&ES recommended mechanical cleaning of intake piping (see T&ES report 91C36-4, Appendix 3).

Mechanical cleaning of the potable water supply line occurred on October 1, 1991 (see T&ES Report 91C36-9, Appendix 3). Mechanical "pigging" (a process where a compressible plug is forced through a line to remove unwanted deposits) was the cleaning method utilized. It is estimated that the potable water line may require subsequent cleanings as often as every two years.

Until recently, Fermi's Zebra mussel control program involved periodic molluscicide treatments at sufficient frequencies to prevent attached mussels from growing to lengths in which heat exchanger fouling would occur when shells release (shells of one half inch or greater).

Evaluation of this treatment methodology indicates that shell debris, if present within the Fire Protection system, could cause fouling of deluge system spray nozzles. To eliminate the potential for this type of fouling, Zebra mussel settling and attachment must be prevented. Fermi has therefore decided to install a new biocide injection system to treat the GSW and Fire Protection systems. This system will continuously add oxidizing biocide to GSW during the months that Zebra mussel larvae are present in the source water. Continuous biocide injection will kill the larvae as they enter the system thereby preventing settling and attachment.

Due to NPDES restrictions, the GSW intake structure and Potable water intake will require periodic mechanical removal of attached Zebra mussels. The close proximity of these components to the lake prohibits the use of biocides. Use of chemical molluscicides on these components would create a high potential for release of water treatment chemicals to the lake in excess of NPDES effluent limitations.

Section II

Appendices

Appendix 1

Appendix 1 consists of an Environmental Evaluation Record written to address the operation of a third Circulating Water Decant Pump.

Appendix B to the Operating License requires that for all additional construction or operational activities which may affect (have a significant adverse environmental impact upon) the environment, the licensee shall prepare and record an environmental evaluation of such activity. For assistance in filling out this record or in assessing environmental impacts, contact Environmental Programs Coordinator - Chemistry.

Part 1:

Responsible Department <u>CHEMISTRY</u>		Review Date <u>7-19-91</u>	
Reviewer Signature <u>[Signature]</u>	Tel. Ext. <u>6557</u>	Admin. Unit <u>6401</u>	Location <u>262 OBA</u>

Descriptor of activity:

EVALUATION OF EFFECTS ON ENVIRONMENT RESULTING FROM OPERATION OF THIRD CIRCULATING WATER DECANT PUMP. WILL INCREASE DECANT EFFLUENT FLOW 14.4 MILLION GALS./DAY (EXISTING FLOW = 28.8 MG)

Part 2:

1. Is there a potential for significant adverse environmental impact associated with this activity? (For assistance in defining significant please contact Environmental Engineer - Nuclear Engineering, 316 NOC, ext. 4286.)

No (See Note No. 1) Yes (Go To No. 2)

2. Will this activity involve an environmental question not reviewed in the Final Environmental Statement or will this activity result in a significant increase in any adverse environmental impact previously evaluated in the FES?

No (See Note No. 1) Yes (Go To No. 3)

3. Will this activity result in either an off-site environmental impact or an on-site impact on areas not previously disturbed?

No (See Note No. 1) Yes (Go To No. 4)

4. Will the environmental impact involve activities outside of those currently covered by existing site permits?

No (See Note No. 1) Yes (Go To No. 5)

5. Is this activity outside of that required to achieve compliance with other federal, state or local environmental regulations?

No (See Note No. 1) Yes (if yes) this activity requires either
 a. A change in the EPP, or
 b. An Environmental Assessment and NRC approval before initiation of activity *

Additional Comments:

EFFECTIVE JULY 19, 1990 FERMI'S NPDES PERMIT NO. M10037028 WAS REISSUED BY THE MDNR. THE REISSUED PERMIT CONTAINS FLOW PROVISIONS REQUIRED TO ALLOW OPERATION OF A THIRD CW DECANT PUMP (FLOW LIMIT INCREASED FROM 30 MGD TO 45 MGD). AS STATED IN THE ENVIRONMENTAL PROTECTION PLAN (APPENDIX E TO FACILITY OPERATING LICENSE) SECTION 2, THE NRC WILL RELY ON THE MDNR FOR THE PRO

Note 1: No further action is required. Please send this form to the Environmental Programs Coordinator - Chemistry

* Please send this form immediately to the Environmental Programs Coordinator - Chemist:

