Introduction

On February 2-6, 2009, staff from the U.S. Nuclear Regulatory Commission (NRC), NRC's contractors, and the U.S. Army Corps of Engineers, Detroit District (USACE), conducted an environmental site audit related to the review of the Detroit Edison Company (Detroit Edison) Fermi Nuclear Power Plant, Unit 3 (Fermi 3) combined license (COL) application. Representatives from the U.S. Environmental Protection Agency Region 5 (EPA), Michigan Department of Environmental Quality (MDEQ), and Michigan Department of Natural Resources (MDNR) participated in portions of the audit.

The audit consisted of meetings, topic-specific breakout sessions, and literature reviews at DTE Energy (Detroit Edison's parent company) headquarters in Detroit, Michigan; a general tour and discipline-specific tours of the Fermi site in Monroe County, Michigan; a meeting with USACE, EPA, MDNR, and MDEQ representatives at the Fermi site; a meeting with Michigan State Historic Preservation Office (SHPO) staff in Lansing, Michigan; and offsite meetings with regional and local agency representatives.

The remainder of this report summarizes major site audit technical discussions and issues by review area (technical discipline) identified at the time of the audit.

Summary of Major Technical Discussions and Issues by Review Area

General

At the beginning of the site audit, Detroit Edison advised NRC staff that the Fermi 3 site layout as presented in the COL Environmental Report (ER) was in the process of being modified. The staff were presented with a preliminary description of expected site layout changes that would be made in large part to reduce or avoid environmental impacts of construction. These changes would affect many of the assessment results and could impact the NRC's environmental review schedule. The site audit staff were advised to take these changes into consideration during breakout discussions and when discussing information needs during, and developing requests for additional information (RAIs) after, the site audit. One of the proposed changes was reported to be relocation of the cooling tower to reduce impacts to wetlands. Some other changes may require modification to existing infrastructure that supports Fermi 2 operations. NRC indicated the need for Detroit Edison to specify which changes to Fermi 2 infrastructure would result from the construction of Fermi 3, and which changes would occur regardless of a decision on Fermi 3 licensing.

Accidents

Detroit Edison indicated that the design basis accident discussions in the ER have been revised using ESBWR Design Control Document (DCD) Revision 5; and presented a revised draft ER Section 7.1 with new results. NRC identified a discrepancy in the PAVAN input for Exclusion Area Boundary (EAB) and Low Population Zone (LPZ) distances.

Detroit Edison presented new analyses of severe accident consequences using information from the ESBWR Probabilistic Risk Assessment (PRA) Revision 3 and DCD Revision 5. Detroit Edison indicated that a new analysis based on the ESBWR PRA Revision 3 resulted in lower maximum averted costs than those reported in ER Section 7.3 (because of lower core damage frequency estimate). Detroit Edison is expected to provide an electronic copy of the analysis

and assumptions used in determining averted costs for Severe Accident Mitigation Alternatives (SAMAs), and committed to consider and evaluate as part of SAMAs the administrative and procedural items identified in the ESBWR DCD Severe Accident Mitigation Design Alternative analysis.

Air Quality and Meteorology

The air quality and meteorology team toured the Fermi site, observed meteorological instrumentation, and met with onsite meteorological staff to discuss instrumentation and measurements associated with Fermi 2 operations. The team also held a conference call with Joe Sinodis of Numerical Applications, Inc., to discuss selection of input parameters for X/Q calculations (ER Sections 2.7.6 and 7.1). Determination of distances to the EAB and LPZ was not made according to the methodologies described in NRC Regulatory Guide 1.145. Re-running the models for X/Q calculations was requested.

Visual inspection during the site audit indicated that the distance from the meteorological tower to the nearest obstruction (i.e., the wooded area located west of the tower) is less than ten obstruction heights. This distance is not consistent with the distances identified in Regulatory Guide 1.23, which states, *"The sensors should be located over level, open terrain at a distance of at least 10 times the height of any nearby obstruction if the height of the obstruction exceeds one-half the height of the wind measurement."* Detroit Edison stated that this was a self-identified issue entered into the Fermi 2 corrective action system in 2004 and was resolved as having no impact on the monitoring program based on a comparison with historic data collected during the previous 30 years. The staff requested that Detroit Edison provide a written description of the evaluation that closed out this issue. These issues would also warrant a review to determine whether onsite meteorological data are representative of the site dispersion characteristics for a Fermi 3 air permit application.

