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6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

6.1 THERMAL MONITORING

{This section presents the preapplication, preoperational, and operational thermal monitoring programs for the new site at the existing two unit Nine Mile Point Nuclear Station (NMPNS) in Oswego County, New York, and referred to as the Nine Mile Point Unit 3 Nuclear Power Plant (NMP3NPP). The objective of thermal monitoring during each phase is to comply with Federal and State water quality criteria and to protect aquatic life within the area of influence of the facility.

Pertinent NMPNS and plant features, including boundaries and bathymetry of all water bodies adjacent to the site are described and shown in Section 2.3.1. The existing and proposed discharge and thermal monitoring stations are shown in Figure 6.1-1. Additional information related to field water temperature measurement and data analysis is described in Section 2.3.1. Hydrological and biological monitoring are described in Sections 6.3 and 6.5. The extent of the predicted thermal plume is described in Section 5.3.2.1.

Temperature monitoring is described in each subsection below corresponding with the pre-application, preoperational, and operational phases of the project. Existing and planned monitoring equipment is similarly described below.

Thermal program acceptance criteria are based on relevant Federal, State, and local requirements.

Consultation with the New York State Department of Environmental Conservation (NYSDEC) has been initiated and will continue throughout preapplication, preoperational, and operational phases of the project. NYSDEC will issue the facility a State Pollutant Discharge Elimination System (SPDES) discharge permit prior to operation.}

6.1.1 PREAPPLICATION MONITORING

{Preapplication monitoring for NMP3NPP consists of past and present thermal monitoring activities conducted for Nine Mile Point (NMP) Unit 1 and Unit 2. NMP Unit 1 began commercial operations in 1969 and Unit 2 in 1988. More than 38 years of monitoring activities associated with the existing plant establishes the basis for the thermal description and baseline water temperature conditions for NMP3NPP.

Data collected prior to the construction of NMP3NPP were used to design the cooling water systems to achieve rapid dispersion of effluents and to minimize water temperature variations in the area of plant influence.

Temperature measurements are taken for monitoring plant discharges from the site according to the plant's State Pollutant Discharge Elimination System (SPDES) permit. Existing site features and the locations of the existing monitoring stations are depicted in Figure 6.1-1. For recent bathymetry characteristics adjacent to the NMPNS site, refer to Section 2.3.1.

The NMP Unit 1 and Unit 2 SPDES permits require thermal monitoring of discharge. The current SPDES permit for Unit 1 allows a maximum daily discharge temperature of 115°F. The maximum allowable intake-discharge temperature difference is 35°F. The current SPDES permit allows a maximum daily discharge temperature of 110°F from Unit 2 and a maximum allowable intake-discharge temperature difference of 30°F. NMP Unit 1 and Unit 2 each have separate

intake and discharge structures located offshore in Lake Ontario, and each has a separate screenwell and pumphouse structure located onshore.

In surveys at NMP Unit 1, the size of the plume, defined as the area or volume within the 2°C (4°F) above ambient isotherm, has varied between 34 and 370 surface acres and 54 and 1,229 acre-feet. While for NMP Unit 2, the initial discharge temperature rise is diluted in excess of 10:1 for all discharge conditions, and because the dilution is achieved in the near-field. The maximum surface temperature rise meets the New York State surface temperature criteria for Lake Ontario, as described in 6 New York Code of Rules and Regulations Sections 704.2 and 704.3 of 3°F; therefore, no surface mixing zone is required (NRC, 1985).

According to NYSDEC SPDES Permit No. NY-000 1015, Unit 1 and Unit 2 are required to be temperature monitored. For both units, computer data logging at least hourly, is performed to verify compliance during normal operating hours. During unusual operating conditions or in situations where the hourly data is near the outfall limitation, chart recorder data will be reviewed and utilized to demonstrate compliance. NMP Unit 1 has the discharge pipe and intake-discharge temperatures difference recorded continuously. NMP Unit 1 also records the decay heat cooling tower blowdown temperature on a monthly basis as a grab sample. NMP Unit 2 only records the discharge pipe and intake-discharge temperatures difference continuously.

Considering that NMP Unit 1 began commercial operations in 1969 and Unit 2 in 1988, thermal monitoring activities associated with the existing plant for the past 30 plus years, adequately establish baseline water temperature conditions for the proposed new plant.}

6.1.2 PREOPERATIONAL MONITORING

{Preoperational thermal monitoring will be a continuation of the preapplication monitoring program. Thermal monitoring data collected during the preoperational monitoring program will supplement preapplication monitoring data and further serve to establish baseline lake water temperature conditions for comparative purposes in assessing potential environmental impact from new plant operations. Preoperational monitoring will be conducted during NMP3NPP site preparation and construction.

Construction related discharges will consist mainly of drainage that collects in sumps at the bottom of excavations, which will be pumped to a storm water discharge point. Therefore, no change in thermal discharges is expected during the preoperational monitoring program.

The NYSDEC will be notified of pending construction activities and approval of storm water management and erosion/sediment control plans will be obtained in accordance with the SPDES Construction General Permit as described in Section 1.3.

Refer to Section 4.2.1 for anticipated bathymetric characteristics of Lake Ontario adjacent to the NMP3NPP site following construction activities.}

6.1.3 OPERATIONAL MONITORING

{Thermal monitoring will continue during operation of NMP3NPP to assess water temperature changes associated with effluents from the new plant.

NMP3NPP requires water for cooling and operational uses. Cooling water for the turbine condenser and a closed cooling heat exchanger for normal plant operating conditions is provided by the Circulating Water Supply System (CWS). The excess heat from the CWS is dissipated to the environment through a closed loop cooling system. A closed loop cooling

system recirculates water through the plant components and cools this water for reuse by transferring excess heat to the atmosphere with a cooling tower. The NMP3NPP system uses a single non-plume abated mechanical draft cooling tower for heat dissipation.

NMP3NPP will also have four smaller Essential Service Water System (ESWS) cooling towers to dissipate heat from safety-related systems. The ESWS provides cooling water to the Component Cooling Water System heat exchangers and the cooling jackets of the emergency diesel generators. Makeup water is normally provided to the ESWS cooling towers from Lake Ontario via the plant Raw Water Supply System (RWSS), but can also be supplied on an emergency basis from Lake Ontario, via the ultimate heat sink (UHS) makeup water pumps.

