DTE

April 4, 2022

10 CFR 50.72(b)(2)(xi)

NRC3-22-0002

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Reference: Fermi 3
NRC Docket No. 52-033
NRC License No. NPF-95

Subject: DTE Electric Company Submittal of Application for the Renewal of the Fermi 3 National Pollutant Discharge Elimination System (NPDES) Permit

On April 4, 2022, DTE Electric Company (DTE) submitted its application for the Fermi 3 NPDES Permit (Submission HP8-3ZRH-G0QVW) to Michigan Department of Environment, Great Lakes, and Energy (EGLE). The current permit (MI0058892) expires October 1, 2022. Section 3.0 of the Fermi 3 Environmental Protection Plan requires that DTE provide a copy of the permit application to the NRC at the same time it is submitted to the permitting agency. The purpose of this letter is to transmit the enclosed copy of the EGLE NPDES permit application.

If you have any questions, or need additional information, please contact me at (313) 235-0443.

Sincerely,

Michael K. Brandon, Manager
Nuclear Development – Licensing
DTE Electric Company

IE25
D095
NRR

Enclosure: Fermi 3 Michigan EGLE Wetland Permit Application

CC: Michael Dudek, NRC Fermi 3 Project Branch Chief (Enclosure submitted electronically)
Demetrius Murray, NRC Fermi 3 Project Manager (Enclosure submitted electronically)
Fermi 2 Resident Inspector (w/o Enclosure)
Andrea D. Veil, Director, NRC Office of Nuclear Reactor Regulation (w/o Enclosure)
NRC Region III Regional Administrator (w/o Enclosure)
NRC Region II Regional Administrator (w/o Enclosure)
Supervisor, Electric Operators, Michigan Public Service Commission (w/o Enclosure)
Michigan Department of Environment, Great Lakes and Energy
OWMRP, Radiological Protection Section (w/o Enclosure)
Craig D. Sly, Dominion Energy, Inc. (w/o Enclosure)
Kent Halac, General Electric (w/o Enclosure)
Art Zaremba, Duke Energy (w/o Enclosure)
Steve Franzone, Florida Power and Light (w/o Enclosure)

DTE

April 4, 2022

Michigan Department of Environment, Great Lakes, and Energy
Water Resource Division - Permit Section
Industrial and Storm Water Permits Unit
525 West Allegan, PO Box 30457
Lansing, MI 48909

Re: NPDES Permit Renewal Application
DECO - Fermi 3 Power Plant
NPDES Permit No. MI0058892

Dear Sir or Madam:

In accordance with Michigan Department of Environment, Great Lakes, and Energy Authorization to Discharge under NPDES Permit No. MI0058892, the DTE Electric Company (the Company) is submitting the attached application for the reissuance for the DTE Fermi 3 Power Plant (DECO – Fermi 3 Power Plant). The associated $750.00 application fee will be paid online at the time of the submittal of the application.

Comments Regarding the Application on MiWaters

- Facility Description: Fermi 3 is not yet built and operational
- Outfall Information and Effluent Characteristics: Fermi 3 will operate in much the same manner as Fermi 2, with a similar cooling water cycle; therefore, Fermi 2 2014 NPDES Permit Renewal laboratory analyses are provided as expected/estimated data in support of this proposed discharge.

If you have any questions relative to this application or desire additional information, please contact me at (248)207-7768 or via e-mail at marcela.orlandea@dteenergy.com.

Sincerely,
DTE Electric Company

Marcela P Orlandea, PE, LEED AP
Principal Environmental Engineer
Environmental Management & Safety

Enclosures

Cc: Tarek Buckmaster – EGLE, Southeast Michigan District
Michael Brandon – DTE Electric Company, Fermi 2 Power Plant

National Pollutant Discharge Elimination System (NPDES) Industrial/Commercial Application Form (Reissuance)

version 2.25

(Submission #: HP8-3ZRH-G0QVW, version 1)

Details

Submission ID	HP8-3ZRH-G0QVW
Status	Draft

Form Input

Applicant Information

Permit Number (Pre-populated)
MI0058892

►►"APPLICANT" refers to the entity legally responsible for the information submitted with this application, and for the permit that will result from it. DO NOT provide the name of an individual. Contact information will be collected in another section.

Applicant Information

Enter name of legal entity:

Organization Name
DTE Electric Company

Phone Type	Number	Extension
Mobile	248.207.7768	

Email
marcela.orlandea@dteenergy.com

Fax
NONE PROVIDED

Enter address of legal entity:

One Energy Plaza

Detroit, MI 48226

United States

Facility Information

FACILITY DESIGNATED NAME (pre-populated)
DECO-Fermi 3 Power Plt

Facility Name 1 - Company Name
DTE Electric Company

Facility Name 2 - Division Name
NONE PROVIDED

Facility Name 3 - Plant Name
DECO - Fermi 3 Power Plant

Which of the following best describes this facility?
Private

Facility Location
41.9608,-83.2619

Site/Facility Location Address

6400 North Dixie Highway

Newport, MI 48166

NAICS (North American Industry Classification System) code:
221113

SIC (Standard Industrial Classification) code:
4911

Is this facility a primary industry? Refer to Table 1 of the Appendix to make this determination.
Yes, this facility is a primary industry.

CLICK HERE to view the Appendix to the permit application

Select all primary industrial categories that apply:
Steam Electric Power Plants

Enter the name of the Local Unit of Government (LUG) in which the facility is located:
Frenchtown Township

Provide an e-mail address for an appropriate LUG contact, such as a clerk, who can be notified about the public notice period:
clerk@frenchtownchartertwp.org

Does the facility have an EGLE-certified operator at the appropriate level?
NO

Please provide an explanation:
An EGLE-certified operators at the appropriate level will be assigned when the plant will be operational. The power plant is not built yet..

Contacts (1 of 3)

Additional instructions for completing this portion of the application are provided in the Appendix.

Appendix to the Permit Application

Contact
Facility Contact
DMR Contact
Storm Water Operator

Required Contact Types:
► At minimum the following contact types must be provided:
Annual Permit Billing Contact; Application Contact; Facility Contact; DMR Contact; and Certified Operator

Contact

Prefix
Ms.

First Name	**Last Name**
Catherine	*Gorski*

Title
Senior Environmental Specialist

Organization Name
DTE Electric

Phone Type	**Number**	**Extension**
Business	313.389.7768	

Email
catherine.gorski@dteenergy.com

Fax
NONE PROVIDED

Address

Enrico Fermi Nuclear Plant

6400 North Dixie Highway

Newport, MI 48166

United States

Certification Number(s)
I-15976

Certification Classification(s)
Industrial Stormwater Operator

Contacts (2 of 3)

Additional Instructions for completing this portion of the application are provided in the Appendix.

Appendix to the Permit Application

Contact
Annual Permit Billing Contact
Application Contact

Required Contact Types:
► At minimum the following contact types must be provided:
Annual Permit Billing Contact; Application Contact; Facility Contact; DMR Contact; and Certified Operator

Contact

Prefix
Ms.

First Name	Last Name
Marcela	*Orlandea*

Title
NONE PROVIDED

Organization Name
DTE Electrical Company

Phone Type	Number	Extension
Mobile	248.207.7768	

Email
marcela.orlandea@dteenergy.com

Fax
NONE PROVIDED

Address

One Energy Plaza

Detroit, MI 48226

United States

Contacts (3 of 3)

Additional Instructions for completing this portion of the application are provided in the Appendix.

Appendix to the Permit Application

Contact
Other

Required Contact Types:
► At minimum the following contact types must be provided:
Annual Permit Billing Contact; Application Contact; Facility Contact; DMR Contact; and Certified Operator

Contact

Prefix
Mr.

First Name	**Last Name**
Michael	*Brandon*

Title
NONE PROVIDED

Organization Name
DTE Electric Company

Phone Type	**Number**	**Extension**
Mobile	865.223.9555	

Email
michael.brandon@dteenergy.com

Fax
NONE PROVIDED

Address

One Energy Plaza

Detroit, MI 48226

United States

Antidegradation

This part of the application enables the Department to determine whether you are seeking authorization for a change to your current NPDES permit that represents a new or increased loading of pollutants to the surface waters of the state. Select any/all that apply or select "None."
E) None: I am not seeking any such changes to my current permit

Additional Information

Other Environmental Permits
Provide the information requested in the table for any other federal, state, or local environmental permits in effect or applied for at the time of submittal of this Application, including, but not limited to, permits issued under any of the following programs: Air Pollution Control, Hazardous Waste Management, Wetlands Protection, Soil Erosion and Sedimentation Control, and other NPDES permits.

Other Environmental Permits (Hit 'Add Row' for each environmental permit)

Issuing Agency:	Permit or COC Number:	Permit type:

Issuing Agency:	Permit or COC Number:	Permit type:
EGLE	WRP032246 v1.0	Part 301, 303, 325
USACE	LRE-2008-00443-1-S11	Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

WATER FLOW DIAGRAM

Attachment 1 - Fermi 3 Water Use Diagram & Supplemental Information.pdf - 03/03/2022 02:43 PM

Comment

NONE PROVIDED

'Surface waters of the state' means all the following: The Great Lakes and their connecting waters, all inland lakes, rivers, streams, impoundments, open drains, wetlands, and other surface bodies of water within the confines of the state but does not include drainage ways and ponds used solely for wastewater conveyance, treatment, or control. A storm sewer is not a surface water of the state.

NARRATIVE

Attachment 2 - Fermi 3 Narrative Water Use & Supplemental Information.pdf - 03/11/2022 10:32 AM

Comment

NONE PROVIDED

MAP OF FACILITY AND DISCHARGE LOCATION

Attachment 3 - Site Plan Fig 2.1-4 ER Rev 2.pdf - 03/03/2022 02:50 PM

Comment

NONE PROVIDED

Laboratory Services (1 of 2)

Laboratory: DTE Fermi 2 Power Plant Laboratory

►To add additional laboratories, please use the "Add New" button at the bottom of this page, or select "Duplicate Section" to copy the laboratory information and edit a portion of the fields.

Laboratory Name

DTE Fermi 2 Power Plant Laboratory

Lab Type

In-house Laboratory

Laboratory Phone

734.586.1342

Laboratory Email
Patrick.Snay@dteenergy.com

Analyses Performed
To be determined after the plant is built and operational

Laboratory Services (2 of 2)

Laboratory: Merit Laboratories, Inc.

►To add additional laboratories, please use the "Add New" button at the bottom of this page, or select "Duplicate Section" to copy the laboratory information and edit a portion of the fields.

Laboratory Name
Merit Laboratories, Inc.

Lab Type
Contract Laboratory

Laboratory Street Address

2680 East Lansing Drive
East Lansing, MI 48823

Laboratory Phone
517.332.0167

Laboratory Email
info@meritlabs.com

Analyses Performed
VOCs, SVOCs, PCBs, Metals, Low Level Hg

Water Source and Discharge Type

1. WATER SUPPLY INFORMATION

Identify all water sources entering the facility and treatment systems, and provide average flows. The volume may be estimated from water supply meter readings, pump capacities, etc. Provide the name of the source where appropriate (e.g., Grand River, Lake Michigan, City of Millpond, etc.).

Water Supply Type	Name and Location of Source	Average Volume or Flow Rate	Units
Surface Water Intake	Lake Erie	50	MGD
Municipal Supply	Frenchtown Township	0.52	MGD
Other: Precipitation	Precipitation	5	Other: MGD/Event

2. WATER DISCHARGE INFORMATION

Select all wastewater types discharged from this facility.
Process Wastewater
Sanitary Wastewater
Regulated Storm Water

Identify water discharged by the facility and treatment systems, and provide average flows. If water is first used for one purpose and then is subsequently used for another purpose, indicate the type and amount of the last use. For example, if the water is initially used for noncontact cooling water and then for process water, indicate the amount of process water. The amount of water from sources should approximate the amount of water usage. If the amounts are different, provide an explanation.

Discharge Type	Average Flow Rate	Units
Process Wastewater	9125	MGY
Sanitary Wastewater	365000	Other: GPD
Regulated Storm Water	2.6	MGD

Briefly explain why the combined water from all sources does not equal the total approximate water usage, if applicable.
NONE PROVIDED

3. PRELIMINARY COOLING WATER QUESTIONS

Does the facility use water for cooling purposes?
YES

Does or will the facility use a surface water intake structure as a cooling water source for the facility? Use of an intake structure includes obtaining water by any sort of contract or arrangement with an independent supplier if the supplier is itself not a facility covered by the requirements of 40 CFR 125 Subparts I or J, except as provided in §125.91(c) and (d).
YES

4. WHOLE EFFLUENT TOXICITY (WET) TESTS.

Have any acute or chronic WET tests been conducted on any discharge(s) or receiving water(s) in relation to this facility's discharge within the last three (3) years? This includes WET tests conducted for water treatment additive approval.
NO

Outfall Information and Effluent Characteristics (1 of 1)

Outfall:001 Receiving water:Lake Erie

1. OUTFALL INFORMATION

Enter the outfall number (e.g., 001):
001

Outfall Description
Main Outfall

Enter the name of the receiving water:
Lake Erie

Outfall
41.9608,-83.2619

2. TYPE OF WASTEWATER DISCHARGED THROUGH THIS OUTFALL

Type(s) of Wastewater Discharged (check all that apply to this outfall):
Process Wastewater
Storm Water - regulated

3. FLOW

►DEFINITIONS: A facility is considered to have a SEASONAL discharge if wastewater is treated AND STORED throughout a portion of the year and then discharged over a specified period or periods of days, weeks, or months. Batch process discharges are not seasonal discharges. Any facility that does not discharge seasonally is considered to have a CONTINUOUS discharge. Batch discharges are a type of continuous discharge.

Is the discharge continuous or seasonal?
Continuous

What maximum daily flow rate are you requesting authorization to discharge from this outfall during the next five years? Enter a numeric value only based on the units Million Gallons Per Day. If the requested flow rate is less than 1,000 gallons per day, please enter a minimum of "0.001".
25

How often is there a discharge from this outfall (on average)?

Hours per day:	Days per year:
24	365

Does this outfall have batch discharges?
NO

4. PROCESS STREAMS CONTRIBUTING TO OUTFALL DISCHARGE

The information requested below is used to determine the applicable federal regulations for this facility. For each industrial process at the facility, provide the name, the SIC or the NAICS code, and a brief description of the process. As part of each description, identify a reasonable measure of the facility's actual long-term daily production and average number of production days per year. In many cases, this is the average daily or average annual production rate from the last five years. Some federal regulations require that certain industries report different information, depending on the type of process. The Summary of Information to Be Reported by Industry Type, pages 10-11 of the Appendix, includes an abbreviated list of industrial categories and their specific Application requirements. If the industrial process does not have specific Application requirements and recent long-term production rates are not an appropriate measure of future production, report the expected annual production rate for the next five (5) years, or for the life of the permit.
Appendix to the Permit Application

PROCESS STREAMS CONTRIBUTING TO OUTFALL DISCHARGE

Name of the process contributing to the discharge	SIC or NAICS code:	Describe the process and provide measures of production:
Closed-cycle Cooling System Blowdown	4911	Blowdown from the plant's closed-cycle condenser cooling system cooling tower blowdown. Maxium total expected discharge = 25 MGD.
Processed Radwaste System Discharge	4911	Process radwaste from the plant floor drains and equipment drains. Maximum expected discharge (included in total above) = 0.2 MGD

5. EFFLUENT CHARACTERISTICS - CONVENTIONAL POLLUTANTS

Please confirm that you have read the statements above.
I CONFIRM

Effluent Characteristics - Conventional Pollutants

Conventional Pollutants	HOW ARE RESULTS PROVIDED?	Waiver Information	Provide Rationale Here to Support Waiver Request
Biochemical Oxygen Demand - five day (BOD5)	LAB REPORT		
Chemical Oxygen Demand (COD)	LAB REPORT		
Total Organic Carbon (TOC)	LAB REPORT		
Ammonia Nitrogen (as N)	LAB REPORT		
Total Suspended Solids	LAB REPORT		
Temperature, Summer	LAB REPORT		
Temperature, Winter	LAB REPORT		
pH	LAB REPORT		
Total Dissolved Solids	LAB REPORT		
Total Phosphorus (as P)	LAB REPORT		
Fecal Coliform Bacteria	NONE	Waiver request not required.	
Escherichia coli	NONE	Waiver request not required.	
Total Residual Chlorine	LAB REPORT		
Dissolved Oxygen	LAB REPORT		
Oil & Grease	LAB REPORT		

Please attach lab reports for conventional pollutants here.

Attachment 4 - Laboratory Analyses.pdf - 03/11/2022 10:04 AM

Comment

NONE PROVIDED

6. EFFLUENT CHARACTERISTICS - TOXIC POLLUTANTS

Instructions: Carefully review each of the toxic pollutant groups below and respond as appropriate. For guidance concerning test procedures, see Part II.B.2. of your NPDES permit.

Tables 1 – 6, referenced below, are located in the Appendix.

CLICK HERE to open the Appendix to the Permit Application

Do you have analytical results of this type to report?
NO

Do you have analytical results of this type to report?
NO

Do you have analytical results of this type to report?
NO

Do you have analytical results of this type to report?
NO

ADDITIONAL TOXIC AND OTHER POLLUTANT INFORMATION
All existing industries, regardless of discharge type, are required to provide the results of at least one analysis for any chemical listed in Table 4 known or believed to be present in the facility's effluent, and a measured or estimated effluent concentration for any chemical listed in Table 5 known or believed to be present in the facility's effluent. In addition, submit the results of any effluent analysis performed within the last three years for any chemical listed in Tables 4 and 5.

Do you have analytical results of this type to report?
NO

Water Treatment Additives

Water Treatment Additives (WTAs)

Approvals to use WTAs are authorized by the Michigan Department of Environment, Great Lakes, and Energy under separate correspondence. Issuance of a permit/COC does not authorize the use of water treatment additives. Written approval from the Department must be obtained prior to using water treatment additives at the facility.

Water treatment additives (WTAs) include any material that is added to water used at the facility or to wastewater generated by the facility to condition or treat the water. Examples of WTAs include biocides, flocculants, water conditioners, pH adjusting agents, etc.

Are any WTAs added to water used at the facility or to wastewater generated by the facility?
YES

Please list any WTAs currently in use, or will be used during the next permit cycle
The following WTA to be used during operation:
Biocide/Algaecide - Sodium Hypochlorite (15%)
Corrosion Inhibitor – Sodium Silicate
Scale Inhibitor/Dispersant
Dehalogenation – Sodium Bisulfite

Approval Upload

Attachment 5 - WTA.pdf - 03/03/2022 02:52 PM
Comment
NONE PROVIDED

Appendix to the Permit Application

Cooling Water Intake Structures

COOLING WATER INTAKE STRUCTURES

The withdrawal of cooling water removes and kills hundreds of billions of aquatic organisms from waters of the United States each year, including fish, shellfish, fish eggs, and larvae. Aquatic organisms drawn through cooling water intake structures (CWIS) are either impinged (I) against components of the intake structure or get drawn into or entrained (E) in the cooling water system itself. Most impacts are to the early life stages of aquatic organisms. Due to the adverse environmental impact of I and E on aquatic organisms, USEPA has promulgated rules under section 316(b) of the Clean Water Act to set national performance standards to minimize the mortality of aquatic organisms from I and E for new and existing industrial facilities.

Section 316(b) requires that the location, design, construction, and capacity of CWISs reflect the best technology available (BTA) for minimizing adverse environmental impacts (I and E). All new or existing facilities utilizing a surface water intake structure to provide cooling water shall submit information for review as specified below. Please complete the following questions, compile the requested information, and submit the information as an attachment to this Application.
The rules and requirements referenced below can be accessed at https://www.michigan.gov/eglenpdes. Under the Information banner, click on 316(b) Cooling Water Intake Structure Guidance.

Does or will the intake structure have a design intake flow (DIF) rate (instantaneous maximum) greater than 2 MGD AND does or will the facility use at least twenty-five percent of water withdrawn exclusively for cooling purposes?
YES

In accordance with the Final Rules promulgated by USEPA under 316(b) and effective October 14, 2014, existing facilities (including those utilizing a closed-cycle recirculating cooling system) shall submit the information specified in 40 CFR 122.21(r)(2), (3), (4), (5), (6), (7), and (8).

Does this facility have an AIF greater than 125 MGD?
NO

Does this facility have a 'new unit' as defined under 40 CFR 125.92(u)? A 'new unit' may have its own dedicated cooling water intake structure, or the new unit may use an existing or modified cooling water intake structure.
YES

In addition to submitting or updating the information specified above for existing facilities, these facilities shall also submit the information specified in §122.21(r)(14).

Attach all information required above for your facility.

Attachment 6 - Intake Structure Description.pdf - 03/03/2022 02:52 PM
Comment
NONE PROVIDED

Comments:
Attachment 6 contains preliminary information, previously submitted, to meet the requirements of 40 CFR 122.21(r) and 40 CFR 125.86 for a new facility with a new cooling water intake structure. At least one (1) year prior to the start of operations, the Company shall submit a 316(b) demonstration to complete the submittal requirements of 40 CFR 122.21(r) and 40 CFR 125.86.

Storm Water

Please confirm that you have read the definition of "Surface Waters of the State" above
I Confirm

Is the storm water from this facility discharged to a surface water of the state, either directly or through another conveyance such as a municipal separate storm sewer system? NOTE: If storm water is discharged to a municipal combined storm sewer system, a municipal wastewater treatment system, or a privately-owned activated sludge treatment system, select "NO."
YES

To determine if this facility is engaged in a regulated "Industrial activity" as defined in 40 CFR 122.26(b)(14), carefully review the document available at:
CLICK HERE or go to https://www.michigan.gov/documents/deq/wrd-isw-fed-sic_398366_7.pdf

Please confirm that you have reviewed the "Primary Activities & Standard Industrial Classification (SIC) Codes" document referenced above.
I Confirm

Is this facility engaged in a regulated "Industrial activity" as defined in 40 CFR 122.26(b)(14)? To make this determination, click the link found above.
YES

Are any Industrial activities or materials exposed to storm water at this facility?
YES

Storm Water Discharge Receiving Waters

Receiving Water Name:
Lake Erie

Receiving Water Name:
Swan Creek

Does this facility have an Industrial Storm Water Certified Operator who has supervision over the facility's industrial storm water treatment and control measures?
NO

Has a Storm Water Pollution Prevention Plan (SWPPP) been developed and implemented for this facility?
NO

For information go to the link below, then click on Industrial Program, then look under Storm Water Pollution Prevention Plans.
For more information click here

This facility directly discharges storm water to a surface water of the state or MS4 from the following special-use area(s):
Secondary containment structure(s) required by state or federal law

Materials stored in secondary containment structures

PLEASE IDENTIFY ALL MATERIALS STORED WITHIN SECONDARY CONTAINMENT STRUCTURES REQUIRED BY STATE OR FEDERAL LAW:
No. 2 Fuel Oil
Sodium Hypochlorite
Mineral Oil

Has a Short-Term Storm Water Characterization Study (STSWCS) Plan been approved by EGLE for this facility?
NO

Additional Information

NONE PROVIDED

Comment

NONE PROVIDED

PFAS

"Surface waters of the state" means all of the following: The Great Lakes and their connecting waters, all inland lakes, rivers, streams, impoundments, open drains, wetlands, and other surface bodies of water within the confines of the state but does not include drainage ways and ponds used solely for wastewater conveyance, treatment, or control.

1. Is this facility known to have PFOS and/or PFOA present in wastewater discharged to surface waters of the state?
NO

2. Is this facility a landfill for solid or hazardous waste with a discharge of leachate to a surface water of the state?
NO

3. Is this facility a metal finisher that discharges wastewater associated with this activity to a surface water of the state?
NO

4. Is the discharge from the remediation of a contaminated site to a surface water of the state?
NO

5. Does the facility manufacture paper, corrugated paper, cardboard, paperboard, or packaging paper (coated or uncoated), and discharge wastewater associated with this activity to a surface water of the state?
NO

6. Does the facility conduct car washing as all or part of its operations and discharge car wash wastewater to a surface water of the state?
NO

7. Is this facility a commercial industrial laundry that discharges wastewater associated with this activity to a surface water of the state?
NO

8. Is this facility a chemical manufacturer with a discharge of wastewater associated with this activity to a surface water of the state?
NO

9. Has Aqueous Film-Forming Foam (AFFF) ever been used at the facility for training or testing, or to respond to a fire emergency? Has AFFF ever been stored at this facility? If yes to either, please select "YES."
NO

10. Does this facility manufacture, formulate, or mix paints/pigments and discharge wastewater from these operations to a surface water of the state?
NO

11. Does this facility have a discharge from a leather or hide tanning/finishing operation to a surface water of the state?
NO

12. Does this facility perform carpet and/or upholstery cleaning and discharge wastewater from these operations to a surface water of the state?
NO

13. Is the facility a carpet, rug, or textile manufacturer that discharges wastewater associated with this activity to a surface water of the state?
NO

14. Is this facility a centralized waste treater? Centralized Waste Treaters treat or recover metal-bearing, oily, and organic wastes, wastewater, or used material received from off site, and are regulated under 40 CFR Part 437.
NO

15. Does this facility apply a stain-, dirt-, water-, or fire-resistant coating and/or protectant, and discharge wastewater associated with this activity to a surface water of the state?
NO

Other Information

Comments (As needed)
The following documents are attached to this application:
- Cover Letter
- Attachment 1- Fermi 3 Water Use Diagram & Supplemental Information
- Attachment 2 - Fermi 3 Narrative Water Use & Supplemental Information
- Attachment 3 - Site Plan Fig 2.1-4 ER Rev 2
- Attachment 4 - Laboratory Analyses
- Attachment 5 - WTA
- Attachment 6 - Intake Structure Description

Additional Documents (As needed)

Fermi 3 NPDES Permit Renewal Application - cover letter.pdf - 03/11/2022 10:16 AM
Attachment 1 - Fermi 3 Water Use Diagram & Supplemental Information.pdf - 03/11/2022 10:17 AM
Attachment 2 - Fermi 3 Narrative Water Use & Supplemental Information.pdf - 03/11/2022 10:37 AM
Attachment 3 - Site Plan Fig 2.1-4 ER Rev 2.pdf - 03/11/2022 10:39 AM
Attachment 4 - Laboratory Analyses.pdf - 03/11/2022 10:39 AM
Attachment 5 - WTA.pdf - 03/11/2022 10:40 AM
Attachment 6 - Intake Structure Description.pdf - 03/11/2022 10:40 AM

Comment
NONE PROVIDED

Application Fee

Refer to page 2 of your existing NPDES permit to determine which application fee applies to your facility. If the Annual Permit Fee Classification identified on page 2 of your existing NPDES permit includes the word "Major" (e.g., Industrial-Commercial Major, Municipal Major), select "Major" from the drop-down menu below. If the word "Major" does not appear in the Annual Permit Fee Classification identified on page 2 of your existing NPDES permit, select "Minor" from the drop-down menu.
Major

Please note, if you mistakenly select the incorrect fee, underpayments result in the application being administratively incomplete and if you over pay, refunds for the overpayment take additional time to process. Also, only pay the NPDES application fee one time: If you are prompted to pay when REVISING a previously submitted application, do not pay the application fee a second time.

