

May 7, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
DETROIT EDISON CO.) Docket No. 52-033-COL
)
(Fermi Nuclear Power Plant, Unit 3))

NRC STAFF ANSWER TO APPLICANT'S MOTION
FOR SUMMARY DISPOSITION OF CONTENTION 6

INTRODUCTION

Pursuant to 10 C.F.R. § 2.1205(b), the staff of the U.S. Nuclear Regulatory Commission (Staff) hereby answers the motion filed April 17, 2012, by the Detroit Edison Company (Applicant), requesting summary disposition on Contention 6. See Applicant's Motion for Summary Disposition of Contention 6 (Apr. 17, 2012) (Motion). For the reasons set forth below, the Staff agrees that there is no genuine issue as to any material fact relevant to the contention, and that the Applicant is entitled to summary disposition on this contention.

BACKGROUND

By letter dated September 18, 2008, the Applicant submitted a combined license (COL) application (Application or COLA) for one Economic Simplified Boiling Water Reactor (ESBWR) to be located at the site of the operating Fermi Nuclear Power Plant, Unit 2 in Monroe County, Michigan. Letter from Jack M. Davis, DTE, to NRC, Detroit Edison Company Submittal of Application for a Combined License for Fermi 3 (NRC Project No. 757) (Sept. 18, 2008) (ADAMS Accession No. ML082730763). The ESBWR design is the subject of an NRC rulemaking under Docket No. 52-010.

On March 9, 2009, Beyond Nuclear, Citizens for Alternatives to Chemical Contamination, Citizens Environmental Alliance of Southwestern Ontario, Don't Waste Michigan, the Sierra Club, and numerous individuals (collectively "Intervenors") filed a Petition for Leave to Intervene in the COLA proceeding, along with a separate document containing 14 contentions. Petition of Beyond Nuclear et al. for Leave to Intervene in Combined Operating License Proceedings and Request for Adjudication Hearing (Mar. 9, 2009) (Contention Filing). Following oral argument on May 15, 2009, this Licensing Board found that the Intervenors had standing in this proceeding and had filed four contentions that were admissible in part. *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-09-16, 70 NRC 227, 237 (2009). Currently, there are three admitted contentions: Contention 6, Contention 8, and Contention 15. *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-11-14, 73 NRC __, __ (May 20, 2011) (slip op. at 1); Order (Granting Motion for Summary Disposition of Contention 3), at 8 (July 9, 2010) (unpublished); Order (Granting Motion for Summary Disposition of Contention 5), at 3 (Mar. 1, 2011) (unpublished); *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-10-09, 71 NRC 493, 499 (2010) (admitting Contention 15, as clarified by the Board).

As originally submitted by the Intervenors, Contention 6 asserted that "[t]he COLA omits critical information disclosing environmental impacts to Lake Erie's Western Basin and Maumee River/Maumee Bay." Contention Filing at 67. The Intervenors asserted that the ER should include an assessment of the algal bloom potential as a result of the proposed chemical (i.e., phosphorus) and thermal discharges expected during operation of proposed Fermi Unit 3. *Fermi*, LBP-09-16, 70 NRC at 277. The Board admitted Contention 6 only "insofar as it relates to the adequacy of the Applicant's water quality analysis in the ER [environmental report] regarding the potential for increasing algal blooms and the proliferation of a newly identified species of harmful algae [*Lyngbya wollei*] in the western Lake Erie basin." *Id.*

On September 17, 2010, the Applicant filed a Motion for Summary Disposition of Contention 6. Applicant's Motion for Summary Disposition of Contention 6 (Sep. 17, 2010) (2010 Motion). The Applicant based its 2010 Motion on a letter to the NRC, dated February 15, 2010, and on its supplement to the ER, Revision 1 of the ER, dated March 24, 2010, which both addressed the issues underlying Contention 6. 2010 Motion at 4; Letter from Peter W. Smith, Director, Nuclear Development – Licensing and Engineering, Detroit Edison Company to NRC Document Control Desk, NRC3-10-0005, Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 2 Related to the Environmental Review (Feb. 15, 2010) (ADAMS Accession No. ML100541329); Fermi Unit 3 COLA, Part 3, Environmental Report Rev. 1 (ADAMS Accession No. ML101110563). The Applicant revised its ER: "to reflect that it will not use phosphoric acid at Fermi 3 (thereby eliminating phosphorus discharges); to incorporate a discussion of the impacts of thermal and chemical discharges on algae; and to include a discussion of *Lyngbya wollei*." 2010 Motion at 4. The Intervenors opposed summary disposition of Contention 6, and the Staff agreed the contention was moot. Intervenors' Memorandum in Opposition to DTE's 'Motion for Summary Disposition of Contention 6,' (Oct. 27, 2010); 2010 Motion at 1 n.1.

The Board denied the Applicant's motion for summary disposition of Contention 6, stating the following issues remained in dispute: 1) the potential impacts of calcium, a chemical component of effluent from proposed Fermi Unit 3, on algae growth; 2) the effectiveness of the Applicant's visual observations to identify the presence of *Lyngbya wollei* and the ER's lack of consideration of the increased turbidity in the water during plant construction and operation, which would be favorable to *Lyngbya wollei* growth; and 3) the Applicant's estimates of the size of the proposed Fermi Unit 3 thermal plume and the residence time for algae in the plume. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 10-12).

On April 17, 2012, the Applicant filed another Motion for Summary Disposition of Contention 6 (Motion). The Applicant's Motion was accompanied by a Statement of Material Facts On Which No Genuine Dispute Exists (Statement of Facts), three supporting affidavits, and several reports and studies. Since the Board issued LBP-11-14, denying the Applicant's original motion for summary disposition of Contention 6, the Staff has issued its Draft Environmental Impact Statement (DEIS),¹ and the Applicant has conducted additional studies and submitted additional information along with its Motion. These documents show that no genuine dispute on any material fact remains with respect to Contention 6 and, therefore, summary disposition is appropriate.

DISCUSSION

I. LEGAL STANDARDS

A. *Summary Disposition Standards*

The standards for summary disposition under 10 C.F.R. § 2.1205 are the same as those under 10 C.F.R. § 2.710(d)(2). 10 C.F.R. § 2.1205(c) ("In ruling on motions for summary disposition, the presiding officer shall apply the standards for summary disposition set forth in subpart G of this part"). A party is entitled to summary disposition as to all or any part of the matters involved in the proceeding "if the filings in the proceeding, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law." 10 C.F.R. § 2.710(d)(2). "The standards are based upon those the federal courts apply to motions for summary judgment under Rule 56 of the Federal Rules of Civil Procedure." *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 297 (2010)

¹ NUREG-2105, *Draft Environmental Impact Statement for Combined License (COL) for Enrico Fermi Unit 3* (Oct. 2011) (DEIS). The DEIS was issued in October 2011 and is contained in two volumes. Volume 1 (ADAMS Accession No. ML11287A108) provides coverage through Chapter 8. Volume 2 (ADAMS Accession No. ML11287A109) provides coverage from Chapter 9 through Appendix L.

(citing *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993)).

