CONTENTION 14 The Environmental Report fails to identify and consider direct, indirect, and cumulative impingement/entrainment and chemical and thermal effluent discharge impacts of the proposed cooling system intake and discharge structures on aquatic resources.

Lake Erie’s shallow western basin cannot tolerate the thermal pollution from yet one more large-scale thermo-electric power plant. Lake Erie already faces major lake level loss and retreat of its waters from the current lakeshore due to climate change. It already has a significantly higher air temperature than the rest of the Great Lakes, which contributes to evaporation of Lake Erie's waters. Such water loss will exacerbate overheating, especially in the shallow waters of Lake Erie’s western basin, with a current average depth of just 24 feet.

Monroe County already hosts DTE’s Monroe (Coal) Power Plant, at 3,000 megawatt-electric, one of the largest in the U.S. It also hosts DTE’s Fermi 2 nuclear reactor, as well as Consumers Energy’s Whiting Coal Plant. Due to such facilities, many billions of gallons of water are withdrawn from Lake Erie by Monroe County each and every day – an incredibly high percentage of water usage in all of Michigan – and returned super-heated. Additional nuclear reactors and coal plants in northwest Ohio also contribute heat to Lake Erie’s western basin. As already seen throughout the Great Lakes, such overheating could even force the shutdown of thermo-electric power plants on hot summer days, significantly impacting the reliability of the electric grid. (In fact, Fermi 3, at 1,560 megawatts-electric, would introduce significant grid instability if it ever shut down for an extended period for any reason whatsoever, thus increasing potential electricity reliability risks that could well require massive purchases of expensive replacement power.)

Given this massive thermal pollution, Fermi 3 should be required to utilize the best available dry cooling tower technology, to minimize or even eliminate water withdrawals from, and heat discharges, into Lake Erie. In addition, DTE’s Monroe Coal Plant should be required to install an additional best-available-technology cooling tower.

Fermi 3’s intake and outfall is Lake Erie but during at least some conditions the intake and outfall would impact the nearby Maumee Bay estuary, the average depth of which is just five feet, and which is already impacted by the neighboring DTE Monroe coal burning power plant, which uses an average of 1.9 billion gallons of water a day, as well as the adjacent Fermi 2 nuclear plant, which uses an additional tens of millions of gallons a day. Such impacts must be evaluated.

Toxic discharges from Fermi 3 would threaten Lake Erie's fragile ecosystem. Biocides, such as chemicals used to control zebra mussels, would be used in significant quantities and then released into Lake Erie. Cleaning solvents, heavy metals, and even fossil fuels integral to Fermi 3's operations would also be released into Lake Erie. Over a decade ago, the U.S.-Canadian International Joint Commission called for the virtual elimination of toxic chemicals into the Great Lakes, a goal Fermi 3 would not meet. Lake Erie, already suffering from phosphorus contamination and risking a return of algal blooms and consequent dead zones, is too fragile for yet another large-scale source of significant toxic contamination. Given Fermi 3's inevitable radiological and toxic releases, drinking water intakes from Lake Erie must be required to constantly monitor contaminants in order to adequately protect public health. NRC should address the synergistically harmful health impacts due to human exposures to radioactivity and toxic chemicals. Detroit Edison's Environmental Report holds that there are currently no problems with phosphorus contamination or algae in Lake Erie, which is false. NRC should address these issues, and the cumulative impacts that can be expected from adding yet another reactor at the Fermi power plant site.

Fermi 3 would harm Lake Erie's remarkably productive fisheries. Fermi 3's water usage would worsen the impingement and entrainment of Lake Erie biota already occurring at the numerous large-scale thermo-electric power plants sited on its shores. Negative impacts, including fish kills, must be prevented, to protect sports fisheries as well as Native American fishing rights recognized by legally-binding treaties signed by the U.S. federal government. Harm to all life stages of Lake Erie biota must be analyzed by NRC, and mitigated by DTE at Fermi 3.