Blowdown from the CWS cooling tower and the ESWS cooling towers will collect in a retention basin where some of the water's heat will be released to the atmosphere and surrounding media prior to entering the final discharge pipe. Additional heat will also be transferred to piping and the surrounding environs during its passage to the discharge outfall.

The discharge temperature for NMP3NPP is anticipated to be lower than NMP Unit 1 and Unit 2, and the cooling water discharge flow will be a small percentage of that for the existing units resulting in less energy being transferred to the Lake Ontario waters.

New York State has a state program which has been approved by the United States Environmental Protection Agency (USEPA) for the control of wastewater and storm water discharges in accordance with the Clean Water Act. Under New York State law the program is known as the State Pollutant Discharge Elimination System (SPDES) and is broader in scope than that required by the Clean Water Act in that it controls point source discharges to groundwater as well as surface waters (NYS, 1991).

The SPDES permit requirements are in compliance with local, state, and federal regulations such as the Federal Water Pollution Control Act Section 316(a) and NYSDEC. Specific New York state regulations (6 NYCRR 704) (NYS, 1991) includes:

- The water temperature at the surface of a lake shall not be raised more than 3^{o}F over the temperature that existed before the addition of heat of artificial origin.
- In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges that will raise the temperature of the receiving waters shall be confined to the epilimnion.
- In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges that will lower the temperature of the receiving waters shall be discharged to the hypolimnion and shall meet the water quality standards contained in Part 703 of this Title in all respects.

Thermal plume modeling performed to estimate the distribution of additional heat load entering Lake Ontario indicates that the combined thermal discharges from the new and existing plants meet and comply with State of New York regulations. Analyses of thermal impacts and the extent of the estimated thermal plume are provided in Section 5.2 and Section 5.3.2. Although the new plant will utilize a closed-loop cooing system, it is anticipated that locations of new monitoring stations will be similar to the existing monitoring stations (i.e., by new plant intake screens and by the new plant discharge structure).

The extent and duration of the operational monitoring program will conform to the requirements of the SPDES permit applicable to NMP3NPP, and are expected to be similar to

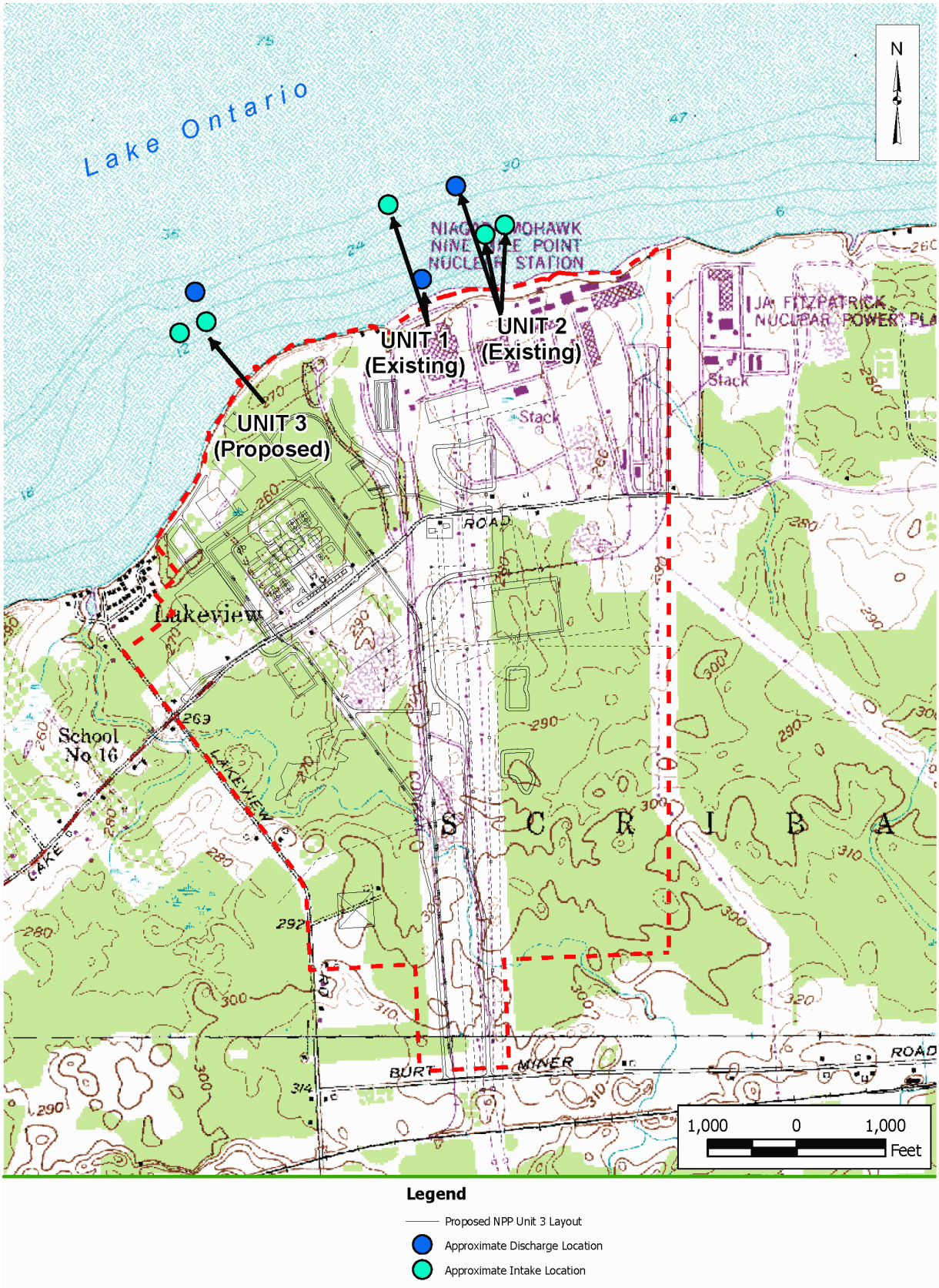
the existing program for NMP Unit 1 and Unit 2. Water temperatures from new plant discharges will meet applicable federal and state environmental regulatory requirements (NYS, 1991). In the proposed plan for NMP Unit 3, flow elements will be installed on the intake system pipelines. Two temperature monitors will be installed in the intake pumphouse forebay. A temperature monitor and a flow element will also be installed on the retention basin discharge pipeline.}

6.1.4 REFERENCES

{**NYS, 1991.** New York State Environmental Conservation Law §§15-0313, 17-0301, Part (§§704.1-704.4), 1974 - 1991. Part 704 Criteria Governing Thermal Discharges, http://www.dec.ny.gov/regs/4589.html#16148 accessed on 23 July 2008.