Fee Amount
750

Attachments

Date	Attachment Name	Context	User
3/11/2022 10:40 AM	Attachment 6 - Intake Structure Description.pdf	Attachment	Marcela Orlandea
3/11/2022 10:40 AM	Attachment 5 - WTA.pdf	Attachment	Marcela Orlandea
3/11/2022 10:39 AM	Attachment 4 - Laboratory Analyses.pdf	Attachment	Marcela Orlandea
3/11/2022 10:39 AM	Attachment 3 - Site Plan Fig 2.1-4 ER Rev 2.pdf	Attachment	Marcela Orlandea
3/11/2022 10:37 AM	Attachment 2 - Fermi 3 Narrative Water Use & Supplemental Information.pdf	Attachment	Marcela Orlandea
3/11/2022 10:32 AM	Attachment 2 - Fermi 3 Narrative Water Use & Supplemental Information.pdf	Attachment	Marcela Orlandea
3/11/2022 10:17 AM	Attachment 1 - Fermi 3 Water Use Diagram & Supplemental Information.pdf	Attachment	Marcela Orlandea
3/11/2022 10:16 AM	Fermi 3 NPDES Permit Renewal Application - cover letter.pdf	Attachment	Marcela Orlandea
3/11/2022 10:04 AM	Attachment 4 - Laboratory Analyses.pdf	Attachment	Marcela Orlandea
3/3/2022 2:52 PM	Attachment 6 - Intake Structure Description.pdf	Attachment	Marcela Orlandea

Date	Attachment Name	Context	User
3/3/2022 2:52 PM	Attachment 5 - WTA.pdf	Attachment	Marcela Orlandea
3/3/2022 2:50 PM	Attachment 3 - Site Plan Fig 2.1-4 ER Rev 2.pdf	Attachment	Marcela Orlandea
3/3/2022 2:43 PM	Attachment 1 - Fermi 3 Water Use Diagram & Supplemental Information.pdf	Attachment	Marcela Orlandea

Attachment 1 – Fermi 3 Water Use Diagram

Figure 3.3-1,

Fermi 3 Environmental Report, Rev. 2 (pages: 3-21 through 3-23)

Figure 3.3-1 Water Use Diagram (Sheet 1 of 3)

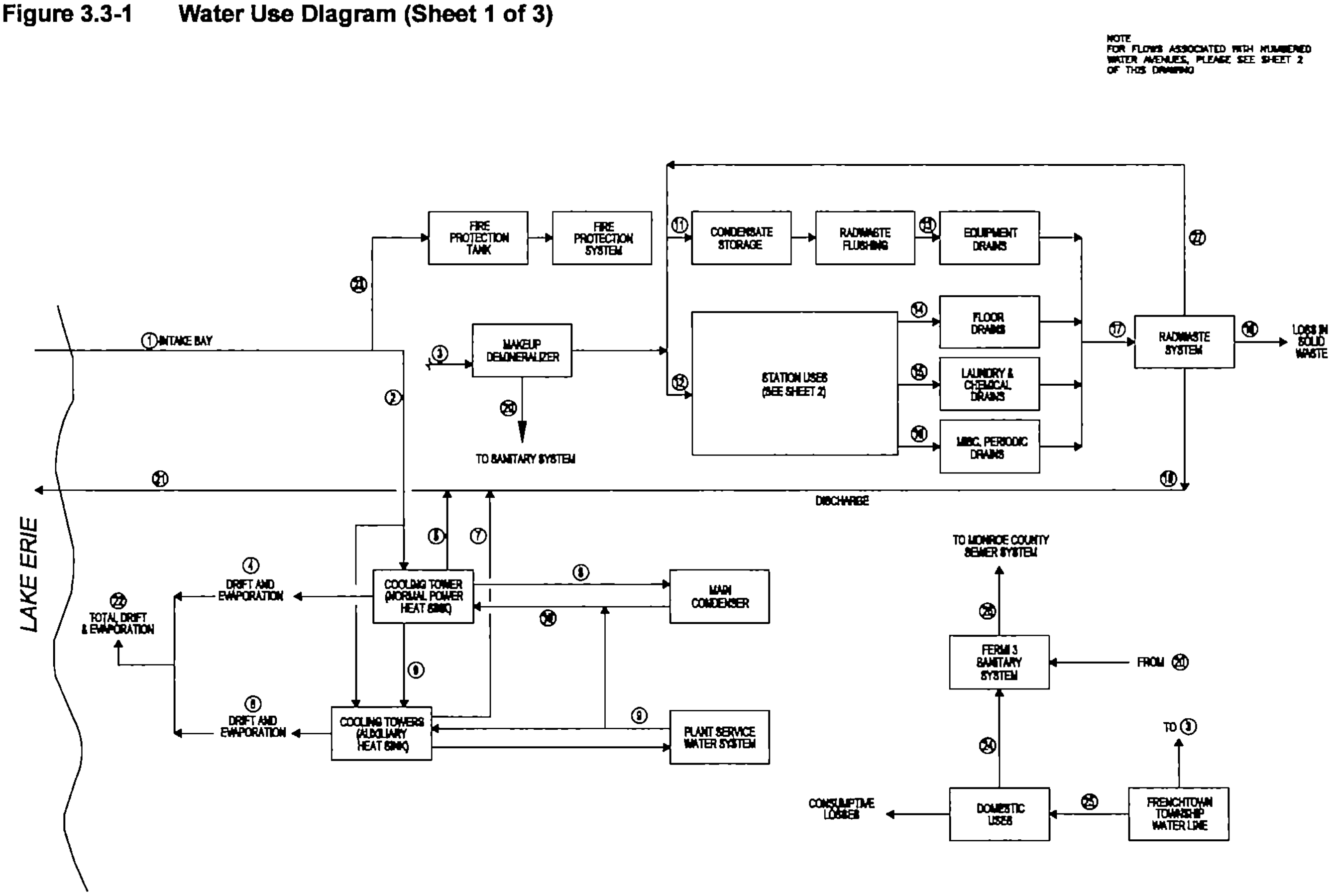


Figure 3.3-1 Water Use Diagram (Sheet 2 of 3)

Flow	Description	Value (gpm) Maximum Normal Power Operation[1] Discharged Radwaste	Value (gpm) Minimum Normal Power Operation[2] Discharged Radwaste	Value (gpm) Average Normal Power Operation[3] Discharged Radwaste	Value (gpm) Average Shutdown Operation Discharged Radwaste
1	Total Makeup Water Intake	34,264	23,780	28,993	1,166
2	Cooling Tower Makeup Water	34,234	23,750	28,963	1,136
3	Demineralizer Makeup Water	160	160	160	639
4	Normal Power Heat Sink Drift & Evaporation	17,124	11,882	14,488	0
5	Normal Power Heat Sink Discharge	17,110	11,868	14,474	0
6	Auxiliary Heat Sink Drift & Evaporation	0	0	0	569
7	Auxiliary Heat Sink Discharge	0	0	0	567
8	Inflow to Main Condenser	684,000	684,000	684,000	0
9	Total Plant Service Water System Flow	40,000	40,000	40,000	40,000
10	Total Circulating Water System Flow	724,000	724,000	724,000	0
11	Inflow to Condensate Storage	58	58	58	232
12	Inflow to Station Uses	49	49	49	196
13	Outflow to Equipment Drains	58	58	58	232
14	Outflow to Floor Drains	8	8	8	30
15	Outflow to Laundry & Chemical Drains	24	24	24	95
16	Outflow to Miscellaneous Periodic Drains	18	18	18	71
17	Inflow to the Radwaste System	107	107	107	428
18	Loss in Solid Radwaste	2	2	2	9
19	Radwaste Discharge (Liquid Radwaste Loss)	105	105	105	419
20	Makeup Demineralizer Blowdown	53	53	53	211
21	Total Discharge	17,215	11,973	14,579	987
22	Total Drift & Evaporation	17,124	11,882	14,488	569
23	Fire Protection Uses	30	30	30	30
24	Potable Water Discharge to Sewer	200	35	35	47
25	Domestic Uses	200	35	35	47
26	Total Discharge to Monroe County sewer system	253	88	88	258
27	Liquid Radwaste Recycled	0	0	0	0

Station Water Uses.

Standby Liquid Control System
Reactor Component Cooling Water System
Process Sampling System process use
HVAC system
Liquid Waste System chemical addition and line flushing
Turbine Component Cooling Water System
Auxiliary Boiler System
Isolation Condenser/Passive Containment Cooling Pool
Solid Waste System for line flushing
Chilled Water System
Post Accident Sampling station flushing

Figure 3.3-1 Water Use Diagram (Sheet 3 of 3)

Flow	Description	Value (gpm) Maximum Normal Power Operation[1] Recycled Radwaste	Value (gpm) Minimum Normal Power Operation[2] Recycled Radwaste	Value (gpm) Average Normal Power Operation[3] Recycled Radwaste	Value (gpm) Average Shutdown Operation Recycled Radwaste
1	Total Makeup Water Intake	34,264	23,780	28,993	1,166
2	Cooling Tower Makeup Water	34,234	23,750	28,963	1136
3	Demineralizer Makeup Water	3	3	3	13
4	Normal Power Heat Sink Drift & Evaporation	17,124	11,882	14,488	0
5	Normal Power Heat Sink Discharge	17,110	11,868	14,474	0
6	Auxiliary Heat Sink Drift & Evaporation	0	0	0	569
7	Auxiliary Heat Sink Discharge	0	0	0	567
8	Inflow to Main Condenser	684,000	684,000	684,000	0
9	Total Plant Service Water System Flow	40,000	40,000	40,000	40,000
10	Total Circulating Water System Flow	724,000	724,000	724,000	0
11	Inflow to Condensate Storage	58	58	58	232
12	Inflow to Station Uses	49	49	49	196
13	Outflow to Equipment Drains	58	58	58	232
14	Outflow to Floor Drains	8	8	8	30
15	Outflow to Laundry & Chemical Drains	24	24	24	95
16	Outflow to Miscellaneous Periodic Drains	18	18	18	71
17	Inflow to the Radwaste System	107	107	107	428
18	Loss in Solid Radwaste	2	2	2	9
19	Radwaste Discharge (Liquid Radwaste Loss)	0	0	0	0
20	Makeup Demineralizer Blowdown	1	1	1	4
21	Total Discharge	17,110	11,868	14,474	567
22	Total Drift & Evaporation	17,124	11,882	14,488	569
23	Fire Protection Uses	30	30	30	30
24	Potable Water Discharge to Sewer	200	35	35	47
25	Domestic Uses	200	35	35	47
26	Total Discharge to Monroe County sewer system	201	36	36	52
27	Liquid Radwaste Recycled	105	105	105	419

1 Summer months (Design/maximum)
2 Winter months (January/minimum)
3. Spring and fall months (Average)

Attachment 2 – Water Use Narrative and Supplemental Information

Water Use Narrative (1 page)

Section 3.3 - Plant Water Use, Fermi 3 Environmental Report, Rev. 2
(5 pages: 3-16 through 3-20)

Section 3.4 - Cooling System, Fermi 3 Environmental Report, Rev. 2
(13 pages: 3-24 through 3-36)

Section 3.6 - Nonradioactive Waste Systems, Fermi 3 Environmental Report, Rev. 2
(8 pages: 3-42 through 3-49)

Fermi 3 Water Use Narrative

Fermi 3 Power Plant will be a closed-cycle steam electric power generation unit with a net electrical output of approximately 1535 $\pm$ 50 MWe. Lake Erie will provide water for cooling and operational uses. Potable water will be used as makeup water for the demineralizer and for various station uses. Attachment 1 details the water uses, discharges and recycled flows.

The predominant uses of Lake Erie water at the Fermi 3 Power Plant will be as cooling water in the Circulating Water System and in the Plant Service Water System. The maximum intake has been calculated to be approximately 50 million gallons per day (MGD). A small portion of the intake water, 43,200 gallons per day (gpd), will be used in the Fire Protection System. The maximum daily discharge to Lake Erie, which includes cooling water and miscellaneous low volume wastes, has been calculated to be approximately 25 MGD. The low volume wastes will include equipment drains and floor drains that will be treated in the plant's Radwaste System, with a calculated discharge of about 0.2 MGD. The low volume wastes that cannot be treated and discharged from the Radwaste System will be disposed of in accordance with applicable local, state and federal regulations. Approximately half (~ 25 MGD) of the cooling and plant service water is used consumptively and will be discharged as drift and evaporation via the cooling tower and reservoir.

A detailed description of all plant water uses and discharges are contained in the Fermi 3 Combined License Application on pages 3-16 to 3-20, 3-24 to 3-36, and 3-42 to 3-49, all of which are attached.

3.3 Plant Water Use

Fermi 3 requires water for cooling and operational uses. Lake Erie provides water for plant cooling, including the normal power heat sink (NPHS) and auxiliary heat sink (AHS).

Subsection 3.3.1 discusses water consumption and discharges by the various plant components and systems, including the NPHS, AHS, Ultimate Heat Sink (UHS), potable water and sanitary waste, demineralized water, and fire protection. Additionally, Figure 3.3-1 presents a water use diagram for Fermi 3 outlining normal plant power operating conditions as well as non-power/shutdown conditions.

Subsection 3.3.2 discusses methods of water treatment used in the plant and discharged back to the receiving water body (i.e., Lake Erie). Plant service water treatment is discussed in this subsection and also further discussed in FSAR Subsection 9.2.1. Makeup water is also discussed in this subsection, as well as in FSAR Subsection 9.2.3.

3.3.1 Water Consumption

Plant water systems discussed in this subsection include the CIRC, PSWS, Station Water System (SWS), Potable Water System (PWS), Sanitary Waste Discharge System (SWDS), demineralized system, and Fire Protection System (FPS). The CIRC, PSWS, SWS, and FPS share a common intake from Lake Erie. Potable water is being supplied for the demineralized system from the Frenchtown Township municipal water supply. The design of the intake structure is based on record low water levels for Lake Erie, thus even under these conditions plant operation is able to carry on normally. Under normal conditions, Lake Erie water levels remain relatively constant except during extreme seiche events. The intake structure is not designed for extreme seiche events. During extreme seiche events, the water supply to the SWS could be degraded and the unit operationally controlled to limit makeup requirements. The Ultimate Heat Sink (UHS) for Fermi 3, described in FSAR Subsection 9.2.5, contains a separate water supply for safety-related cooling. Lake Erie is not used for safety-related water withdrawal for Fermi 3. Therefore, a seiche event will not affect a safety-related water supply for Fermi 3. This is discussed further in Subsection 3.4.2.1. The SWS provides makeup water to the NPHS and AHS cooling tower basins, and the FPS. The SWS is further described in FSAR Subsection 9.2.10. Various drains in the plant produce effluent liquid radwaste. This flow can either be treated and discharged to Lake Erie, or recycled. Blowdown from several sources, including both NPHS and AHS cooling towers; optional treated liquid radwaste, including chemical waste is combined and shares a common discharge to Lake Erie. The demineralized water waste is discharged to the Fermi 3 SWDS.

3.3.1.1 Circulating Water System and Normal Power Heat Sink

The CIRC is used to remove the waste heat from the main condenser discharging to the NPHS. A more detailed description of the CIRC is presented in Subsection 3.4.1.1. During normal operation the NPHS may provide cooling to the AHS loads. Makeup water to the NPHS cooling tower replenishes water losses due to evaporation, drift, and blowdown. Figure 3.3-1 shows the water use (makeup, blowdown, evaporation, etc.) by the NPHS for Fermi 3. Figure 3.3-1 describes the flow rates for power and shutdown operations. Power operations are further subdivided into the

maximum heat load (expected during summer months), minimum heat load (expected during the winter months), and the average heat load (expected during the spring and fall months). The maximum makeup water flow is approximately 34,000 gpm for the NPHS.

The maximum blowdown from the NPHS cooling tower is approximately 17,000 gpm, and the minimum blowdown is approximately 12,000 gpm. The annual average blowdown flow is approximately 14,000 gpm. The maximum blowdown value represents the design condition, at the warmest temperatures. The minimum value represents winter conditions under the coldest temperatures, which occur in the month of January. The average value represents the average of all monthly flows; this value would be representative of flows in the spring or fall months. Table 3.4-1 outlines the monthly variation in evaporation, blowdown and makeup flows. The blowdown is directed to an outfall that discharges into Lake Erie.

3.3.1.2 **Plant Service Water System and Auxiliary Heat Sink**

The PSWS provides nonsafety-related cooling to the Reactor Building and Turbine Building systems. During operation of Fermi 3, PSWS cooling is provided by either the NPHS cooling tower or the AHS cooling towers. While in shutdown condition, the PSWS is cooled by the AHS cooling towers. The AHS requires makeup water to replenish water losses due to evaporation, drift, and blowdown. Blowdown from the AHS is mixed with the NPHS cooling tower blowdown. The flow requirements for makeup flow for the PSWS are a maximum of approximately 1100 gpm. The makeup water requirements are included in the flow values stated in Subsection 3.3.1.1. A more detailed description of the PSWS is provided in Subsection 3.4.1.3.

3.3.1.3 **Ultimate Heat Sink**

The ESBWR design has no separate emergency water cooling system. The UHS function is provided by safety systems integral and interior to the reactor plant. These systems ultimately use the atmosphere as the eventual heat sink. These systems do not rely on cooling towers, basins, or cooling water intake/discharge structures external to the reactor plant. (Reference 3.3-1)

3.3.1.4 **Potable Water and Sanitary Waste Discharge System**

The PWS and SWDS are designed to provide potable water supply and sewage treatment necessary for normal plant operation and shutdown periods. The source of the potable water supply is the Frenchtown Township municipal water system. The PWS is designed to supply up to 200 gpm of potable water during peak demand period with a monthly average usage of 35 gpm, as outlined on Figure 3.3-1. The Demineralized water waste and the effluent from the auxiliary boiler are routed to the Fermi 3 SWDS. Sanitary waste is routed to the Frenchtown Township Sewage Treatment Facility.

3.3.1.5 **Demineralized Water**

The required flow for makeup water to the demineralization subsystem when using the option of discharging liquid radwaste to Lake Erie, is expected to be a monthly average of 160 gpm, with short term maximum flow expected to be 639 gpm during outages. The required flow for makeup water to the demineralization subsystem when using the option of recycling liquid radwaste is bounded by the makeup flow with liquid radwaste discharged to Lake Erie. The option to operate

with liquid radwaste recycled supports zero discharge of liquid radwaste. The makeup water is supplied from the Frenchtown Township water line as depicted on Figure 3.3-1. Flows for various modes of operation, as well as liquid radwaste effluent are also outlined on this figure.

3.3.1.6 Fire Protection

Fire protection water is provided to the FPS from onsite storage tanks that have makeup supplied from the SWS. After the FPS is initially filled, maximum usage is about 30 gpm for activities such as maintaining the system filled and pressurized and periodic testing.

3.3.2 Water Treatment

As outlined in Subsection 3.3.1, plant makeup water is taken from a common intake from Lake Erie. This intake is treated with sodium hypochlorite, a biocide/algaecide, thus disseminating to the appropriate water use systems. Sodium hypochlorite is used to eradicate the presence of biologicals in the systems, both in the form of plant life such as algae and animals such as zebra mussels and corbicula. During select periods in spring and fall, sodium hypochlorite levels are elevated to ensure the absence of zebra mussels.

The SWS supplies makeup water to the PSWS, CIRC, and FPS. There are viable treatment options for mussel control in these systems, which include: chlorination and thermal shock treatment. The chlorination option will consist of isolation of the PSWS and elevation of chlorine levels within the PSWS for a specific duration of time. This will cause the eradication of any zebra mussel population within the system. Upon returning the PSWS to service, the chlorinated PSWS water will be combined with the much larger portion of blowdown from the NPHS, thus diluting the chlorine to acceptable discharge levels. The thermal shock treatment option would consist of raising the temperature of the CIRC to greater than 95°F for at least 60 minutes. This method is less practical for the PSWS due to system thermal limitations.

3.3.2.1 Station Water System

The SWS draws water from Lake Erie as the source of makeup to the plant. The SWS is described in FSAR Subsection 9.2.10. Makeup water to the plant is treated with a biocide, sodium hypochlorite, as it enters through the SWS pump house intake. Water treatment chemistry is provided in Table 3.3-1.

3.3.2.2 Circulating Water

The CIRC provides cooling water for removal of the power cycle heat from the main condensers and transfers this heat to the NPHS. The CIRC is described in FSAR Section 10.4. Chemical additions are made to both influent and effluent flows. System chemistry control is provided by the incorporation of an injection system at the inlet to the condenser that introduces a biocide, corrosion inhibitor, and scale inhibitor. The necessity of using a biocide is outlined in Subsection 3.4.2.2. The corrosion inhibitor is needed in order to reduce the effects of corrosion on the piping and condenser. The scale inhibitor is needed to reduce the build-up of scaling that could affect the efficiency of the condenser. Quantities and identification of these various chemicals are shown in Table 3.3-1. Discharge must also be treated before exiting to Lake Erie. Dehalogenation must occur in order to maintain oxidant within reasonable discharge limits. As discussed in Section 1.2, permits, e.g.,

National Pollution Discharge Elimination System (NPDES) permit and Section 401 Water Quality Certification, will be obtained for the discharge from Fermi 3. Additionally, Section 5.2 provides a discussion on effluent limitations and permit conditions.

3.3.2.3 Plant Service Water System

PSWS chemistry control is maintained in a similar fashion to that of the CIRC, i.e., with the addition of biocide, corrosion inhibitor, scale inhibitor, as well as dispersant chemicals to break up sedimentation when lake water is highly turbid. Water treatment chemistry is provided in Table 3.3-1. There are no expected changes to water treatment operating procedures based on seasonal variations. The PSWS is described in FSAR Subsection 9.2.1.

3.3.2.4 Potable Water and Sanitary Waste

The potable water for the Fermi site is supplied from the Frenchtown Township municipal water system. This water supply does not require any additional chemical treatment or additives. The sanitary waste system effluent is discharged to the Frenchtown Township Sewage Treatment Facility without addition of chemical treatments. FSAR Subsection 9.2.4 provides further description of the PWS and SWDS.

3.3.3 References

3.3-1 GE-Hitachi Nuclear Energy, "ESBWR Design Control Document – Tier 2," Revision 6, August 2009.

Table 3.3-1 Chemical Additives for Water Treatment

System/Injection Point	Chemical	Approximate Usage	
Circulating Water System/ Cooling tower basin/ Station Water System	Biocide/Algaecide – Sodium Hypochlorite (15%)	1200 gal/week	Normal Power Operating Conditions/ Shutdown Conditions
Circulating Water System/ Makeup water line discharge	Corrosion Inhibitor - Sodium Silicate	400 gal/day	Normal Power Operating Conditions/ Shutdown Conditions
Circulating Water System / Makeup water line discharge	Scale Inhibitor/Dispersant	220 gal/day	Normal Power Operating Conditions/ Shutdown Conditions
Circulating Water System blowdown	Dehalogenation – Sodium Bisulfite	175 gal/day	Normal Power Operating Conditions/ Shutdown Conditions

3.4 Cooling System

Fermi 3 requires cooling water for the normal power heat sink in the CIRC and the auxiliary heat sink in the PSWS. Thermal energy is transferred via air or water through these heat sinks. Major system components include the intake and discharge portions.

Subsection 3.4.1 gives a description of the various cooling water systems and the operational modes for Fermi 3. The NPHS is discussed in this section, as well as in Section 3.3 and Subsection 5.3.2. Discharge to the air is also discussed in this section, as well as in Subsection 5.3.3.

Subsection 3.4.2 provides a description of the major components of the systems. Major components are contained within the intake structure and discharge piping. Further clarification of the intake structure is provided on Figure 3.4-1 and Figure 3.4-2. Additional discussion on the impacts of the discharge can be found in Subsection 5.3.2 and Subsection 5.3.3.

3.4.1 Description and Operational Modes

3.4.1.1 Circulating Water System

The CIRC provides cooling water during startup, normal plant operations, and hot shutdown for removal of power cycle heat from the main condensers and rejects this heat to the NPHS. The NPHS is comprised of a natural draft cooling tower. The main condensers contribute the majority of the heat to the NPHS with additional heat load introduced by the PSWS.

The main condenser rejects heat to the atmosphere at a rate of approximately 9.883×10^9 Btu/hr during normal full-power operation. Water from the NPHS basin is pumped through the main condenser and then back to the cooling tower where heat, transferred to the cooling water in the main condenser, is dissipated to the environment (the atmosphere) by evaporation.

As a result of the heat dissipation process, some water is evaporated. This results in an increase in the solids level in the NPHS cooling tower. To control solids levels or concentrations, a portion of the recirculated water is discharged. In addition to this blowdown from the CIRC, and evaporative losses, a small percentage of water in the form of droplets (drift) is lost from the cooling tower. Water pumped from Lake Erie via the intake structure is used to replace water lost by evaporation, drift and blowdown from the cooling tower. Blowdown water is returned to Lake Erie via an outfall into the lake (Subsection 3.4.2). A portion of the waste heat is thus dissipated to Lake Erie through the blowdown process.

The maximum, minimum and average Fermi 3 blowdown flow rates from the CIRC during normal full power operation are provided in Figure 3.3-1. Table 3.4-1 provides the monthly values for evaporation, blowdown, and makeup for the NPHS. The maximum temperature of the blowdown after passing through the NPHS is 86°F at the discharge to Lake Erie. The heat rejected to Lake Erie via blowdown is estimated based on these maximum blowdown flow and temperature conditions (Subsection 5.3.2). During other operating modes, heat dissipation to the environment is less than the bounding values for the normal full-power operational mode for the NPHS, except

when the Turbine Bypass System (TBS) is in operation. In this condition, it is possible for the temperature of the discharge to rise to 96°F.

3.4.1.2 Station Water System

The SWS draws water from Lake Erie through an intake bay into the pump house located on the west shore of Lake Erie. The SWS provides makeup water to various plant systems. For example, the SWS provides makeup water to the NPHS cooling tower basin for the CIRC and to the AHS cooling tower basin for the PSWS. The pump configuration consists of three 50 percent capacity Plant Cooling Tower Makeup System (PCTMS) pumps that supply makeup to the cooling towers, and two 100 percent capacity Pretreated Water Supply System (PWSS) pumps. The PWSS pumps are capable of supplying makeup to the FPS as well as the AHS in shutdown conditions. The PCTMS pump configuration allows for one pump to be out of service and the other two maintaining design flow. This is also discussed in Subsection 3.4.2.1 and FSAR Subsection 9.2.10. The AHS can be used in conjunction with the NPHS during normal power operation. However during certain shutdown conditions, heat rejection is performed entirely with the AHS. The AHS operates during startup, hot shutdown, stable shutdown, cold shutdown, and refueling.

3.4.1.3 Plant Service Water System

The PSWS provides cooling water to the Turbine Component Cooling Water System (TCCWS) heat exchangers and the Reactor Component Cooling Water System (RCCWS) heat exchangers and rejects the heat back to the NPHS and/or the AHS during normal power operations. During shutdown conditions, the heat is rejected to the AHS. Further discussion of the PSWS can be found in FSAR Subsection 9.2.1. A simplified flow diagram is provided in FSAR Figure 9.2-205. Subsection 3.3.1.2 further discusses flows associated with PSWS, and Figure 3.3-1 outlines flow paths and values for maximum, minimum and average normal power conditions and average shutdown conditions. Chemical treatment of the PSWS is discussed in Subsection 3.3.2.3 and Table 3.3-1.

3.4.1.4 Ultimate Heat Sink

The Fermi 3 ESBWR design has no separate emergency water cooling system. The UHS function is provided by safety systems integral and interior to the reactor plant. This system ultimately uses the atmosphere as the eventual heat sink. These systems do not have cooling towers, basins, or cooling water intake/discharge structures external to the reactor plant.

3.4.1.5 Discharges to Lake Erie

Lake Erie is subject to liquid discharges during plant operation. Discharge from the heat dissipation system consists of blowdown from the CIRC and PSWS, as well as optional treated liquid radwaste. The thermal aspect of the discharge is covered in this subsection. Section 3.5 and Section 3.6 complete the description of the discharge characteristics.

The rate of discharge into Lake Erie is constant under normal full power operating conditions. The discharge is approximately 17,000 gpm (Figure 3.3-1), with a maximum temperature of 86°F. Table 3.4-1 contains a summary of the monthly discharge temperatures. A discussion of thermal plume predictions is contained in Subsection 5.3.2. The discharge pipe is fortified with riprap to reduce

the effects of scouring; additional discussion of scouring can be found in Subsection 5.3.2.1.2. The current NPDES permit for Fermi 2 (Permit No. MI0037028) was renewed in 2005 with an expiration date in 2009. As discussed in Section 1.2, permits, e.g., NPDES permit and Section 401 Water Quality Certification, will be obtained for the discharge from Fermi 3. The discharge of chemicals that have been added to various systems as treatments such as biocide, corrosion inhibitor, and scale inhibitor are closely monitored in the NPDES permit, as well as the presence of metals and the temperature of effluent flow. Section 3.6 provides discussion and comparison to regulatory limitations on effluent flow from Fermi 3.