The movant bears the initial burden of showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials that accompany its dispositive motion. See *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102-03 (1993). If the opposing party fails to counter each adequately supported material fact with its own statement of material facts in dispute and supporting materials, the movant's facts will be deemed admitted. *Id.* “[T]he mere existence of *some* alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment; the requirement is that there be no *genuine* issue of *material* fact.” *Anderson v. Liberty Lobby*, 477 U.S. 242, 247-48 (1986) (emphasis in original); see also 10 C.F.R. § 2.710(b) (“[A] party opposing the motion may not rest upon the mere allegations or denials of his answer,” but rather, “must set forth specific facts showing that there is a genuine issue of fact.”). “Only disputes over facts that might affect the outcome of a proceeding would preclude summary disposition.” *Pilgrim*, CLI-10-11, 71 NRC at 297 (quoting *Liberty Lobby*, 477 U.S. at 248).

In addition, the Commission will reject attempts to add new arguments in an answer to a summary disposition motion that could have been raised earlier. See *Pilgrim*, CLI-10-11, 71 NRC at 310-11. Such arguments include those not fairly encompassed by the contention at issue in the motion for summary disposition, as originally pled and admitted, when the intervenor does not attempt to amend the contention to add the new arguments. *Id.*

B. *Standards for Analyzing Environmental Impacts*

Using the approach outlined in regulations promulgated by the Council on Environmental Quality, 40 C.F.R. § 1508.27, the Staff developed a three-level (*i.e.*, small, moderate, and large) standard system to guide its categorization of impact significance in environmental reviews. See 10 C.F.R. Part 51, Subpt. A, App. B, Table B-1 n.3. The Staff followed this approach in drafting the Fermi COL DEIS. DEIS at 1-3 to 1-4. As explained in Table B-1 n.3 and the DEIS, an impact is small if “environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.” 10 C.F.R. Part 51, Subpt. A, App. B, Table B-1 n.3; DEIS at 1-3. Impacts are moderate when they alter noticeably, but do not destabilize, important attributes of the resource; they are large when they are clearly noticeable and are sufficient to destabilize important attributes of the resource. 10 C.F.R. Part 51, Subpt. A, App. B, Table B-1 n.3; DEIS at 1-4.

Under the National Environmental Policy Act of 1969, as amended (NEPA), the NRC is required to take a “hard look” at the environmental impacts of a proposed action, as well as reasonable alternatives to that action. See *Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998). This “hard look” is tempered by a “rule of reason” that requires agencies to address only environmental impacts that are reasonably foreseeable – not those that are remote and speculative. See, *e.g.*, *Long Island Lighting Co.* (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 836, 838 (1973). In addition, “NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries.” *LES*, CLI-98-3, 47 NRC at 103 (citation omitted).

NEPA does not require the use of the “best scientific methodology” or the use of an alternative methodology just because it is “plainly better.” *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 315 (2010) (internal quotation omitted). “An environmental impact statement [is

not] intended to be a 'research document,' reflecting the frontiers of scientific methodology, studies, and data. . . . [W]hile there 'will always be more data that could be gathered,' agencies 'must have some discretion to draw the line and move forward with decisionmaking.'" *Id.* (quoting *Town of Winthrop v. Federal Aviation Administration*, 535 F.3d 1, 11-13 (1st Cir. 2008)).

II. THERE IS NO GENUINE ISSUE OF MATERIAL FACT AS TO CONTENTION 6

Contention 6 raises the overarching issue of the adequacy of the Applicant's ER analysis² of the potential impacts of Fermi Unit 3 on algae growth as well as the following specific issues: 1) the potential impacts of calcium in Fermi Unit 3 effluent on the growth of algae are not considered; 2) the lack of documented algal blooms observed in the vicinity of Fermi Unit 2 and the Monroe Power Plant are unreliable because the Intervenors contend that the Applicant's methods of observation are not a matter of record, visual inspections with the naked eye are insufficient to detect *Lyngbya wollei*, *Lyngbya wollei* have been documented between the Fermi site and the Monroe Power Plant, and turbidity would increase during construction and operation of Fermi Unit 3, which would favorably influence *Lyngbya wollei* growth; and 3) the Applicant's estimate of the size of the thermal plume resulting from the operation of Fermi Unit 3 as well as the residence time for algae in the thermal plume are inaccurate. See *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 10-12).

As described below, the Applicant's Motion and Statement of Material Facts demonstrate that there is no longer a dispute with respect to any of the issues related to Contention 6. Paragraphs 1 through 6 of the Applicant's Statement of Material Facts set forth a number of historical issues related to Contention 6. The Staff agrees that these paragraphs accurately describe the COLA, the process by which Contention 6 was admitted, and the DEIS. Paragraphs 7 through 25 of the Applicant's Statement of Facts describe the Applicant's position

² Because the DEIS has now been issued, the Staff will focus on the adequacy of the DEIS analysis rather than the adequacy of the Applicant's ER analysis.

on the impact of proposed Fermi Unit 3 on algal blooms and the proliferation of nuisance algae in the Western Basin of Lake Erie. The attached affidavit of the Staff's aquatic ecologist for the Fermi Unit 3 COL review, Dr. John W. Hayse, supports the Staff's position that summary disposition is warranted. Staff Attachment 1, Affidavit of Dr. John W. Hayse (Hayse Affidavit). The Hayse Affidavit explains that issues in Contention 6 related to the impacts of Fermi Unit 3 on algal blooms and the proliferation of nuisance algae in the Western Basin of Lake Erie have been adequately addressed by both the Applicant, in its additional submittals since Contention 6 was admitted, and by the Staff, in the DEIS. Therefore, the Staff agrees that the Applicant has appropriately identified and characterized the material facts, that the Applicant's Motion and associated Statement of Facts demonstrate there is no genuine dispute of material fact, and that summary disposition is warranted. See Hayse Affidavit at ¶¶ 3-4.

Below, the Staff will address the overarching issue raised by the Intervenors in Contention 6, i.e., the adequacy of the Applicant's ER analysis of the potential impacts of Fermi Unit 3 on algae growth, and then the three specific disputed issues identified in LBP-11-14. See *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 10-12).

A. The DEIS Adequately Addresses Fermi Unit 3 Impacts on Algae Growth

The Intervenors claim that the ER does not sufficiently evaluate the potential contribution of chemical and thermal effluent from the proposed Fermi Unit 3 to algal production and the potential proliferation of the newly identified species of harmful algae. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 9). As described below, the DEIS adequately addresses the potential impacts of Fermi Unit 3 on algal blooms and the proliferation of nuisance algal species in the Western Basin of Lake Erie; therefore, no genuine dispute related to these impacts remains.

Many of the analyses in the DEIS describe the potential for impacts near the Fermi site because it is likely that adverse effects of chemical and thermal discharges from the construction and operation of proposed Fermi Unit 3 would be smaller or would be less likely to

occur farther away from the site due to mixing and dilution with ambient Lake Erie waters. Hayse Affidavit at ¶ 5. Overall, the DEIS concluded that the thermal and chemical constituents in proposed discharges to Lake Erie would result in a small impact on the water quality of Lake Erie. DEIS at 5-16. The DEIS also considered the incremental contribution of the construction and operation of proposed Fermi Unit 3 to cumulative impacts on water quality, including chemical and thermal conditions, and concluded that they would not significantly contribute to the overall cumulative impact to the Western Basin of Lake Erie. DEIS at 7-27; Hayse Affidavit at ¶ 12.