NRC, 1985. Niagara Mohawk Power Corporation. Environmental Report Operating License Stage Nine Mile Point Nuclear Station Unit 2. Volume 1. February 8, 1985.}

Figure 6.1-1—{Existing and Proposed NMP3NPP Discharge and Temperature Monitoring Stations}



6.2 RADIOLOGICAL MONITORING

{This section describes the objectives, basis, content, reporting and quality assurance aspects of the site area Radiological Environmental Monitoring Program (REMP), which includes both the existing NMPNS REMPs and the new NMP3NPP REMP. The NMP3NPP REMP will build upon this existing NMPNS site program where sample types, locations, collection frequencies, and analysis requirements satisfy the program requirements (such as objectives, basis, and reporting) that are identified for NMP3NPP. The NMP3NPP REMP is considered a separate program from that administered by Unit 1 and Unit 2, even though many of the program elements are shared between operating companies on the NMPNS and NMP3NPP sites. The existing REMP for Units 1 & 2 covers the entire NMPNS site and environs surrounding the site and will be used to provide baseline information in support of the preoperational phase of NMP3NPP. In addition to NMPNS reactors, the James A. Fitzpatrick (JAFNPP) reactor, owned by Entergy Nuclear Northeast, sits on property adjacent to the NMPNS site. Section 6.2 will not address any concerns associated with the JAFNPP reactor.

The preoperational monitoring program for NMP Unit 1 and Unit 2 was implemented in 1964 and continued for five years prior to any reactor operation (Constellation, 2007a). NMP Unit 1 achieved criticality in 1969. The JAFNPP reactor achieved criticality in 1975. NMP Unit 2 achieved criticality in 1988. Results of the existing monitoring program for both the preoperational and operational periods to date have been reported to the Nuclear Regulatory Commission (NRC) in a series of annual reports. Annual reporting of REMP activities, detected radioactivity, trends, and plant related impacts will continue through the construction and operation of NMP3NPP and will cover the influence of all four units in a series of reports called the Annual Radiological Environmental Operating Report (AREOR).

The objectives of the REMP for both the existing NMPNS Unit 1 and Unit 2 and the addition of NMP3NPP are:

a. To verify that radioactivity and ambient radiation levels attributable to plant operations are within the limits specified in 10 CFR Part 50, Appendix I for maintaining doses to members of the public "As Low As Reasonably Achievable (ALARA)" (CFR, 2007b) and within the Environmental Protection Agency Radiation Protection Standards as stated in 40 CFR Part 190 (CFR, 2007a);

b. To detect any measurable buildup of long-lived radionuclides in the environment;

c. To monitor and evaluate ambient radiation levels;

d. To determine whether any statistically significant increase occurs in concentration of radionuclides in important pathways.

The environmental monitoring sampling program for the site is consistent with the guidance provided in standard radiological effluent technical specifications (CFR, 2007a) as described in Regulatory Guide 4.1 (NRC, 1975), NUREG-1301, (NRC, 1991), and NRC guidance (NRC, 1979b).

Changes to the NMP Unit 1 and Unit 2 REMPs to reflect NMP3NPP are noted in Section 6.2.7.}

6.2.1 PATHWAYS MONITORED

{Environmental exposure pathways to man resulting from NMP3NPP radiological effluents are described in Section 5.4.1. These are the same environmental pathways that apply to effluents from Unit 1 and Unit 2. Radioactive liquid pathways include internal exposure due to ingestion of aquatic foods (fish) and external exposure due to recreational activities on the shoreline and

in the water (swimming and boating). Radioactive gaseous pathways include external exposure due to immersion in airborne effluents and exposure to a deposited material on the ground plane. Internal exposures are due to ingestion of food products grown in areas under the influence of atmospheric releases, and inhalation from airborne effluents. In additional, direct radiation exposure from the facility structures is also considered a potential pathway. The REMP for both Unit 1 and Unit 2 and NMP3NPP are designed to evaluate detectable levels of radioactive materials in environmental media associated with these exposure pathways.

The relationships between exposure pathways and environmental media included in the NMPNS REMP sampling program are shown in Table 6.2-1 and are applicable to NMP3NPP.

The exposure pathways being monitored are listed in Table 6.2-2, Table 6.2-3, and Table 6.2-4 for the existing REMP. These same pathways and monitoring locations will be applied to the NMP3NPP REMP, except as noted in Section 6.2.7.}

6.2.2 LAND USE CENSUS

{A land use census for the NMPNS site area is conducted during the growing season at least once every twelve months as described in the Off-site Dose Calculation Manual (ODCM) (Constellation 1 and Constellation 2). The same land use census requirement will be applied to NMP3NPP. The census identifies the following within each of the sixteen meteorological sectors in the 5 mi (8 km) vicinity:

The nearest milk animal,

The nearest residence, and

The nearest garden of greater than 500 ft^2 (50 m^2) producing broad leaf vegetation.