Also, the Fermi 2 meteorological system engineer indicated that the secondary delta-temperature channel ($\Delta T = T60m - T10m$) recorded values were consistently 0.2°C higher than the primary delta-temperature channel. This discrepancy translates to 0.4°C/100 m. Because this value is used in NRC's $\Delta T100m$ method to determine the Pasquill-Gifford stability class, results from the primary and secondary monitoring systems could result in different stability class estimates. The staff requested that Detroit Edison provide an evaluation of the potential cause(s) and implication(s) of this temperature difference.

Aquatic Ecology

The aquatic ecology staff toured major aquatic habitats on the Fermi site and held discussions with Detroit Edison contractor staff who have surveyed the site and prepared portions of the ER. In addition, two interim documents describing the ongoing, one-year aquatic ecology monitoring program were reviewed and are expected to be provided in response to RAIs. Specific issues were identified relative to the following items:

- Construction impacts related to the modifications of the intake bay, development of a barge slip, and construction of a discharge pipe in Lake Erie. There is also a possibility that dredging would be needed to develop an access channel to the shipping lane in Lake Erie for barges.
- Identification of the final facility footprint and design relative to land clearing, wetland areas affected, and alterations to the onsite water canals.

- Completion and documentation of the remaining monitoring activities for aquatic biota in Lake Erie near the Fermi site and for entrainment and impingement at the existing Fermi 2 intake location. The remaining monitoring period will include portions of the year (spring and summer) during which fish movement and larval production in Lake Erie are likely to be the greatest.
- Collection of past entrainment monitoring samples at a mid-depth in the intake bay. There was a suggestion by NRC and Argonne that future entrainment monitoring activities should include collection of samples throughout the water column of the intake bay to confirm that there is no significant vertical stratification of organisms.

Alternatives

Alternatives to the proposed action were discussed including alternative energy sources, cooling system options, and alternative sites. There was also discussion of the information that Detroit Edison needs to provide to demonstrate that one or both of the Greenfield alternative sites (A and C) are viable for construction of a nuclear power plant.

Benefit-Cost Balance

There were discussions on benefit-cost information needed on spent fuel storage costs. Detroit Edison stated that there is no specific plan to address spent fuel storage in an independent spent fuel storage facility (ISFSI) dedicated to Fermi 3; and although the plan is to store fuel this way for Fermi 2, no cost information exists for an ISFSI for Fermi 3. Detroit Edison assumes that a spent fuel pool will be used for storage for Fermi 3, and that any storage costs for the new reactor would be included in overall plant construction costs. This issue needs to be resolved through the RAI process.

Cultural Resources

Subsequent to a cultural resources tour led by Detroit Edison, the staff met with the Michigan SHPO to discuss the project. The SHPO discussed its comments on Detroit Edison's Phase I cultural resources report and indicated that additional information for archaeology and architectural resources would be requested prior to their acceptance of that report's conclusions. The SHPO expressed concern that the Phase I report does not clearly indicate what the proposed action is, making it difficult to make an effect determination. The SHPO also indicated that additional information would be needed for Fermi 1 and Fermi 2, to assess their eligibility for the National Register of Historic Places. The SHPO indicated that viewshed/visual impacts will not be a concern for them. The Monroe County Historical Commission and beach community associations were identified as potentially interested parties.

Significant uncertainties exist regarding Fermi 1's National Register eligibility and other SHPO determinations, which could greatly affect the project. Detroit Edison's proposed schedule in the ER for submittal of the Fermi 1 cultural resources report and other cultural resources documentation to the SHPO would not allow for incorporation of conclusions in the Draft EIS.

Fuel Cycle

Uranium fuel cycle issues and information needs were discussed in a conference call. Detroit Edison agreed that identified mathematical errors required correction and committed to send revised calculations.

Human Health

Most of the information needs discussed at the site audit will require a more detailed review of calculation packages following the site audit. New issues raised at the site audit included the NRC's need for groundwater monitoring results based on the Nuclear Energy Institute (NEI) initiative, calculations of biota dose inside the site boundary (at 0.25 mile from Fermi 3 emission sources), and updated dose calculations based on the new site layout for construction worker and site boundary doses. The issue of spent fuel storage for the last 30 years of operation also arose.

Hydrology

Hydrology staff participated in a specialized tour of major surface water bodies on the Fermi site including the quarry ponds, north and south lagoons, and Lake Erie. Several information needs were discussed in breakout sessions, but resolution of some of these will await review of calculation packages after the site audit. Major issues identified included:

- The considerable uncertainty regarding existence and locations of clay dikes surrounding and within the site, which could have a major influence on groundwater interconnections.
- The need for a better understanding of the effects of dewatering on surface water bodies and wetlands.
- The need for more information on conceptual designs and construction methods for the discharge and barge slip in Lake Erie.