3.4.1.6 **Discharges to Air**

At the normal full-power design condition, the natural draft tower requires a maximum of 5.6×10^7 cfm of ambient air to dissipate about 10.72×10^9 Btu/hr of waste heat from the natural draft cooling tower at Fermi 3. Heat dissipated by the natural draft cooling tower includes contributions from the main condenser and the PSWS system. The heat load used for determining parameters associated with the natural draft cooling tower is conservative relative to the design heat loads (Reference 3.4-2).

The cooling tower used at Fermi 3 provides the only plant effluents with a potential for influencing local meteorology. The effluent types of concern are commonly described as visible plumes (fog) and cooling tower drift. Cooling tower drift is limited to no greater than 0.001 percent of the total tower water flow. Drift eliminators exist as a design feature of the natural draft cooling tower meant to reduce the volume of drift from the tower. These effluent types and their impacts on local weather are described in Subsection 5.3.3.

In addition to the heat discharged to the air, auditory discharges are considered. The noise from the NPHS is primarily the result of water splash. The sound level is estimated as being between 55 and 60 dBA at 1000 ft. Subsection 5.3.4 also discusses the estimated noise levels from the NPHS operation. The noise generated by the AHS is from water splash and fan motors. The sound level for the AHS is estimated at between 55 and 60 dBA at 1000 ft. (Reference 3.4-1)

3.4.1.7 **Operational Modes**

For the purposes of the design of the cooling systems, Fermi 3 is based on an estimated capacity factor of 96 percent (annualized). This considers a 24 month fuel cycle combined with an assumed 30-day refueling outage period. On a long term average, the heat load is 10.29×10^9 Btu/hr, which is 96 percent of the rated head load of 10.72×10^9 Btu/hr. There are six modes of plant operation; normal full-power operation, startup, hot shutdown, stable shutdown, cold shutdown and refueling. These can be generally grouped into two predominant modes, normal full power operation and shutdown operation. During normal full power operation, the NPHS, or a combination of the NPHS and the AHS, handle the heat dissipation to the atmosphere. Under normal full power operation, the heat load is rejected either entirely by the NPHS or by both the NPHS and the AHS. The AHS is capable of exchanging 2.98×10^8 Btu/hr. During shutdown operations, approximately 4 percent of plant operation annually, the AHS handles heat dissipation to the atmosphere.

3.4.2 Component Description

3.4.2.1 Intake System

The lake water intake and makeup water system is composed of two main parts: a wet pit pump house structure containing five vertical wet pit pumps, trash racks and traveling screens, and piping routed from the pump house structure to the cooling tower basin and the plant.

The SWS draws lake water via an intake bay (Figure 3.4-1 and Figure 3.4-2) from Lake Erie. This inlet bay is formed by two rock groins that extend 600 ft into Lake Erie. The intake bay is periodically dredged to maintain appropriate operating conditions.

At the inlet to the pump house structure a trash rack is positioned which is equipped with a trash rake. Trash collected from the trash racks is disposed of. There are three dual flow traveling screens arranged side by side to further prevent debris from entering the pump house. Aquatic organisms are first washed from the traveling screens using low pressure water spray. The remaining trash is then removed using high pressure wash sprays. Strainers are in place at the pump discharge and strainer backwash is directed back to Lake Erie. Strainer backwash is controlled to ensure that the limits of the applicable NPDES permit are adhered to.

The SWS pumps take suction from an intake bay through the makeup water pump house. The three PCTMS pumps supply makeup water to the cooling tower basins. Each pump has capacity to supply 50 percent of the total flow requirements. Two pumps are normally operated and the third is reserved for standby operation. This ensures makeup flow can be delivered in the event that one pump is out of service. The two operating pumps are capable of delivering the maximum cooling tower makeup water requirement of approximately 34,000 gpm, (Figure 3.3-1). The two PWSS pumps supply makeup water to the FPS under normal power operating conditions. They are 100 percent capacity pumps capable of supplying the necessary makeup water to the AHS and FPS in shutdown conditions.

The velocity of the water flowing through the dual flow intake traveling screens is approximately 0.5 fps at record low lake water levels, and no more than 0.5 fps under all operating conditions, as required by Section 316(b) of the Clean Water Act. The mesh size on each traveling screen is ⅜-inch. Each screen is capable of handling approximately 20,000 gpm of flow. The flow is designed to be sufficiently low that fish are not caught or trapped against the traveling screens. Fish which have entered the intake bay to this point are free to return to the lake in the same way they came. The pump house intake structure is sized such that the formation of vortices or other abnormal flow conditions that would interfere with the operation of the pumps is minimized. If fouling occurs, the screens are cleaned by backwashing. The formation of frazil ice on the screens is prevented by the low intake flow rate and by recirculating warmed water that has been rerouted from the discharge. A profile view of the intake screens and pumps suction is shown on Figure 3.4-2. This system is designed such that the intake structure has a minimal impact on the wildlife present in Lake Erie. This is consistent with good engineering design and environmental practices.

The addition of a biocide/algaecide, sodium hypochlorite, takes place as water enters the pump house structure. Once the water has passed through the trash rack and the traveling screens, a diffuser injects the biocide into the flow before the flow proceeds into the pump suction. Further chemical treatments are discussed in Subsection 3.3.2.

The elevation reference in use at Fermi is NAVD88. The elevation of the bottom of the intake bay at the entrance to the pump house is 559 ft. The record low level of Lake Erie water is 563'-11" and the record high level is 576'-6". The elevation of the base of the bay at the location of the pump suction is 553 ft. This is more than 10 ft below the record low water level for Lake Erie, thus pump suction should not be a concern. Impacts to SWS pump suction due to seiche events are discussed in Subsection 3.3.1.

3.4.2.2 **Discharge System**

Dilution and dissipation of the discharge heat as well as other effluent constituents are affected by both the design of the discharge and the flow characteristics of the receiving water, in this case Lake Erie. Normal plant effluent flow from all sources (cooling tower blowdown, and optional treated liquid radwaste) is approximately 17,000 gpm. The NPHS cooling tower blowdown is the major contributor to the total flow, and its maximum return temperature is estimated at 86°F and the average temperature is 68°F. Table 3.4-1 contains the monthly discharge flow rates and the discharge temperatures (cold water temperature) to Lake Erie. Figure 3.4-4 and Figure 3.4-5 are used in the development of Table 3.4-1. The temperature rise across the main condenser is 31.2°F.

The 4-ft diameter discharge pipe is located approximately 1300 ft into Lake Erie to avoid recirculation. Another consideration in the length of the discharge pipe was to preclude the discharge plume from intruding on environmentally sensitive onsite areas (such as wetlands) during wind-driven rises in Lake Erie water level (seiche events). The pipe is buried in the bank as it is routed into Lake Erie where the discharge is located, below the water surface, see Figure 5.3-1. The pipe discharges through a diffuser, as described in Subsection 5.3.2.1.1.1. The analysis of the thermal plume that results from the discharge is discussed in Subsection 5.3.2.1. The analysis includes consideration of seiche events. As discussed in Subsection 3.3.1 and Subsection 5.3.2.1, due to potential for the water supply to the SWS to be degraded during extreme seiche events, the unit could be operationally controlled to limit makeup water requirements. These seiche events are relatively short-lived. As part of the operational controls in response to an extreme seiche event, the discharge could be reduced and or secured.

For a total discharge flow rate of approximately 17,000 gpm, the exit jet velocity is approximately 8.5 fps. The submerged jet mixes rapidly with the ambient lake water, accompanied by a reduction of momentum and kinetic energy through turbulent action. The environmental impact of discharged heat on Lake Erie is discussed in Subsection 5.3.2. The use of cooling towers for Fermi 3 provides good engineering design and represents the best technology available under Phase I of Section 316(a) of the Clean Water Act and also acts to greatly reduce the thermal loading to Lake Erie. Discharges from the AHS are directed to the CIRC basin. As shown in Figure 3.3-1, the discharge from the AHS is small in comparison to the NPHS discharge (less than 5 percent). When the

PSWS is operating without the CIRC operating, discharges from the AHS are controlled to ensure that the resultant thermal plume is bounded by the thermal plume from operating the NPHS.

3.4.2.3 Heat Dissipation System

The main source of heat dissipation is the NPHS. The NPHS is a natural draft cooling tower, as shown on Figure 3.4-3. The AHS consists of two mechanical draft cooling towers. The AHS is further discussed in FSAR Subsection 9.2.1.

Makeup flow to the NPHS cooling tower basin is supplied by the SWS through the intake structure located on Lake Erie. The NPHS is located approximately 2200 ft from the pump house intake structure. At the cooling tower basin, there are four CIRC pumps, each 25 percent capacity, which supply a total flow of 744,000 gpm. The flow is directed to the main condenser, and is then directed back to the cooling towers so that the heat can be rejected to the atmosphere. The cooling tower basin is located approximately 1100 ft from the main condenser.

The NPHS cooling tower discharges water to the basin, which receives makeup from Lake Erie. Intake water temperatures from Lake Erie can be seen in Subsection 2.3.1, and meteorological data can be found in Section 2.7. Cooling tower performance curves for wet bulb temperature and evaporation, as well as wet bulb and cold water temperature are seen on Figure 3.4-4 and Figure 3.4-5. The information in Table 3.4-1 is developed using these cooling tower performance curves. The design of the heat dissipation system does not present any major departures from acceptable cooling system design practices, nor does it contain any additional components for consideration, beyond the NPHS in the form of a natural draft cooling tower. This system is consistent with good engineering practices.

The PSWS and AHS are discussed in FSAR Section 9.2 and FSAR Table 9.2-201.

3.4.3 References

3.4-1 Edison Electric Institute, "Electric Power Plant Environmental Noise Guide," New York, 1978.

3.4-2 GE-Hitachi Nuclear Energy, "ESBWR Design Control Document – Tier 2," Revision 6, August 2009.

Table 3.4-1 Monthly Cooling Tower Temperatures and Flows

Month	Wet Bulb Temperature (°F)	Cold Water Temperature (°F) *	Evaporation Flow rate (gpm)	Drift Flow rate (gpm)	Blowdown Flow rate (gpm)	Makeup Flow rate (gpm)
January	23.7	53.8	11875	7.2	11867.8	23750
February	25.7	55.3	12200	7.2	12192.8	24400
March	32.3	59.4	13100	7.2	13092.8	26200
April	42.6	66	14300	7.2	14292.8	28600
May	52.7	72.7	15400	7.2	15392.8	30800
June	61.7	78.4	16300	7.2	16292.8	32600
July	65.9	81.5	16750	7.2	16742.8	33500
August	65	80.8	16700	7.2	16692.8	33400
September	58.1	76.3	16100	7.2	16092.8	32200
October	47	68.8	14800	7.2	14792.8	29600
November	37.5	62.7	13750	7.2	13742.8	27500
December	28	56.6	12500	7.2	12492.8	25000

* Cold Water temperatures are calculated based on ambient wet bulb temperatures, however the temperature of the discharge from the NPHS cooling tower basin will be maintained at 55°F or above.

Figure 3.4-1 Station Water Intake Structure

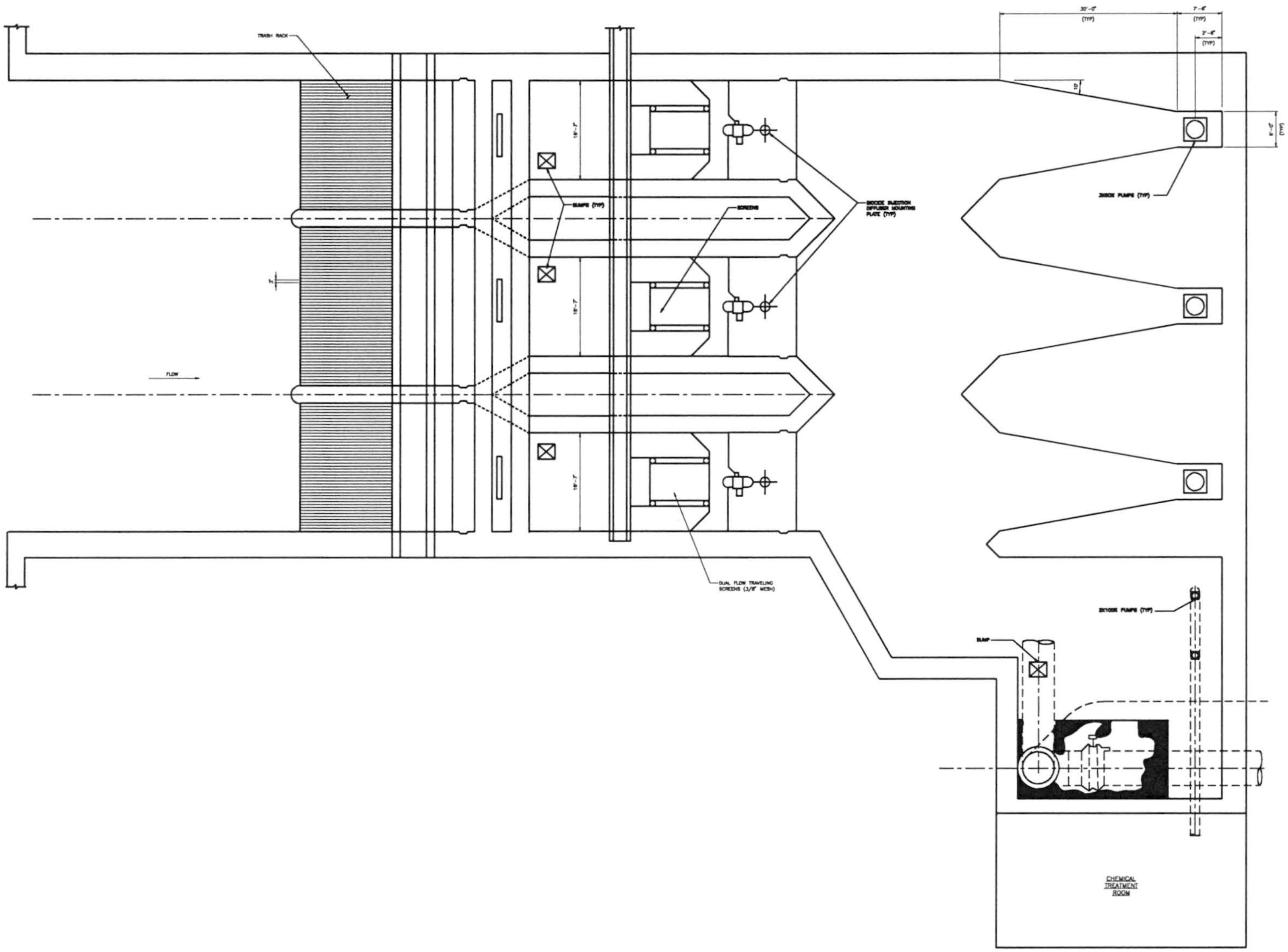


Figure 3.4-2 Station Water Intake Structure – Elevation View

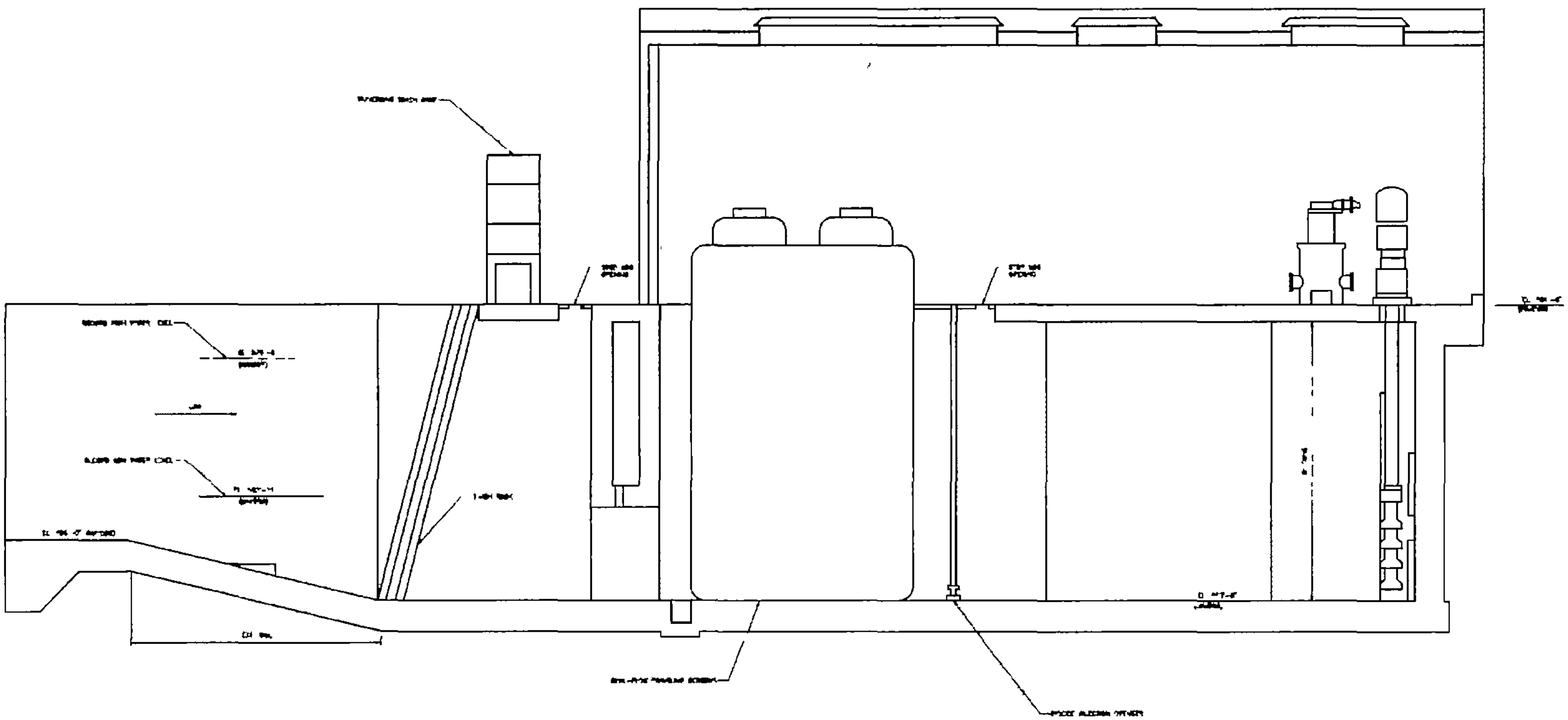


Figure 3.4-3 NPHS Cooling Tower

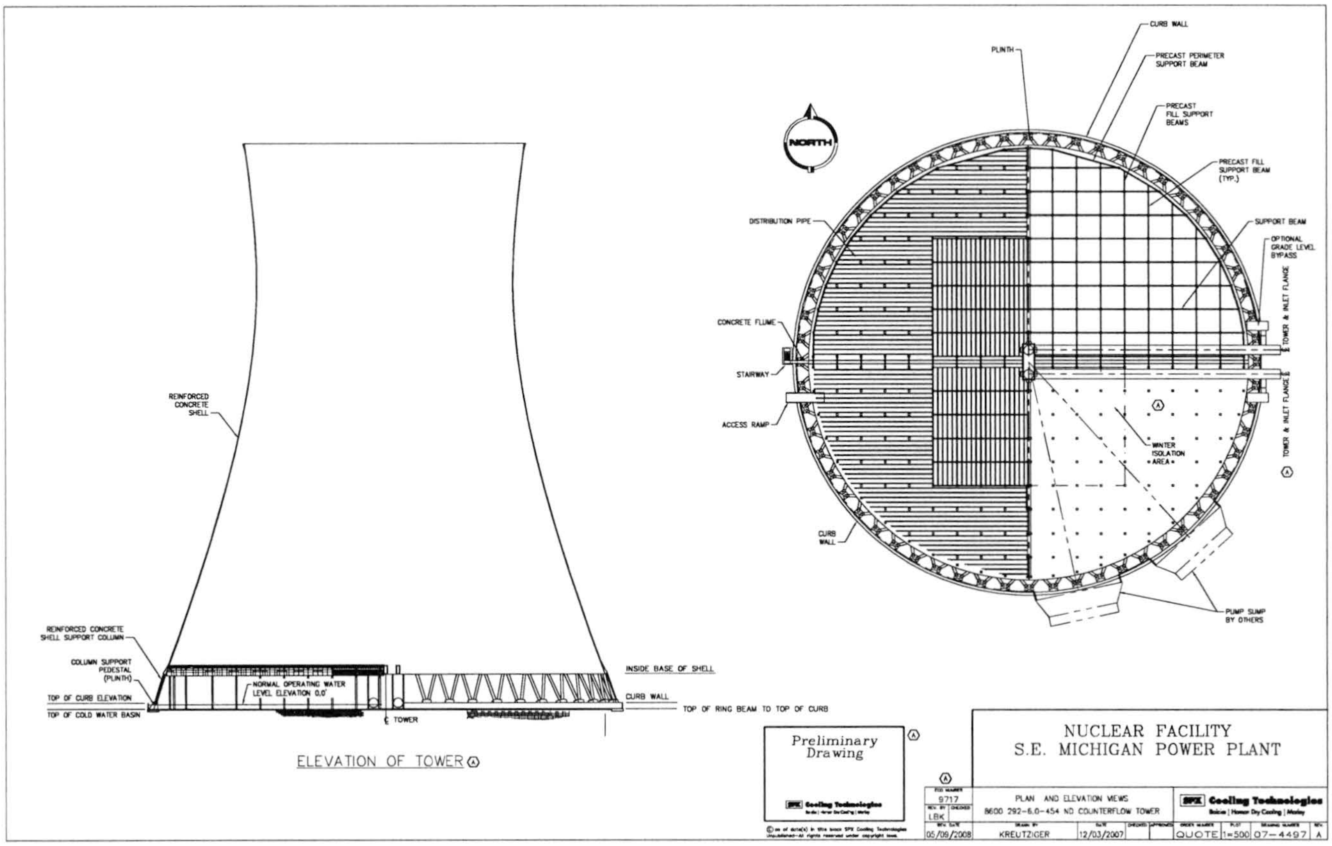


Figure 3.4-4 Cooling Tower Performance Curve

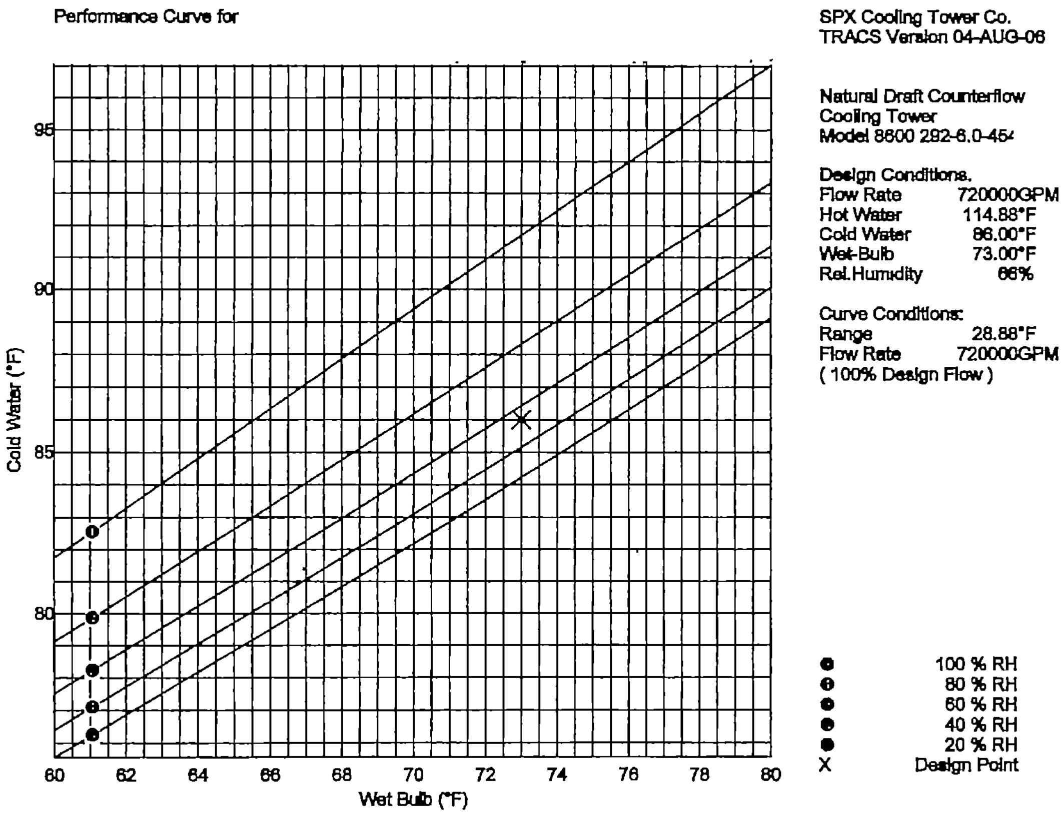


Figure 3.4-5 Cooling Tower Evaporation Curves

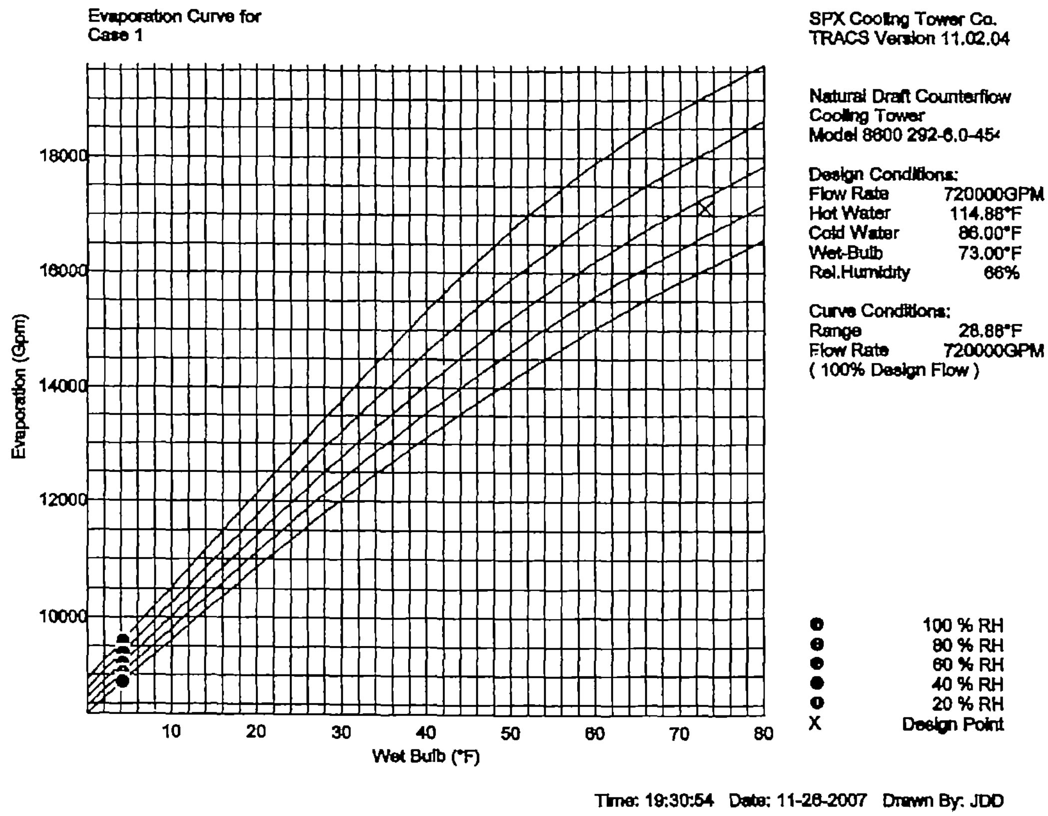
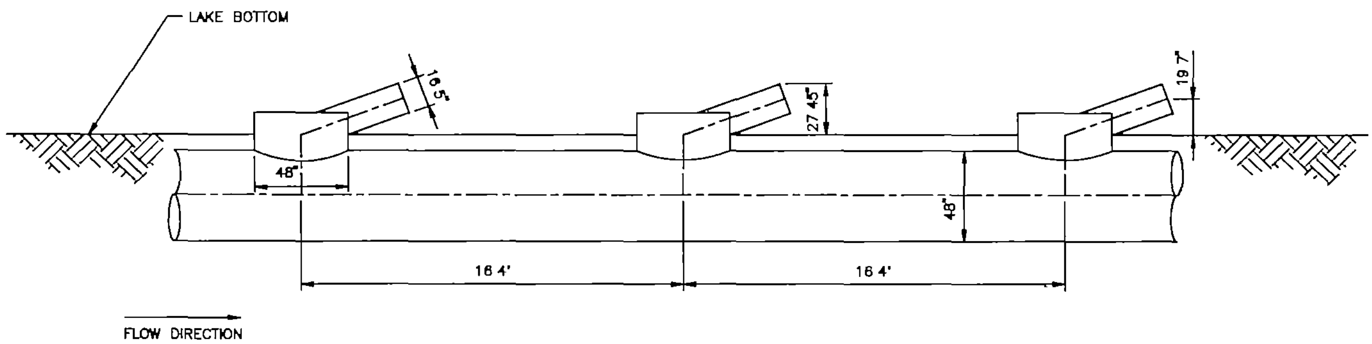


Figure 3.4-6 Outfall Diffuser Arrangement



3.6 Nonradioactive Waste Systems

The nonradioactive waste from Fermi 3 is discussed in this section. Subsection 3.6.1 describes effluent wastes expected from the CIRC, PSWS, PWS, various drains within the plant, and other miscellaneous gaseous, liquid and solid effluents. The effluent from the SWDS is discussed in Subsection 3.6.2. Subsection 3.6.3 discusses other effluent streams from Fermi 3, including gaseous effluents, stormwater, various plant drains, and other waste.