The purpose of the land use census is to identify needed changes in the Radiological Environmental Monitoring Program. This ensures that sampling locations associated with media that have the highest dose potential are included in the REMP as changes in land use patterns occur over time. The implementation of the land use census satisfies the requirement of 10 CFR Part 50, Appendix I (CFR, 2007b).}

6.2.3 ENVIRONMENTAL MONITORING PROGRAM SAMPLE TYPES

6.2.3.1 {Direct Radiation Monitoring

Radiation exposure occurs by immersion in radionuclides present in the atmosphere, deposited on the ground, or via direct shine from fixed sources. Thermoluminescent dosimeters (TLDs) are used to measure ambient gamma radiation levels at many locations surrounding the existing units and will be extended to include locations near the NMP3NPP site boundary for each of the sixteen meteorological sectors. Current locations are listed in Table 6.2-4 and shown in Figure 6.2-1,Figure 6.2-2, and Figure 6.2-3. Table 6.2-5 describes the direct radiation measurements criteria applied to both the preoperational and operational REMPs specific to NMP3NPP. NMP3NPP additional locations are identified in Table 6.2-6. Data collected as part of the existing Unit 1 and Unit 2 environmental TLD program will be included as part of the NMP3NPP REMP as indicated in Table 6.2-6.

TLDs are crystalline devices that store energy when they are exposed to radiation. They are processed after their exposure periods, with minimal loss of information, to read the amount of stored energy, that they had accumulated during their exposure period in the field. This makes them well suited for quarterly environmental radiation measurements.

During TLD processing, stored energy is released as light, and is measured by a TLD reader. The light intensity is proportional to the radiation dose to which the TLD was exposed.

6.2.3.2 Airborne Activity Monitoring

Radioiodine and particulate samples are currently collected with continuously operating air pumps, particulate filters, and iodine collection charcoal cartridges at 15 sample collection points (R-1, R-2, R-3, R-4, R-5, D1, D2, E, F, G-on-site, G-off-site, H, I, J, and K). Sampling frequencies are shown in Table 6.2-2 and Table 6.2-3, respectively, for the existing NMP Unit 1 and Unit 2 REMPs. Filter elements and iodine cartridges are changed out on a weekly basis. Airborne radioactivity monitoring data collected as part of the existing NMPNS Unit 1 and Unit 2 REMPs will be included in the assessment of the NMP3NPP REMP. Additions to the airborne monitoring program that are related directly to the NMP3NPP REMP are identified in Section 6.2.7. These include two new air samplers near the NMP3NPP site boundary with high ranked D/Q values, as well as one new air sampler near the Scriba, NY community, which has the highest D/Q estimate for nearby communities. Table 6.2-5 describes the air sampling criteria applied to both the preoperational and operational REMP specific to NMP3NPP. Table 6.2-6 and Figure 6.2-4, Figure 6.2-5, and Figure 6.2-6 provide the locations of air particulate and radioiodine sampling locations for the NMP3NPP REMP.

6.2.3.3 Waterborne Monitoring

Waterborne and sediment samples for the existing NMPNS REMPs are currently collected at 11 locations (five surface waters, four ground waters, and two shoreline sediments), as listed in Table 6.2-2, Table 6.2-3, and Table 6.2-4 and illustrated in Figure 6.2-1, Figure 6.2-2, and Figure 6.2-3. Sampling frequencies are shown in Table 6.2-2 and Table 6.2-3 for the existing REMPs. Waterborne activity monitoring data collected as part of the existing REMPs will be included as appropriate in the assessment of the NMP3NPP REMP. One addition to the waterborne monitoring program that is related directly to the NMP3NPP REMP is identified in Sections 6.2.7. This addition consists of a new surface water sampling location at the NMP3NPP Unit 3 intake. Table 6.2-5 describes the surface and groundwater sampling criteria applied to both the preoperational and operational REMPs specific to NMP3NPP. Table 6.2-6 and Figure 6.2-4, Figure 6.2-5, and Figure 6.2-6 provide the locations of the additional waterborne sampling site for the NMP3NPP REMP.

6.2.3.4 Ingestion Pathway Monitoring

For liquid effluent pathways, fish have been collected as part of the existing NMP Unit 1 and Unit 2 REMPs at off-site locations shown in Table 6.2-2, Table 6.2-3, and Table 6.2-4, and Figure 6.2-4, Figure 6.2-5, and Figure 6.2-5.

Food products (fruits and vegetables) are sampled from as many as 18 locations as shown in Table 6.2-4 and Figure 6.2-4, Figure 6.2-5, and Figure 6.2-6. Food product collection locations are identified annually through the land use census and D/Q estimates.

The NMPNS Unit 2 REMP requires the sampling of both ground water and drinking water if sources are likely to be affected by plant discharges (Constellation, 2). During 2007, no sampling was required since there were no groundwater sources tapped or drinking purposes in areas where the hydraulic gradient or recharge properties were suitable for contamination (Constellation, 2007). Although not required by the REMP, samples were collected from four locations in 2007 as part of the NEI Industry Groundwater Protection Initiative (NEI, 2007).

Milk samples have been collected in the recent past, as needed to meet the minimum sample requirements of the NMPNS REMP listed in Table 6.2-4, from as many as four (4) different

locations depending on D/Q ranking and availability of milk from locations in business at the time.

Environmental ingestion pathway media collected as part of the existing NMPNS REMP as shown in Table 6.2-2 and Table 6.2-3 will be included in the assessment of the NMP3NPP REMP. The same ingestion pathway sample sites will be utilized to satisfy the NMP3NPP ingestion pathway requirements as listed in Table 6.2-5. Table 6.2-6 provides the locations of ingestion sampling locations for the NMP3NPP REMP.}

6.2.4 SAMPLE SIZES

{Table 6.2-9 is an estimate of typical sample sizes for radiological analyses. These are approximations and may vary depending on such things as laboratory procedures and methods, available media obtained during sampling, lower limits of detection (LLDs), and split sampling, if applicable.}

6.2.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REPORTS

{Routine REMP reports are submitted annually to the NRC. The annual REMP reports for both NMP Unit 1 and Unit 2 and NMP3NPP include summaries, interpretations, and an analysis of trends of the results of the radiological environmental surveillance activities for the report period. The reports also include comparisons with preoperational studies and with operational controls, as appropriate, and with previous environmental surveillance reports, and an assessment of any observed impacts of the plant operation on the environment. The reports also include the results of the land use census for NMP Unit 1 and Unit 2, and NMP3NPP. Either a single joint report covering all three units on the NMPNS site, or two separate reports, one for Unit 1 and Unit 2 and one for NMP3NPP, will be submitted annually and include all data collected and shared between operating companies.}

6.2.6 QUALITY ASSURANCE PROGRAM

{The REMP quality assurance program for NMP3NPP will be conducted in accordance with Regulatory Guide 4.15, Revision 2 (NRC, 2007).