The Environmental Report provides these citations that speak to our concerns.

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 towerreplenishes 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 thewinter months), and the average heat load (expected during the spring and fall months). Themaximum 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.

3.3.2 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.

3.4.1 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 10.43 x 109 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.

3.4.1.4 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.

3.4.2.2 Discharge SystemDilution and dissipation of the discharge heat as well as other effluent constituents are affected byboth 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 Section316(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 SystemThe 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 5900 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 740,000 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 4800 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.

3.4.2.1 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. There are three dual flow traveling screens arranged side by side to further prevent debris from entering the pump house. Trash from the trash rack and traveling water screens is collected for disposal. Strainers are in place at the pump discharge. Strainer backwash is directed to the overflow canal. 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 0.5fps 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 d?-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.

Contention Pertaining to Toxic Agents / Etiological Agents

The Toxic Agents and Etiological Agents that could result from Fermi 3 Cooling system are indeed very toxic agents, a few of which, at least, when inhaled into the lungs (i.e. Pseudomonas, Legionella) can initiate lung infections and pneumonias that can prove resistant to all but very strong medications, and even sometimes to those. They would be delivered in an aerosol that could easily be taken down deep into the lungs.

DTE has neglected to look at the cumulative effect of these pneumonia-causing etiological agents and their synergistic effects when they are mixed with fog and smog, such as when there is a calm and an inversion (not common, but does occur on the shores of Lake Erie) or when there is a wind blowing inland that causes the output from the cooling tower to blow near human habitat. Fog combined with smog creates hazardous breathing for human beings (and other species as well), and when mixed with these toxic agents, could prove a deadly combination, especially for those with a compromised immune system, such as people undergoing chemotherapy, or those with chronic lung disease, such as emphysema, or asthma or a growing fetus, infant or child, especially those with compromised lungs. DTE has also failed to consider the synergistic effects of these toxic etiological agents if they mix with radionuclides vented by the reactor in either planned or unplanned releases, that could also potentially carry various radionuclides deep into the lungs.

As well, DTE has not considered that the toxic agents used to kill these dangerous germs in the cooling tower, may also leave residue in the aerosol that comes from the stack that is harmful to humans or other species, and that their chronic use may also help create resistant strains of these potentially deadly agents.

These etiological agents include, but are not limited to, the enteric pathogens Salmonella spp., Vibrio spp. and Shigella spp., and Plesiomonas shigelloides, as well as Pseudomonas spp., toxin-producing algae such as Karenia brevis, noroviruses, and thermophilic fungi. Etiological

agents also include the bacteria Legionella spp., which causes Legionnaires' disease, and free-living amoebae of the genera Naegleria, Acanthamoeba, and Cryptosporidium. Exposure to these microorganisms, or in some cases the endotoxins or exotoxins produced by the organisms,

can cause illness or death.

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5.3.4 Impacts to Members of the Public

This section describes the potential health impacts associated with the thermal discharges from the Fermi 3 cooling systems on the environment. Specifically, the potential impacts to human health are from etiological agents such as microorganisms, parasites, and thermo-stable viruses (formerly

referred to collectively as thermophilic microorganisms), and from noise resulting from the operation of the cooling systems.

5.3.4.1 Etiological Agents

Etiological agents associated with cooling tower reservoirs and thermal discharges can impair human health. These agents may include microorganisms, thermophilic fungi, parasites, and viruses whose presence or numbers can be affected by the addition of heat. While the growth rate

of some etiological agents can be increased by the addition of heat, others can resist moderately high temperatures long enough to be released into a cooler body of water for growth. Therefore, cooling tower reservoirs and thermal discharges can act to harbor or accelerate some etiologic agents that ultimately affect human health once released into the environment. These etiological agents include, but are not limited to, the enteric pathogens Salmonella spp., Vibrio spp. and Shigella spp., and Plesiomonas shigelloides, as well as Pseudomonas spp.,