ION OF THE AQUATIC ENVIRONMENT FROM NON-RADIOLOGICAL OPERATIONAL IMPACTS VIA THE NPDES PERMIT. SINCE INCREASED DECANT FLOW IS PERMITTED VIA REISSUED NPDES PERMIT M10037028, THERE IS NO NEED TO PERFORM AN ENVIRONMENTAL ASSESSMENT AND OBTAIN NRC APPROVAL TO OPERATE THE THIRD DECANT PUMP. [Signature] 7-19-91

Appendix 2

Appendix 2 contains monitoring and treatment reports associated with the Zebra mussel control program at Fermi. Specific documents contained herein are as follows:

1. Technical and Engineering Services (T&ES) Report 91C36-1, Condition of Fermi 2 General Service Water Screenhouse Midbays
2. T&ES Report 91C36-4, Inspection of the Fermi 2 Potable Water Intake Structure for Zebra Mussels
3. T&ES Report 91C36-9, Control of Zebra Mussel Fouling of the Fermi Potable Water Plant Intake

Detroit
Edison

Date: October 15, 1991
To: Fritz Lehmann
Fermi 2
From: G. D. Longton *GL*
R. D. Smithee
Technical and Engineering Services
Subject: Condition of Fermi 2 General Service Water
Screenhouse Midbays
Technical & Engineering Services Report 91C36-8

The Technical and Engineering Services Dive Team performed an underwater inspection of the trash bars and floor areas between the trash bars and the outer stop log channel of the Fermi 2 general service water pumphouse on October 14, 1991.

Visual inspection of the east and west bays was impossible because diver visibility was zero. Therefore, percent coverage by zebra mussels was estimated by touch. A video record was not attempted at this time.

The west bay trash bars had approximately 5% coverage by zebra mussels and one foot or so of gelatinous muck deposited on the floor area between the trash bars and the traveling screen.

The east bay trash bars were about 5% covered with mussels down to approximately 5-6 feet off the floor where it was 80 to 90% occluded by mussels. The floor was covered with 15 to 20 inches of gelatinous muck along with branches and miscellaneous debris.

Zebra mussels on the trash bars can be removed by high-pressure underwater sprays (3000 psi) by contract divers. One such dive contractor is presently at Monroe Power Plant removing mussels from all four unit trash bars. If desired, the operation could be observed by your people. The muck build-up on the floor could be removed by underwater vacuuming also provided by contract divers.

Rick Smithee of Technical and Engineering Services has assisted Monroe Power Plant in establishing zebra mussel cleaning protocols and coordinating related dive activities. Rick (extension 71337) will be glad to assist you if you want.

Approved by: W.P. Kovalak
W. P. Kovalak
Acting Supervisor
Environmental and Regulatory Compliance

GDL/psb

Copies to: G. A. Horuczi (file)

Serving Customers

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Date: May 22, 1991

To: R. J. DeWulf
Nuclear Operations

From: R. D. Smith *RDS*
G. D. Longton
Technical and Engineering Services

Subject: Inspection of the Fermi 2 Potable Water
Intake Structure for Zebra Mussels
Technical & Engineering Services Report 91C36-4

Technical and Engineering Services conducted an underwater videoprobe inspection of the Fermi 1 potable water intake structure on April 24, 1991. The purpose was to determine if zebra mussels were fouling the 8 inch diameter water supply pipe which connects the crib to the water plant. A diver was able to insert the videoprobe about 12 feet into the pipe. Subsequent review of the video indicated that the walls of this section of pipe were approximately 24% covered with a single layer of zebra mussels. If this level of fouling is typical, then about 6 cubic feet of zebra mussels are living in the supply pipe.

The level of fouling of the supply pipe and the intake crib (Technical and Engineering Services Report 90H19-4) indicate that the system should be cleaned. It also seems reasonable to install feed lines to allow for future chlorine injection at the crib. This would control zebra mussels in the pipeline but not the intake grid. The intake grid could be easily modified to allow for diver access and cleaning. It is anticipated that this cleaning would have to be done every two years. A diver should be able to clean the grid in less than one hour of bottom time.

Discussions with contractors and others suggest that a mechanical cleaning of the pipeline should be considered. The job could be completed in several days using a barge anchored at the crib. The removed mussels would be backwashed out of the system as the cleaning progressed. The barge and cleaning equipment would also facilitate the installation of the chlorine feed line and support crib intake grid modification. Alternatively, chemical or thermal treatment could be used to kill the

mussels, but this would not immediately remove them from the system. The dead animals would slough off the supply pipe over a several week period causing intermittent pluggage of the strainer system in the water plant.