More specifically, the DEIS considered the effects of a number of factors on algal blooms and examined the history of algal blooms associated with the operation of Fermi Unit 2. For example, Section 2.4.2.1 discusses several species of planktonic algae that can rapidly increase their population size to unusually high densities, resulting in algal blooms. DEIS at 2-71 to 2-72; Hayse Affidavit at ¶ 6. The DEIS notes that there have been increases in blooms of some nuisance algae in Lake Erie “coincident with (and perhaps attributable to)” increasing dissolved phosphorus loads in the lake. DEIS at 2-71; Hayse Affidavit at ¶ 6. In addition, Section 2.4.2.3 of the DEIS presents information regarding the invasion of portions of the Western Basin of Lake Erie by the blue-green algae, *Lyngbya wollei*, and reviews information about water quality conditions that may contribute to its proliferation. DEIS at 2-120; Hayse Affidavit at ¶¶ 7-8. The DEIS concludes that “it appears that the potential for excessive growth of lyngbya is related to the amount of light penetration into the water column (a function of water turbidity), water depth, nutrient availability, and the type of substrate that is present.” DEIS at 2-120 (citations omitted), 5-51; Hayse Affidavit at ¶¶ 8, 10. Additionally, the DEIS recognized that increased water temperatures could exacerbate the potential for algal blooms to occur. DEIS at 5-51; Hayse Affidavit at ¶ 10. The DEIS focuses on the factors influencing *Lyngbya wollei* growth that proposed Fermi Unit 3 might affect: light penetration, nutrients, substrate type, and

temperature. *See id.* While the substrate in the vicinity of the Fermi site is similar to the substrates upon which *Lyngbya wollei* was found growing near Maumee Bay and other areas in the Western Basin, no algal blooms of *Lyngbya wollei* or any other species have been reported at the Fermi site. DEIS at 5-52; Hayse Affidavit at ¶ 10(c). The remaining factors influencing the proliferation of nuisance algae that may be affected by Fermi Unit 3, water turbidity, nutrient availability, and increased water temperatures, were identified in Contention 6 and are addressed below.

Because the DEIS adequately addresses the potential contribution of chemical and thermal effluent from the proposed Fermi Unit 3 to algal production and proliferation of nuisance algae, no material dispute remains with respect to the overarching issue raised by Contention 6. Therefore, the Applicant is entitled to summary disposition as a matter of law. *See* 10 C.F.R. § 2.710(d)(2).

B. Potential Impacts of Calcium on Algae Growth

Contention 6 claims that the potential impacts of calcium from proposed Fermi Unit 3 on algae growth have not been addressed. *See Fermi*, LBP-11-14 at 10. To support their position, the Intervenor's note that the Applicant's revised ER continues to list calcium as a chemical constituent of the Fermi Unit 3 effluent, and calcium supports the growth of *Lyngbya wollei*. *Id.* Since the issuance of LBP-11-14, both the Applicant and Staff have issued documents that demonstrate there is no longer a genuine dispute related to this issue because the impact of calcium contained in the Fermi Unit 3 discharge on algae growth is negligible. In the DEIS, the Staff notes that increased nutrient levels, especially phosphorus concentrations, have long been recognized as the principal contributor to algal blooms. DEIS at 5-51; Hayse Affidavit at ¶ 10(b). In Lake Erie, the important limiting nutrients responsible for controlling algal blooms are phosphorus and nitrogen. *Id.* Because the Applicant has stated that it would not use phosphorus-containing corrosion and scale inhibitors, operation of Fermi Unit 3 is not expected

to measurably increase nutrient levels that could affect algal blooms near the site. DEIS at 5-52; Hayse Affidavit at ¶ 10(b).

To support Contention 6, Intervenor's stated that the ER does not include a specific discussion of the potential impact of calcium on algae growth even though it is listed as a component of Fermi Unit 3 effluent. See *Fermi*, LBP-11-14 at 10. However, both the Staff and Applicant have now documented that calcium is not important in limiting the growth of algae in Lake Erie. Hayse Affidavit at ¶ 14; Applicant Statement of Facts at ¶¶ 8-9, 11. Therefore, the presence of calcium in the effluent is not significant in evaluating the impact of Fermi Unit 3 on algal growth. See Hayse Affidavit at ¶ 10(b). Furthermore, Lake Erie is located in a basin of limestone and dolomite, both calcium-rich minerals, so the levels of dissolved calcium in Lake Erie are normally at or near the saturation point. Applicant Statement of Facts at ¶ 8; Hayse Affidavit at ¶ 14. Additionally, there will not be any mass addition of calcium to Lake Erie as a result of Fermi Unit 3 operations, and the design of the diffusers for the discharge would result in rapid mixing of the effluent with ambient water. *Id.* As a result, the dissolved calcium levels outside the area delineated by the discharge plume would likely not be measurably higher than dissolved calcium levels if Fermi Unit 3 were not operating. Hayse Affidavit at ¶ 14. The levels of calcium near the Fermi site, in the Western Basin of Lake Erie, or in Lake Erie as a whole would not be measurably altered by the operation of Fermi Unit 3. *Id.*

In summary, the DEIS stated that “[t]he chemical concentrations in Fermi 3 discharges (1) would be expected to be relatively low, (2) would be similar to those in Fermi 2 discharges, and (3) would be established and controlled through the NPDES permitting process.” DEIS at 5-36. Therefore, the DEIS concluded that the impacts on water quality would be small, and the impacts on aquatic biota from the chemical concentrations in the discharge would be minor. *Id.*

Because calcium in the discharge of proposed Fermi Unit 3 will not increase the potential for proliferation of algae, it would not be reasonable to require additional information to be added to the EIS to address calcium-related impacts on algae, such as *Lyngbya wollei*. Agencies must take a “hard look” at environmental impacts that are reasonably foreseeable, which is governed by a “rule of reason.” See *Claiborne Enrichment Center*, CLI-98-3, 47 NRC at 87-88; *Shoreham*, ALAB-156, 6 AEC at 836, 838. The courts have also noted that EISs should not be “research documents,” and agencies do not have to continually collect more data, as agencies must have some discretion to move forward with decisionmaking. *Pilgrim*, CLI-10-11, 71 NRC at 315 (quoting *Town of Winthrop v. Federal Aviation Administration*, 535 F.3d at 11-13 ([W]hile there ‘will always be more data that could be gathered,’ agencies ‘must have some discretion to draw the line and move forward with decisionmaking.’”). Therefore, because the DEIS addresses the key factors influencing algae growth in the Western Basin of Lake Erie and calcium is not among them, the disputed issue has been addressed and it would not be reasonable to require additional information to address such impacts. See *id.*

Because the information described above demonstrates that calcium in Fermi Unit 3 effluent would not have a measurable impact on algae growth, no material dispute remains with respect to that aspect of Contention 6. Therefore, the Applicant is entitled to summary disposition as a matter of law. See 10 C.F.R. § 2.710(d)(2).

C. Lack of Documented Algal Blooms Near Fermi Site and Monroe Power Plant

The Intervenors claim that the Applicant’s methods of demonstrating algal blooms have not been observed in the vicinity of Fermi Unit 2 and the Monroe Power Plant are not a matter of record, that naked eye inspections are not sufficient, and that *Lyngbya wollei* have been observed at a location between Fermi Unit 3 and the Monroe Power Plant. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 10). As described below, the Staff and Applicant have provided further

information to evaluate and document algal blooms in the Western Basin of Lake Erie.

Therefore, a genuine dispute no longer exists.