3.6.1 Effluents Containing Chemicals or Biocides

This subsection discusses the CIRC, PSWS, PWS, and other chemically treated systems, and for completeness, the FPS. The flows associated with these systems are outlined on Figure 3.3-1. Effluent flow from the Fermi site must remain within the limits outlined by the NPDES permit, or other appropriate limits as specified by the Michigan Department of Environmental Quality. As discussed in Section 1.2, permits, e.g., NPDES permit and Section 401 Water Quality Certification, will be obtained for the discharge from Fermi 3.

There are four categories of water treatment chemicals: biocide, algaecide, corrosion inhibitor, and scale inhibitor. Specific chemicals anticipated to be used are determined by site specific water conditions, based on a conservative determination. The amount of chemicals added per year in pounds is outlined in Table 3.6-1. Effluent chemical constituents from Fermi 3 are shown in Table 3.6-2. Values specified in the Fermi 2 NPDES permit include Total Suspended Solids (TSS) and Total Residual Chlorine (TRC). The TSS specified in the permit is 100 ppm as a daily maximum; the maximum concentration discharged from Fermi 3 (Table 3.6-2) is 15.9 ppm, well within acceptable permitting limits. The TRC specified in the NPDES permit is 38 ppb or less, the amount discharged from Fermi 3 is zero. The addition of sodium hypochlorite does introduce chlorine into the water; however the addition of sodium bisulfite nullifies the presence of the chlorine. Regardless of the water systems' sources or constituents, each constituent discharged to the environment would be limited (i.e., volume and concentration) by the NPDES permit as discussed in Section 6.6.

The main body of water that receives effluent from Fermi 3 is Lake Erie. There is one discharge from Fermi 3 that includes the blowdown from the CIRC and PSWS, as well as optional treated liquid radwaste discharge. Effluent from these sources is in liquid form; no sludge disposal is necessary from these systems. The location and other details pertaining to this discharge into Lake Erie are discussed in Subsection 3.4.2.2.

In addition to the liquid discharge paths, discharge of some chemical constituents will be entrained in the fallout from the spray from the CIRC and PSWS Cooling Towers. This effect is discussed in Subsection 5.3.3.1.

The current status of the water quality in Lake Erie, as well as other water sources in proximity to the plant, is discussed in Subsection 2.3.3. The ecology of Fermi 3 is discussed in Section 2.4. Ecology is of particular importance due to the prevalence of zebra mussels in Lake Erie. They present an additional need for the use of biocides such as sodium hypochlorite.

3.6.1.1 Circulating Water System

The chemical treatment of the CIRC is discussed in Subsection 3.3.2.2 and Table 3.3-1. This system is treated with a biocide, algaecide, corrosion inhibitor, and scale inhibitor. The blowdown from the CIRC is also treated with dehalogenation. The effluent from the CIRC is discharged to Lake Erie, as described in Subsection 3.4.2.2.

The CIRC operates on two cycles of concentration under normal full power operating conditions; additional operating parameters of the CIRC are discussed in Subsection 3.4.1.1. Effluent chemical constituents discharged in the blowdown from the CIRC are shown in Table 3.6-2.

3.6.1.2 Plant Service Water System

The chemical treatment of the PSWS is discussed in Subsection 3.3.2.3 and Table 3.3-1. This system is treated with a biocide, algaecide, corrosion inhibitor, and scale inhibitor. The effluent from the PSWS is discharged to Lake Erie. Chemical constituents discharged in the effluent from the PSWS are shown in Table 3.6-2.

3.6.1.3 Potable Water System

The operation of the PWS is designed to supply water for domestic use and human consumption to Fermi 3. The source of the PWS is the Frenchtown Township Municipal Water System, and any chemicals present in the water are those added by the Frenchtown Township Water Treatment Facility. The water is treated to meet applicable drinking water standards; no additional onsite treatment is provided. The water is discharged to the SWDS which is routed offsite to the Frenchtown Township Sewage Treatment Facility.

3.6.1.4 Fire Protection System

The FPS receives no additional chemical treatment (makeup to the FPS is discussed in Subsection 3.3.1.6) and does not normally discharge any liquid effluent.

3.6.2 Sanitary System Effluents

This subsection discusses the sanitary waste systems effluent, including quantities and treatment of the waste products, during construction and operation of the plant.

Sanitary waste systems needed at Fermi 3 during construction activities include portable toilets supplied and serviced by an offsite vendor. There is no sanitary waste system discharge into the effluent stream.

Permanent SWDS components at Fermi 3 include waste basin, wet well, septic tank, settling tank, wet well pumps, sewage discharge pumps and associated valves, piping, and controls. The SWDS is discussed in FSAR Subsection 9.2.4. The system is designed to accommodate 60 gallons/day/person for up to 840 people during normal power operation and 1140 people during shutdown operation. This design condition drives the flow values that are outlined on Figure 3.3-1.

In addition to sanitary waste generated by domestic uses, the demineralized water waste and effluent from the auxiliary boiler are also routed to the SWDS.

The effluent of the SWDS is sewage that is pumped from the septic tank to the Frenchtown Township Sewage Treatment Facility for ultimate disposal. The SWDS does not come into contact with any systems that may contain radioactive waste; however measures are in place to ensure that no radioactive waste could be transmitted offsite. Since the effluent from the SWDS is routed to a waste treatment facility, and not discharged to the environment, it is not necessary for the effluent to meet NPDES permit requirements. It is, however, necessary to meet the limits outlined in the Industrial/Non-domestic User Discharge permit with the Frenchtown Township Sewage Treatment Facility. Chemical treatments applied to the waste are those within the Frenchtown Township Sewage Treatment Facility, in keeping with the municipal sewage treatment standards. Further discussion of the chemical treatment of the SWDS can be found in Subsection 3.3.2.4.

3.6.3 Other Effluents

This subsection discusses miscellaneous solid, liquid and gaseous effluents not addressed in Subsection 3.6.1 or Subsection 3.6.2. Gaseous effluents consist of exhaust from diesel generators, diesel-driven fire pumps, and the auxiliary boiler system (Aux Boiler). Stormwater, various plant drains, and other wastes are also discussed in the following subsections.

3.6.3.1 Gaseous Effluents

There are four main sources of gaseous nonradioactive effluent at Fermi 3, the standby diesel generators (SDG), ancillary diesel generators (ADG), Aux Boiler, and the diesel-driven fire pumps. The applicable regulations, permits, and consultation required by Federal, State, regional, and potentially affected Native American tribal agencies are addressed in Section 1.2. Proper maintenance and operating procedures, described in FSAR Section 13.5, assure that emissions are controlled consistent with system design to meet the standards from Section 1.2.

There are two 17.1 MW SDGs that are expected to operate approximately four hours per month for each engine. The proposed SDG for Fermi 3 will meet emission standards for owners and operators listed in 40 CFR 60.4205 at the time of purchase. Emission standards for stationary compression ignition internal combustion engines with a cylinder displacement greater than 30 liters per cylinder are displayed in Table 3.6-3. The non-road diesel fuel used to operate the two SDGs will also be required by 40 CFR 80.510 to meet sulfur content levels of 15 ppm effective June 1, 2010.

There are two 1650 kW ADGs that are expected to operate for approximately two hours every three months, for an annual total of 8 hours of operation for each engine. The manufacturers of the ADGs proposed for Fermi 3 will be required to meet emission standards listed in Table 1 of 40 CFR 1039.101 at the time of purchase. Tier 4 emission standards for compression ignition internal combustion engines manufactured after the model year 2014 with a rating greater than 560 kW are displayed in Table 3.6-4. The non-road diesel fuel used to operate the two ADGs will also be required by 40 CFR 80.510 to meet sulfur content levels of 15 ppm effective June 1, 2010.

Fermi 3 has one package Aux Boiler, rated at 50 tons of steam per hour (112 MBTU/hr or about 33 MW). The maximum expected operation on an annual basis is 30 days. Emissions are shown in Table 3.6-5, based on ASTM D-975 No. 2 fuel oil (Reference 3.6-1).

The fourth source of emissions at Fermi 3 are the two diesel-driven fire pumps. Each pump is approximately 200 kW and is expected to operate approximately 48 hours annually. The manufacturers of diesel-driven fire pumps proposed for Fermi 3 will be required to meet emission standards listed in Table 4 to Subpart IIII of Part 60.4202(d) at the time of purchase. Emission standards for stationary compression ignition internal combustion engines that are fire pumps with a maximum engine rating of 200 kW manufactured after 2009 are displayed in Table 3.6-6. The non-road diesel fuel used to operate the two fire pumps will also be required by 40 CFR 80.510 to meet sulfur content levels of 15 ppm effective on June 1, 2010.

In addition to the gaseous effluents emitted from the aforementioned combustion sources, a natural draft cooling tower (NDCT) and two 4-cell mechanical draft cooling towers (MDCT) will emit solid particulates. The emission estimates of particulate matter for particle sizes of 10 and 2.5 microns (PM_{10} and $PM_{2.5}$) from the operation of the proposed NDCT and 4-cell MDCTs are displayed in Table 3.6-7 along with design parameters that were used to derive the emission estimates. It is conservatively assumed that the $PM_{2.5}$ emissions are the same as the PM_{10} emissions from the cooling towers. The drift rates for the NDCT and 4-cell MDCTs are based on the values provided by the associated manufacturers of each cooling tower. The water flow rate to the NDCT, as specified in Figure 3.3-1, will be supplied at a maximum rate of 724,000 gallons per minute (gpm). The water from the basin of the NDCT will supply the makeup water to the 4-cell MDCTs at a maximum flow rate of 40,000 gpm. Section 5.3.3.1 states that the makeup water for the NDCT is expected to have a total dissolved solids (TDS) concentration of 420 parts per million (ppm) or 0.00042 grams of salt per gram of solution. The makeup water for the 4-cell MDCTs will be supplied from the NDCT basin; therefore, the TDS concentration for the 4-cell MDCTs is also expected to be 420 ppm. The emission rate (lb/hr) for particulates emitted from the cooling towers can be calculated by taking the product of the water flow rate, weight of one gallon of water, drift rate, and TDS concentration.

For the purpose of providing a maximum bounded value for the emissions of particulates from the cooling towers, the calculations in Table 3.6-7 were developed for the operation of both the NDCT and 4-cell MDCTs simultaneously for an entire year at the maximum water flow rate. While this likely overestimates the emissions of PM_{10} and $PM_{2.5}$ from the operation of the NDCT and 4-cell MDCTs, it provides a maximum value for the assessment of impacts from the operation of the cooling towers. Therefore, the maximum hourly and annual emissions of PM_{10} and $PM_{2.5}$ from the simultaneous operation of the NDCT and 4-cell MDCTs are expected to be 1.93 lb/hr and 8.47 tons/year, respectively.

Stationary combustion sources proposed for the operation of Fermi 3 will emit carbon dioxide (CO_2). The following provides the estimated CO_2 emissions and calculation methodology for the proposed standby diesel generators, ancillary diesel generators, diesel-driven fire pumps, and auxiliary boiler.

Standby and Ancillary Diesel Generators and Diesel-Driven Fire Pumps

In order to estimate the annual emissions of CO_2 for the proposed standby diesel generators, ancillary diesel generators, and diesel-driven fire pumps, emission factors were obtained from Tables 3.3-1 and Table 3.4-1 of Reference 3.6-2. The total annual emissions of CO_2 emitted from

the standby diesel generators, ancillary diesel generators, and diesel-driven fire pumps is calculated by taking the product of the emission factor, number of units, annual operating hours, and engine power rating.

Auxiliary Boiler

The estimated annual emissions of CO_2 from the proposed auxiliary boiler is calculated by taking the product of the emission factor, heat input, and the annual operating hours. The CO_2 emission factor for the auxiliary boiler is 22,300 lb/10^3 gal as displayed in Table 1.3-12 of Reference 3.6-2. Dividing the emission factor (22,300 lb/10^3 gal) by the heating value of fuel oil (140 MBtu/10^3 gal), the emission factor becomes 159.29 lb/MBtu. The heat input of the boiler is 112 MBtu/hr.

Table 3.6-6-(A) provides the emission rates and estimated annual emissions of CO_2 for each stationary source proposed for Fermi 3. Therefore, the estimated annual emission of CO_2 from stationary sources during the operation of Fermi 3 is 7,734 tons per year.

3.6.3.2 Stormwater

Stormwater, specifically flood and probable maximum flood (PMF) are discussed in FSAR Subsection 2.4.2 and FSAR Subsection 2.4.3. Stormwater from the Fermi 3 site drains to the North and South Lagoons, which are located north and south of the site respectively. Stormwater construction and operational impacts are discussed in Chapter 4 and Chapter 5.

3.6.3.3 Various Plant Drains

There are several drains at Fermi 3 including: equipment drains, floor drains, laundry and chemical drains, and other miscellaneous periodic drains. These drains are treated and the treated effluent joins the discharge from the CIRC and PSWS to be discharged to Lake Erie. Waste from the various plant drains that cannot be treated for onsite discharge are routed for handling as hazardous waste.

3.6.3.4 Other Waste

Low level mixed waste (LLMW) contains hazardous waste and a low-level radioactive source, special nuclear, or byproduct material. Hazardous waste is not necessarily LLMW; LLMW only includes hazardous waste that has been exposed to radioactive contamination. Section 5.5 provides a more detailed discussion of the environmental impacts that could result from the operation of the non-radioactive waste systems and the storage and disposal of mixed wastes.

A summary of the hazardous waste generated at Fermi 2 for several years is shown in Table 3.6-8. Some examples of LLMW generated at Fermi 2 include:

- Industrial oils and laboratory waste
- Rags/wipes
- Lead products
- Mercury products

Federal regulations governing generation, management, handling, storage, treatment, disposal and protection requirements concerning LLMW are contained in 10 CFR 10 and 10 CFR 40. Additional discussion of guidelines and standards pertaining to waste disposal is found in Section 1.2. Treatment of LLMW from Fermi 3 is handled in a similar manner as that of Fermi 2, with eventual offsite transportation and disposal by properly licensed organizations. Fermi 2 is a Small Quantity Generator, as Fermi 3 will likely be. Further discussion of LLMW is provided in Section 5.5.

Universal waste is also disposed of properly at Fermi 3. Universal waste includes:

- Batteries
- Light bulbs
- Computer monitors and equipment

Handling of universal waste is done in accordance with State of Michigan regulations, with eventual offsite disposal by a properly permitted organization. Additional discussion of guidelines and standards pertaining to waste disposal is found in Section 1.2. When possible, materials are recycled with the proper facilities.

Fermi 2 practices recycling when possible; Fermi 3 also recycles. Examples of items recycled from the Fermi site include:

- Batteries
- Circuit Boards
- Recyclable lead

Used oil is also recycled. The used oil program in use at Fermi 2 will be similarly implemented with Fermi 3. In this program the used oil from site is sent to St. Clair power station for power generation.

In addition to mixed waste and universal waste, another form of waste that must be handled at Fermi 3 is the waste that is disposed of from trash racks and traveling water screens. The trash racks and traveling water screens of the SWS pumps are discussed in Subsection 3.4.2.1. Once the racks and screens are cleaned and the trash is present in the trash cart or trash basket, it is necessary to dispose of the waste. This waste is disposed of offsite.

3.6.4 **References**

3.6-1 "Standard Specification for Diesel Fuel Oils," ASTM D 975, American Society of Testing and Materials, Philadelphia, PA, 2007.

3.6-2 U.S. Environmental Protection Agency (USEPA), "Compilation of Air Pollutant Emission Factors (AP-42)," Fifth Edition, Vol. I., Tables 1.3-1, 1.3-12, 3.3-1, and 3.4-1, October 1996.

Table 3.6-1 Chemicals Added to Liquid Effluent Streams

System	Chemical	Maximum Amount	Average Amount	Frequency of Use	Concentration in Waste Streams
CIRC/ SWS	Biocide/Algaecide - Sodium Hypochlorite (15%)	620,000 lb/year	620,000 lb/year	Approximately 4.5 hour/week	Non-detectable, neutralized by sodium bisulfite TRC < 38ppb*
CIRC	Corrosion Inhibitor – Sodium Silicate	1,700,000 lb/year	1,400,000 lb/year	Continuous	Non-detectable, dissociates in system
CIRC	Scale Inhibitor/Dispersant	830,000 lb/year	700,000 lb/year	Continuous	Non-detectable, dissociates in system
CIRC	Dehalogenation – Sodium Bisulfite	650,000 lb/year	550,000 lb/year	Continuous	Non-detectable, neutralizes sodium hypochlorite

*Fermi 2 NPDES permit

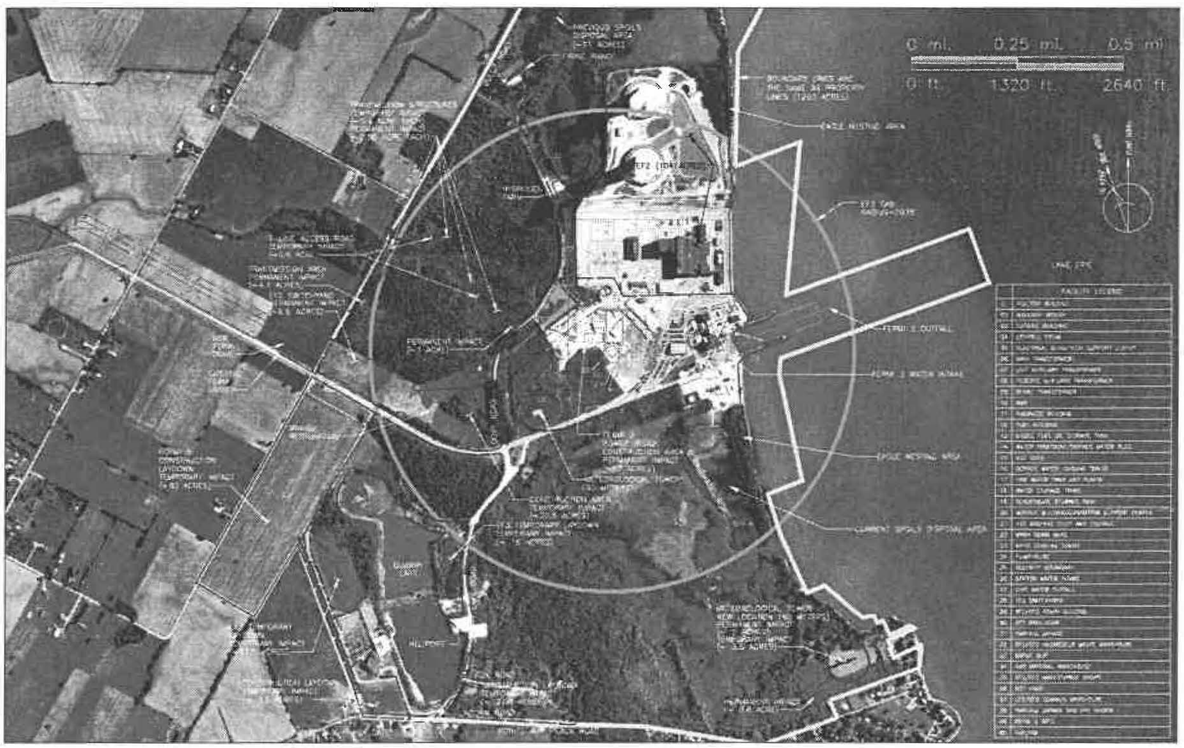
Table 3.6-2 Effluent Chemical Constituents*

Ion/Chemical	As	Max Conc. (ppm)	Avg Conc. (ppm)
Sodium	Na	46.6	34.3
Calcium	Ca	71.9	71.9
Magnesium	Mg	17.4	17.4
Silica	SiO_2	19.9	19.5
Chloride	Cl	61.3	42.5
Sulphate	SO_4	38.5	38.5
Potassium	K	3.6	3.6
Scale Inhibitor/Dispersant	Chemical	11.6	11.6
Bicarbonate Alk.	$CaCO_3$	167.8	167.7
TDS	-	428.5	397.4
TSS	-	16.0	16.0

*Based on 2 cycles of concentration

Attachment 3 – Map of Facility
Figure 2.1-4, Fermi 3 Environmental Report, Rev. 2

Figure 2.1-4 Fermi 3 Site Plan



Attachment 4 - Fermi 3 2022 Outfall 001 Laboratory Analyses

Proposed discharge

Data is expected to be similar to the discharge from Fermi 2 Power Plant

TriMatrix Laboratories Analytical Results for Fermi 2 2014 NPDES Permit Renewal

TRIMATRIX
LABORATORIES

December 19, 2013

DTE - Fermi-2
Attn: Ms. Mary Hana
6400 North Dixie Highway, 200 TAC
Newport, MI 48166

Project: Permit Renewal - Fermi, 2013

Dear Ms. Mary Hana,

Enclosed is a copy of the laboratory report for the following work order(s) received by TriMatrix Laboratories:

Work Order	**Received**	**Description**
1312032	12/03/2013	Laboratory Services

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Program (NELAP) and/or one of the following certification programs:

ACLASS DoD-ELAP/ISO17025 (#ADE-1542); Arkansas DEP (#88-0730/12-056-0); Florida DEP (#E87622-24); Georgia EPD (#E87622-24); Illinois DEP (#200026/003059); Kansas DPH (#E-10302); Kentucky DEP (#0021); Louisiana DEP (#83658); Michigan DPH (#0034); Minnesota DPH (#491715); New York ELAP (#11776/48855); North Carolina DNRE (#659); Texas CEQ (#T104704495-13-3); Virginia DCLS (#460153/1622); Wisconsin DNR (#999472650); USDA Soil Import Permit (#P330-12-00236).

Any qualification or narration of results, including sample acceptance requirements and test exceptions to the above referenced programs, is presented in the Statement of Data Qualifications and Project Technical Narrative sections of this report. Estimates of analytical uncertainties and certification documents for the test results contained within this report are available upon request.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Jennifer L. Rice

Jennifer L. Rice
Project Chemist

5560 Corporate Exchange Court SE ♦ Grand Rapids, MI 49512 ♦ 616.975.4500 ♦ Fax 616.942.7463 ♦ www.trimatrixlabs.com

TRIMATRIX LABORATORIES

PROJECT TECHNICAL NARRATIVE(s)

Polychlorinated Biphenyls (PCBs) by EPA Method 608

Narrative: Due to sample volumes, matrix specific quality control (QC) was not performed on this batch. A blank and a Laboratory Control Sample make up the batch QC.

Analysis: USEPA-608

Sample/Analyte: 1312032-14 Intake Composite
1312032-15 001 Composite

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TRIMATRIX LABORATORIES

PROJECT TECHNICAL NARRATIVE(s)

Volatile Organic Compounds by EPA Method 624

Narrative:	Sample was not preserved per 40 CFR Part 136.3,Table II: a sample collected for Acrolein must be pH adjusted to a range of 4-5 or analyzed within 3 days of collection.
Analysis:	USEPA-624
Sample/Analyte:	1312032-06 Outfall 001 VOC Lab Composite
	1312032-13 Intake VOC Lab Composite

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TRIMATRIX LABORATORIES

PROJECT TECHNICAL NARRATIVE(s)

Semivolatile Organic Compounds by EPA Method 625

Narrative: Due to sample volumes, matrix specific quality control (QC) was not performed on this batch. A blank and a Laboratory Control Sample make up the batch QC.

Analysis: USEPA-625

Sample/Analyte:	1312032-14	Intake Composite
	1312032-15	001 Composite

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TRIMATRIX LABORATORIES

PROJECT TECHNICAL NARRATIVE(s)

Total Metals by EPA 200 Series Methods

Narrative: The CRL recovery for this analyte was outside of the laboratory control limits.

Analysis: USEPA-200.8

3L09035-CRL2 Selenium

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TRIMATRIX LABORATORIES

PROJECT TECHNICAL NARRATIVE(s)

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Narrative: The CRL recovery for this analyte was outside of the laboratory control limits.

Analysis: SM 5540 C-2011

3L04037-CRL1 — Surfactants, MBAS

Narrative: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit.

Analysis: USEPA-351.2 Rev. 2.0

Sample/Analyte: 1312032-15 001 Composite — Nitrogen, Total Kjeldahl

Narrative: The RL for this analysis was elevated due to insufficient sample volume or weight received.

Analysis: USEPA-1664A

Sample/Analyte: 1312032-10 Intake Grab Day 2 — HEM; Oil & Grease

Narrative: A.C.U. stands for Apparent Color Units. Color is pH dependent and its value increases proportionally with pH. The method requires that the pH of the sample be determined and reported along with the A.C.U value. The sample pH was: 7.12.

Analysis: SM 2120 B-2011

Sample/Analyte: 1312032-14 Intake Composite — Color (Apparent)
1312032-15 001 Composite — Color (Apparent)

Narrative: The referenced method requires analysis occur within 15 minutes of sample collection. Analysis was performed at the laboratory on 12-4-13..

Analysis: SM 4500-SO3 B-2011

Sample/Analyte: 1312032-14 Intake Composite — Sulfite
1312032-15 001 Composite — Sulfite

Narrative: The mg/L MBAS result reported should be considered mg MBAS/L (calculated as LAS, molecular weight 320).

Analysis: SM 5540 C-2011

Sample/Analyte: 1312032-14 Intake Composite — Surfactants, MBAS
1312032-15 001 Composite — Surfactants, MBAS

Narrative: Distillation pretreatment was not performed. Common interfering ions were complexed by a buffer solution. Fluoroborates (if present) may result in a low bias of the reported concentration.

Analysis: SM 4500-F C-2011

Sample/Analyte: 1312032-14 Intake Composite — Fluoride
1312032-15 001 Composite — Fluoride

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TRIMATRIX LABORATORIES

STATEMENT OF DATA QUALIFICATIONS

Volatile Organic Compounds by EPA Method 624

Qualification: The corresponding CCV for this analytical batch had a recovery exceeding the upper control limit of the method. A positive result for this analyte in any associated samples are considered estimated. Non-detectable results are not qualified.

Analysis: USEPA-624

Sample/Analyte:	1312032-06	Outfall 001 VOC Lab Composite	Chloroethane
	1312032-13	Intake VOC Lab Composite	Chloroethane

Qualification: The chemical utilized to preserve this sample has the potential to degrade 2-chloroethyl vinyl ether through polymerization or other rapid chemical reaction. The reporting limit and/or any positive result must be considered estimated.