The REMP quality assurance programs at NMP Unit 1 and Unit 2, prior to NMP3NPP has been conducted in accordance with Regulatory Guide 4.15, Revision 1 (NRC, 1979a). For site area environmental sample results that are to be shared between all three units, the most limiting quality assurance requirements of either revision of Regulatory Guide 4.15 will be applied, or independent sampling and analyses for Unit 1 and Unit 2 and NMP3NPP will be performed in accordance with their respective versions of the Regulatory Guide 4.15 guidance document.

The quality assurance program also involves the use of "Interlaboratory Comparison Program" samples as discussed in the ODCM and split samples for all parameters listed in Table 6.2-8 to verify the accuracy of laboratory techniques. The comparisons are reported in annual REMP reports. Since no NRC approved laboratory supplies TLDs as part of a comparison program, no TLDs are analyzed as part of the "Interlaboratory Comparison Program." The nature of TLDs precludes their use in the split sample program.}

6.2.7 REMP MODIFICATIONS FOR {NMP3NPP

{Table 6.2-6 lists the operational NMP3NPP REMP sampling locations. The operational REMP shares many of the same sampling locations with those used for NMP Unit 1 and Unit 2, along with several additional locations specific to NMP3NPP.

Changes to the existing NMP Unit 1 and 2 REMPs may result from the location of NMP3NPP near Unit 1 and Unit 2 and the inner ring of on-site sample locations. NMPN 3 is centered approximately 0.6 miles (1.0 km) southwest (SW) of the center line between NMPNS Unit 1 and Unit 2. This creates the potential need to relocate existing NMPNS REMP sample collection locations if interferences during plant construction of NMP3NPP are identified. As an example, existing TLD sample site 7 (0.7 miles WSW of Unit 2), may need to be moved since it falls within the area of the NMP3NPP site that will likely be physically affected by construction activities (i.e., the removal of the meteorological tower).

In addition to the relocation of existing NMP Unit 1 and 2 sample sites, the NMP3NPP REMP includes the addition of several new sampling locations in order to meet the sampling criteria of Table 6.2-5 as related to the specific location of the NMP3NPP facilities and its effluent release points (the plant vent stack located next to the NMP3NPP Containment, and the NMP3NPP liquid effluent discharge line located offshore in Lake Ontario). The following items identify specific sample additions to the NMP3NPP:

- The addition of two new air particulate/charcoal filter samplers close to the NMP3NPP site boundary in areas with high ranked annual average D/Q values. These samplers are designated AP1 and AP2, and their locations are listed in Table 6.2-6. Together with existing NMPNS Unit 1 and Unit 2 air sampler "K", also listed in Table 6.2-6, these monitoring locations represent three of the four highest ranked accessible site boundary locations with regard to D/Q. Note that the existing NMPNS air sampler located at D1, which has the highest D/Q value, was not incorporated into the NMP3NPP REMP as a required monitoring location due to its on-site location between NMP Unit 2 and the JAFNPP reactors.

- The addition of one new air particulate/charcoal filter sampler close to a community with high ranked annual average D/Q. This sampler is designated AP3 and is situated near the community of Scriba, NY. This supplements the existing NMP Unit 1 and Unit 2 community sampler at location G in Oswego, NY, and the location R-4 in Lycoming, NY. These locations are given in Table 6.2-6.

- The addition of ten new TLD locations, each in a different meteorological sector near the NMP3NPP site boundary, designated TL1 through TL7 and TL9 through TL11. These additional TLD monitoring locations, along with six existing NMP Unit 1 and Unit 2 TLD locations, provide indications of radiation levels near the plant boundary perimeter.

- The addition of one new TLD location at the AP3 community air sampling location (see above) in Scriba, NY.

- The addition of one new surface water sample location, designated WS6, at the NMP3NPP intake. This is a non-required sampling location, and supplements the existing "downstream" locations near the Unit 1, Unit 2, and JAFNPP intakes.

NMP Unit 1 and Unit 2 REMPs and NRC regulations contain no explicit requirements to routinely monitor groundwater on-site near plant facilities. By design, liquid effluents are not released to groundwater or structures that discharge to groundwater, and as such, there is no expected or intended human exposure pathway associated with groundwater for NMP3NPP. However, recent nuclear industry initiatives by the Nuclear Energy Institute, the Electric Power Research Institute and NRC assessments (NRC, 2006) of existing nuclear reactors, indicates that guidance documents covering the implementation of NRC regulation 10 CFR 20.1406 (CFR, 2007c) relating to groundwater monitoring for both operating and future nuclear reactors is being developed. Groundwater monitoring near plant facilities will provide an early indication if

unexpected releases through system leaks or failures has occurred and is impacting the environment beyond expected pathways. Development of these guidance documents concerning ground water protection are being followed and future requirements will be addressed, as applicable, for inclusion in the NMP3NPP REMP.}

6.2.8 REFERENCES

{**CFR, 2007a, Title 40.** Code of Federal Regulations, Part 190, Environmental Protection Standards for Nuclear Power Operations, U.S. Environmental Protection Agency, 2007.

CFR, 2007b. Title 10, Code of Federal Regulations, Part 50, Appendix I, Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Possible' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents, January 2007.

Constellation, 1. Nine Mile Point Nuclear Station Nine Mile Point Unit 1 Off-site Dose Calculation Manual (ODCM), Revision 29 .

Constellation, 2. Nine Mile Point Nuclear Station Nine Mile Point Unit 2 Off-site Dose Calculation Manual (ODCM), Revision 30.

Constellation, 2007a. Nine Mile Point Nuclear Station, LLC, 2007 Annual Radiological Environmental Operating Report, May 11, 2007.