In opposing the Applicant's 2010 Motion for Summary Disposition of Contention 6, the Intervenor's cited a study documenting the presence of *Lyngbya wollei* at a location south of the Fermi site, between Fermi and the Monroe Power Plant, near Sterling State Park. Statement of Facts Demonstrating Issues of Material Fact, In Support of Intervenor's Opposition to DTE's 'Motion for Summary Disposition of Contention 6,' at ¶ 3 (Oct. 27, 2010) (Intervenor's 2010 Statement of Facts) (citing Bridgeman T.B. and W.A. Penamon. 2010. "*Lyngbya wollei* in Western Lake Erie." *Journal of Great Lakes Research* 36:167–171). In drafting the DEIS, the Staff considered this observation of *Lyngbya wollei* cited by Bridgeman and Penamon (2010). The DEIS notes that the closest reported observation of *Lyngbya wollei* in the Western Basin of Lake Erie was near Sterling State Park, approximately five miles south-southwest from the Fermi site, and that no *Lyngbya wollei* were found in samples collected at Stony Point, approximately 2 miles southwest of the Fermi site, in 2008. DEIS at 2-120; DEIS at 5-52; Hayse Affidavit at ¶ 7. The Applicant has also considered this data. See, e.g., Applicant's Statement of Facts at ¶¶ 15-18. After the DEIS was drafted, the Applicant submitted a report, "Assessment of Fermi 3 discharge impacts on *Lyngbya wollei* and other algal species," as Attachment 1 to its Motion. This report includes observations recorded in ship and dive logs during surveys conducted as part of the Fermi Unit 2 Radiological Environmental Monitoring Program, and algal sampling results conducted near the existing Fermi Unit 2 discharge and near the proposed Fermi Unit 3 discharge location. Hayse Affidavit at ¶ 13. These observations confirm that the nearest *Lyngbya wollei* have been observed to the Fermi site is by Sterling State Park, approximately five miles away. *Id.*; Applicant Statement of Facts at ¶¶ 17-18. As both the DEIS and Applicant have now accounted for the observation of *Lyngbya wollei* near Sterling State Park, this aspect of Contention 6 is moot, and no genuine dispute remains.

Furthermore, while visual observations with the naked eye are suitable for determining whether mats or blooms of algae, including *Lyngbya wollei*, are present,³ the Applicant confirmed these visual observations with the microscopic analysis of algal sampling. Hayse Affidavit at ¶ 13; Applicant Statement of Facts at ¶ 17. The findings of the Applicant's report, Attachment 1 to its Motion, are consistent with the conclusions in the DEIS regarding the locations where *Lyngbya wollei* have been observed in the Western Basin of Lake Erie and that the Fermi Unit 3 discharge is unlikely to cause or exacerbate algal blooms in Lake Erie or support growth of *Lyngbya wollei*. Hayse Affidavit at ¶¶ 13, 15. Because the Applicant has documented how it performed its observation and sampling of algae and conducted microscopic analysis of algae samples, there is no longer a genuine dispute with respect to these issues.

In addition, the Intervenors asserted that the ER did not account for the increased turbidity during construction and operation, which would lead to conditions favorable to *Lyngbya wollei* growth. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 11). However, the DEIS addresses the potential for altered turbidity during construction and operation. The DEIS addresses construction impacts on water quality in Lake Erie, as well as whether preconstruction and construction activities would affect the potential for harmful algal blooms near the Fermi site. DEIS at 4-46; Hayse Affidavit at ¶ 10(a). The DEIS acknowledges that dredging for the barge slip, intake structure, and discharge structure during preconstruction activities could increase turbidity, but concludes that impacts on aquatic biota and habitats would be temporary, easily mitigated, and minor. *Id.* With respect to harmful algal blooms, the DEIS finds that the National Pollutant Discharge Elimination System stormwater construction permit, the stormwater management plan for the Fermi site, and the use of best management practices would have sufficient controls to protect water quality in Lake Erie. *Id.* Therefore, the discharge of suspended sediment from building activities would not affect the density and distribution of

³ Even the Intervenors acknowledge that naked eye observation is sufficient to detect the presence of large, floating algal mats. Intervenors' 2010 Statement of Facts at ¶ 2.

aquatic nuisance species, such as *Lyngbya wollei*. *Id.* With respect to impacts during operation of Fermi Unit 3, the DEIS concluded that neither turbidity levels nor light penetration in the vicinity of the site are expected to be altered compared to existing conditions. DEIS at 5-51; Hayse Affidavit at ¶ 10(a). “Although maintenance dredging activities could result in infrequent, temporary localized increases in turbidity, the frequency of dredging and the areas affected by dredging would be the same as for Fermi 2. Therefore, maintenance dredging during Fermi 3 operations would not alter the potential for algal blooms to occur.” DEIS at 5-51; Hayse Affidavit at ¶ 10(a). Because the DEIS addresses the potential impacts from construction and operation of Fermi Unit 3 on water turbidity, the Intervenor’s assertion that the ER does not consider these impacts is moot, and no genuine dispute remains.

Because the Applicant and Staff have now provided information demonstrating that visual observations, confirmed by microscopic analysis, have not resulted in any documented algal blooms within the vicinity of the Fermi site, no material dispute remains with respect to that aspect of Contention 6. See *Pilgrim*, CLI-10-11, 71 NRC at 297 (quoting *Liberty Lobby*, 477 U.S. at 248). As such, the Applicant is entitled to summary disposition as a matter of law. See 10 C.F.R. § 2.710(d)(2).

D. Size of Thermal Plume and Residence Time for Algae in Thermal Plume

The Intervenor’s claim that the Applicant underestimates the size of the thermal plume resulting from the operation of Fermi Unit 3. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 11-12). To support this assertion, the Intervenor presented a larger area for the thermal plume by calculating the volume of water that would be discharged from Fermi Unit 3. *Id.* at 12; Hayse Affidavit at ¶ 11. In addition, there is a question related to the Applicant’s estimates regarding residence time for algae in the thermal plume. *Fermi*, LBP-11-14, 73 NRC at ___ (slip op. at 12). As described below, the Staff and Applicant have now addressed these issues, and there is no genuine issue as to any material fact.

In the DEIS, the Staff explain that the size of the estimated thermal plume associated with the cooling water discharge from proposed Fermi Unit 3 encompasses a relatively small area compared to the Western Basin of Lake Erie. DEIS at 5-11; Hayse Affidavit at ¶ 11. In addition, the thermal plume from proposed Fermi Unit 3 would not overlap or interact with the thermal plume from the Fermi Unit 2 discharge. Hayse Affidavit at ¶ 11; Applicant Statement of Facts at ¶ 14. The size of the thermal plume was estimated using thermal plume modeling conducted by the Applicant and independently reviewed by the Staff. Hayse Affidavit at ¶ 11. The Staff reviewed the Applicant's model input data, independently ran the appropriate models, and confirmed the model results. *Id.* "Based on the expected volumes and water temperatures of cooling water blowdown discharged from Fermi 3, the estimated maximum extent of the thermal plume (i.e., where ambient water temperatures would be increased by 3°F or more) would encompass an area of no more than approximately 55,300 ft² (1.3 ac) during any period of the year." DEIS at 5-34 (citation omitted); Hayse Affidavit at ¶ 11. During most periods of the year and under most conditions, the size of the thermal plume would be considerably smaller. Hayse Affidavit at ¶ 11. Therefore, at its maximum estimated extent, the water surface area that would be affected by the thermal plume would represent approximately 0.00017 percent of the surface area of the Western Basin of Lake Erie. *Id.*

The Intervenor's calculation of approximately 75 acre-feet per day is a calculation the volume of water that would be discharged from Fermi Unit 3. *Id.* "The size of the thermal plume, which is defined as the area or volume of water that exceeds specific temperature conditions, is affected by many factors, such as the volume of effluent, the rate at which the effluent is discharged, the temperature of the effluent, the temperature of the receiving waters, and how quickly the effluent would be mixed with ambient waters (itself dependent on many factors)." *Id.* However, the Intervenor's calculation does not account for any of these factors

and, therefore, is not an estimate of the thermal plume but of the amount of water discharged from Fermi Unit 3.