Analysis: USEPA-624

Sample:	1312032-06	Outfall 001 VOC Lab Composite
	1312032-13	Intake VOC Lab Composite

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TRIMATRIX LABORATORIES

STATEMENT OF DATA QUALIFICATIONS

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Qualification: The following reported test methods and analyte(s) are exceptions to our NELAP Fields of Accreditation, or for which accreditation is not required, applicable, or available.

Analysis: EPA-351.2/4500-NH3G

Analyte(s): Nitrogen, Organic

Analysis: SM 4500-SO3 B-2011

Analyte(s): Sulfite

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Outfall 001 Grab Day 1**	Sampled:	12/2/13 13:00
Lab Sample ID:	**1312032-01**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Chlorine, Total Residual (Field)	<0.20	0.20	mg/L	1	HACH-8167	12/02/13 13:00	JAE	1313078
Oxygen, Dissolved (Field)	**7.57**	0.10	mg/L	1	SM 4500-O G	12/02/13 13:00	JAE	1313078
pH (Field)	**8.31**	1.00	pH Units	1	SM 4500-H B-2011	12/02/13 13:00	JAE	1313078
Temperature °C (Field)	**16.0**	0.1	°C	1	SM 2550 B	12/02/13 13:00	JAE	1313078

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Outfall 001 LLHg**	Sampled:	12/2/13 12:44
Lab Sample ID:	**1312032-02**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	**7.84**	2.50	ng/L	5	USEPA-1631E	12/05/13 12:43	MSM	1313075

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Outfall 001 Grab Day 2**	Sampled:	12/3/13 12:35
Lab Sample ID:	**1312032-03**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Phenolics, Total	<0.0500	0.0500	mg/L	1	USEPA-420 4	12/09/13 10.39	LMA	1313065
Chlorine, Total Residual (Field)	<0.20	0.20	mg/L	1	HACH-8167	12/03/13 12 35	JAE	1313078
Oxygen, Dissolved (Field)	**6.89**	0 10	mg/L	1	SM 4500-O G	12/03/13 12.35	JAE	1313078
pH (Field)	**8.56**	1.00	pH Units	1	SM 4500-H B-2011	12/03/13 12:35	JAE	1313078
Temperature °C (Field)	**19.0**	0.1	°C	1	SM 2550 B	12/03/13 12.35	JAE	1313078
Cyanide, Available	<2.0	2.0	ug/L	1	USEPA OIA-1677	12/09/13 12:10	LMA	1313173
HEM; Oil & Grease	<5.00	5.00	mg/L	1	USEPA-1664A	12/10/13 08 00	WAH	1313184

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Outfall 001 LLHg Duplicate**	Sampled:	12/2/13 12:47
Lab Sample ID:	**1312032-04**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	**7.51**	0.500	ng/L	1	USEPA-1631E	12/05/13 12.01	MSM	1313075

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Outfall 001 Field Blank**	Sampled:	12/2/13 12:41
Lab Sample ID:	**1312032-05**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	<0 500	0 500	ng/L	1	USEPA-1631E	12/05/13 12.05	MSM	1313075

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Outfall 001 VOC Lab Composite**	Sampled:	12/3/13 12:35		
Lab Sample ID:	**1312032-06**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:00	By:	DLV
Dilution Factor:	1	Analyzed:	12/6/13 16:34	By:	DLV
QC Batch:	1313145	Analytical Batch:	3L09003		

*Volatile Organic Compounds by EPA Method 624

CAS Number	Analyte	Analytical Result	RL
107-02-8	Acrolein	<5.0	5.0
107-13-1	Acrylonitrile	<1.0	1.0
71-43-2	Benzene	<1.0	1.0
75-27-4	Bromodichloromethane	<1.0	1.0
75-25-2	Bromoform	<1.0	1.0
74-83-9	Bromomethane	<1 0	1.0
56-23-5	Carbon Tetrachloride	<1.0	1.0
108-90-7	Chlorobenzene	<1.0	1.0
*75-00-3	Chloroethane	<1.0	1.0
110-75-8	2-Chloroethyl Vinyl Ether	<10	10
67-66-3	Chloroform	<1 0	1.0
74-87-3	Chloromethane	<1.0	1.0
124-48-1	Dibromochloromethane	<1.0	1.0
75-34-3	1,1-Dichloroethane	<1.0	1.0
107-06-2	1,2-Dichloroethane	<1.0	1.0
75-35-4	1,1-Dichloroethene	<1.0	1.0
542-75-6	1,3-Dichloropropene (Total)	<2 0	2.0
156-60-5	trans-1,2-Dichloroethene	<1.0	1.0
78-87-5	1,2-Dichloropropane	<1.0	1 0
100-41-4	Ethylbenzene	<1.0	1.0
75-09-2	Methylene Chloride	<5.0	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<1.0	1.0
127-18-4	Tetrachloroethene	<1.0	1.0
108-88-3	Toluene	<1.0	1.0
71-55-6	1,1,1-Trichloroethane	<1.0	1 0
79-00-5	1,1,2-Trichloroethane	<1.0	1.0
79-01-6	Trichloroethene	<1.0	1.0
75-01-4	Vinyl Chloride	<1.0	1 0

Continued on next page

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Outfall 001 VOC Lab Composite**	Sampled:	12/3/13 12:35		
Lab Sample ID:	**1312032-06**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:00	By:	DLV
Dilution Factor:	1	Analyzed:	12/6/13 16:34	By:	DLV
QC Batch:	1313145	Analytical Batch:	3L09003		

*Volatile Organic Compounds by EPA Method 624 (Continued)

Surrogates:	*% Recovery*	*Control Limits*
Dibromofluoromethane	*98*	*85-118*
1,2-Dichloroethane-d4	*99*	*87-122*
Toluene-d8	*98*	*85-113*
4-Bromofluorobenzene	*93*	*82-110*

*See Statement of Data Qualifications

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Fermi LLHg Trip Blank**	Sampled:	12/2/13 0:00
Lab Sample ID:	**1312032-07**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	<0.500	0.500	ng/L	1	USEPA-1631E	12/05/13 12:08	MSM	1313075

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake Grab Day 1**	Sampled:	12/2/13 12:25
Lab Sample ID:	**1312032-08**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Chlorine, Total Residual (Field)	<0.20	0.20	mg/L	1	HACH-8167	12/02/13 12:25	JAE	1313078
Oxygen, Dissolved (Field)	**6.43**	0.10	mg/L	1	SM 4500-O G	12/02/13 12:25	JAE	1313078
pH (Field)	**7.51**	1.00	pH Units	1	SM 4500-H B-2011	12/02/13 12:25	JAE	1313078
Temperature °C (Field)	**5.0**	0.1	°C	1	SM 2550 B	12/02/13 12:25	JAE	1313078

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake LLHg**	Sampled:	12/2/13 12:02
Lab Sample ID:	**1312032-09**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	**3.61**	0.500	ng/L	1	USEPA-1631E	12/19/13 10.58	MSM	1313536

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake Grab Day 2**	Sampled:	12/3/13 12:00
Lab Sample ID:	**1312032-10**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Phenolics, Total	<0.0500	0.0500	mg/L	1	USEPA-420 4	12/09/13 10 39	LMA	1313065
Chlorine, Total Residual (Field)	<0.20	0.20	mg/L	1	HACH-8167	12/03/13 12:00	JAE	1313078
Oxygen, Dissolved (Field)	**7.56**	0.10	mg/L	1	SM 4500-O G	12/03/13 12.00	JAE	1313078
pH (Field)	**7.57**	1.00	pH Units	1	SM 4500-H B-2011	12/03/13 12.00	JAE	1313078
Temperature °C (Field)	**12.0**	0.1	°C	1	SM 2550 B	12/03/13 12:00	JAE	1313078
Cyanide, Available	<2.0	2.0	ug/L	1	USEPA OIA-1677	12/09/13 12.11	LMA	1313173
HEM; Oil & Grease	<5.10	5.10	mg/L	1	USEPA-1664A	12/10/13 08 00	WAH	1313184

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake LLHg Duplicate**	Sampled:	12/2/13 12:05
Lab Sample ID:	**1312032-11**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	**3.50**	0.500	ng/L	1	USEPA-1631E	12/19/13 09:14	MSM	1313536

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake LLHg Field Blank**	Sampled:	12/2/13 11:59
Lab Sample ID:	**1312032-12**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 1600 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Mercury	<0.500	0.500	ng/L	1	USEPA-1631E	12/05/13 12 19	MSM	1313075

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake VOC Lab Composite**	Sampled:	12/3/13 12:00		
Lab Sample ID:	**1312032-13**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:00	By:	DLV
Dilution Factor:	1	Analyzed:	12/6/13 17:03	By:	DLV
QC Batch:	1313145	Analytical Batch:	3L09003		

*Volatile Organic Compounds by EPA Method 624

CAS Number	Analyte	Analytical Result	RL
107-02-8	Acrolein	<5 0	5.0
107-13-1	Acrylonitrile	<1.0	1.0
71-43-2	Benzene	<1.0	1.0
75-27-4	Bromodichloromethane	<1.0	1.0
75-25-2	Bromoform	<1.0	1.0
74-83-9	Bromomethane	<1.0	1.0
56-23-5	Carbon Tetrachloride	<1.0	1.0
108-90-7	Chlorobenzene	<1.0	1.0
*75-00-3	Chloroethane	<1.0	1.0
110-75-8	2-Chloroethyl Vinyl Ether	<10	10
67-66-3	Chloroform	<1.0	1.0
74-87-3	Chloromethane	<1.0	1.0
124-48-1	Dibromochloromethane	<1.0	1.0
75-34-3	1,1-Dichloroethane	<1 0	1.0
107-06-2	1,2-Dichloroethane	<1.0	1.0
75-35-4	1,1-Dichloroethene	<1.0	1.0
542-75-6	1,3-Dichloropropene (Total)	<2.0	2.0
156-60-5	trans-1,2-Dichloroethene	<1.0	1.0
78-87-5	1,2-Dichloropropane	<1.0	1.0
100-41-4	Ethylbenzene	<1.0	1.0
75-09-2	Methylene Chloride	<5.0	5.0
79-34-5	1,1,2,2-Tetrachloroethane	<1.0	1.0
127-18-4	Tetrachloroethene	<1.0	1.0
108-88-3	Toluene	<1 0	1.0
71-55-6	1,1,1-Trichloroethane	<1.0	1.0
79-00-5	1,1,2-Trichloroethane	<1.0	1.0
79-01-6	Trichloroethene	<1.0	1.0
75-01-4	Vinyl Chloride	<1.0	1.0

Continued on next page

*See Statement of Data Qualifications

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake VOC Lab Composite**	Sampled:	12/3/13 12:00		
Lab Sample ID:	**1312032-13**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:00	By:	DLV
Dilution Factor:	1	Analyzed:	12/6/13 17:03	By:	DLV
QC Batch:	1313145	Analytical Batch:	3L09003		

***Volatile Organic Compounds by EPA Method 624 (Continued)**

Surrogates:	*% Recovery*	*Control Limits*
Dibromofluoromethane	*98*	*85-118*
1,2-Dichloroethane-d4	*98*	*87-122*
Toluene-d8	*99*	*85-113*
4-Bromofluorobenzene	*95*	*82-110*

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20		
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:31	By:	ALK
Dilution Factor:	1	Analyzed:	12/13/13 3:08	By:	ASC
QC Batch:	1313086	Analytical Batch:	3L13025		

Polychlorinated Biphenyls (PCBs) by EPA Method 608

CAS Number	Analyte			Analytical Result	RL
12674-11-2	PCB-1016			<0.20	0.20
11104-28-2	PCB-1221			<0.20	0.20
11141-16-5	PCB-1232			<0.20	0 20
53469-21-9	PCB-1242			<0.20	0.20
12672-29-6	PCB-1248			<0.20	0.20
11097-69-1	PCB-1254			<0.20	0.20
11096-82-5	PCB-1260			<0.20	0.20
Surrogates:		*% Recovery*	*Control Limits*		
Decachlorobiphenyl		*86*	*45-134*		
Tetrachloro-m-xylene		*71*	*27-126*		

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20		
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/5/13 8:00	By:	ALK
Dilution Factor:	1	Analyzed:	12/11/13 6:36	By:	DWJ
QC Batch:	1313027	Analytical Batch:	3L11050		

Semivolatile Organic Compounds by EPA Method 625

CAS Number	Analyte	Analytical Result	RL
83-32-9	Acenaphthene	<5.0	5.0
208-96-8	Acenaphthylene	<5.0	5.0
120-12-7	Anthracene	<5 0	5.0
92-87-5	Benzidine	<50	50
56-55-3	Benzo(a)anthracene	<5.0	5.0
50-32-8	Benzo(a)pyrene	<5 0	5.0
205-99-2	Benzo(b)fluoranthene	<5 0	5.0
207-08-9	Benzo(k)fluoranthene	<5.0	5.0
191-24-2	Benzo(g,h,i)perylene	<5 0	5.0
101-55-3	4-Bromophenyl Phenyl Ether	<5.0	5.0
85-68-7	Butyl Benzyl Phthalate	<5.0	5.0
59-50-7	4-Chloro-3-methylphenol	<5.0	5.0
111-91-1	Bis(2-chloroethoxy)methane	<5 0	5.0
111-44-4	Bis(2-chloroethyl) Ether	<5.0	5 0
108-60-1	Bis(2-chloroisopropyl) Ether	<5.0	5.0
91-58-7	2-Chloronaphthalene	<5.0	5.0
95-57-8	2-Chlorophenol	<5.0	5.0
7005-72-3	4-Chlorophenyl Phenyl Ether	<5 0	5.0
218-01-9	Chrysene	<5.0	5.0
53-70-3	Dibenz(a,h)anthracene	<5.0	5.0
84-74-2	Di-n-butyl Phthalate	<5.0	5 0
95-50-1	1,2-Dichlorobenzene	<5.0	5.0
541-73-1	1,3-Dichlorobenzene	<5.0	5 0
106-46-7	1,4-Dichlorobenzene	<5.0	5.0
91-94-1	3,3'-Dichlorobenzidine	<20	20
120-83-2	2,4-Dichlorophenol	<5.0	5.0
84-66-2	Diethyl Phthalate	<5.0	5.0
105-67-9	2,4-Dimethylphenol	<5.0	5.0
131-11-3	Dimethyl Phthalate	<5.0	5.0

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20		
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/5/13 8:00	By:	ALK
Dilution Factor:	1	Analyzed:	12/11/13 6:36	By:	DWJ
QC Batch:	1313027	Analytical Batch:	3L11050		

Semivolatile Organic Compounds by EPA Method 625 (Continued)

CAS Number	Analyte	Analytical Result	RL
534-52-1	4,6-Dinitro-2-methylphenol	<20	20
51-28-5	2,4-Dinitrophenol	<20	20
121-14-2	2,4-Dinitrotoluene	<5.0	5.0
606-20-2	2,6-Dinitrotoluene	<5.0	5.0
117-84-0	Di-n-octyl Phthalate	<5.0	5.0
122-66-7	1,2-Diphenylhydrazine	<5.0	5.0
117-81-7	Bis(2-ethylhexyl) Phthalate	<5.0	5.0
206-44-0	Fluoranthene	<5.0	5.0
86-73-7	Fluorene	<5.0	5.0
118-74-1	Hexachlorobenzene	<5.0	5.0
87-68-3	Hexachlorobutadiene	<5.0	5.0
77-47-4	Hexachlorocyclopentadiene	<5.0	5.0
67-72-1	Hexachloroethane	<5.0	5.0
193-39-5	Indeno(1,2,3-cd)pyrene	<5.0	5.0
78-59-1	Isophorone	<5.0	5.0
91-20-3	Naphthalene	<5.0	5.0
98-95-3	Nitrobenzene	<5.0	5.0
100-02-7	4-Nitrophenol	<20	20
88-75-5	2-Nitrophenol	<5.0	5.0
62-75-9	N-Nitroso-dimethylamine	<5.0	5.0
86-30-6	N-Nitroso-diphenylamine	<5.0	5.0
621-64-7	N-Nitroso-di-n-propylamine	<5.0	5.0
87-86-5	Pentachlorophenol	<20	20
85-01-8	Phenanthrene	<5.0	5.0
108-95-2	Phenol	<5.0	5.0
129-00-0	Pyrene	<5.0	5.0
120-82-1	1,2,4-Trichlorobenzene	<5.0	5.0
88-06-2	2,4,6-Trichlorophenol	<5.0	5.0

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20		
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/5/13 8:00	By:	ALK
Dilution Factor:	1	Analyzed:	12/11/13 6:36	By:	DWJ
QC Batch:	1313027	Analytical Batch:	3L11050		

Semivolatile Organic Compounds by EPA Method 625 (Continued)

CAS Number	Analyte			Analytical Result	RL
	Surrogates:	*% Recovery*	*Control Limits*		
	2-Fluorophenol	*40*	*18-74*		
	Phenol-d6	*26*	*12-47*		
	Nitrobenzene-d5	*80*	*34-122*		
	2-Fluorobiphenyl	*81*	*36-136*		
	2,4,6-Tribromophenol	*56*	*19-131*		
	o-Terphenyl	*84*	*27-138*		

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ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 200 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Aluminum	**0.65**	0.050	mg/L	1	USEPA-200.7	12/09/13 12.12	KLV	1313073
Antimony	<1.0	1.0	ug/L	1	USEPA-200 8	12/09/13 13:27	MSM	1313011
Arsenic	**1.1**	1.0	ug/L	1	USEPA-200.8	12/09/13 13:27	MSM	1313011
Barium	**26**	5.0	ug/L	1	USEPA-200.8	12/09/13 13·27	MSM	1313011
Beryllium	<1.0	1.0	ug/L	1	USEPA-200 8	12/09/13 13.27	MSM	1313011
Boron	**27**	20	ug/L	1	USEPA-200 8	12/10/13 10·19	MSM	1313011
Cadmium	<0.20	0.20	ug/L	1	USEPA-200.8	12/09/13 13:27	MSM	1313011
Chromium	<10	10	ug/L	1	USEPA-200.8	12/09/13 13.27	MSM	1313011
Cobalt	<10	10	ug/L	1	USEPA-200.7	12/09/13 12·12	KLV	1313073
Copper	**3.7**	1.0	ug/L	1	USEPA-200 8	12/09/13 13·27	MSM	1313011
Iron	**1.0**	0 010	mg/L	1	USEPA-200.7	12/09/13 15 40	CKD	1313073
Lead	**1.2**	1.0	ug/L	1	USEPA-200.8	12/09/13 13.27	MSM	1313011
Magnesium	**11**	0.50	mg/L	1	USEPA-200.7	12/09/13 15.40	CKD	1313073
Manganese	**0.031**	0.010	mg/L	1	USEPA-200 7	12/09/13 12·12	KLV	1313073
Molybdenum	<0.10	0.10	mg/L	1	USEPA-200.7	12/05/13 09.54	KLV	1312991
Nickel	<5.0	5 0	ug/L	1	USEPA-200 8	12/09/13 13:27	MSM	1313011
Selenium	<1.0	1.0	ug/L	1	USEPA-200.8	12/09/13 13:27	MSM	1313011
Silver	<0.50	0.50	ug/L	1	USEPA-200 8	12/09/13 13·27	MSM	1313011
Thallium	<1.0	1.0	ug/L	1	USEPA-200 8	12/09/13 13 27	MSM	1313011
Tin	<0.20	0.20	mg/L	1	USEPA-200.7	12/05/13 09·54	KLV	1312991
Titanium	<0 10	0.10	mg/L	1	USEPA-200 7	12/05/13 09.54	KLV	1312991
Zinc	**11**	10	ug/L	1	USEPA-200 8	12/09/13 13·27	MSM	1313011

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**Intake Composite**	Sampled:	12/3/13 12:20
Lab Sample ID:	**1312032-14**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Hardness as CaCO3	**147**	2	mg/L	1	SM 2340 C-2011	12/06/13 14:30	KAR	1313099
BOD, (5-Day)	<4.0	4.0	mg/L	1	SM 5210 B-2011	12/04/13 11:37	SKA	1313038
Bromide	<0.50	0.50	mg/L	1	ASTM D 1246-05	12/11/13 13:00	SLL	1313240
Chemical Oxygen Demand	**22**	5.0	mg/L	1	SM 5220 D-2011	12/04/13 14:59	SLL	1313025
Color (Apparent)	**15.0**	5.00	A.C.U.	1	SM 2120 B-2011	12/04/13 14:23	CAC	1313019
Fluoride	**0.16**	0.10	mg/L	1	SM 4500-F C-2011	12/13/13 10:40	SLL	1313326
Surfactants, MBAS	<0.0250	0.0250	mg/L	1	SM 5540 C-2011	12/04/13 12:14	WAH	1313020
Phosphorus, Total	**0.148**	0.0100	mg/L	1	SM 4500-P E-2011	12/10/13 10:09	KAR	1313144
Residue, Dissolved @ 180° C	**190**	50	mg/L	1	SM 2540 C-2011	12/05/13 13:00	WAH	1313033
Residue, Suspended	**25.7**	3.3	mg/L	1	SM 2540 D-2011	12/05/13 15:30	WAH	1313036
Sulfate	**30**	5.0	mg/L	1	ASTM D516-90 (07)	12/12/13 09:45	LMA	1313298
Sulfide, Total	<0.020	0.020	mg/L	1	SM 4500-S2 D-2011	12/06/13 15:28	WAH	1313149
Sulfite	<1.0	1.0	mg/L	1	SM 4500-SO3 B-2011	12/04/13 13:50	CAC	1313110
Carbon, Total Organic	**3.6**	0.50	mg/L	1	SM 5310 C-2011	12/05/13 19:16	KAR	1313095
Nitrogen, Ammonia	**0.079**	0.050	mg/L	1	SM 4500-NH3 G-2011	12/11/13 11:15	CLB	1313163
Nitrogen, Nitrate+Nitrite	**0.48**	0.050	mg/L	1	SM 4500-NO3 F-2011	12/04/13 13:19	CAC	1313118
Nitrogen, Organic	<0.50	0.50	mg/L	1	EPA-351 2/4500-NH3G	12/12/13 14:35	CLB	1313201
Nitrogen, Total Kjeldahl	<0.50	0.50	mg/L	1	USEPA-351 2 Rev. 2 0	12/09/13 11:45	CLB	1313050
Nitrogen, Inorganic	**0.56**	0.050	mg/L	1	[CALC]	12/11/13 11:15	CAC	[CALC]

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55		
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/6/13 7:31	By:	ALK
Dilution Factor:	1	Analyzed:	12/13/13 3:36	By:	ASC
QC Batch:	1313086	Analytical Batch:	3L13025		

Polychlorinated Biphenyls (PCBs) by EPA Method 608

CAS Number	Analyte			Analytical Result	RL
12674-11-2	PCB-1016			<0.20	0.20
11104-28-2	PCB-1221			<0.20	0.20
11141-16-5	PCB-1232			<0.20	0.20
53469-21-9	PCB-1242			<0.20	0.20
12672-29-6	PCB-1248			<0.20	0.20
11097-69-1	PCB-1254			<0.20	0.20
11096-82-5	PCB-1260			<0.20	0.20
	Surrogates:	***% Recovery***	***Control Limits***		
	Decachlorobiphenyl	*73*	*45-134*		
	Tetrachloro-m-xylene	*64*	*27-126*		

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55		
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/5/13 8:00	By:	ALK
Dilution Factor:	1	Analyzed:	12/11/13 7:08	By:	DWJ
QC Batch:	1313027	Analytical Batch:	3L11050		

Semivolatile Organic Compounds by EPA Method 625

CAS Number	Analyte	Analytical Result	RL
83-32-9	Acenaphthene	<5 0	5.0
208-96-8	Acenaphthylene	<5.0	5.0
120-12-7	Anthracene	<5 0	5.0
92-87-5	Benzidine	<50	50
56-55-3	Benzo(a)anthracene	<5.0	5.0
50-32-8	Benzo(a)pyrene	<5.0	5.0
205-99-2	Benzo(b)fluoranthene	<5.0	5.0
207-08-9	Benzo(k)fluoranthene	<5.0	5.0
191-24-2	Benzo(g,h,i)perylene	<5.0	5.0
101-55-3	4-Bromophenyl Phenyl Ether	<5.0	5.0
85-68-7	Butyl Benzyl Phthalate	<5 0	5.0
59-50-7	4-Chloro-3-methylphenol	<5.0	5.0
111-91-1	Bis(2-chloroethoxy)methane	<5.0	5.0
111-44-4	Bis(2-chloroethyl) Ether	<5.0	5 0
108-60-1	Bis(2-chloroisopropyl) Ether	<5.0	5.0
91-58-7	2-Chloronaphthalene	<5.0	5 0
95-57-8	2-Chlorophenol	<5.0	5.0
7005-72-3	4-Chlorophenyl Phenyl Ether	<5.0	5.0
218-01-9	Chrysene	<5.0	5.0
53-70-3	Dibenz(a,h)anthracene	<5.0	5.0
84-74-2	Di-n-butyl Phthalate	<5.0	5.0
95-50-1	1,2-Dichlorobenzene	<5.0	5.0
541-73-1	1,3-Dichlorobenzene	<5.0	5.0
106-46-7	1,4-Dichlorobenzene	<5.0	5.0
91-94-1	3,3'-Dichlorobenzidine	<20	20
120-83-2	2,4-Dichlorophenol	<5.0	5.0
84-66-2	Diethyl Phthalate	<5.0	5.0
105-67-9	2,4-Dimethylphenol	<5.0	5 0
131-11-3	Dimethyl Phthalate	<5.0	5.0

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**		
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services		
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55		
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey		
Matrix:	Waste Water	Received:	12/3/13 17:00		
Unit:	ug/L	Prepared:	12/5/13 8:00	By:	ALK
Dilution Factor:	1	Analyzed:	12/11/13 7:08	By:	DWJ
QC Batch:	1313027	Analytical Batch:	3L11050		

Semivolatile Organic Compounds by EPA Method 625 (Continued)

CAS Number	Analyte	Analytical Result	RL
534-52-1	4,6-Dinitro-2-methylphenol	<20	20
51-28-5	2,4-Dinitrophenol	<20	20
121-14-2	2,4-Dinitrotoluene	<5.0	5.0
606-20-2	2,6-Dinitrotoluene	<5.0	5.0
117-84-0	Di-n-octyl Phthalate	<5.0	5 0
122-66-7	1,2-Diphenylhydrazine	<5.0	5.0
117-81-7	Bis(2-ethylhexyl) Phthalate	<5.0	5.0
206-44-0	Fluoranthene	<5 0	5.0
86-73-7	Fluorene	<5 0	5.0
118-74-1	Hexachlorobenzene	<5.0	5.0
87-68-3	Hexachlorobutadiene	<5.0	5.0
77-47-4	Hexachlorocyclopentadiene	<5.0	5.0
67-72-1	Hexachloroethane	<5.0	5.0
193-39-5	Indeno(1,2,3-cd)pyrene	<5.0	5.0
78-59-1	Isophorone	<5.0	5.0
91-20-3	Naphthalene	<5.0	5.0
98-95-3	Nitrobenzene	<5.0	5.0
100-02-7	4-Nitrophenol	<20	20
88-75-5	2-Nitrophenol	<5.0	5.0
62-75-9	N-Nitroso-dimethylamine	<5.0	5.0
86-30-6	N-Nitroso-diphenylamine	<5.0	5.0
621-64-7	N-Nitroso-di-n-propylamine	<5.0	5.0
87-86-5	Pentachlorophenol	<20	20
85-01-8	Phenanthrene	<5.0	5.0
108-95-2	Phenol	<5.0	5.0
129-00-0	Pyrene	<5 0	5.0
120-82-1	1,2,4-Trichlorobenzene	<5 0	5.0
88-06-2	2,4,6-Trichlorophenol	<5.0	5.0

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ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00
Unit:	ug/L	Prepared:	12/5/13 8:00 By: ALK
Dilution Factor:	1	Analyzed:	12/11/13 7:08 By: DWJ
QC Batch:	1313027	Analytical Batch:	3L11050