Constellation, 2007b. Nine Mile Point Nuclear Station, LLC, 2006 Annual Radiological Environmental Operating Report, May 11, 2007.

CFR, 2007. Title 10, Code of Federal Regulations, Part 20.1406, Minimization of Contamination, January 2007.

NCRP, 1987. Exposure of the Population in the United States and Canada from Natural Radiation, National Council on Radiation Protection and Measurement (NCRP) Report No. 94, December 30, 1987.

NEI, 2007. NEI-07-07, Industry Ground Water Protection Initiative - Final Guidance Document, August, 2007.

NRC, 1975. Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants, Regulatory Guide 4.1, Revision 1, Nuclear Regulatory Commission, April 1975.

NRC, 1977. Performance, Testing, and Procedural Specifications for Thermoluminescene Dosimetry: Environmental Applications, Regulatory Guide 4.13, Revision 1, Nuclear Regulatory Commission, July 1977.

NRC, 1979a. Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment, Regulatory Guide 4.15, Revision 1, Nuclear Regulatory Commission, February 1979.

NRC, 1979b. Branch Technical Position, Revision 1, Radiological Assessment Branch Technical Position regarding Radiological Environmental Monitoring Programs, Nuclear Regulatory Commission, November 27, 1979.

NRC, 1991. Off-site Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, NUREG-1301, Nuclear Regulatory Commission, 1991.

NRC, 2006. Liquid Radioactive Release Lessons Learned Task Force, Final Report, Nuclear Regulatory Commission, September 1, 2006.

NRC, 2007. Quality Assurance for Radiological Monitoring Programs (Inception Through Normal Operations to License Termination) - Effluent Streams and the Environment Regulatory Guide 4.15, Revision 2, Nuclear Regulatory Commission, July 2007.}

Table 6.2-1—{Effluent Exposure Pathways and Environmental Sampling Media}

Effluent Exposure Pathways	REMP Sampling Media
Liquid Effluents:	
Ingestion of fish	Commercial & recreational fish species
Ingestion of water	Drinking waters
Shoreline exposure (external direct)	Sediments from shoreline
Swimming & boating (external direct)	Surface waters
Gaseous Effluents:	
Cloud immersion (external direct)	TLDs
Ground plane (external direct)	TLDs
Inhalation	Air particulate sampling, Iodine sampling
Ingestion of agricultural products	Broadleaf vegetation
Ingestion of dairy products	Milk

Table 6.2-2—{Existing Radiological Environmental Monitoring Program for NMPNS Unit 1}

(Page 1 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
1. Direct Radiation [e]	32 stations with two or more dosimeters to be placed as follows: An inner ring of stations in the general area of the site boundary An outer ring in the 4 to 5 mile range from the site with a station in each land based sector. (At this distance, 8 wind rose sectors are over Lake Ontario.) The balance of the stations should be placed in special interest areas such as population centers, nearby residences, schools, and in 2 or 3 areas to serve as control stations	Once per three months	Gamma dose once per three months
2. Airborne Radioiodine and Particulates	Samples from 5 locations: 3 samples from off-site locations in different sectors of the highest calculated site average D/Q (based on all site licensed reactors) 1 sample from the vicinity of an established year round community having the highest calculated site average D/Q (based on all site licensed reactors) 1 sample from a control location 10-17 miles distant and in a least prevalent wind direction[d]	Continuous sampler operation with sample collection weekly or as required by dust loading, whichever is more frequent	Radioiodine Canisters: Analyze once/week for I-131 Particulate Samplers: Gross beta radioactivity following filter change [b], composite (by location) for gamma isotopic analysis [c] once per 3 months (as a minimum)
3. Waterborne			
a. Surface [f]	1 sample upstream 1 sample from the site's downstream cooling water intake	Composite sample over 1 month period [g]	Gamma isotopic analysis [c] once/month. Composite for once per 3 months tritium analysis.
b. Sediment from shoreline	1 sample from a downstream area with existing or potential recreational value	Twice per year	Gamma isotopic analysis [c]
4. Ingestion			
a. Fish	1 sample each of two commercially or recreationally important species in the vicinity of a plant discharge area [h] 1 sample each of the same species from an area at least 5 miles distant from the site [d]	Twice per year	Gamma isotopic analysis [c] on edible portions twice per year.
b. Food Products	Sample of 3 different kinds of broad leaf vegetation (such as vegetables) grown nearest to each of two different off-site locations of highest calculated site average D/Q (based on all licensed site reactors) One sample of each of the similar broad leaf vegetation grown at least 9.3-20 miles distant in a least prevalent wind direction.	Once per year during the harvest season	Gamma isotopic analysis [c] of edible portions (isotopic to include I-131 or a separate I-131 analysis may be performed) once during the harvest seasons

Table 6.2-2—{Existing Radiological Environmental Monitoring Program for NMPNS Unit 1}

(Page 2 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
c. Milk	Samples from milk sampling locations in 3 locations within 3.5 miles distance having the highest calculated site average D/Q. If there are none, then 1 sample from milking animals in each of 3 areas 3.5-5.0 miles distant having the highest calculated site average D/Q (based on all site licensed reactors) 1 sample from a milk sampling location at a control location (9-20 miles distant and in a least prevalent wind direction) [d]	Twice per month, April-December (samples will be collected in January-March if I-131 is detected in November and December of the preceding year.)	Gamma isotopic and I-131 analysis twice per month when animals are on pasture (April to December). Once per month at other times (January to March) if required.

Notes:

(a) It is recognized that, at times, it may not be possible or practical to obtain samples of the media of choice at the most desired location or time. In these instances, suitable alternative media and locations may be chosen for the particular pathway in question and may be substituted. Actual locations (distance and directions) from the site shall be provided in the Annual Radiological Environmental Operating Report. Highest D/Q locations are based on historical meteorological data for all site licensed reactors.

(b) Particulate sample filters should be analyzed for gross beta 24 hours or more after sampling to allow for radon and thoron daughter decay. If the gross beta activity in air is greater than 10 times a historical yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

(c) Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

(d) The purpose of these samples is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites, such as historical control locations which provide valid background data may be substituted.