The estimates of the size of the thermal plumes presented by the Applicant and by the Staff in the DEIS are consistent. The Applicant's and Staff's estimates were based on computer modeling, which accounted for the factors described above, and different models produced different estimates. See Hayse Affidavit at ¶ 11. The DEIS presents two estimates of thermal plume size. One estimate represents the maximum extent of the portion of the thermal plume mixing zone where water temperature would exceed maximum monthly water temperatures for Lake Erie, as identified by MDEQ, during any period of the year (188 ft² or less). *Id.* (citing DEIS at 5-34). This estimate is consistent with the Applicant's estimate of a thermal plume approximately nine feet by twelve feet during the month of August, when algal growth is typically near its annual maximum. Hayse Affidavit at ¶ 11. The other estimate of thermal plume area presented in the DEIS (55,300 ft² [1.3 ac]) is a conservative estimate and represents the estimated maximum extent (at any time of the year under the range of conditions modeled) of the area where existing lake water temperatures would be increased by 3°F or more by the thermal effluent of Fermi 3. *Id.* The Staff estimate is larger because this conservative estimate of surface area of the plume includes an area with a smaller temperature change over ambient lake conditions than the area presented by the Applicant's nine feet by twelve feet estimate for August conditions. *Id.*

As the Intervenors' estimate of thermal plume was actually an estimate of the volume of water that would be discharged from Fermi Unit 3 and not the thermal plume size, there is no genuine dispute with respect to a material fact relating to the size of the thermal plume. Furthermore, both the Applicant and Staff have presented estimates that are consistent with one another for the size of the thermal plume based on computer modeling, which accounts for the various factors influencing the size of the thermal plume.

The Applicant and Staff have also provided additional information to eliminate any dispute related to the ability of the thermal plume to affect an algal species, such as *Lyngbya wollei*, that is a bottom mat forming species. *Lyngbya wollei* is not considered abundant in the vicinity of the Fermi site, and it is not clear that *Lyngbya wollei* rely upon thermal refuge to tolerate the ambient wintertime water temperatures in Lake Erie. DEIS at 5-51. Nevertheless, “it is anticipated that the area of the thermal plume from Fermi 3 would not be large enough to provide substantial thermal refuge for invasive nuisance organisms.” *Id.*

Furthermore, *Lyngbya wollei* is a filamentous algae and turbulent open-lake conditions such as those present near the proposed location of the Fermi Unit 3 discharge would not be suitable for high densities of *Lyngbya wollei* to grow. *Id.*; Hayse Affidavit at ¶ 11; Applicant Statement of Facts at ¶ 12. The conditions at the proposed Fermi Unit 3 discharge location are more turbulent than the conditions present in Maumee Bay, where high densities of *Lyngbya wollei* have been reported. Hayse Affidavit at ¶ 11. Due to the diffusers discharging water at a high velocity, the diffusers pointing upward and thus discharging water toward the lake surface, and the considerable amount of wave action near the Fermi site, the water temperatures and chemical concentrations measured in the lake at relatively short distances from the discharge would not be significantly different from ambient lake water. Hayse Affidavit at ¶ 11; see also DEIS at 5-52; Applicant Statement of Facts at ¶ 14. Because lake conditions conducive to the proliferation of algal blooms are not expected to be present in the vicinity of the Fermi Unit 3 discharge, the Staff does not anticipate Fermi Unit 3 construction or operation to exacerbate algal blooms in the area. Hayse Affidavit at ¶ 11; DEIS at 5-52. Therefore, increasing the period in which water temperatures are conducive to algal blooms will not increase the seasonal duration or severity of blooms in the vicinity of the Fermi site or in the Western Basin of Lake Erie. Hayse Affidavit at ¶ 11.

Because the Applicant and Staff have now provided information demonstrating that the thermal plume from proposed Fermi Unit 3 effluent would not have a measurable impact on algae growth, no material dispute remains with respect to that aspect of Contention 6. See *Pilgrim*, CLI-10-11, 71 NRC at 297 (quoting *Liberty Lobby*, 477 U.S. at 248). Thus, the Applicant is entitled to summary disposition as a matter of law. See 10 C.F.R. § 2.710(d)(2).

CONCLUSION

The NRC Staff agrees that there is no genuine issue remaining as to any material fact related to Contention 6. All disputed issues related to Contention 6 have been resolved by information submitted by the Applicant and by the Staff's DEIS. The Applicant is therefore entitled to summary disposition as a matter of law.

Respectfully Submitted,

/Signed (electronically) by/

Andrea L. Silvia
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U.S. Nuclear Regulatory Commission
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Dated at Rockville, Maryland
this 7th day of May, 2012

STAFF ATTACHMENT 1

May 7, 2012

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
DETROIT EDISON CO.) Docket No. 52-033-COL
)
(Fermi Nuclear Power Plant, Unit 3))

AFFIDAVIT OF DR. JOHN W. HAYSE CONCERNING CONTENTION 6

I, John W. Hayse, do hereby state as follows:

1. I am an aquatic ecologist with more than 20 years of experience as an environmental scientist preparing environmental impact statements, conducting analyses of the effects of human activities on aquatic organisms and aquatic habitats, evaluating impacts to threatened and endangered species, and other environmental and ecological investigations. I have a Ph.D. in Zoology from Miami University and a M.S. in Marine Biology from the College of Charleston. I have been employed since 1991 in the Environmental Science Division at Argonne National Laboratory, as an Environmental Scientist/Aquatic Ecologist. I reviewed the Environmental Report (including revised versions) for the Fermi 3 COL application and was the lead author of the sections of the Draft Environmental Impact Statement for the COL for Fermi 3 (DEIS) that addressed aquatic ecology issues (Sections 2.4.2, 4.3.2, 5.3.2, and 7.3.2). I have attached a copy of my résumé (Staff Attachment 2), which provides details of my educational background and experience.

2. I am familiar with Contention 6 as it relates to the potential impact of chemical and thermal discharges from the proposed Fermi Unit 3 on algal blooms in the western basin of

Lake Erie and the lack of discussion in the ER about the potential proliferation of algae, including the invasive algal species, *Lyngbya wollei*, in the basin.

3. The purpose of this affidavit is to support the Staff's position that the Applicant's Motion for Summary Disposition of Contention 6 should be granted because there is no genuine dispute on a material fact. This affidavit identifies information provided in the DEIS that evaluates the potential for the chemical and thermal discharge from Fermi 3 to contribute to algal blooms, including proliferation of *L. wollei* in Lake Erie, and addresses other information relevant to issues identified in Contention 6.