toxin-producing algae such as Karenia brevis, noroviruses, and thermophilic fungi. Etiological agents also include the bacteria Legionella spp., which causes Legionnaires' disease, and free-living amoebae of the genera Naegleria, Acanthamoeba, and Cryptosporidium. Exposure to these microorganisms, or in some cases the endotoxins or exotoxins produced by the organisms, can cause illness or death. Thermo-stable viruses are also considered etiological agents and are subject to review for this impact analysis. A study regarding thermophilic and thermotolerant fungi isolated specimens from the thermal effluent of nuclear power generating reactors examined the dispersal of human opportunistic and veterinary pathogenic fungi (

Reference 5.3-36). The following excerpt is taken from the study which concludes that thermal discharges from power plants do not significantly affect human health:

Over a period of a year, samples of water, foam, microbial mat, soil and air were obtained from areas associated with the cooling canal of a nuclear power station. The seventeen sample sites included water in the cooling canal that was thermally enriched and soil and water adjacent to, upstream, downstream and at a distance from the generator. Air samples

were taken at the plant and at various distances from the plant. Fifty-two species of thermotolerant and thermophilic fungi were isolated. Of these, eleven species are grouped as opportunistic Mucorales or opportunistic Aspergillus species. One veterinary pathogen was also isolated (Dactylaria gallopava). The opportunistic/pathogenic fungi were found primarily in the intake bay, the discharge bay and the cooling canal. Smaller numbers were obtained at both upstream and downstream locations. Soil samples near the cooling canal reflected an enrichment of thermophilous organisms, the previously mentioned opportunistic

Mucorales and Aspergillus spp. Their numbers were found to be greater than that usually encountered in a mesophilic environment. However, air and soil samples taken at various distances from the power station indicated no greater abundance of these thermophilous fungi than would be expected from a thermal enriched environment. The results indicate

that there was no significant dissemination of thermophilous fungi from the thermal enriched effluents to the adjacent environment. These findings are consistent with the results of other investigators.

The operation of an additional cooling tower for Fermi 3 is not anticipated to significantly increase thermal discharges into areas surrounding the Fermi site. Discharged blowdown from the cooling tower basin is expected to be released directly into Lake Erie in accordance with MDEQ NPDES permits. Lake Erie provides a significant mixing source thus preventing etiological agents from developing or becoming prolific.

No streams, ponds, or other small water resources will be influenced by the Fermi 3 thermal discharge, thus eliminating the potential for heated effluent retention to lead to increased abundance of thermophilic etiological agents.The heated effluent for Fermi 3 results in a limited thermal discharge plume into Lake Erie within a small mixing zone. This small mixing zone will limit the area of conditions necessary for optimal

growth of these etiological agents. Even during worst case scenario operational conditions(maximum operations, effluent discharge into Lake Erie during the spring time when ambient water temperatures are low, and a low ambient lake depth), the total plume surface area is only approximately 55,300 ft

2. Additionally, ambient water temperature increases under these conditions will remain within the MDEQ required 3˚F ΔT standard, as further detailed in Subsection 5.3.2.2.1. Heated effluent is expected to rapidly mix with ambient lake waters, presenting limited opportunity for rapid growth and population increases of etiological agents. While small scale increases of thermophilic microorganisms within the cooling towers themselves, and within aquatic and soil environments in the vicinity of the Fermi site could result, impacts