Semivolatile Organic Compounds by EPA Method 625 (Continued)

CAS Number	Analyte			Analytical Result	RL
	Surrogates:	*% Recovery*	*Control Limits*		
	2-Fluorophenol	*40*	*18-74*		
	Phenol-d6	*26*	*12-47*		
	Nitrobenzene-d5	*66*	*34-122*		
	2-Fluorobiphenyl	*68*	*36-136*		
	2,4,6-Tribromophenol	*51*	*19-131*		
	o-Terphenyl	*74*	*27-138*		

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Total Metals by EPA 200 Series Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Aluminum	**1.0**	0.050	mg/L	1	USEPA-200.7	12/09/13 12:16	KLV	1313073
Antimony	<1.0	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Arsenic	**2.3**	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Barium	**46**	5.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Beryllium	<1.0	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Boron	**46**	20	ug/L	1	USEPA-200.8	12/10/13 10:20	MSM	1313011
Cadmium	<0.20	0.20	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Chromium	<10	10	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Cobalt	<10	10	ug/L	1	USEPA-200.7	12/09/13 12:16	KLV	1313073
Copper	**7.1**	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Iron	**1.6**	0.010	mg/L	1	USEPA-200.7	12/09/13 15:43	CKD	1313073
Lead	**2.1**	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Magnesium	**20**	0.50	mg/L	1	USEPA-200.7	12/09/13 15:43	CKD	1313073
Manganese	**0.047**	0.010	mg/L	1	USEPA-200.7	12/09/13 12:16	KLV	1313073
Molybdenum	<0.10	0.10	mg/L	1	USEPA-200.7	12/05/13 09:58	KLV	1312991
Nickel	<5.0	5.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Selenium	<1.0	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Silver	<0.50	0.50	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Thallium	<1.0	1.0	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011
Tin	<0.20	0.20	mg/L	1	USEPA-200.7	12/05/13 09:58	KLV	1312991
Titanium	<0.10	0.10	mg/L	1	USEPA-200.7	12/05/13 09:58	KLV	1312991
Zinc	**18**	10	ug/L	1	USEPA-200.8	12/09/13 13:34	MSM	1313011

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**DTE - Fermi-2**	Work Order:	**1312032**
Project:	Permit Renewal - Fermi, 2013	Description:	Laboratory Services
Client Sample ID:	**001 Composite**	Sampled:	12/3/13 12:55
Lab Sample ID:	**1312032-15**	Sampled By:	J. Elsey
Matrix:	Waste Water	Received:	12/3/13 17:00

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Hardness as CaCO3	**248**	2	mg/L	1	SM 2340 C-2011	12/06/13 14:30	KAR	1313099
BOD, (5-Day)	<4.0	4.0	mg/L	1	SM 5210 B-2011	12/04/13 11 31	SKA	1313038
Bromide	<0 50	0.50	mg/L	1	ASTM D 1246-05	12/11/13 13 00	SLL	1313240
Chemical Oxygen Demand	**28**	5.0	mg/L	1	SM 5220 D-2011	12/04/13 14.59	SLL	1313025
Color (Apparent)	**15.0**	5.00	A.C.U.	1	SM 2120 B-2011	12/04/13 14:23	CAC	1313019
Fluoride	**0.23**	0.10	mg/L	1	SM 4500-F C-2011	12/13/13 10 40	SLL	1313326
Surfactants, MBAS	<0.0250	0 0250	mg/L	1	SM 5540 C-2011	12/04/13 12:15	WAH	1313020
Phosphorus, Total	**0.667**	0.0100	mg/L	1	SM 4500-P E-2011	12/10/13 10.09	KAR	1313144
Residue, Dissolved @ 180° C	**340**	50	mg/L	1	SM 2540 C-2011	12/05/13 13:00	WAH	1313033
Residue, Suspended	**59.4**	5.0	mg/L	1	SM 2540 D-2011	12/05/13 15.30	WAH	1313036
Sulfate	**49**	10	mg/L	2	ASTM D516-90 (07)	12/12/13 10.38	LMA	1313298
Sulfide, Total	<0.020	0.020	mg/L	1	SM 4500-S2 D-2011	12/06/13 15:31	WAH	1313149
Sulfite	<1.0	1.0	mg/L	1	SM 4500-SO3 B-2011	12/04/13 13 50	CAC	1313110
Carbon, Total Organic	**5.3**	0.50	mg/L	1	SM 5310 C-2011	12/05/13 20.20	KAR	1313095
Nitrogen, Ammonia	**0.089**	0.050	mg/L	1	SM 4500-NH3 G-2011	12/11/13 11:15	CLB	1313163
Nitrogen, Nitrate+Nitrite	**0.87**	0 050	mg/L	1	SM 4500-NO3 F-2011	12/04/13 13:19	CAC	1313118
Nitrogen, Organic	**0.51**	0.50	mg/L	1	EPA-351 2/4500-NH3G	12/12/13 14 35	CLB	1313201
Nitrogen, Total Kjeldahl	**0.59**	0.50	mg/L	1	USEPA-351 2 Rev 2 0	12/09/13 11:45	CLB	1313050
Nitrogen, Inorganic	**0.96**	0.050	mg/L	1	[CALC]	12/11/13 11:15	CAC	[CALC]

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Polychlorinated Biphenyls (PCBs) by EPA Method 608

Analyte	Sample Conc	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1313086 608 Liquid/Liquid Extraction/USEPA-608								
Method Blank					Analyzed:		12/13/2013	By: ASC
Unit: ug/L					Analytical Batch:		3L13025	
PCB-1016			<0.20			--		0.20
PCB-1221			<0.20					0.20
PCB-1232			<0.20					0.20
PCB-1242			<0.20					0.20
PCB-1248			<0.20					0.20
PCB-1254			<0.20					0.20
PCB-1260			<0.20					0.20
Surrogates:								
Decachlorobiphenyl				*98*	*45-134*			
Tetrachloro-m-xylene				*72*	*27-126*			
Laboratory Control Sample					Analyzed:		12/13/2013	By: ASC
Unit: ug/L					Analytical Batch:		3L13025	
PCB-1248		0.600	**0.552**	92	38-158	--		0.20
Surrogates:								
Decachlorobiphenyl				*96*	*45-134*			
Tetrachloro-m-xylene				*70*	*27-126*			

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Volatile Organic Compounds by EPA Method 624

QC Batch: 1313145 5030B Aqueous Purge & Trap/USEPA-624

Method Blank | Analyzed: 12/06/2013 | By: DLV
Unit: ug/L | Analytical Batch: 3L09003

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Acrolein			<5 0					5 0
Acrylonitrile			<1.0					1.0
Benzene			<1.0					1.0
Bromodichloromethane			<1.0					1.0
Bromoform			<1.0					1.0
Bromomethane			<1.0					1.0
Carbon Tetrachloride			<1.0					1.0
Chlorobenzene			<1.0					1.0
Chloroethane			<1.0					1.0
2-Chloroethyl Vinyl Ether			<10					10
Chloroform			<1.0					1.0
Chloromethane			<1.0					1.0
Dibromochloromethane			<1.0					1.0
1,1-Dichloroethane			<1.0					1.0
1,2-Dichloroethane			<1.0					1.0
1,1-Dichloroethene			<1.0					1.0
1,3-Dichloropropene (Total)			<2.0					2.0
trans-1,2-Dichloroethene			<1.0					1.0
1,2-Dichloropropane			<1.0					1.0
Ethylbenzene			<1.0					1.0
Methylene Chloride			<5.0					5.0
1,1,2,2-Tetrachloroethane			<1.0					1.0
Tetrachloroethene			<1 0					1.0
Toluene			<1.0					1 0
1,1,1-Trichloroethane			<1.0					1.0
1,1,2-Trichloroethane			<1.0					1.0
Trichloroethene			<1.0					1.0
Vinyl Chloride			<1.0					1.0
Surrogates:								
Dibromofluoromethane				*101*	*85-118*			
1,2-Dichloroethane-d4				*99*	*87-122*			
Toluene-d8				*100*	*85-113*			
4-Bromofluorobenzene				*95*	*82-110*			

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Volatile Organic Compounds by EPA Method 624 (Continued)

Analyte	Sample Conc	Spike Qty.	Result	Spike % Rec	Control Limits	RPD	RPD Limits	RL

QC Batch: 1313145 (Continued) 5030B Aqueous Purge & Trap/USEPA-624

Laboratory Control Sample Analyzed: 12/06/2013 By: DLV

Unit: ug/L Analytical Batch: 3L09003

Analyte	Sample Conc	Spike Qty.	Result	Spike % Rec	Control Limits	RPD	RPD Limits	RL
Acrolein		40.0	**44.5**	111	48-146	--		5.0
Acrylonitrile		40.0	**34.4**	86	73-129	--		1 0
Benzene		40.0	**39.7**	99	84-119	--		1.0
Bromodichloromethane		40.0	**37.6**	94	82-124	--		1.0
Bromoform		40.0	**34.8**	87	65-123	--		1.0
Bromomethane		40.0	**45.0**	113	55-142	--		1.0
Carbon Tetrachloride		40.0	**38.2**	95	79-127	--		1.0
Chlorobenzene		40.0	**38.0**	95	84-118	--		1.0
Chloroethane		40.0	**49.2**	123	76-124	--		1.0
Chloroform		40.0	**39.1**	98	82-119	--		1.0
Chloromethane		40 0	**39.5**	99	73-125	--		1.0
Dibromochloromethane		40.0	**34.9**	87	74-121	--		1.0
1,1-Dichloroethane		40.0	**39.2**	98	80-118	--		1.0
1,2-Dichloroethane		40.0	**37.8**	95	81-122	--		1.0
1,1-Dichloroethene		40.0	**42.6**	107	77-123	--		1.0
1,3-Dichloropropene (Total)		80.0	**65.5**	82	81-116	--		2 0
trans-1,2-Dichloroethene		40.0	**39.7**	99	76-126	--		1 0
1,2-Dichloropropane		40.0	**40.5**	101	82-122	--		1.0
Ethylbenzene		40.0	**38.2**	96	87-119	--		1.0
Methylene Chloride		40 0	**38.6**	97	75-129	--		5 0
1,1,2,2-Tetrachloroethane		40.0	**37.5**	94	70-137	--		1.0
Tetrachloroethene		40 0	**38.4**	96	81-117	--		1.0
Toluene		40.0	**38.5**	96	85-118	--		1.0
1,1,1-Trichloroethane		40 0	**39.8**	99	81-122	--		1.0
1,1,2-Trichloroethane		40.0	**37.9**	95	83-121	--		1.0
Trichloroethene		40.0	**39.9**	100	82-119	--		1.0
Vinyl Chloride		40.0	**42.1**	105	77-123	--		1.0
Surrogates:								
Dibromofluoromethane				*103*	*85-118*			
1,2-Dichloroethane-d4				*97*	*87-122*			
Toluene-d8				*101*	*85-113*			
4-Bromofluorobenzene				*97*	*82-110*			

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Semivolatile Organic Compounds by EPA Method 625

QC Batch: 1313027 625 Liquid/Liquid Extraction/USEPA-625

Method Blank — Analyzed: 12/11/2013 By: DWJ

Unit: ug/L — Analytical Batch: 3L11050

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Acenaphthene			<5.0					5.0
Acenaphthylene			<5.0					5.0
Anthracene			<5 0					5.0
Benzidine			<50					50
Benzo(a)anthracene			<5.0			–		5.0
Benzo(a)pyrene			<5.0					5.0
Benzo(b)fluoranthene			<5.0					5.0
Benzo(k)fluoranthene			<5.0					5.0
Benzo(g,h,i)perylene			<5.0					5.0
4-Bromophenyl Phenyl Ether			<5.0					5.0
Butyl Benzyl Phthalate			<5.0					5.0
4-Chloro-3-methylphenol			<5 0					5.0
Bis(2-chloroethoxy)methane			<5.0			–		5.0
Bis(2-chloroethyl) Ether			<5.0					5.0
Bis(2-chloroisopropyl) Ether			<5.0					5.0
2-Chloronaphthalene			<5 0					5.0
2-Chlorophenol			<5.0			–		5.0
4-Chlorophenyl Phenyl Ether			<5.0					5.0
Chrysene			<5.0			–		5.0
Dibenz(a,h)anthracene			<5.0					5 0
Di-n-butyl Phthalate			<5.0			–		5 0
1,2-Dichlorobenzene			<5.0					5 0
1,3-Dichlorobenzene			<5 0					5.0
1,4-Dichlorobenzene			<5.0					5.0
3,3´-Dichlorobenzidine			<20					20
2,4-Dichlorophenol			<5.0					5.0
Diethyl Phthalate			<5 0			–		5.0
2,4-Dimethylphenol			<5.0					5.0
Dimethyl Phthalate			<5.0					5.0
4,6-Dinitro-2-methylphenol			<20			–		20
2,4-Dinitrophenol			<20					20
2,4-Dinitrotoluene			<5.0					5.0
2,6-Dinitrotoluene			<5.0					5.0
Di-n-octyl Phthalate			<5 0					5.0
1,2-Diphenylhydrazine			<5 0					5.0
Bis(2-ethylhexyl) Phthalate			<5.0			–		5.0

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Semivolatile Organic Compounds by EPA Method 625 (Continued)

QC Batch: 1313027 (Continued) 625 Liquid/Liquid Extraction/USEPA-625

Analyte	Sample Conc	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Method Blank (Continued) Unit: ug/L					Analyzed: 12/11/2013 By: DWJ; Analytical Batch: 3L11050			
Fluoranthene			<5.0					5.0
Fluorene			<5.0					5 0
Hexachlorobenzene			<5.0					5.0
Hexachlorobutadiene			<5 0					5.0
Hexachlorocyclopentadiene			<5 0					5.0
Hexachloroethane			<5 0					5.0
Indeno(1,2,3-cd)pyrene			<5.0					5.0
Isophorone			<5.0					5 0
Naphthalene			<5.0					5 0
Nitrobenzene			<5.0			--		5.0
4-Nitrophenol			<20					20
2-Nitrophenol			<5.0					5 0
N-Nitroso-dimethylamine			<5 0					5 0
N-Nitroso-diphenylamine			<5.0			--		5 0
N-Nitroso-di-n-propylamine			<5.0					5 0
Pentachlorophenol			<20					20
Phenanthrene			<5.0					5 0
Phenol			<5.0					5.0
Pyrene			<5.0					5.0
1,2,4-Trichlorobenzene			<5.0					5.0
2,4,6-Trichlorophenol			<5.0					5.0
Surrogates:								
2-Fluorophenol				*49*	*18-74*			
Phenol-d6				*31*	*12-47*			
Nitrobenzene-d5				*87*	*34-122*			
2-Fluorobiphenyl				*94*	*36-136*			
2,4,6-Tribromophenol				*69*	*19-131*			
o-Terphenyl				*98*	*27-138*			
Laboratory Control Sample Unit: ug/L					Analyzed: 12/11/2013 By: DWJ; Analytical Batch: 3L11050			
Acenaphthene		100	**99.2**	99	47-145	--		5.0

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Semivolatile Organic Compounds by EPA Method 625 (Continued)

QC Batch: 1313027 (Continued) 625 Liquid/Liquid Extraction/USEPA-625

Laboratory Control Sample (Continued) Analyzed: 12/11/2013 By: DWJ

Unit: ug/L Analytical Batch: 3L11050

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Acenaphthylene		100	**102**	102	33-145	--		5.0
Anthracene		100	**99.3**	99	27-133	--		5.0
Benzidine		200	**171**	86	28-120	--		50
Benzo(a)anthracene		100	**96.8**	97	33-143	--		5.0
Benzo(a)pyrene		100	**96.8**	97	17-163	--		5.0
Benzo(b)fluoranthene		100	**96.6**	97	24-159	--		5.0
Benzo(k)fluoranthene		100	**104**	104	11-162	--		5.0
Benzo(g,h,i)perylene		100	**96.5**	96	1-219	--		5.0
4-Bromophenyl Phenyl Ether		100	**83.0**	83	53-127	--		5 0
Butyl Benzyl Phthalate		100	**98.3**	98	1-152	--		5.0
4-Chloro-3-methylphenol		100	**93.9**	94	22-147	--		5.0
Bis(2-chloroethoxy)methane		100	**100**	100	33-184	--		5 0
Bis(2-chloroethyl) Ether		100	**105**	105	12-158	--		5.0
Bis(2-chloroisopropyl) Ether		100	**104**	104	36-166	--		5.0
2-Chloronaphthalene		100	**101**	101	60-118	--		5 0
2-Chlorophenol		100	**93.2**	93	23-134	--		5.0
4-Chlorophenyl Phenyl Ether		100	**93.5**	94	25-158	--		5 0
Chrysene		100	**102**	102	17-168	--		5 0
Dibenz(a,h)anthracene		100	**94.1**	94	1-227	--		5 0
Di-n-butyl Phthalate		100	**94.5**	94	1-118	--		5.0
1,2-Dichlorobenzene		100	**97.5**	98	32-129	--		5.0
1,3-Dichlorobenzene		100	**98.3**	98	1-172	--		5.0
1,4-Dichlorobenzene		100	**100**	100	20-124	--		5 0
3,3'-Dichlorobenzidine		200	**214**	107	1-262	--		20
2,4-Dichlorophenol		100	**97.4**	97	39-135	--		5.0
Diethyl Phthalate		100	**97.6**	98	1-114	--		5.0
2,4-Dimethylphenol		100	**91.0**	91	32-119	--		5 0
Dimethyl Phthalate		100	**96.5**	96	1-112	--		5.0
4,6-Dinitro-2-methylphenol		100	**100**	100	1-181	--		20
2,4-Dinitrophenol		100	**76.0**	76	1-191	--		20
2,4-Dinitrotoluene		100	**93.2**	93	39-139	--		5.0
2,6-Dinitrotoluene		100	**90.8**	91	50-158	--		5.0
Di-n-octyl Phthalate		100	**95.2**	95	4-146	--		5.0
1,2-Diphenylhydrazine		100	**96.5**	96	62-128	--		5.0
Bis(2-ethylhexyl) Phthalate		100	**99.8**	100	8-158	--		5.0
Fluoranthene		100	**99.8**	100	26-137	--		5.0

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Semivolatile Organic Compounds by EPA Method 625 (Continued)

QC Batch: 1313027 (Continued) 625 Liquid/Liquid Extraction/USEPA-625

Laboratory Control Sample (Continued) Analyzed. 12/11/2013 By: DWJ

Unit: ug/L Analytical Batch: 3L11050

Analyte	Sample Conc	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Fluorene		100	**99.8**	100	59-121	--		5.0
Hexachlorobenzene		100	**99.0**	99	1-152	--		5.0
Hexachlorobutadiene		100	**104**	104	24-116	--		5.0
Hexachlorocyclopentadiene		100	**92.3**	92	21-138	--		5.0
Hexachloroethane		100	**102**	102	40-113	--		5.0
Indeno(1,2,3-cd)pyrene		100	**92.4**	92	21-196	--		5.0
Isophorone		100	**99.7**	100	56-129	--		5.0
Naphthalene		100	**103**	103	21-133	--		5.0
Nitrobenzene		100	**99.2**	99	35-180	--		5.0
4-Nitrophenol		100	**29.1**	29	1-132	--		20
2-Nitrophenol		100	**99.7**	100	29-182	--		5.0
N-Nitroso-dimethylamine		100	**59.7**	60	22-87	--		5.0
N-Nitroso-diphenylamine		100	**82.2**	82	45-110	--		5.0
N-Nitroso-di-n-propylamine		100	**101**	101	1-230	--		5.0
Pentachlorophenol		100	**80.9**	81	14-176	--		20
Phenanthrene		100	**97.5**	98	54-120	--		5.0
Phenol		100	**41.9**	42	5-112	--		5.0
Pyrene		100	**95.9**	96	52-115	--		5.0
1,2,4-Trichlorobenzene		100	**95.1**	95	44-142	--		5.0
2,4,6-Trichlorophenol		100	**89.9**	90	37-144	--		5.0
Surrogates:								
2-Fluorophenol				*57*	*18-74*			
Phenol-d6				*38*	*12-47*			
Nitrobenzene-d5				*89*	*34-122*			
2-Fluorobiphenyl				*92*	*36-136*			
2,4,6-Tribromophenol				*82*	*19-131*			
o-Terphenyl				*93*	*27-138*			

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Total Metals by EPA 200 Series Methods

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Aluminum/USEPA-200.7									
QC Batch: 1313073 (200.2 Digestion)							Analyzed:	12/09/2013	By: KLV
Method Blank			<0 050	mg/L					0 050
Laboratory Control Sample		2.00	**1.87**	mg/L	93	85-115			0.050
Analyte: Antimony/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed.	12/09/2013	By: MSM
Method Blank			<1.0	ug/L					1 0
Laboratory Control Sample		50 0	**52.7**	ug/L	105	85-115			1 0
Analyte: Arsenic/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Method Blank			<1.0	ug/L					1 0
Laboratory Control Sample		50.0	**51.1**	ug/L	102	85-115			1.0
Analyte: Barium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Method Blank			<5 0	ug/L					5 0
Laboratory Control Sample		50 0	**53.5**	ug/L	107	85-115			5 0
Analyte: Beryllium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Method Blank			<1.0	ug/L					1 0
Laboratory Control Sample		50.0	**47.4**	ug/L	95	85-115			1 0
Analyte: Boron/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed·	12/10/2013	By: MSM
Method Blank			<20	ug/L					20
Laboratory Control Sample		50 0	**45.2**	ug/L	90	85-115			20
Analyte: Cadmium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Method Blank			<0 20	ug/L					0.20

Continued on next page

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Total Metals by EPA 200 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Cadmium/USEPA-200.8 (Continued)									
QC Batch: 1313011 (Continued) (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Laboratory Control Sample		50 0	**51.2**	ug/L	102	85-115			0.20
Analyte: Chromium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<10	ug/L					10
Laboratory Control Sample		50 0	**43.8**	ug/L	88	85-115			10
Analyte: Cobalt/USEPA-200.7									
QC Batch: 1313073 (200 2 Digestion)						Analyzed:	12/09/2013	By. KLV	
Method Blank			<10	ug/L					10
Laboratory Control Sample		400	**379**	ug/L	95	85-115			10
Analyte: Copper/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<1.0	ug/L					1 0
Laboratory Control Sample		50 0	**47.5**	ug/L	95	85-115			1 0
Analyte: Iron/USEPA-200.7									
QC Batch. 1313073 (200.2 Digestion)						Analyzed:	12/09/2013	By. CKD	
Method Blank			<0.010	mg/L					0.010
Laboratory Control Sample		0 400	**0.391**	mg/L	98	85-115			0 010
Analyte: Lead/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<1 0	ug/L					1 0
Laboratory Control Sample		50 0	**50.3**	ug/L	101	85-115			1 0
Analyte: Magnesium/USEPA-200.7									
QC Batch: 1313073 (200.2 Digestion)						Analyzed:	12/09/2013	By: CKD	
Method Blank			<0.50	mg/L					0 50

Continued on next page

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Total Metals by EPA 200 Series Methods (Continued)

QC Type	Sample Conc	Spike Qty	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Magnesium/USEPA-200.7 (Continued)									
QC Batch: 1313073 (Continued) (200.2 Digestion)						Analyzed:	12/09/2013	By: CKD	
Laboratory Control Sample		20 0	**19.7**	mg/L	98	85-115			0.50
Analyte: Manganese/USEPA-200.7									
QC Batch: 1313073 (200.2 Digestion)						Analyzed:	12/09/2013	By: KLV	
Method Blank			<0 010	mg/L					0 010
Laboratory Control Sample		0 400	**0.378**	mg/L	94	85-115			0.010
Analyte: Molybdenum/USEPA-200.7									
QC Batch: 1312991 (200.2 Digestion)						Analyzed:	12/05/2013	By: KLV	
Method Blank			<0 10	mg/L					0 10
Laboratory Control Sample		0.400	**0.422**	mg/L	106	85-115			0 10
Analyte: Nickel/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<5 0	ug/L					5 0
Laboratory Control Sample		50 0	**47.0**	ug/L	94	85-115			5 0
Analyte: Selenium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<1 0	ug/L					1.0
Laboratory Control Sample		50 0	**48.9**	ug/L	98	85-115			1 0
Analyte: Silver/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<0 50	ug/L					0 50
Laboratory Control Sample		50 0	**51.9**	ug/L	104	85-115			0 50
Analyte: Thallium/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)						Analyzed:	12/09/2013	By: MSM	
Method Blank			<1 0	ug/L					1 0

Continued on next page

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Total Metals by EPA 200 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty	Result	Unit	Spike % Rec	Control Limits	RPD	RPD Limits	RL
Analyte: Thallium/USEPA-200.8 (Continued)									
QC Batch: 1313011 (Continued) (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Laboratory Control Sample		50 0	**49.8**	ug/L	100	85-115			1.0
Analyte: Tin/USEPA-200.7									
QC Batch. 1312991 (200.2 Digestion)							Analyzed:	12/05/2013	By: KLV
Method Blank			<0 20	mg/L					0 20
Laboratory Control Sample		2 00	**2.12**	mg/L	106	85-115			0.20
Analyte: Titanium/USEPA-200.7									
QC Batch: 1312991 (200 2 Digestion)							Analyzed:	12/05/2013	By: KLV
Method Blank			<0 10	mg/L					0 10
Laboratory Control Sample		0.400	**0.422**	mg/L	106	85-115			0 10
Analyte: Zinc/USEPA-200.8									
QC Batch: 1313011 (200.2 Digestion)							Analyzed:	12/09/2013	By: MSM
Method Blank			<10	ug/L					10
Laboratory Control Sample		50 0	**54.0**	ug/L	108	85-115			10

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Total Metals by EPA 1600 Series Methods

QC Type	Sample Conc	Spike Qty	Result	Unit	Spike % Rec	Control Limits	RPD	RPD Limits	RL
Analyte: Mercury/USEPA-1631E									
QC Batch. 1313075 (1631E Digestion)							**Analyzed:**	12/05/2013	By: MSM
Method Blank			<0.500	ng/L					0.500
Method Blank			<0 500	ng/L					0.500
Method Blank			<0 500	ng/L					0 500
Laboratory Control Sample		4.00	**4.103**	ng/L	103	77-123			0.500
1312832-02 [Outfall 001 LLHg]									
Matrix Spike	7 843	4 00	**11.74**	ng/L	98	71-125			2 50
Matrix Spike Duplicate	7 843	4.00	**11.43**	ng/L	90	71-125	3	24	2.50
QC Batch: 1313536 (1631E Digestion)							**Analyzed:**	12/19/2013	By: MSM
Method Blank			<0 500	ng/L					0.500
Method Blank			<0.500	ng/L					0.500
Method Blank			<0 500	ng/L					0 500
Laboratory Control Sample		4 00	**4.065**	ng/L	102	77-123			0 500

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

QC Type	Sample Conc	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL	
Analyte: BOD, (5-Day)/SM 5210 B-2011										
QC Batch: 1313038 (General Inorganic Prep)							Analyzed:	12/04/2013		By: SKA
Method Blank			<2 0	mg/L					2 0	
Laboratory Control Sample		198	**189**	mg/L	96	85-115			2 0	
Analyte: Bromide/ASTM D 1246-05										
QC Batch: 1313240 (Method Specific Preparation)							Analyzed:	12/11/2013		By: SLL
Method Blank			<0 50	mg/L					0 50	
Laboratory Control Sample		5 00	**5.20**	mg/L	104	90-110			0 50	
1312032-14 [Intake Composite]										
Matrix Spike	0.304	2 50	**2.83**	mg/L	101	80-120			0.50	
Duplicate	0 304		**0.295**	mg/L			3	20	0 50	
Analyte: Carbon, Total Organic/SM 5310 C-2011										
QC Batch: 1313095 (Method Specific Preparation)							Analyzed:	12/05/2013		By: KAR
Method Blank			<0.50	mg/L					0 50	
Laboratory Control Sample		2.00	**2.24**	mg/L	112	84-118			0 50	
1312032-14 [Intake Composite]										
Matrix Spike	3.58	2 00	**5.71**	mg/L	107	75-124			0.50	
Matrix Spike Duplicate	3 58	2.00	**5.68**	mg/L	105	75-124	0 5	20	0 50	
Analyte: Chemical Oxygen Demand/SM 5220 D-2011										
QC Batch: 1313025 (5220 D COD Digestion)							Analyzed.	12/04/2013		By: SLL
Method Blank			<5 0	mg/L					5 0	
Laboratory Control Sample		60.0	**60.6**	mg/L	101	95-105			5 0	
Analyte: Color (Apparent)/SM 2120 B-2011										
QC Batch: 1313019 (Method Specific Preparation)							Analyzed.	12/04/2013		By: CAC
Method Blank			<5 00	A C U					5 00	
Laboratory Control Sample		25 0	**25.0**	A C U	100	80-120			5 00	
1312032-14 [Intake Composite]										
Duplicate	15 0		**15.0**	A.C.U.			0	20	5 00	