4. I have reviewed the statements in paragraphs 4 through 25 of the Applicant's Statement of Facts and agree that they are consistent with the findings of the NRC review team (NRC staff, NRC contractors, and U.S. Army Corps of Engineers staff) in the DEIS with respect to the potential for impacts from the construction and operation of Fermi 3 on proliferation of algae, including *L. wollei*. The DEIS findings are described below.

5. Many of the analyses in the DEIS focus on the potential for impacts in the vicinity of the Fermi site. This was done because it was considered likely that adverse effects of chemical and thermal discharges from the construction and operation of Fermi 3 would decrease with distance from the site due to mixing and dilution with ambient Lake Erie waters.

6. The DEIS identifies on p. 2-71, lines 4-10, that coincident with (and perhaps attributable to) increasing dissolved phosphorus loads, there have been increases in blooms of some undesirable algal taxa (e.g., *Cladophora* sp. and *Microcystis* sp.), and that, in recent years, *L. wollei*, an invasive filamentous cyanobacterial (blue-green algae) species, has become a nuisance in some areas of the western basin, such as Maumee Bay (located approximately 18 mi south-southeast of the Fermi site), that continue to experience higher levels of nutrient enrichment via riverine inputs.

7. The DEIS provides, on p. 2-120, lines 13-38 information about the distribution of *L. wollei* in the western basin of Lake Erie. This information was based upon review of recent

scientific literature (Bridgeman T.B. and W.A. Penamon. 2010. “*Lyngbya wollei* in Western Lake Erie.” *Journal of Great Lakes Research* 36:167–171), and identified that the closest record of occurrence of *L. wollei* is in the vicinity of Sterling State Park, approximately 5 mi south-southwest of the Fermi site, and that no *L. wollei* was found in samples collected at Stony Point, approximately 2 mi southwest of the Fermi site, in 2008. Sterling State Park, where *L. wollei* was observed in shoreline surveys conducted by Bridgeman and Penamon (2010), is located between the Monroe Power Plant and the Fermi site. In addition, the DEIS identified in the same section that the presence of *L. wollei* had not been documented at the Fermi site.

8. The DEIS identified, on p. 2-120, lines 31-34, that the potential for excessive growth of *L. wollei* appears to be related to the amount of light penetration into the water column (a function of water turbidity), water depth, nutrient availability, and the type of substrate that is present (based upon evaluations conducted by Bridgeman and Penamon 2010) and identified, on p. 2-120, lines 36-38, that the reported nutrient concentrations of nitrate, orthophosphate, and total phosphorus in Maumee Bay (where dense mats of *L. wollei* have been observed) were substantially higher than those reported from waters in Lake Erie near the Fermi site.

9. The DEIS identified, on p. 5-35, lines 33-37, that the Applicant intends to use sodium bisulfate for dehalogenation of station cooling water and would avoid the use of phosphorus-containing compounds (e.g., phosphoric acid) that could contribute to nutrient enrichment and development of algal blooms in Lake Erie.

10. In a section on “Invasive Nuisance Organisms,” on pages 5-51 and 5-52 of the DEIS, the NRC review team specifically evaluated the potential for algal blooms caused by species such as *Microcystis* sp., *Anabaena* sp., *Aphanisomenon* sp., and *L. wollei*, to be affected by the cooling water discharge for Fermi 3. The development of algal blooms in Lake Erie has commonly been attributed primarily to increased nutrient levels (especially phosphorus concentrations) resulting from changes in land use practices, altered hydrology, and food web changes. The effects of temperature, nutrients, substrate type, and light penetration on

Lyngbya wollei blooms were considered along with the history of algal blooms associated with the discharge for Fermi 2. Overall, it was considered that the potential for excessive growth of *L. wollei* in Lake Erie is related to the amount of light penetration into the water column (a function of water turbidity), water depth, nutrient availability, and the type of substrate that is present (Bridgeman and Penamon 2010; Lake Erie Lakewide Management Plan (LaMP) Work Group. 2008. *Lake Erie Lakewide Management Plan*. Prepared by the Lake Erie LaMP Management Committee, Environment Canada, and EPA. Available at http://www.epa.gov/greatlakes/lamp/le_2008/index.html. Accessed August 23, 2010. ADAMS Accession No. ML112620518). Additionally, it was identified that increased water temperatures might exacerbate the potential for algal blooms to occur and/or persist. The following points were presented in the DEIS:

- (a) It appears that *L. wollei* can grow under more turbid conditions than some other species of algae in Lake Erie and this could help to explain the proliferation of this species in the turbid conditions in Maumee Bay (Bridgeman and Penamon 2010). However, the relationship between turbidity and the distribution of this species in Lake Erie is not clear. Regardless of the response of *L. wollei* to turbidity, the operation of Fermi 3 is not expected to alter turbidity levels or light penetration in the vicinity of the site compared to existing conditions. Although maintenance dredging activities could result in infrequent, temporary, and localized increases in turbidity, the frequency of dredging and the areas affected by dredging will be the same as currently occurring at the Fermi site. Therefore, maintenance dredging during Fermi 3 operations will not alter the potential for algal blooms to occur. DEIS at 5-51. Additionally, preconstruction and construction activities would not affect the potential for algal blooms to occur. While dredging for the barge slip, intake structure, and discharge structure could also increase turbidity, the National Pollutant Discharge Elimination System stormwater construction permit, the stormwater management plan for the Fermi site, and the use of best

management practices would have sufficient controls to limit the discharge of suspended sediment and protect water quality in Lake Erie. Therefore, the discharge of suspended sediment from building activities would not affect the density and distribution of aquatic nuisance species, such as *Lyngbya wollei*. DEIS at 4-46.

- (b) Algal blooms have long been thought to be controlled by the concentrations of specific nutrients in Lake Erie. Phosphorus has been identified as a nutrient that can affect the frequency and occurrence of algal blooms. Blooms of *L. wollei* in Maumee Bay have been primarily attributed to increased nutrient loading due to agricultural runoff and urbanization. The principal limiting nutrient responsible for controlling algal blooms in Lake Erie is phosphorus. DEIS at 5-51. At the same time, it is also true that nitrogen is important and is one of the limiting nutrients. The NRC review team examined historic water quality information for Maumee Bay and recent water quality information for Lake Erie near the Fermi site and found that levels of nutrients such as nitrate, orthophosphate, and total phosphorus reported from Maumee Bay were substantially higher than those reported for the Fermi site with Fermi 2 in operation. DEIS at 5-51 to 5-52 (citing Moorhead, D., T. Bridgeman, and J. Morris. 2007. "Changes in Water Quality of Maumee Bay 1928-2003." In M. Munawar and R. Heath (eds). *Checking the Pulse of Lake Erie*. Ecovision World Monograph Series, Aquatic Ecosystem Health and Management Society; AECOM. 2009. *Water Quality Survey, Detroit Edison Company Fermi 3 Project*, Final Report. November (ADAMS Accession No. ML093380411)). Detroit Edison has stated that it would not use phosphorus-containing corrosion and scale inhibitors for Fermi 3, replacing them with two non-phosphorus-containing water treatment chemicals (Detroit Edison Company. 2010. Letter from P.W. Smith [Detroit Edison, Director of Nuclear Development-Licensing] to U.S. Nuclear Regulatory Commission dated January 29, 2010. "Subject: Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 2 Related to the Environmental

Review” (ADAMS Accession No. ML100331451)). Therefore, operation of Fermi 3 is not expected to measurably increase nutrient levels that could affect algal blooms in the vicinity of the site.