Land Use

No major land use issues were identified during the site audit. Meetings were held with the following local and regional government officials: Richard Reid (Supervisor of Berlin Township) and Rob Peeven (Assistant Director, Monroe County Planning Department) on February 2, and James McDevitt (Frenchtown Charter Township Supervisor) and Paul Tait (Director, South East Michigan Council of Governments) and his staff on February 3. These meeting provided information on local housing markets; local government finances; planning restrictions with respect to transmission lines; infrastructure restrictions on new development, especially roads; local and regional economic development prospects; and farmland conservation measures.

Need for Power

Changes to NRC guidance regarding need for power were discussed in a breakout session, although these changes do not affect the acceptability of what Detroit Edison provided in the ER. Important findings at the site audit included:

- Detroit Edison has not decided on a schedule on which it would file for a Certificate of Need with the Michigan Public Service Commission as required by recent regulations (Public Act No. 286, MCL 460.6(s)).
- Recent downturns in the Michigan economy may affect the need for power in the short term; however, Detroit Edison considers longer-term power need projections appearing in the Michigan 21st Century Energy Plan to be valid.
- Detroit Edison's last update to its Integrated Resource Plan was in the late 1990s; an update will be processed and submitted to the Michigan Public Service Commission together with an application for a Certificate of Need, along with an updated need for power analysis. The schedule for preparing this update is not known at this time and

could be many years after the Final EIS is issued. Detroit Edison would need to provide the updated analysis to NRC if it is available in time for inclusion in the EIS.

Noise

It was determined that re-running the noise prediction model would be necessary to account for changes in site layout and construction details. Specifically, the following information is needed: (1) predicted noise levels for construction for average and worst day; (2) predicted noise levels for operation using updated site layout and switchyard configuration; and (3) information on blasting for noise modeling.

Socioeconomics and Environmental Justice

The socioeconomics staff participated in the meetings discussed above under Land Use, to discuss issues of the region. Issues discussed with Berlin and Frenchtown Charter Townships and Monroe County representatives included trends in population and housing; low-income and minority populations; housing and economic development proposals; issues, developments, and plans related to the existing transportation, utility, infrastructure and school systems in the area; the local tax structure and tax benefits received from the Fermi 2 plant; and any recollections of local impacts during construction of the Fermi 2 plant. Discussions with Southeast Michigan Council of Governments representatives were related to the availability of studies and other data on trends in population, housing, economic growth, and transportation in the Southeast Michigan area.

Areas that remain outstanding are: (1) whether Detroit Edison can provide documentation of personal communications used to support impact discussion of education, public services, subsistence use, and environmental justice; (2) date of completion of the level of service (LOS)/traffic study (ER states that the LOS/traffic study will be completed within one year of the docketing of the Fermi 3 COL application); and (3) anticipated barge traffic in Lake Erie. Specific information still needed includes: (1) updated information on construction costs, salaries, and workforce; (2) revised RIMS II analysis to reflect only those new workers moving into area; and (3) updated population, housing and employment data.

Terrestrial Ecology

The staff participated in a specialized tour of terrestrial survey locations and habitats of the Fermi site including major wetland areas and relatively undisturbed portions of the property. Major issues discussed and reviewed included:

- Status and results of the one-year confirmatory terrestrial monitoring program.
- Development of a water budget for wetlands of the site to enable an assessment of the effects of dewatering.
- Jurisdictional delineations and functional assessments of site wetlands.

Transmission Lines

The staff toured the transmission line route described in the ER, from the Milan substation (near Milan, Michigan) to the Fermi site substation. The tour was lead by ITC Transmission (ITC), the company that would construct, own and operate the line. The tour included a general orientation to the proposed route and description of modifications that would likely occur at the Milan substation to accommodate transmission from Fermi 3. Types of terrain, vegetation, and land use along the route were observed and typical practices used by ITC in maintaining their

corridors were discussed. ITC and Detroit Edison indicated that there is uncertainty regarding the actual route and whether or not the Milan substation would be the terminus of the Fermi 3 connection. Final determination of the route awaits a system study that is not planned to be conducted until several years hence. It was further discussed that Detroit Edison's plans for the transmission lines are tentative and years from being finalized. Thus, Detroit Edison can provide only reconnaissance-level data at this stage for its tentative transmission line route.

Transportation

Transportation issues were discussed via conference call. One outstanding issue is whether the Fermi 3 transportation analysis in the ER is bounded by the analysis done for Grand Gulf in NUREG-1817, *Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf ESP Site*. It appears that the NUREG-1817 analysis does properly bound that for Fermi 3. However, NUREG-1555 Section 5.7.2 under III (6) indicates that a confirmatory analysis should be performed and documented in the EIS.