(e) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purpose of this table, a thermoluminescent dosimeter may be considered to be one phosphor and two or more phosphors in a packet may be considered as two or more dosimeters. Film badges shall not be used for measuring direct radiation.

(f) The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. The "downstream sample" shall be taken in an area beyond but near the mixing zone, if possible.

(g) Composite samples should be collected with equipment (or equivalent) which is capable of collecting an aliquot at time intervals which are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample.

(h) In the event commercially or recreationally important species are not available as a result of three attempts, then other species may be utilized as available.

Table 6.2-3—{Existing Radiological Environmental Monitoring Program for NMPNS Unit 2}

(Page 1 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
1. Direct Radiation	32 routine monitoring stations (b): An inner ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY An outer ring of stations, one in each land based meteorological sector in the 4 to 5 mi [c] range from the site The balance of the stations should be placed in special interest areas such as population centers, nearby residences, schools, and in one or two areas to serve as control stations [d]	Once per 3 months	Gamma dose: once per 3 months
2. Airborne Radioiodine and Particulates	5 locations: 3 samples from off-site locations close to the site boundary (within 1 mile) in different sectors [e] 1 sample from the vicinity of an established year-round community (e) 1 sample from a control location, at least 10 miles distant and in a least prevalent wind direction [d]	Continuous sampler operation with sample collection weekly or more frequently if required by dust loading	Radioiodine Canister: Analyze weekly for I-131 Particulate Sampler: Analyze for gross beta radioactivity >=24 hours following filter change [f]. Perform gamma-isotopic analysis on each sample [g] in which gross beta activity is >10 times the previous yearly mean of control samples. Gamma isotopic analysis of composite sample [g] (by location) once per three months
3. Waterborne			
a. Surface	1 sample upstream [d] [h] 1 sample from the site's downstream cooling water intake [h]	Composite sample over a 1 month period [i]	Gamma isotopic analysis of each sample [g] once per month H-3 analysis of each composite sample once per 3 months
b. Ground	As required: From one or two sources if likely to be affected [j]	Grab sample once per 3 months	Gamma isotopic analysis of each sample (g) once per 3 months H-3 analysis of each sample once per 3 months
c. Drinking	1 sample of each: One to three of the nearest water supplies that could be affected by its discharge [k]	When I-131 analysis is performed, a composite sample over a two week period [i]; otherwise, a composite sample monthly.	I-131 analysis on each composite sample when the dose calculated for the consumption of the water is greater than 1 mrem/year [l] Gross beta and gamma isotopic analyses of each composite sample [g] monthly H-3 analysis of each composite sample once per 3 months
d. Sediment from shoreline	1 sample: From a downstream area with existing or potential recreational value	Twice per year	Gamma isotopic analysis of each sample [g]
4. Ingestion			

Table 6.2-3—{Existing Radiological Environmental Monitoring Program for NMPNS Unit 2}

(Page 2 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
a. Fish	1 sample each of two commercially or recreationally important species [n] in the vicinity of a plant discharge area 1 sample of the same species in areas not influenced by station discharge (d)	Twice per year	Gamma isotopic analysis on each sample [g] on edible portions twice per year
b. Food Products	1 sample of each principal class of food products: Any area that is irrigated by water in which liquid plant wastes have been discharged (o)	At time of harvest (p)	
	Samples of 3 different kinds of broad leaf vegetation (such as vegetables): Grown nearest to each of 2 different off-site locations (e)	Once per year during the harvest season	Gamma isotopic [g] and 1-131 analysis of each sample of edible portions
	1 sample of each of the similar broad leaf vegetation grown at least 9.3 miles distant in a least prevalent wind direction	Once per year during the harvest season	
c. Milk	3 samples from MILK SAMPLING LOCATIONS in 3 locations within 3.5 miles distance (e) If there are none, then 1 sample from MILK SAMPLING LOCATIONS in each of 3 areas 3.5 – 5.0 miles distant [e] 1 sample from a MILK SAMPLING LOCATION at a control location (9 - 20 miles distant and in a least prevalent wind direction [d]	Twice per month, April through December (m)	Gamma isotopic [g] and I-131 analysis of each sample twice per month April through December Gamma isotopic [g] and I-131 analysis of each sample once per month January through March if required

Notes:

(a) Specific parameters of distance and direction sector from the centerline of one reactor, and additional descriptions where pertinent, shall be provided for each and every sample location in Table 6.2-3. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical position on Environmental Monitoring, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable because of such circumstances as hazardous conditions, seasonal unavailability (which includes theft and uncooperative residents), or malfunction of automatic sampling equipment.

(b) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. Each of the 32 routine monitoring stations shall be equipped with 2 or more dosimeters or with 1 instrument for measuring and recording dose rate continuously. For the purpose of this table, a Thermoluminescent Dosimeter (TLD) is considered to be one phosphor; 2 or more phosphors in a packet are considered as 2 or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation

(c) At this distance, eight windrose sectors (W, WNW, NW, NNW, N, NNE, NE, and ENE) are over Lake Ontario.

(d) The purpose of these samples is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites which provide valid background data may be substituted.

(e) Having the highest calculated annual site average ground level D/Q based on all site licensed reactors.

(f) Airborne particulate sample filters shall be analyzed for gross beta activity 24 hours or more after sampling to allow for radon and thoron daughter decay.

(g) Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

(h) The upstream sample shall be taken at a distance beyond significant influence of the discharge. The downstream sample shall be taken in an area beyond but near the mixing zone.

(i) In this program, representative composite sample aliquots shall be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining

a representative sample.

(j) Ground water samples shall be taken when the source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(k) Drinking water samples shall be taken only when drinking water is a dose pathway.

(l) Analysis for I-131 may be accomplished by Ge-Li analysis provided that the Lower Limit of Detection (LLD) for I-131 in water samples found on Table 6.2-8 can be met. Doses shall be calculated for the maximum organ and age group.

(m) Samples will be collected January through March if I-131 is detected in November and December of the preceding year.

(n) In the event 2 commercially or recreationally important species are not available, after 3 attempts of collection, then 2 samples of one species or other species not necessarily commercially or recreationally important may be utilized.