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Physical/Chemical Parameters by EPA/APHA/ASTM Methods (Continued)

QC Type	Sample Conc	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Cyanide, Available/USEPA OIA-1677									
QC Batch: 1313173 (Method Specific Preparation)						Analyzed:	12/09/2013	By: LMA	
Method Blank			<2.0	ug/L					2.0
Laboratory Control Sample		20.0	**21.5**	ug/L	108	82-132			2.0
1312032-10 [Intake Grab Day 2]									
Matrix Spike	<2.0	20.0	**20.7**	ug/L	103	82-130			2.0
Matrix Spike Duplicate	<2.0	20.0	**21.3**	ug/L	106	82-130	3	11	2.0
Analyte: Fluoride/SM 4500-F C-2011									
QC Batch: 1313326 (Method Specific Preparation)						Analyzed:	12/13/2013	By: SLL	
Method Blank			<0.10	mg/L					0.10
Laboratory Control Sample		2.00	**1.98**	mg/L	99	90-110			0.10
Analyte: Hardness as CaCO3/SM 2340 C-2011									
QC Batch: 1313099 (Method Specific Preparation)						Analyzed:	12/06/2013	By: KAR	
Method Blank			<2	mg/L					2
Laboratory Control Sample		86.3	**87**	mg/L	101	92-110			2
Laboratory Control Sample		200	**202**	mg/L	101	92-110			2
1312032-14 [Intake Composite]									
Matrix Spike	147	400	**545**	mg/L	100	86-113			4
Duplicate	147		**147**	mg/L			0	20	2
Analyte: HEM; Oil & Grease/USEPA-1664A									
QC Batch: 1313184 (1664A Extraction)						Analyzed:	12/10/2013	By: WAH	
Method Blank			<5.00	mg/L					5.00
Laboratory Control Sample		40.0	**37.5**	mg/L	94	78-114			5.00
1312032-03 [Outfall 001 Grab Day 2]									
Duplicate	<5.00		<5.00	mg/L				18	5.00
Analyte: Nitrogen, Ammonia/SM 4500-NH3 G-2011									
QC Batch: 1313163 (4500-NH3 B Ammonia Distillation)						Analyzed:	12/11/2013	By: CLB	
Method Blank			<0.050	mg/L					0.050

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Physical/Chemical Parameters by EPA/APHA/ASTM Methods (Continued)

QC Type	Sample Conc	Spike Qty	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Nitrogen, Ammonia/SM 4500-NH3 G-2011 (Continued)									
QC Batch: 1313163 (Continued) (4500-NH3 B Ammonia Distillation)						Analyzed:	12/11/2013	By: CLB	
Laboratory Control Sample		1.00	**0.963**	mg/L	96	90-110			0 050
Analyte: Nitrogen, Nitrate+Nitrite/SM 4500-NO3 F-2011									
QC Batch: 1313118 (General Inorganic Prep)						Analyzed:	12/04/2013	By: CAC	
Method Blank			<0.050	mg/L					0 050
Laboratory Control Sample		0 500	**0.524**	mg/L	105	90-110			0 050
Analyte: Nitrogen, Total Kjeldahl/USEPA-351.2 Rev. 2.0									
QC Batch: 1313050 (351.2 TKN Digestion)						Analyzed:	12/09/2013	By: CLB	
Method Blank			<0 50	mg/L					0 50
Laboratory Control Sample		2 00	**2.09**	mg/L	104	90-110			0.50
1312032-15 [001 Composite]									
Matrix Spike	0 594	2 00	**2.87**	mg/L	**114**	90-110			0.50
Matrix Spike Duplicate	0.594	2 00	**2.80**	mg/L	110	90-110	3	20	0 50
Analyte: Phenolics, Total/USEPA-420.4									
QC Batch: 1313065 (Method Specific Preparation)						Analyzed:	12/09/2013	By: LMA	
Method Blank			<0.0500	mg/L					0.0500
Laboratory Control Sample		0 250	**0.264**	mg/L	106	90-110			0 0500
Analyte: Phosphorus, Total/SM 4500-P E-2011									
QC Batch: 1313144 (4500-P B Phosphorus Digestion)						Analyzed:	12/10/2013	By: KAR	
Method Blank			<0 0100	mg/L					0 0100
Laboratory Control Sample		0 800	**0.784**	mg/L	98	90-110			0 0100
Analyte: Residue, Dissolved @ 180° C/SM 2540 C-2011									
QC Batch: 1313033 (General Inorganic Prep)						Analyzed:	12/05/2013	By: WAH	
Method Blank			<50	mg/L					50
Laboratory Control Sample		200	**208**	mg/L	99	85-115			50

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Physical/Chemical Parameters by EPA/APHA/ASTM Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: Residue, Suspended/SM 2540 D-2011									
QC Batch: 1313036 (General Inorganic Prep)						Analyzed:	12/05/2013	By: WAH	
Method Blank			<3 3	mg/L					3.3
Laboratory Control Sample		200	**190**	mg/L	95	88-104			24 8
Analyte: Sulfate/ASTM D516-90 (07)									
QC Batch: 1313298 (General Inorganic Prep)						Analyzed:	12/12/2013	By: LMA	
Method Blank			<5 0	mg/L					5.0
Laboratory Control Sample		20 0	**21.7**	mg/L	108	88-112			5.0
Analyte: Sulfide, Total/SM 4500-S2 D-2011									
QC Batch: 1313149 (Method Specific Preparation)						Analyzed:	12/06/2013	By: WAH	
Method Blank			<0 020	mg/L					0 020
Laboratory Control Sample		0 336	**0.345**	mg/L	103	80-120			0.020
Analyte: Sulfite/SM 4500-SO3 B-2011									
QC Batch: 1313110 (Method Specific Preparation)						Analyzed:	12/04/2013	By: CAC	
Method Blank			<1 0	mg/L					1 0
Laboratory Control Sample		50 0	**46.0**	mg/L	92	80-120			1.0
1312032-15 [001 Composite]									
Matrix Spike	<1 0	50 0	**41.0**	mg/L	82	76-104			1 0
Duplicate	<1 0		<1.0	mg/L				20	1 0
Analyte: Surfactants, MBAS/SM 5540 C-2011									
QC Batch: 1313020 (Method Specific Preparation)						Analyzed:	12/04/2013	By: WAH	
Method Blank			<0 0250	mg/L					0 0250
Laboratory Control Sample		0 125	**0 120**	mg/L	96	80-120			0 0250
1312032-15 [001 Composite]									
Duplicate	<0.0250		<0 0250	mg/L				20	0 0250

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Chain of Custody Record

COC No. 131136695

Pg. 1 of 1

For Lab Use Only

Cart: 13
VOA Rack/Tray: 624-RED
Receipt Log No: 4/2-22
Project Chemist: ~~Lisa Harvey~~ JLR
Work Order No: 1312032

Client Name: DTE - Fermi	Project Name: Permit Renewal
Address: 6400 North Dixie Highway	Client Project No / P.O. No
City, State Zip: Newport, MI 48166	Invoice To: (●) Client ( ) Other (comments)
Phone/Fax 734-586-1839	Contact/Report To: Mary Hana
Email: hanamj@dteenergy.com	

Analyses Requested

PRESERVATIVES: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOCs	Field Tests	Total Phenol	Oil & Grease	AvCN	LLHg	Total	Sample Comments
				Preservative							D	A	C	C	E	A		
				Container Type							1	--	13	7	23	24		
03	WW	01	1	Outfall 001 Grab Day 1	2503	12/2/13	1300		X	WW	2*	X					2	pH 8.31
05		02	2	outfall 001 LLHg	↓	12/2/13	1244									4	4	Temp 16 °C
			3															TRC ≤0.2mg/L
			4															DO 7.57
02	WW	03	5	Outfall 001 Grab Day 2	2503	12/3/13	1235		X	WW	2*	X	1	2	3	~~4~~ (JD)	11	pH 8.56
07	WW	04	6	Outfall 001 LLHg Duplicate	↓	12/2/13	1247									2	2	Temp 19 °C
07	WW	05	7	Outfall 001 Field Blank	↓	12/2/13	1241									2	2	TRC ≤0.2mg/L
			8															DO 6.89
01	WW	06	9	Outfall 001 VOC Lab Composite				X		WW	4*						4	*Lab: Add Day1 +Day2 VOCs together
06	WW	07	10	Fermi LLHg Trip Blank	2503	12-2-13										2	2	

Number of Containers Submitted

Sampled By (print): ~~Jeff Elsey~~ NEIL TATE
Sampler's Signature: [signature]
Company: ~~TriMatrix Laboratories~~ DTE ENERGY

How Shipped? Hand X Carrier ____
Tracking No.

Comments: 2RLM.

	Date	Time		Date	Time		Date	Time
1. Relinquished By: [signature]	12/3/13	1410	2. Relinquished By: [signature]	12.3.13	1700	3. Relinquished By		
1. Received By: [signature]	12.3.13	1410	2. Received By			3. Received For Lab By: [signature]	12.3.13	1700

ORIGINAL - LABORATORY COPY - FIELD/SAMPLER

DTE Fermi Permit Renewal 001 Grab COC 11/25/2013

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Chain of Custody Record

COC No. 131136695

Pg. 1 of 1

For Lab Use Only
Cart: 13
VOA Rack/Tray: 513 - RED
Receipt Log No.: 42-21
Project Chemist: Lisa Harvey
Work Order No.: 1312032

Client Name: DTE - ~~BRPP~~ [illegible]
Address: 6400 North Dixie Highway
City, State Zip: Newport, MI 48166
Phone/Fax 734-586-1839
Email: hanam@dteenergy.com

Project Name: Permit Renewal
Client Project No. / P.O. No: Mary Ott
Invoice To: (●) Client ( ) Other (comments)
Contact/Report To: Mary Hana

Analyses Requested

Preservative	D	A		C	C	E	A
Analysis	VOCs	Field Tests		Total Phenol	Oil & Grease	AvCN	LLHg
Container Type (corresponds to Container Packing List)	1	--		13	7	23	24

PRESERVATIVES:
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOCs	Field Tests		Total Phenol	Oil & Grease	AvCN	LLHg	Total	Sample Comments
03	WW	08	1	Intake Grab Day 1	2503	12/2/13	1225		X	WW	2*	X						2	pH 7.51
07		09	2	Intake LLHg	↓	12/2/13	1202										2	2	Temp 5 °C
			3																TRC <0.2mg/L
			4																DO 6.43
02	WW	10	5	Intake Grab Day 2	2503	12/3/13	1200		X	WW	2*	X		1	2	2	[illegible]	9	pH 7.57
07	WW	11	6	Intake LLHg Duplicate	↓	12/2/13	1205										2	2	Temp 12 °C
07	WW	12	7	Intake LLHg Field Blank	↓	12/2/13	1159										2	2	TRC <0.2mg/L
			8																DO 7.50
01	WW	13	9	Intake VOC Lab Composite				X		WW	4*							4	*Lab: Add Day1 + Day2 VOCs together
			10																

Number of Containers Submitted

Sampled By (print): Jeff Elsey Neil Tate
Sampler's Signature: [illegible signatures]
Company: TriMatrix Laboratory DTE Energy

How Shipped? Hand X Carrier ____
Tracking No.

Comments: 2RLM

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	12/3/13	1410	[signature]	12-3-13	1700			
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**
[signature]	12-3-13	1410				[signature]	12-3-13	1700

ORIGINAL - LABORATORY COPY - FIELD/SAMPLER

DTE Fermi Permit Renewal Intake Grab COC 11/25/2013

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TRIMATRIX LABORATORIES

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Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 131136695

Pg. 1 of 1

For Lab Use Only

Cart: 11
VOA Rack/Tray: –
Receipt Log No.: 41-20
Project Chemist: Lisa Harvey JLR
Work Order No.: 1312032

Client Name: DTE - Fermi
Address: 6400 North Dixie Highway
City, State Zip: Newport, MI 48166
Phone/Fax: 734-586-1839
Email: hanamj@dteenergy.com

Project Name: Permit Renewal
Client Project No. / P.O. No:
Invoice To: (●) Client ( ) Other (comments)
Contact/Report To: Mary Hana

Analyses Requested

	BOD,cBOD,MBAS	TSS,TDS,Fl,SO4,Br	MBAS, color	COD,NH3,phos,TKN,NPN	sulfide	sulfite	metals,hardness	PCB	SVOC	TOC
Preservative	A	A	A	C	F	H	B	A	A	C
Container Type (corresponds to Container Packing List)	3	3	3	4	9	25	6	2	2	11

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number	#	Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	BOD,cBOD,MBAS	TSS,TDS,Fl,SO4,Br	MBAS, color	COD,NH3,phos,TKN,NPN	sulfide	sulfite	metals,hardness	PCB	SVOC	TOC	Total	Sample Comments
04	WW	14	1	Intake Composite	2819	12/3/13	1220	X		WW	1	1	1	1	1	1	1	2	2	3	15	
04	WW	15	2	001 Composite	0410	12/3/13	1255	X		WW	1	1	1	1	1	1	1	2	2	3	15	
			3																			
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

Number of Containers Submitted

Sampled By (print): Jeff Elsey
Sampler's Signature: [signature]
Company: TriMatrix Laboratory

How Shipped? Hand X Carrier ______
Tracking No.

Comments: 2RLM. Report Total inorganic Nitrogen and Total Organic Nitrogen

	By	Date	Time
1. Relinquished By	[signature]	12/3/13	1410
1. Received By	[signature]	12-3-13	1410
2. Relinquished By	[signature]	12-3-13	1700
2. Received By			
3. Relinquished By			
3. Received For Lab By	[signature]	12-3-13	1700

ORIGINAL - LABORATORY COPY - FIELD/SAMPLER

DTE Fermi Permit Renewal Composite COC 11/25/2013

TRIMATRIX LABORATORIES

TRIMATRIX LABORATORIES

SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: DTE-FERMI
Receipt Record Page/Line #: 41-20
Work Order #: New / Add To 1312032
Project Chemist / Sample #s

Recorded by (initials/date): DNL 12-3-13
☑ Cooler ☐ Box ☐ Other____ — Qty Received: 2
Thermometer Used: ☑ IR Gun (#202) ☐ Digital Thermometer (#54) ☐ Other (#____)
☐ See Additional Cooler Information Form

	Cooler 1	Cooler 2	Cooler 3	Cooler 4
Cooler # / Time	1113819 / 1810	1170410 / 1815		
Custody Seals	☑ None ☐ Present / Intact ☐ Present / Not Intact	☑ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Location	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice ☐ Blue Ice ☐ None	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None
Alternate Temperature Taken Via	☑ Temperature Blank (TB) ☐ 1 Container	☑ Temperature Blank (TB) ☐ 1 Container	☐ Temperature Blank (TB) ☐ 1 Container	☐ Temperature Blank (TB) ☐ 1 Container
Temp Blank (Recorded / Correction / Actual °C)	0 / 1.7	0 / 3.2		
TB location	Representative / Not Representative	Representative / Not Representative	Representative / Not Representative	Representative / Not Representative
1 (Recorded / Correction / Actual °C)	3.0 / 0 / 3.0	3.5 / 0 / 3.5		
2	2.1 / 0 / 2.1	4.8 / 0 / 4.8		
3	2.1 / 0 / 2.1	4.9 / 0 / 4.9		
Average °C	2.4	4.4		
Cooler ID on COC?	☑	☑	☐	☐
VOC Trip Blank received?	☐	☐	☐	☐

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes	No	
☑	☐	Chain of Custody record(s)? If No, Initiated By ____
☑		Received for Lab Signed/Date/Time?
☐	☑	Shipping document?
☑	☐	Other FIELD DATA

COC Information

☑ TriMatrix COC ☐ Other____

COC ID Numbers: 131136695

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☑	☐	☐	Was thermal preservation required?
			If "No", Project Chemist Approval Initials: ____
☑	☐		If "Yes" Completed Non Con Cooler - Cont Inventory Form?
☐	☑		Completed Sample Preservation Verification Form?
☐	☑	☐	Samples chemically preserved correctly?
☑	☐		If "No", added orange tag?
	☐	☑	Received pre-preserved VOC soils? ☐ MeOH ☐ Na_2SO_4

Check COC for Accuracy

Yes	No	
☑	☐	Analysis Requested?
☑	☐	Sample ID matches COC?
☑	☐	Sample Date and Time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☑ Green-tagged containers
☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY: COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Sample Condition Summary

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate or non-TriMatrix containers received?
☑	☐	☐	VOC vials / TOX containers have headspace?
☑	☐	☐	Extra sample locations / containers not listed on COC?

Notes

☐ Trip Blank received ☐ Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
DNL 12-3-13	12-3-13	Yes / No

Log In Forms - Receiving.Log-In_Checklist revision: 3.4

TRIMATRIX LABORATORIES

SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: DTE - BRPP	Work Order #: 1312032 (New / Add To)
Receipt Record Page/Line #: 42-21	Project Chemist / Sample #s

Recorded by (initials/date): SN 12-3-13

☑ Cooler ☐ Box ☐ Other ___ — Qty Received: 1

Thermometer Used: ☑ IR Gun (#202) ☐ Digital Thermometer (#54) ☐ Other (# ___) ☐ See Additional Cooler Information Form

	Cooler 1	Cooler 2	Cooler 3	Cooler 4
Cooler # / Time	TN3303 / 1837			
Custody Seals	☑ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact	☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Location	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None	☐ Loose Ice ☐ Bagged Ice ☐ Blue Ice ☐ None
Alternate Temperature Taken Via	☑ Temperature Blank (TB) ☐ 1 Container	☐ Temperature Blank (TB) ☐ 1 Container	☐ Temperature Blank (TB) ☐ 1 Container	☐ Temperature Blank (TB) ☐ 1 Container

Cooler 1 temperatures:

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank		0	9.3
TB location: Representative / Not Representative			
1	10.7	0	10.7
2	8.4	0	8.4
3	8.0	0	8.0
Average °C			9.0

☑ Cooler ID on COC?
☐ VOC Trip Blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes / No
- ☑ Yes — Chain of Custody record(s)? If No, Initiated By ______
- ☑ Yes — Received for Lab Signed/Date/Time?
- ☑ No — Shipping document?
- ☑ No — Other ______

COC Information

☑ TriMatrix COC ☐ Other ______

COC ID Numbers: 13113 6695

Check Sample Preservation

N/A / Yes / No
- ☑ No — Average sample temperature ≤6° C?
- ☑ Yes — Was thermal preservation required?
- ☑ N/A — If "No", Project Chemist Approval Initials: ______
- ☑ N/A — If "Yes" Completed Non Con Cooler - Cont Inventory Form?
- ☑ Yes — Completed Sample Preservation Verification Form?
- ☑ Yes — Samples chemically preserved correctly?
- ☑ N/A — If "No", added orange tag?
- ☑ No — Received pre-preserved VOC soils? ☐ MeOH ☐ Na_2SO_4

Check COC for Accuracy

Yes / No
- ☑ Yes — Analysis Requested?
- ☑ Yes — Sample ID matches COC?
- ☑ Yes — Sample Date and Time matches COC?
- ☑ Yes — Container type completed on COC?
- ☑ Yes — All container types indicated are received?

Check for Short Hold-Time Prep/Analyses

- ☐ Bacteriological
- ☐ Air Bags
- ☐ EnCores / Methanol Pre-Preserved
- ☐ Formaldehyde/Aldehyde
- ☑ Green-tagged containers (12-3-13)
- ☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY: COPIES OF COC TO LAB AREA(S)
- ☐ NONE RECEIVED
- ☑ RECEIVED, COCs TO LAB(S)

Sample Condition Summary

N/A / Yes / No
- ☑ No — Broken containers/lids?
- ☑ No — Missing or incomplete labels?
- ☑ No — Illegible information on labels?
- ☑ No — Low volume received?
- ☑ No — Inappropriate or non-TriMatrix containers received?
- ☑ No — VOC vials / TOX containers have headspace?
- ☑ N/A — Extra sample locations / containers not listed on COC?

Notes

☐ Trip Blank received ☐ Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
SN 12-3-13	SN 12-3-13	Yes / No

Log In Forms - Receiving Log-In_Checklist   revision: 3.4

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TRIMATRIX LABORATORIES

TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

page 1 of 1

Client: DTE-BRPP	Work Order #: 1312032
Receipt Log #: 42-21 Completed By (initials/date): JN 12-3-13	Project Chemist:

COC ID #: 1311366 95 Adjusted by: ______ Date: ______

DO NOT ADJUST pH FOR THESE CONTAINER TYPES (3, 6, 15)

Container Type	5/23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5	✓✓		✓					
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

COC ID #: Adjusted by: ______ Date: ______

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5/23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot #

- [x] HC378115
- [ ] ______

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

Log In Forms.xls -- Sample_Preserve_Verification

version: 3.0

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TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

page 1 of 1

Client: DTE-FERMI		Work Order #: 1312032
Receipt Log #: 42-22	Completed By (initials/date): DN 12-3-13	Project Chemist:

COC ID # 1311 36695	Adjusted by: Date:			DO NOT ADJUST pH FOR THESE CONTAINER TYPES			
Container Type	5/23 (circled 23)	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5	✓✓		✓					
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

COC ID #	Adjusted by: Date:			DO NOT ADJUST pH FOR THESE CONTAINER TYPES				
Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot #
☑ HC378115
☐

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

Log In Forms.xls -- Sample_Preserve_Verification

version: 3.0

TRIMATRIX LABORATORIES

TRIMATRIX LABORATORIES SAMPLE PRESERVATION VERIFICATION FORM

page 1 of 1

Client: DTE - FERMI	Work Order #: 1312032
Receipt Log #: 41-20 Completed By (initials/date): DN 12-3-13	Project Chemist:

COC ID #: 13113669.5 — Adjusted by: ______ Date: ______ — DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1		✓			✓✓✓	✓		
COC Line #2		✓			✓✓✓	✓		
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

COC ID #: ______ — Adjusted by: ______ Date: ______ — DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot #
☐ HC378115
☐ ______

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

Log In Forms.xls -- Sample_Preserve_Verification

version: 3.0

Attachment 5 – Water Treatment Additives

Table 3.6-1, Fermi 3 Environmental Report, Rev. 2

Table 3.6-1 Chemicals Added to Liquid Effluent Streams

System	Chemical	Maximum Amount	Average Amount	Frequency of Use	Concentration In Waste Streams
CIRC/ SWS	Biocide/Algaecide - Sodium Hypochlorite (15%)	620,000 lb/year	620,000 lb/year	Approximately 4.5 hour/week	Non-detectable, neutralized by sodium bisulfite TRC < 38ppb*
CIRC	Corrosion Inhibitor – Sodium Silicate	1,700,000 lb/year	1,400,000 lb/year	Continuous	Non-detectable, dissociates in system
CIRC	Scale Inhibitor/Dispersant	830,000 lb/year	700,000 lb/year	Continuous	Non-detectable, dissociates in system
CIRC	Dehalogenation – Sodium Bisulfite	650,000 lb/year	550,000 lb/year	Continuous	Non-detectable, neutralizes sodium hypochlorite

*Fermi 2 NPDES permit

Attachment 6 – Intake Structure Description

Section 3.4 - Cooling System, Fermi 3 Environmental Report, Rev. 2

(13 pages: 3-24 through 3-36)

3.4 Cooling System

Fermi 3 requires cooling water for the normal power heat sink in the CIRC and the auxiliary heat sink in the PSWS. Thermal energy is transferred via air or water through these heat sinks. Major system components include the intake and discharge portions.

Subsection 3.4.1 gives a description of the various cooling water systems and the operational modes for Fermi 3. The NPHS is discussed in this section, as well as in Section 3.3 and Subsection 5.3.2. Discharge to the air is also discussed in this section, as well as in Subsection 5.3.3.

Subsection 3.4.2 provides a description of the major components of the systems. Major components are contained within the intake structure and discharge piping. Further clarification of the intake structure is provided on Figure 3.4-1 and Figure 3.4-2. Additional discussion on the impacts of the discharge can be found in Subsection 5.3.2 and Subsection 5.3.3.

3.4.1 Description and Operational Modes

3.4.1.1 Circulating Water System

The CIRC provides cooling water during startup, normal plant operations, and hot shutdown for removal of power cycle heat from the main condensers and rejects this heat to the NPHS. The NPHS is comprised of a natural draft cooling tower. The main condensers contribute the majority of the heat to the NPHS with additional heat load introduced by the PSWS.

The main condenser rejects heat to the atmosphere at a rate of approximately 9.883×10^9 Btu/hr during normal full-power operation. Water from the NPHS basin is pumped through the main condenser and then back to the cooling tower where heat, transferred to the cooling water in the main condenser, is dissipated to the environment (the atmosphere) by evaporation.

As a result of the heat dissipation process, some water is evaporated. This results in an increase in the solids level in the NPHS cooling tower. To control solids levels or concentrations, a portion of the recirculated water is discharged. In addition to this blowdown from the CIRC, and evaporative losses, a small percentage of water in the form of droplets (drift) is lost from the cooling tower. Water pumped from Lake Erie via the intake structure is used to replace water lost by evaporation, drift and blowdown from the cooling tower. Blowdown water is returned to Lake Erie via an outfall into the lake (Subsection 3.4.2). A portion of the waste heat is thus dissipated to Lake Erie through the blowdown process.

The maximum, minimum and average Fermi 3 blowdown flow rates from the CIRC during normal full power operation are provided in Figure 3.3-1. Table 3.4-1 provides the monthly values for evaporation, blowdown, and makeup for the NPHS. The maximum temperature of the blowdown after passing through the NPHS is 86°F at the discharge to Lake Erie. The heat rejected to Lake Erie via blowdown is estimated based on these maximum blowdown flow and temperature conditions (Subsection 5.3.2). During other operating modes, heat dissipation to the environment is less than the bounding values for the normal full-power operational mode for the NPHS, except

when the Turbine Bypass System (TBS) is in operation. In this condition, it is possible for the temperature of the discharge to rise to 96°F.

3.4.1.2 Station Water System

The SWS draws water from Lake Erie through an intake bay into the pump house located on the west shore of Lake Erie. The SWS provides makeup water to various plant systems. For example, the SWS provides makeup water to the NPHS cooling tower basin for the CIRC and to the AHS cooling tower basin for the PSWS. The pump configuration consists of three 50 percent capacity Plant Cooling Tower Makeup System (PCTMS) pumps that supply makeup to the cooling towers, and two 100 percent capacity Pretreated Water Supply System (PWSS) pumps. The PWSS pumps are capable of supplying makeup to the FPS as well as the AHS in shutdown conditions. The PCTMS pump configuration allows for one pump to be out of service and the other two maintaining design flow. This is also discussed in Subsection 3.4.2.1 and FSAR Subsection 9.2.10. The AHS can be used in conjunction with the NPHS during normal power operation. However during certain shutdown conditions, heat rejection is performed entirely with the AHS. The AHS operates during startup, hot shutdown, stable shutdown, cold shutdown, and refueling.