to humans associated with increase in disease outbreaks are expected to be minimal. It is also important to note that diseases caused by etiological agents associated with warm waters are typically contracted via nasal passageway contact with contaminated water (i.e., swimming, diving, and other water sports). The point of discharge of heated effluent from the Fermi site is not typically utilized for primary contact recreation (restricted industrial area). It is highly unlikely that a disease caused by an etiological agent would be contracted as a result of human interaction with the thermal plume. Certain freshwater algal blooms can present issues to human health. Algal species such as Microcystis spp., Anabaena spp., Nodularia spp., Nostoc spp., and Oscillatoria spp. produce neuroand hepa-totoxins that, when present in high numbers, can damage neurological systems and cause hepatic tumors. While increases in water temperature can be a causative factor in triggering algal blooms, temperature increases in Lake Erie due to increased thermal discharges will be limited to a small area, as previously detailed. To date, no harmful algal blooms have been documented as a result of Fermi 2 thermal discharges. The Fermi 2 discharge is located along the shoreline of Lake Erie, north of Fermi 2, due east of the Fermi 2 cooling towers. The Fermi 3 discharge pipe will be located southeast of Fermi 2 extending approximately 1300 feet into Lake Erie. Based on the plume analysis in Subsection 5.3.2.1, no mixing of Fermi 2 and Fermi 3 thermal discharges are anticipated which would contribute to an additive thermal increase that would act as a causative agent in triggering algal blooms in Lake Erie. These factors indicate that additional thermal discharges associated with Fermi 3 would result in limited increases in etiological agents at the Fermi site and human impacts would be SMALL with no mitigative measures needed.

5.3.4.1.1 Health Effects to Public

The MDEQ reports information associated with beach closures and monitoring effects. In Monroe County, eleven public beaches and/or waterbodies are monitored. During 2007, no beach closures were documented for the Monroe County public beaches and/or waterbodies under study. A review of data from the Center for Disease Control (CDC) and the Michigan Department of Community Health indicates that there have been no waterborne disease outbreaks in the vicinity of the Fermi site within the last 10 years.

Additionally, the Lake Erie Lakewide Management Plan (LaMP) has designated the drinking water use of Lake Erie as unimpaired (Reference 5.3-37). The closest potable water intake utilizing water from Lake Erie is the Frenchtown Township water intake located south of the Fermi site which draws water approximately one mile offshore through two intake lines. The distance of the nearest residence is approximately 0.2 miles from the southwest boundary of the Fermi site.

Therefore, the risk to public health from etiological agents resulting from additional thermal discharges to Lake Erie at the Fermi site would be SMALL, and no mitigation measures associated with etiological agents are necessary.

5.3.4.1.2 Health Effects to Workers

Several reported cases, recorded prior to 1990, of fatal Naegleria infections in association with cooling towers have lead to the extensive study of free-living amoebae in power plant environments. In response to these cases, many electric utilities require workers to utilize respiratory protection when cleaning cooling towers and condensers. In the case of Fermi 2, biocides are utilized to help reduce the levels of harmful microbial populations. This treatment has prevented the need for respiratory protection when cleaning cooling towers and condensers. Fermi 3 will utilize biocides as described in

Subsection 5.2.2.2.1. There have been no reportable cases of Legionnaires Disease, Naegleria infections, or any other diseases associated with the operation of cooling towers (including the heated effluent associated with cooling tower discharge) at Fermi 2. Although no Occupational Safety and Health Administration (OSHA) standard currently exists for the exposure to microorganisms, Detroit Edison would comply with all relevant OSHA standards measures for reducing worker exposure to the adverse impacts associated with microorganisms for Fermi 3 as are currently employed for Fermi 2. The NRC has stated that it is anticipated that all plants will continue to employ proven industrial hygiene principles so that adverse occupational health effects associated with microorganisms will be of small significance at all sites, and no mitigation measures beyond those currently implemented for Fermi 2 would be necessary.

The operations of Fermi 3 will comply with all relevant OSHA regulations. In summary, the risk to site workers, such as maintenance personnel, from etiological agents resulting from Fermi 3 cooling tower operation is expected to be SMALL.

Petitioners Contentions are borne out by the the Enviromental Report on these matters.