- (c) The NRC review team concluded that the substrate in the vicinity of the Fermi site is similar to the substrates upon which *Lyngbya wollei* was found growing in the vicinity of Maumee Bay and other areas of the western basin of Lake Erie (Bridgeman and Penamon 2010). Although the substrate may be suitable, no algal blooms of *L. wollei* or other species have been reported from the Fermi site. The nearest reported observation of *L. wollei* in the western basin was near Sterling State Park, approximately 5 mi south-southwest of the Fermi site. DEIS at 5-52.
- (d) The NRC review team considered the possibility that thermal discharge from Fermi 3 could affect the potential for algal blooms, including *L. wollei*, at the Fermi site. Because Fermi 3 will use a closed cycle cooling system, the amount of heated effluent is significantly reduced compared to a once-through plant, such as the plants located near the mouth of the Maumee River or the Monroe Power Plant. Additionally, the heated effluent will be discharged offshore through a three-port diffuser with the flow directed upwards toward the surface. Such a discharge system would result in a highly turbulent discharge flow that would facilitate rapid mixing of the thermal plume and would minimize the effects of discharged effluent on the benthic environment. Although heated water might periodically reach the bottom, such occurrences would be infrequent and would not encompass a large area. In addition, no algal blooms have been reported in the vicinity of the discharge from Fermi 2, a closed-cycle plant which has been operating commercially since 1988, discharges into the same general vicinity in the western basin of Lake Erie, and has a thermal plume that is greater in size than the projected thermal plume that would result from operation of the proposed Fermi 3 facility. Therefore, the NRC review team concluded that the heated discharge from

Fermi 3 would not significantly increase the potential for development of algal blooms.

See DEIS at 5-52.

11. As presented in Section 5.2.3.1 (pages 5-10 to 5-15) of the DEIS, the size of the estimated thermal plume associated with the cooling water discharge from Fermi 3 encompasses a relatively small area and would not overlap or interact with the thermal plume from the Fermi 2 discharge. This conclusion was based on thermal plume modeling that was conducted by Detroit Edison; the NRC review team reviewed the input data used in the models, independently ran the appropriate models, and confirmed the model results. Based on the expected volumes and water temperatures of cooling water blowdown discharged from Fermi 3, the estimated maximum extent of the thermal plume (i.e., where ambient water temperatures would be increased by 3°F or more) would encompass a surface area of no more than approximately 55,300 ft² (1.3 ac) during any period of the year; during most periods of the year and under most conditions, the size of the plume would be considerably smaller. Thus, the water surface area that would be affected by the thermal plume at its maximum estimated extent would represent about 1.7E-04 (0.00017) percent of the surface area (not volume) of the western basin of Lake Erie (estimated to be about 1200 mi²).

The Intervenors have questioned the estimated size of the Fermi Unit 3 thermal plume presented in the ER and incorrectly contended that the thermal plume would be about 75 acre-feet (per day) in size. See *Detroit Edison Co. (Fermi Nuclear Power Plant, Unit 3)*, LBP-11-14, 73 NRC __, __ (May 20, 2011) (slip op. at 11-12). According to the Intervenors, a discharge of 17,000 gpm x 60 min. x 24 hrs. = 24,480,000 gal. per day / 325,851 gal./acre = 75.127 ac.-ft/day. Statement of Facts Demonstrating Issues of Material Fact, In Support of Intervenors' Opposition to DTE's 'Motion for Summary Disposition of Contention 6,' at 2 n.1 (Oct. 27, 2010). This calculation only presents the volume of water that would be discharged (i.e., the volume of effluent) from Fermi 3, not the area or volume of the thermal plume. The size of the thermal plume, which is defined as the area or volume of water that exceeds specific temperature

conditions, is affected by many factors, such as the volume of effluent, the rate at which the effluent is discharged, the temperature of the effluent, the temperature of the receiving waters, and how quickly the effluent would be mixed with ambient waters (itself dependent on many factors). The thermal plume modeling conducted to estimate the extent of the thermal plume that would result from operation of Fermi 3 accounted for these and other factors. DTE presented that the thermal plume of Fermi Unit 3 was estimated as being 9 ft by 12 ft in extent in August, when algal growth is typically near its annual maximum. Letter to NRC Document Control Desk from Peter W. Smith, Director, Nuclear Development – Licensing and Engineering, Detroit Edison Company, NRC3-10-0005, “Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 2 Related to the Environmental Review” (ADAMS Accession No. ML100541329), Attachment 2, at 4. This is consistent with results of thermal plume modeling, as described in Section 5.3.2.1 (page 5-34) of the DEIS, for the maximum extent of the portion of the thermal plume mixing zone where water temperature would exceed maximum monthly water temperatures for Lake Erie, as identified by MDEQ, during any period of the year (188 ft² or less). The other estimate of thermal plume area presented in the DEIS (55,300 ft² [1.3 ac]) is a conservative estimate and represents the estimated maximum extent (at any time of the year under the range of conditions modeled) of the area where existing lake water temperatures would be increased by 3°F or more by the thermal effluent of Fermi 3. The review team’s conservative estimate of surface area of the plume defines an area with a smaller temperature change over ambient than in the area presented by DTE. Therefore, the size of the plume is expected to be larger under this modeling scenario.

Because of turbulent mixing of the discharge water with ambient lake water due to the diffuser design and the considerable amount of wave action near the Fermi site, water temperatures or chemical concentrations measured in the lake at relatively short distances from the discharge would not be significantly different from ambient lake water. Because the diffusers would discharge water upward and at a high velocity, elevated water temperatures or

concentrations of chemicals are unlikely to occur on the lakebed. *Lyngbya wollei* is a filamentous alga and turbulent open-lake conditions such as those that are present near the proposed location of the Fermi 3 discharge would not be expected to be suitable for developing high densities of this species. The conditions at the proposed Fermi 3 discharge location are more turbulent than the conditions present in Maumee Bay where high densities of *L. wollei* have been reported. The high-velocity discharge and turbulent conditions that would be present at the discharge from Fermi 3 due to the design of the diffusers would be unsuitable for establishment of a sustained bloom of a filamentous algal species such as *L. wollei* in the water column. Because (1) the effluent from the discharge of the proposed Fermi 3 facility would be directed upward, would infrequently come into contact with the lakebed, and would only contact a small area of the lakebed on such occasions, and (2) because the turbulent conditions present in the waters of Lake Erie in the vicinity of the Fermi site are not suitable for establishment of benthic algal mats (such as those that are formed by *L. wollei*), the operation of Fermi 3 would not be expected to favor the development of such algal mats on the lake bottom. Because conditions for proliferation of algal blooms are not expected to be present in the vicinity of the discharge, no algal blooms exacerbated by Fermi 3 construction and operation are anticipated. Therefore, increasing the period in which water temperatures are conducive to algal blooms will not increase the seasonal duration or severity of blooms in the vicinity of the Fermi site or in the western basin of Lake Erie.

12. In Section 7.3.2 of the DEIS (pages 7-22 to 7-27), the NRC review team considered the incremental contribution of the construction and operation of Fermi 3 to cumulative impacts on water quality (including chemical and temperature conditions) by comparing the contribution of Fermi 3 discharges to the water quality effects attributable to other agricultural, industrial, and energy facilities and activities within the western basin of Lake Erie. Based upon its review, it was concluded that the construction and operation of Fermi 3 would not contribute significantly to the overall chemical or thermal cumulative impacts on water quality.