Approved by: W. P. Kovalak
W. P. Kovalak
Acting Supervisor
Environmental and Regulatory Compliance

RDS/pah

Copies to: W. D. Gilbert
G. A. Horuczi (file)
S. K. Labudda
F. M. Lehmann

Detroit
Edison

Date: October 17, 1991

To: R. J. Dewulf
Near Operations

From: R. D. Smithee *RDS*
G. D. Longton
Technical and Engineering Services

Subject: Control of Zebra Mussel Fouling of the Fermi
Potable Water Plant Raw Water Intake System
Technical & Engineering Services Report 91C36-9

The problem of zebra mussel fouling of the Fermi potable water plant raw water intake system has been addressed. A dive contractor has modified the intake crib cover and pigged out the 8 inch diameter raw water supply pipe. The project was completed on October 1, 1991. The crib cover modification will simplify and reduce costs of future cleanings. The pigging of the supply line has removed most, if not all, of the mussels and rust deposits. The pumping capacity required to meet the water plants raw water needs has also been reduced.

The infestations of zebra mussels in the water plant intake system has been monitored since 1989. Technical and Engineering Services (T&ES) divers photo and video documented the increasing zebra mussel concentrations on the crib cap in 1989 and 1990 (T&ES Report 90H19-4). In addition, a videoprobe inspection in April, 1991 revealed that zebra mussels had colonized the inside of the raw water supply pipe (T&ES Report 91C36-4). The buildup of the mussels in the supply pipe substantiated the need for a control program.

Thermal, chemical and mechanical methods of controlling zebra mussels have all been used with varying success in industry. The different approaches were discussed internally and with several contractors. It was finally decided to hire a contractor experienced in mechanical pigging operations to do the job (Pigging describes the process where a compressible plug is forced through a line to remove unwanted deposits from the line).

The contractor began the operation in September with the modification of the concrete cap on the intake crib. A 11.5 inch hole was cut in the center of the cap to allow access for cleaning and a passageway for the pigs. A 0.5 inch thick aluminum plate with holes matching those in the original concrete cap was fabricated for installation after completion of the pigging operation.

The pigging operation was conducted on October 1, 1991. A pig launcher was connected to the raw water supply line in the dry well. A 6 inch valve and a portion of the strainer were temporarily removed to make room for the launcher. The launcher was plumbed with a fire hose to provide water pressure for launching the pigs. The operation commenced with the launchings of three, progressively stiffer 8 inch diameter swabs. The swabs were bullet

shaped, compressible, open cell, plastic foam with a solid plastic sealing coating across the rear end. The operation continued with the launching of progressively larger pigs from 6.5 to 8 inches in diameter. The pigs are similar to the swabs except that they are completely coated with a solid flexible plastic. The last pig was 8 inches in diameter and was also equipped with a spiral of stiff wire brush. A boat and diver were stationed at the intake crib to retrieve the pigs (some floated to the surface and others did not). The raw water supply pipe was out of service for about 10 hours.

The launch sequence was as follows: 1. Open the launcher. 2. Load the pig or swab and close the launcher. 3. Open the raw water isolation valve. 4. Pressurize the launcher with the fire hose valve to launch the pig., 5. Close the fire hose valve. 6. Open the backwash valve to flush the pig out of the line. 7. Close the backwash valve. 8. Drain the launcher. Note; Observing the pressure changes on the raw water line will indicate the pigs movements through the system to the operator. All valve operations should be made slowly to minimize the potential for water hammer.

It is felt that pigging is a viable method of controlling the zebra mussels in this system. It has been demonstrated that the operation can be completed in a minimal amount of time with good results. Observations indicate that the swabs alone removed most of the mussels. The more robust pigs removed mainly years of accumulated rust and scale (it was several inches deep around the crib structure). Installation of a permanent pig launcher might further reduce cleaning costs.

Future zebra mussel concentrations should be monitored. This could include positioning a batch of test coupons in the crib area to determine annual zebra mussel deposition. Retrieval of the coupons would also facilitate both a visual inspection of the crib structure and removal of the mussels plugging the cap openings.

Approved by:

W.P. Kovalak

W. P. Kovalak
Acting Supervisor
Environmental and Regulatory Compliance

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