Thermal Monitoring 6.16.1 Thermal Monitoring

This section describes the thermal monitoring program for the Fermi 3 plant cooling system. The program is divided into three phases: pre-application monitoring [combined construction and operating license (COL) application], pre-operational monitoring (including construction monitoring), and operational monitoring. Features of the plant and site, including the boundaries and bathymetry of all water bodies adjacent to the site both before and after construction activities, is discussed in

Subsection 2.3.1.1 Subsection 4.2.2, and Subsection 5.2.2. The location of all thermal, hydrological, or aquatic biological monitoring stations is discussed in Subsection 2.3.3. The predicted extent of the thermal plume is discussed in Subsection 5.3.2.1.1.6, and Subsection 6.1.1.

6.1.1 Pre-Application MonitoringThis program includes evaluations made for the licensing and permitting of Fermi 2 and additionalinformation presented in this section. Current Lake MonitoringThis program utilized the data collected or generated by the National Oceanic and Atmospheric Association (NOAA). Water level values at the Fermi plant (Buoy ID 9063090) have been collected at hourly intervals and are available from January 1, 1996 to March 1, 2008 (

Reference 6.1-1).Both ambient lake temperature and current data were generated by the Lake Erie ObservationalForecast System (LEOFS) (Reference 6.1-2), a component the NOAA’s Great Lakes CoastalForecasting System (GLCFS), for a location approximately 2-km east of the plant location. LEOFSuses near real-time atmospheric observations and numerical weather prediction forecast guidanceto produce three-dimensional forecasts of water temperature and currents. Data values weregenerated every three hours from January 1, 2006 to March 1, 2008. The monitoring data collectedas described above adequately established baseline data in Lake Erie to support the potential environmental impacts discussed in this report and the thermal discharge descriptions and evaluations provided in Section 5.3. Past Thermal Impact Evaluations Previous thermal studies of the Fermi site have concluded that hot water discharge plumes from cooling water discharges to western Lake Erie have negligible impact due to the large size (approximately 811,000 acres) and assimilation capacity of western Lake Erie. Past studies have indicated that plumes do not restrict fish passage or significantly raise lake temperature (Reference 6.1-3).

New Thermal Modeling of Fermi 3 The cooling system for Fermi 3 is described in

Section 3.4. Additional review of cooling system impacts was conducted in 2008 using the CORMIX (Cornell Mixing Zone Expert System) mixing zone model (which is supported by the U.S. Environmental Protection Agency (EPA)). The modeling shows that the combined cooling water blowdown discharge plume from Fermi 3 willhave minimal impact on western Lake Erie (see Subsection 5.3.2.1). The model used design values that reflected inter-annual temperature variations from operation of Fermi 3 including maximum monthly effluent temperatures. Lake temperature data was based upon forecasted temperature ranges as discussed in Subsection 5.3.2.1. The maximum mixing zone size (plan view area) determined by the CORMIX model for a temperature rise up to 3˚F above ambient lake temperature per Michigan water quality regulations (Reference 6.1-4) is about 130 feet long and 226 feet wide. The total area of the plume is 29,486 ft2. This plume is located approximately 1317 feet from the western shoreline of Lake Erie. The longest plume predicted by CORMIX is narrower and covers a smaller plan view area. It is about 179 feet long and 42 feet wide at the same outfall location. For both cases, the plume would be very small within the lake before dissipation. Additional discussion of this topic is provided in Subsection 5.3.2.1. Neighboring Facility Thermal Plumes Any other facilities that discharge heated water into the Western Basin are beyond the area influenced by the Fermi 3 thermal plume. Based on the thermal discharge analysis (SeeSubsection 5.3.2.1), no interference or interaction with plumes generated by nearby facilities isexpected.

Summary of Evaluations

The modeling results as described above adequately established baseline data in the westernbasin of Lake Erie to support the potential environmental impacts discussed in this report and the

thermal discharge descriptions and evaluations provided in

Section 5.3. As indicated in the CORMIX modeling described above and in Subsection 5.3.2.1, thermal impacts to Lake Erie are shown to be minimal. Construction and operation of Fermi 3 will not cause hydrological alterations of Lake Erie flow or water supplies (as discussed in Section 4.2 and Section 5.2) that will impact thermal monitoring programs.