3.4.1.3 Plant Service Water System

The PSWS provides cooling water to the Turbine Component Cooling Water System (TCCWS) heat exchangers and the Reactor Component Cooling Water System (RCCWS) heat exchangers and rejects the heat back to the NPHS and/or the AHS during normal power operations. During shutdown conditions, the heat is rejected to the AHS. Further discussion of the PSWS can be found in FSAR Subsection 9.2.1. A simplified flow diagram is provided in FSAR Figure 9.2-205. Subsection 3.3.1.2 further discusses flows associated with PSWS, and Figure 3.3-1 outlines flow paths and values for maximum, minimum and average normal power conditions and average shutdown conditions. Chemical treatment of the PSWS is discussed in Subsection 3.3.2.3 and Table 3.3-1.

3.4.1.4 Ultimate Heat Sink

The Fermi 3 ESBWR design has no separate emergency water cooling system. The UHS function is provided by safety systems integral and interior to the reactor plant. This system ultimately uses the atmosphere as the eventual heat sink. These systems do not have cooling towers, basins, or cooling water intake/discharge structures external to the reactor plant.

3.4.1.5 Discharges to Lake Erie

Lake Erie is subject to liquid discharges during plant operation. Discharge from the heat dissipation system consists of blowdown from the CIRC and PSWS, as well as optional treated liquid radwaste. The thermal aspect of the discharge is covered in this subsection. Section 3.5 and Section 3.6 complete the description of the discharge characteristics.

The rate of discharge into Lake Erie is constant under normal full power operating conditions. The discharge is approximately 17,000 gpm (Figure 3.3-1), with a maximum temperature of 86°F. Table 3.4-1 contains a summary of the monthly discharge temperatures. A discussion of thermal plume predictions is contained in Subsection 5.3.2. The discharge pipe is fortified with riprap to reduce

the effects of scouring; additional discussion of scouring can be found in Subsection 5.3.2.1.2. The current NPDES permit for Fermi 2 (Permit No. MI0037028) was renewed in 2005 with an expiration date in 2009. As discussed in Section 1.2, permits, e.g., NPDES permit and Section 401 Water Quality Certification, will be obtained for the discharge from Fermi 3. The discharge of chemicals that have been added to various systems as treatments such as biocide, corrosion inhibitor, and scale inhibitor are closely monitored in the NPDES permit, as well as the presence of metals and the temperature of effluent flow. Section 3.6 provides discussion and comparison to regulatory limitations on effluent flow from Fermi 3.

3.4.1.6 Discharges to Air

At the normal full-power design condition, the natural draft tower requires a maximum of 5.6 x 10^7 cfm of ambient air to dissipate about 10.72 x 10^9 Btu/hr of waste heat from the natural draft cooling tower at Fermi 3. Heat dissipated by the natural draft cooling tower includes contributions from the main condenser and the PSWS system. The heat load used for determining parameters associated with the natural draft cooling tower is conservative relative to the design heat loads (Reference 3.4-2).

The cooling tower used at Fermi 3 provides the only plant effluents with a potential for influencing local meteorology. The effluent types of concern are commonly described as visible plumes (fog) and cooling tower drift. Cooling tower drift is limited to no greater than 0.001 percent of the total tower water flow. Drift eliminators exist as a design feature of the natural draft cooling tower meant to reduce the volume of drift from the tower. These effluent types and their impacts on local weather are described in Subsection 5.3.3.

In addition to the heat discharged to the air, auditory discharges are considered. The noise from the NPHS is primarily the result of water splash. The sound level is estimated as being between 55 and 60 dBA at 1000 ft. Subsection 5.3.4 also discusses the estimated noise levels from the NPHS operation. The noise generated by the AHS is from water splash and fan motors. The sound level for the AHS is estimated at between 55 and 60 dBA at 1000 ft. (Reference 3.4-1)

3.4.1.7 Operational Modes

For the purposes of the design of the cooling systems, Fermi 3 is based on an estimated capacity factor of 96 percent (annualized). This considers a 24 month fuel cycle combined with an assumed 30-day refueling outage period. On a long term average, the heat load is 10.29 x 10^9 Btu/hr, which is 96 percent of the rated head load of 10.72 x 10^9 Btu/hr. There are six modes of plant operation; normal full-power operation, startup, hot shutdown, stable shutdown, cold shutdown and refueling. These can be generally grouped into two predominant modes, normal full power operation and shutdown operation. During normal full power operation, the NPHS, or a combination of the NPHS and the AHS, handle the heat dissipation to the atmosphere. Under normal full power operation, the heat load is rejected either entirely by the NPHS or by both the NPHS and the AHS. The AHS is capable of exchanging 2.98 x 10^8 Btu/hr. During shutdown operations, approximately 4 percent of plant operation annually, the AHS handles heat dissipation to the atmosphere.

3.4.2 Component Description

3.4.2.1 Intake System

The lake water intake and makeup water system is composed of two main parts: a wet pit pump house structure containing five vertical wet pit pumps, trash racks and traveling screens, and piping routed from the pump house structure to the cooling tower basin and the plant.

The SWS draws lake water via an intake bay (Figure 3.4-1 and Figure 3.4-2) from Lake Erie. This inlet bay is formed by two rock groins that extend 600 ft into Lake Erie. The intake bay is periodically dredged to maintain appropriate operating conditions.

At the inlet to the pump house structure a trash rack is positioned which is equipped with a trash rake. Trash collected from the trash racks is disposed of. There are three dual flow traveling screens arranged side by side to further prevent debris from entering the pump house. Aquatic organisms are first washed from the traveling screens using low pressure water spray. The remaining trash is then removed using high pressure wash sprays. Strainers are in place at the pump discharge and strainer backwash is directed back to Lake Erie. Strainer backwash is controlled to ensure that the limits of the applicable NPDES permit are adhered to.

The SWS pumps take suction from an intake bay through the makeup water pump house. The three PCTMS pumps supply makeup water to the cooling tower basins. Each pump has capacity to supply 50 percent of the total flow requirements. Two pumps are normally operated and the third is reserved for standby operation. This ensures makeup flow can be delivered in the event that one pump is out of service. The two operating pumps are capable of delivering the maximum cooling tower makeup water requirement of approximately 34,000 gpm, (Figure 3.3-1). The two PWSS pumps supply makeup water to the FPS under normal power operating conditions. They are 100 percent capacity pumps capable of supplying the necessary makeup water to the AHS and FPS in shutdown conditions.

The velocity of the water flowing through the dual flow intake traveling screens is approximately 0.5 fps at record low lake water levels, and no more than 0.5 fps under all operating conditions, as required by Section 316(b) of the Clean Water Act. The mesh size on each traveling screen is ⅜-inch. Each screen is capable of handling approximately 20,000 gpm of flow. The flow is designed to be sufficiently low that fish are not caught or trapped against the traveling screens. Fish which have entered the intake bay to this point are free to return to the lake in the same way they came. The pump house intake structure is sized such that the formation of vortices or other abnormal flow conditions that would interfere with the operation of the pumps is minimized. If fouling occurs, the screens are cleaned by backwashing. The formation of frazil ice on the screens is prevented by the low intake flow rate and by recirculating warmed water that has been rerouted from the discharge. A profile view of the intake screens and pumps suction is shown on Figure 3.4-2. This system is designed such that the intake structure has a minimal impact on the wildlife present in Lake Erie. This is consistent with good engineering design and environmental practices.

The addition of a biocide/algaecide, sodium hypochlorite, takes place as water enters the pump house structure. Once the water has passed through the trash rack and the traveling screens, a diffuser injects the biocide into the flow before the flow proceeds into the pump suction. Further chemical treatments are discussed in Subsection 3.3.2.

The elevation reference in use at Fermi is NAVD88. The elevation of the bottom of the intake bay at the entrance to the pump house is 559 ft. The record low level of Lake Erie water is 563'-11" and the record high level is 576'-6". The elevation of the base of the bay at the location of the pump suction is 553 ft. This is more than 10 ft below the record low water level for Lake Erie, thus pump suction should not be a concern. Impacts to SWS pump suction due to seiche events are discussed in Subsection 3.3.1.

3.4.2.2 Discharge System

Dilution and dissipation of the discharge heat as well as other effluent constituents are affected by both the design of the discharge and the flow characteristics of the receiving water, in this case Lake Erie. Normal plant effluent flow from all sources (cooling tower blowdown, and optional treated liquid radwaste) is approximately 17,000 gpm. The NPHS cooling tower blowdown is the major contributor to the total flow, and its maximum return temperature is estimated at 86°F and the average temperature is 68°F. Table 3.4-1 contains the monthly discharge flow rates and the discharge temperatures (cold water temperature) to Lake Erie. Figure 3.4-4 and Figure 3.4-5 are used in the development of Table 3.4-1. The temperature rise across the main condenser is 31.2°F.

The 4-ft diameter discharge pipe is located approximately 1300 ft into Lake Erie to avoid recirculation. Another consideration in the length of the discharge pipe was to preclude the discharge plume from intruding on environmentally sensitive onsite areas (such as wetlands) during wind-driven rises in Lake Erie water level (seiche events). The pipe is buried in the bank as it is routed into Lake Erie where the discharge is located, below the water surface, see Figure 5.3-1. The pipe discharges through a diffuser, as described in Subsection 5.3.2.1.1.1. The analysis of the thermal plume that results from the discharge is discussed in Subsection 5.3.2.1. The analysis includes consideration of seiche events. As discussed in Subsection 3.3.1 and Subsection 5.3.2.1, due to potential for the water supply to the SWS to be degraded during extreme seiche events, the unit could be operationally controlled to limit makeup water requirements. These seiche events are relatively short-lived. As part of the operational controls in response to an extreme seiche event, the discharge could be reduced and or secured.

For a total discharge flow rate of approximately 17,000 gpm, the exit jet velocity is approximately 8.5 fps. The submerged jet mixes rapidly with the ambient lake water, accompanied by a reduction of momentum and kinetic energy through turbulent action. The environmental impact of discharged heat on Lake Erie is discussed in Subsection 5.3.2. The use of cooling towers for Fermi 3 provides good engineering design and represents the best technology available under Phase I of Section 316(a) of the Clean Water Act and also acts to greatly reduce the thermal loading to Lake Erie. Discharges from the AHS are directed to the CIRC basin. As shown in Figure 3.3-1, the discharge from the AHS is small in comparison to the NPHS discharge (less than 5 percent). When the

PSWS is operating without the CIRC operating, discharges from the AHS are controlled to ensure that the resultant thermal plume is bounded by the thermal plume from operating the NPHS.

3.4.2.3 **Heat Dissipation System**

The main source of heat dissipation is the NPHS. The NPHS is a natural draft cooling tower, as shown on Figure 3.4-3. The AHS consists of two mechanical draft cooling towers. The AHS is further discussed in FSAR Subsection 9.2.1.

Makeup flow to the NPHS cooling tower basin is supplied by the SWS through the intake structure located on Lake Erie. The NPHS is located approximately 2200 ft from the pump house intake structure. At the cooling tower basin, there are four CIRC pumps, each 25 percent capacity, which supply a total flow of 744,000 gpm. The flow is directed to the main condenser, and is then directed back to the cooling towers so that the heat can be rejected to the atmosphere. The cooling tower basin is located approximately 1100 ft from the main condenser.

The NPHS cooling tower discharges water to the basin, which receives makeup from Lake Erie. Intake water temperatures from Lake Erie can be seen in Subsection 2.3.1, and meteorological data can be found in Section 2.7. Cooling tower performance curves for wet bulb temperature and evaporation, as well as wet bulb and cold water temperature are seen on Figure 3.4-4 and Figure 3.4-5. The information in Table 3.4-1 is developed using these cooling tower performance curves. The design of the heat dissipation system does not present any major departures from acceptable cooling system design practices, nor does it contain any additional components for consideration, beyond the NPHS in the form of a natural draft cooling tower. This system is consistent with good engineering practices.

The PSWS and AHS are discussed in FSAR Section 9.2 and FSAR Table 9.2-201.

3.4.3 **References**

3.4-1 Edison Electric Institute, "Electric Power Plant Environmental Noise Guide," New York, 1978.

3.4-2 GE-Hitachi Nuclear Energy, "ESBWR Design Control Document – Tier 2," Revision 6, August 2009.

Table 3.4-1 Monthly Cooling Tower Temperatures and Flows

Month	Wet Bulb Temperature (°F)	Cold Water Temperature (°F) *	Evaporation Flow rate (gpm)	Drift Flow rate (gpm)	Blowdown Flow rate (gpm)	Makeup Flow rate (gpm)
January	23.7	53.8	11875	7 2	11867 8	23750
February	25.7	55 3	12200	7.2	12192.8	24400
March	32.3	59.4	13100	7 2	13092.8	26200
April	42.6	66	14300	7.2	14292.8	28600
May	52.7	72.7	15400	7.2	15392.8	30800
June	61.7	78.4	16300	7.2	16292.8	32600
July	65.9	81 5	16750	7.2	16742.8	33500
August	65	80.8	16700	7.2	16692.8	33400
September	58.1	76 3	16100	7.2	16092.8	32200
October	47	68 8	14800	7.2	14792.8	29600
November	37 5	62.7	13750	7.2	13742 8	27500
December	28	56.6	12500	7.2	12492.8	25000

* Cold Water temperatures are calculated based on ambient wet bulb temperatures, however the temperature of the discharge from the NPHS cooling tower basin will be maintained at 55°F or above.

Figure 3.4-1 Station Water Intake Structure

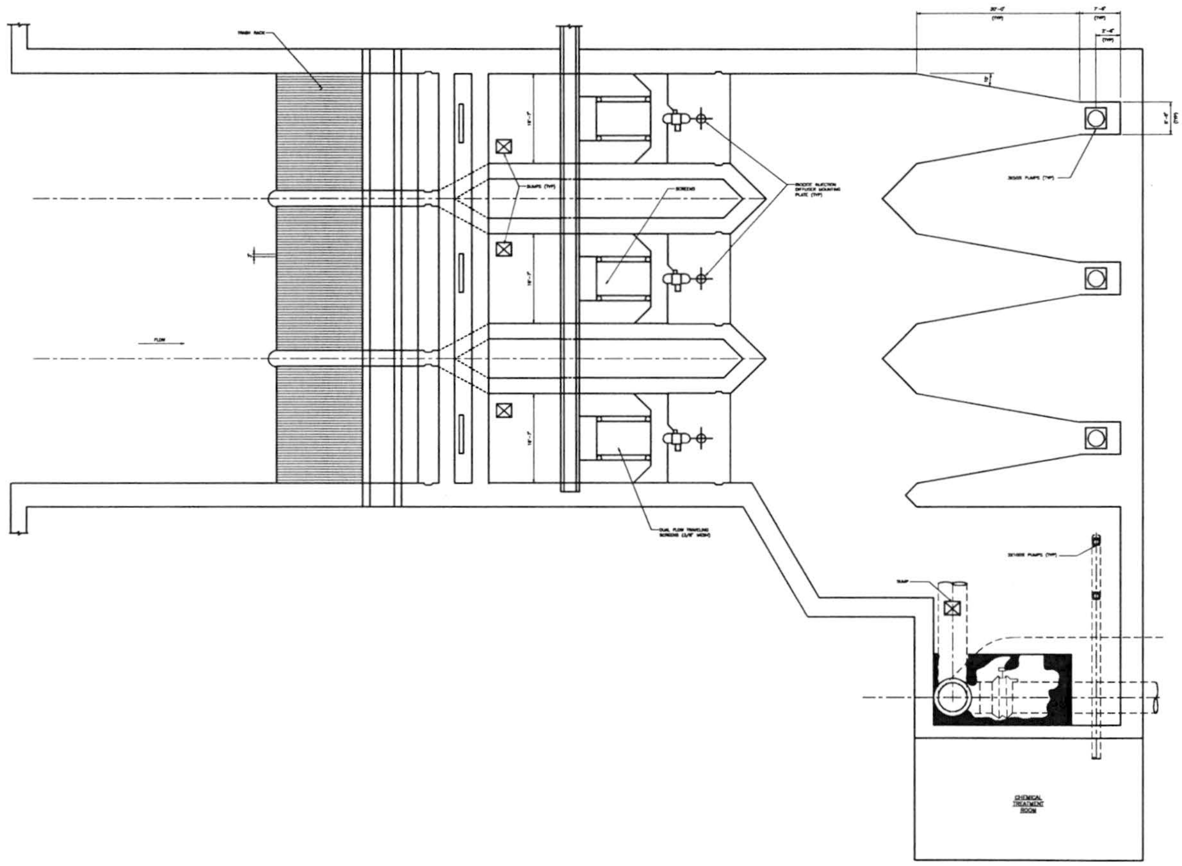

Figure 3.4-2 Station Water Intake Structure – Elevation View

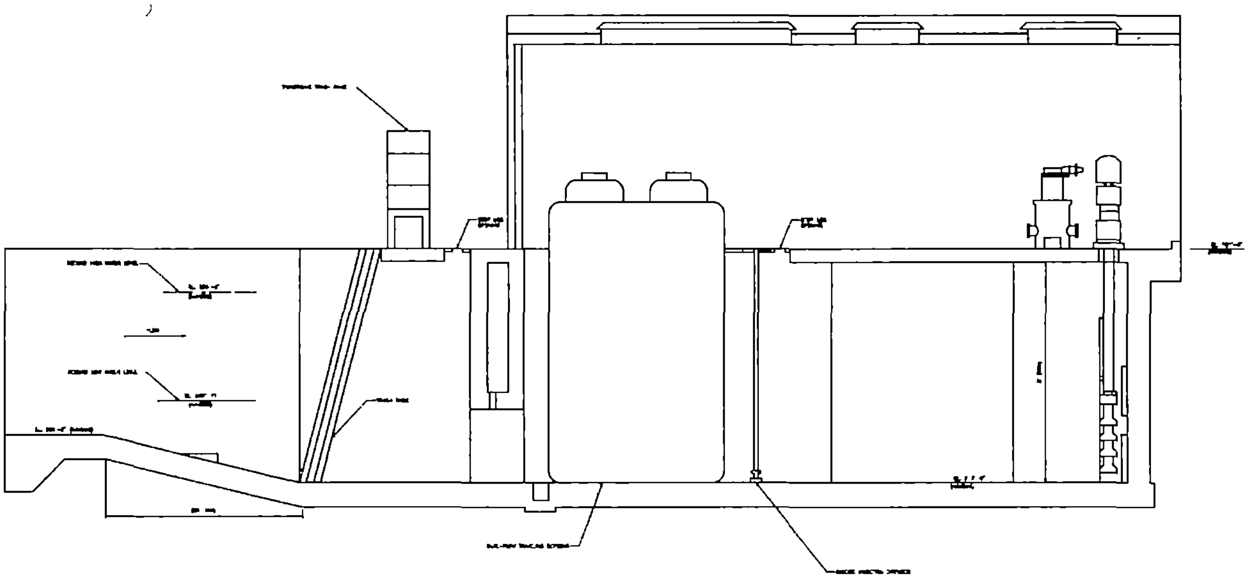

Figure 3.4-3 NPHS Cooling Tower

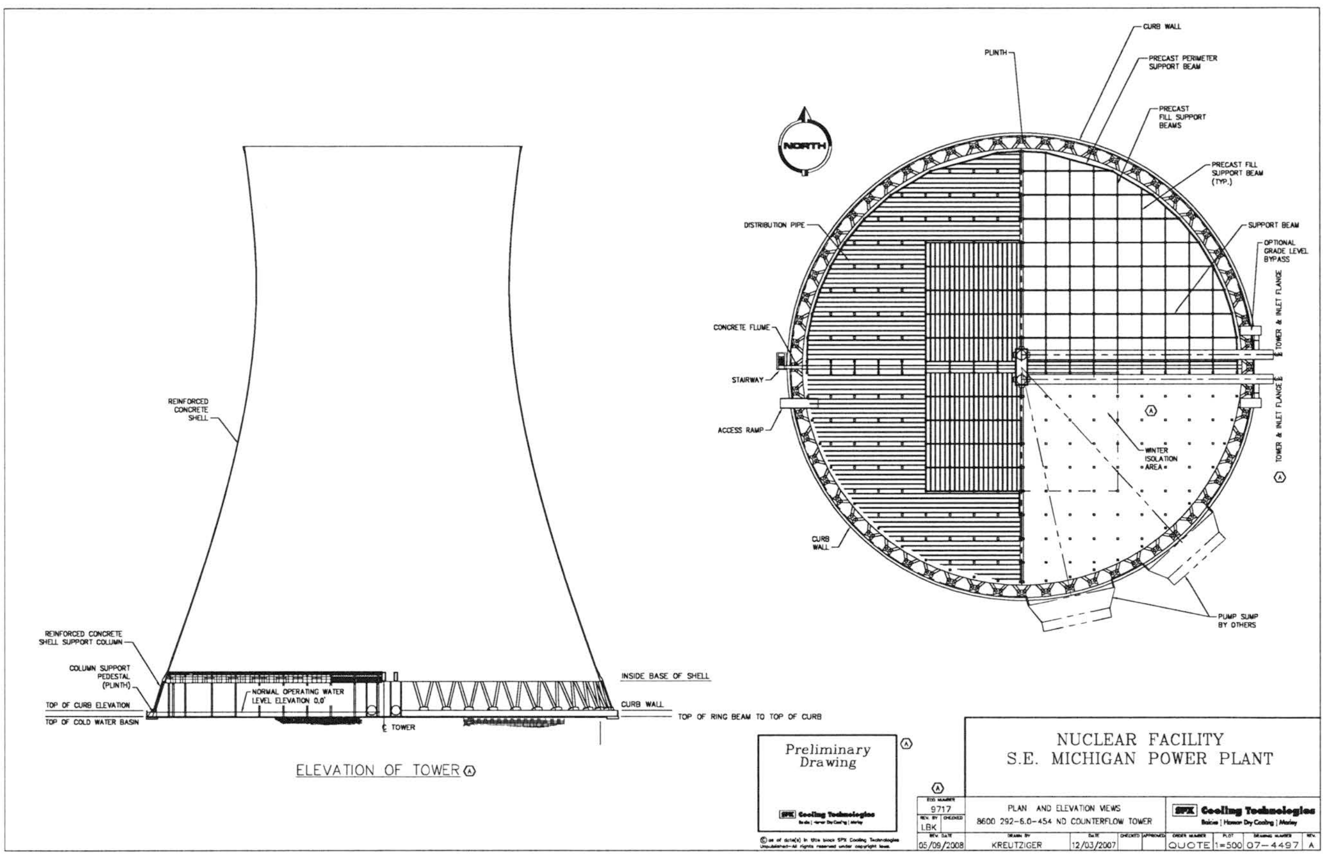

Figure 3.4-4 Cooling Tower Performance Curve

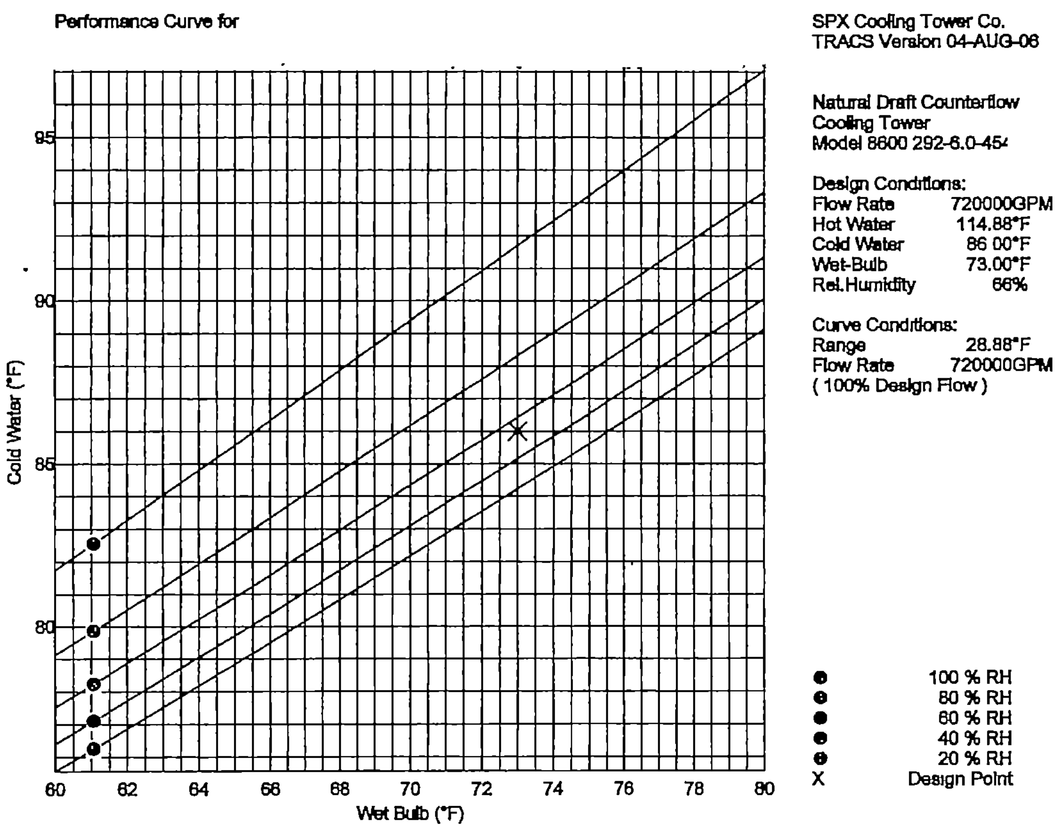

Figure 3.4-5 Cooling Tower Evaporation Curves

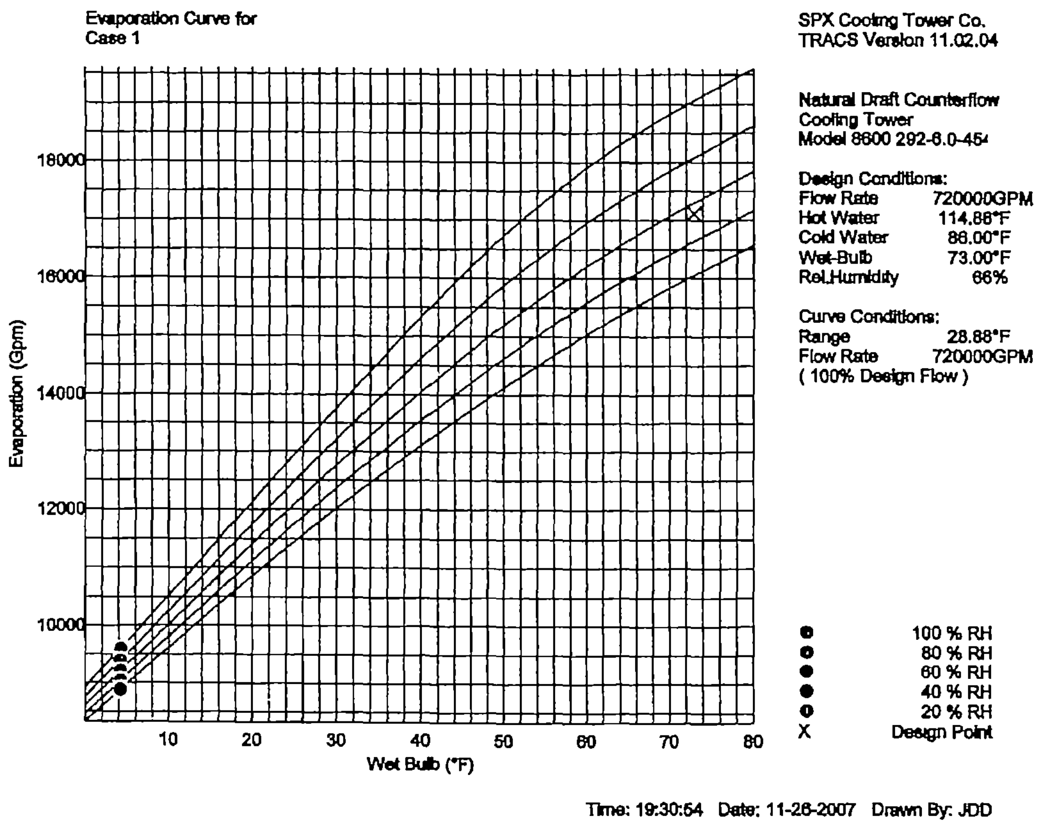

Figure 3.4-6 Outfall Diffuser Arrangement