13. I have reviewed the “Assessment of Fermi 3 discharge impacts on *Lyngbya wollei* and other algal species,” Attachment 1 to Applicant’s Motion (dated April 6, 2012). This report provides information that was not incorporated into the DEIS, including visual observations recorded in ship and dive logs during surveys conducted as part of the Fermi 2 Radiological Environmental Monitoring Program, and results of microscopic analyses of algal samples collected near the existing Fermi 2 discharge and near the proposed location for the Fermi 3 discharge in late 2011. Visual observations are suitable for determining whether mats or blooms of algae are present within an area, but may not be adequate to determine what species of algae are present or to detect algal cells when densities are too low to form visible mats or blooms. Information from the logs indicated that no mats or stands of algae were observed in the vicinity of the Fermi site and the microscopic analyses confirmed that *L. wollei* was not present in samples from the Fermi site. Based upon the information provided in the report, the findings of that report are consistent with the conclusions in the Fermi DEIS and this affidavit regarding the locations where *L. wollei* has been observed in the western basin of Lake Erie and that the Fermi 3 discharge is unlikely to cause or exacerbate algal blooms in Lake Erie or support growth of *L. wollei*.

14. I agree with statements in “Assessment of Fermi 3 discharge impacts on *Lyngbya wollei* and other algal species,” Attachment 1 to Applicant’s Motion (dated April 6, 2012) that (a) Lake Erie already retains relatively high concentrations of calcium due to natural basin characteristics, (b) that the levels of dissolved calcium are normally at or near the saturation point in Lake Erie, and (c) that even though the *concentration* of calcium in the water discharged from the Fermi 3 discharge will be higher than in ambient Lake Erie water due to evaporative losses during cooling, this would not result in any *mass addition* of calcium to Lake Erie. Further, the design of the diffusers for the proposed Fermi 3 discharge would result in rapid mixing of the effluent with ambient water. Because of this, the dissolved calcium levels outside the area delineated by the discharge plume would be unlikely to be measurably higher than

dissolved calcium levels that would be present without operation of the discharge and the levels of calcium in Lake Erie near the Fermi site, in the Western Basin of Lake Erie, or in Lake Erie as a whole would not be measurably altered. Therefore, calcium in the effluent of the Fermi 3 discharge would not have a measurable effect on the growth of algae in the general vicinity of the proposed Fermi 3 discharge or in the western basin of Lake Erie.

15. The evaluations reported in "Assessment of Fermi 3 discharge impacts on *Lyngbya wollei* and other algal species," Attachment 1 to Applicant's Motion (dated April 6, 2012), where collection of algae and subsequent microscopic examinations of the samples were conducted, indicate that there is no proliferation of *L. wollei* or *Cladophora* sp. at the existing Fermi 2 discharge location or at the location of the proposed Fermi 3 discharge.

16. I declare under penalty of perjury that my statements set forth above and in my résumé, Staff Attachment 2, are true and correct to the best of my knowledge, information and belief.

Executed in Accord with 10 CFR § 2.304(d)

John W. Hayse
Environmental Scientist – Aquatic Ecologist
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Executed in Argonne, IL
this 7th day of May, 2012

STAFF ATTACHMENT 2

JOHN WILLIAM HAYSE

Ecological and Geographical Sciences Section
Environmental Science Division
Argonne National Laboratory

Education:

Ph.D. Miami University, Zoology, 1991
M.S. College of Charleston, Marine Biology, 1987
B.S. University of Kentucky, Zoology, 1983

Professional Experience:

1995-Present Environmental Scientist - Aquatic Ecologist
Environmental Science Division
Argonne National Laboratory

Team Leader for the Ecological Assessment and Measurement Team since January 2012. Section leader for the Ecological and Geographical Sciences Section from 2006 through 2011. Participate on multidisciplinary teams to evaluate environmental impacts, especially impacts to freshwater and marine ecosystems, from Federal Government activities under the mandates of legislation such as NEPA, CERCLA, and RCRA. Current and past project activities include evaluating impacts to aquatic ecosystems from hydropower operations; development of individual-based models to evaluate environmental influences on growth and survival of fish; training environmental project managers to prepare ecological risk assessments that conform with U.S. EPA guidance; and preparation of ecological risk assessments for a Superfund site at the U.S. Army's Aberdeen Proving Ground. EIS projects include programmatic EISs for wind energy program development by Western Area Power Administration and the U.S. Fish and Wildlife Service in the Upper Great Plains, for solar energy program development by the Bureau of Land Management and the Department of Energy in the Western U.S., and for alternative energy program development on the outer continental shelf for the Minerals Management Service; EISs for licensing of nuclear power plants by the Nuclear Regulatory Commission, an EIS for the Minerals Management Service's proposed oil and gas leasing program for the outer continental shelf, and an EIS for renewal of the Trans Alaska Pipeline System right-of-way.

Summary of Previous Experience:

1991-1995 Postdoctoral Appointee, Environmental Assessment Division
Argonne National Laboratory, Argonne, Illinois

Used multispectral aerial videography to evaluate changes to aquatic habitats under different operational scenarios for an environmental impact statement evaluating

impacts to natural resources from proposed changes in marketing of electricity produced by 5 hydroelectric facilities on the Green, Gunnison, and Colorado Rivers in the upper Colorado River basin. Prepared work plans, procured data collection services, coordinated and participated in ground truthing operations, identified ecological resource information from aerial videography, and analyzed results using GIS technology. Used videography in conjunction with additional information from Federal and state agencies, academic institutions, and the existing literature, to evaluate impacts to threatened and endangered fish species, various native fish species, and trout. Prepared a Biological Assessment that evaluated the potential for impacts to threatened and endangered species from remediation activities and assisted with wetland delineation for the DOE Weldon Spring Chemical Plant Site in Missouri.

1987-1991 Teaching Associate, Dept. of Zoology, Miami University,
Oxford, Ohio

Taught lecture courses in Environmental Biology, taught lecture and field laboratory portions of Field Ecology, and served as laboratory instructor for Animal Diversity, Ichthyology, and Limnology.

1986-1987 Research Assistant, Marine Resources Research Institute, South
Carolina Wildlife and Marine Resources Department,
Charleston, South Carolina

Conducted daily hydrographic sampling on the Cooper River, South Carolina as part of an environmental assessment for a proposed U.S. Navy submarine tending station. Examined the effect of habitat enhancement on juvenile clam recruitment, designed and built a new sampling device, supervised field sampling and laboratory work, and co-authored the final report.

Research Interests:

Ecological risk assessment; fisheries biology and management; predator-prey relationships in aquatic systems

Professional Activities:

Member of the American Fisheries Society and the Ecological Society of America
Serve as referee for *Transactions of the American Fisheries Society*, *Fishery Bulletin*, and *Transactions of the Illinois State Academy of Science* and as a reviewer for the Recovery Program for the Endangered Fishes of the Upper Colorado River Basin and for the North Pacific Fishery Research Board.

Publications:

Author/co-author of 40+ journal/report/conference publications and 40+ presentations.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
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DETROIT EDISON CO.) Docket No. 52-033
)
)
(Fermi Nuclear Power Plant, Unit 3))

CERTIFICATE OF SERVICE

I hereby certify that copies of the NRC STAFF ANSWER TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF CONTENTION 6 have been served upon the following persons by Electronic Information Exchange and electronic mail this 7th day of May, 2012:

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