6.1.2 Pre-Operational Monitoring The pre-operational monitoring program would be a continuation of the existing monitoring program, as required by the Michigan Department of Environmental Quality (MDEQ) for Fermi 2. Detroit Edison will continue to monitor and continuously record the Fermi 2 cooling water blowdown discharge temperature as required by the MDEQ in the National Pollutant Discharge Elimination System (NPDES) permitting process.

6.1.3 Operational Monitoring

The operational monitoring program is anticipated to be a continuation of the pre-operational monitoring program, and would conform to applicable NPDES permit requirements at the time of operation. For current operations of Fermi 2, the MDEQ requires continuous monitoring/recording of discharge water temperature from Outfall 001, which includes the cooling water blowdown discharge. Detroit Edison expects similar monitoring requirements for operation of Fermi 3. A description of the estimated thermal discharge and the predicted rapid dissipation of the thermal plume are presented in

Subsection 5.3.2. Due to the extremely small size of the predicted thermal plume as well as the well-accepted basis for the estimation of the extent of the plume, direct monitoring of the plume dimension is not planned. In fact, given the wind-induced turbulence present in Lake Erie and the relatively small areas affected, resolution of the plume by boat-based measurement would be challenging. The plume is very likely to be small and the changes in temperature from ambient would be modest. The plume is also likely to migrate from side to side due to wind-driven current direction variability. The temperature of the effluent from Fermi 3 will be monitored on a continuous basis prior to discharge as required by a Fermi 3 NPDES permit (see Reference 6.1-5 for the Fermi 2 NPDES permit). Because the monitoring activities of the MDEQ (via current and future permits) are extensive and complete, additional monitoring of thermal effluents is not warranted for Fermi 3.

Section 316(b) of the Clean Water Act requires that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. 33 U.S.C.

ß 1326(b). In 2004, EPA promulgated rules implementing ß 316(b) for large existing electric generating plants. 69 Fed. Reg. 41576; 40 C.F.R. ß 125.94. Compliance with the performance standards in the regulations is deemed to meet the "best available technology" mandate of the CWA. Id. However, more stringent standards may be required if "compliance with the applicable requirements of this section would not meet the requirements of applicable State and Tribal law, or other Federal law." 40 C.F.R. ß 125.94(e). Thus, even if the new intake structure complies with the "best available technology" mandate of section 316(b), that does not alleviate the need to analyze the impacts of the intake on aquatic species. The ER must still comply with the Commission’s rules that require analysis of environmental impacts, as well as disclosure of regulatory requirements imposed by other state and federal laws. 10 C.F.R. ß51.45.

All cooling system discharges from the new unit, including cooling tower blowdown, will be discharged into Lake Erie via a new discharge structure that will be built next to the existing discharge structure. ER at 2.3.3-1. The ER describes the chemical discharge associated with the proposed new units as "small" and "relatively innocuous" but fails to characterize the discharge in terms of constituents and amount. ER at 5.2-4. Operation of the cooling system requires use of anti-scaling compounds, corrosion inhibitors, and biocides, including chlorine, bromide, and chromium. ER

ß 3.4.2.2; ER 5.2-4; ER Table 3.6-1. The ER does not disclose whether chemical constituents in the liquid effluent will be discharged at harmful levels. Id. The ER reveals some of the chemical constituents of the proposed discharge:

The ER also fails to address potential impacts of thermal pollution on aquatic species at the point of discharge and downstream. ER

ß 5.3.2. Instead, the ER focuses on computer modeling of the plume and the size of the mixing zone necessary to avoid violations of water quality standards ER ß 5.2.3.2; ER Table 5.2-8. However, the ER does not acknowledge the potential impacts on aquatic species from this discharge.

Petitioners request that remedy to our concerns be provided by denial of the Combined Operation License Application as it has been presented.