(o) Applicable only to major irrigation projects within 9 miles of the site in the general downcurrent direction.

(p) If harvest occurs more than once/year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be taken monthly. Attention should be paid to including samples of tuberous and root food products.

Table 6.2-4—{Existing Environmental Monitoring Sites for NMPNS Unit 1 and Unit 2}

(Page 1 of 3)

Sample Type/No.	Map Code	NMP 2 Sector (1)	NMP 2 Distance (1)		Collection Site
			km	miles	
Airborne (Radioiodine & Air Particulates)					
R-1	R-1	E	2.9	1.8	Nine Mile Point Road North
R-2	R-2	ESE	1.8	1.1	County Route 29 & Lake Road
R-3	R-3	SE	2.3	1.4	County Route 29
R-4	R-4	SE	2.9	1.8	Village of Lycoming, NY
R-5	R-5	NE	26.1	16.2	Montario Point Road
D1	D1	ENE	0.5	0.3	D1 On-Site Station
G	G	WSW	1.1	0.7	G On-Site Station
H	H	ENE	1.3	0.8	H On-Site Station
I	I	E	1.3	0.8	I On-Site Station
J	J	ESE	1.4	0.9	J On-Site Station
K	K	SE	0.8	0.5	K On-Site Station
G	G	SW	8.7	5.4	G Off-Site Station, St. Paul St.
D2	D2	ESE	14.5	9.0	D2 Off-Site Station, Rt. 64
E	E	SSE	11.4	7.1	E Off-Site Station, Rt. 4
F	F	SSW	12.2	7.6	F Off-Site Station, Dutch Ridge Rd.
Direct Radiation (TLD)					
75	75	N	0.2	0.1	North Fence, NMP-2
76	76	NNE	0.2	0.1	North Fence, NMP-2
77	77	NE	0.3	0.2	North Fence, NMP-2
23	23	ENE	1.3	0.8	H On-Site Station
78	78	E	1.6	1.0	JAF East Boundary
79	79	ESE	1.8	1.2	Route 29
80	80	SE	2.3	1.5	Route 29
81	81	SSE	2.6	1.7	Miner Road
82	82	S	2.6	1.6	Miner Road
83	83	SSW	1.9	1.2	Lakeview Road
84	84	SW	1.8	1.1	Lakeview Road
7	7	WSW	1.1	0.7	G On-Site Station
18	18	W	0.8	0.5	Energy Information Center
85	85	WNW	0.3	0.2	North Fence, NMP-1
86	86	NW	0.2	0.1	North Fence, NMP-1
87	87	NNW	0.2	0.1	North Fence, NMP-2
88	88	E	7.2	4.5	Hickory Grove Road
89	89	ESE	6.9	4.3	Leavitt Road
90	90	SE	6.8	4.2	Route 104 & Keefe Road
91	91	SSE	7.9	4.9	Route 51A
92	92	S	7.2	4.5	Maiden Lane Road
93	93	SSW	7.1	4.4	County Route 53
94	94	SW	7.1	4.4	County Route 1 & Kocher Road
95	95	WSW	6.0	3.7	Lakeshore Campsite
49	49	SSE	31.7	19.7	Phoenix, NY Control
14	14	SW	20.1	12.5	S.W. Oswego, Control
96	96	SSW	5.8	3.6	Creamery Road
58	58	SW	4.8	3.0	Alcan Aluminum, Route 1A
97	97	SE	2.9	1.8	County Route 29
56	56	SE	8.4	5.2	New Haven Elementary School
15	15	WSW	1.4	0.9	West Site Boundary

Table 6.2-4—{Existing Environmental Monitoring Sites for NMPNS Unit 1 and Unit 2}

(Page 2 of 3)

Sample Type/No.	Map Code	NMP 2 Sector [1]	NMP 2 Distance [1]		Collection Site
			km	miles	
98	98	ESE	1.9	1.2	Lake Road
3	3	ENE	0.5	0.3	D1 On-Site Station
4	4	SE	0.6	0.4	D2 On-Site Station
5	5	SSE	0.6	0.4	E On-Site Station
6	6	SSW	0.8	0.5	F On-Site Station
8	8	NE	26.1	16.2	R-5 Off-Site Station
9	9	E	18.3	11.4	State Route 3
10	10	ESE	14.5	9.0	D2 Off-Site Station
11	11	SSE	11.4	7.1	E Off-Site Station
12	12	SSW	12.4	7.7	F Off-Site Station
13	13	SW	8.7	5.4	G Off-Site Station
19	19	E	2.3	1.4	East Site Boundary
24	24	E	1.3	0.8	I On-Site Station
25	25	ESE	1.4	0.9	J On-Site Station
26	26	SE	0.8	0.5	K On-Site Station
27	27	ENE	0.6	0.4	North Fence, JAFNPP
28	28	ENE	0.8	0.5	North Fence, JAFNPP
29	29	ENE	0.8	0.5	North Fence, JAFNPP
30	30	ENE	0.6	0.4	North Fence, JAFNPP
31	31	W	0.3	0.2	North Fence NMP-1
39	39	WNW	0.3	0.2	North Fence NMP-1
47	47	ENE	1.0	0.6	North Fence JAFNPP
51	51	SW	11.7	7.3	Oswego Steam Station, East
52	52	SW	9.5	5.9	Fitzhugh Park Elem. School, East
53	53	S	22.0	13.7	Fulton High School
54	54	ESE	15.1	9.4	Mexico High School
55	55	ENE	20.9	13.0	Pulaski Gas Substation, Rt. 5
99	99	E	2.9	1.8	Nine Mile Point Road
100	100	ESE	1.8	1.1	County Route 29 and Lake Road
101	101	SE	2.3	1.4	County Route 29
102	102	S	19.1	11.9	Oswego County Airport
103	103	W	0.6	0.4	Energy Center, East
104	104	ESE	2.3	1.4	Parkhurst Road
105	105	SSW	2.3	1.4	Lakeview Road
106	106	W	0.5	0.3	Shoreline Cove, West of NMP-1
107	107	W	0.5	0.3	Shoreline Cove, West of NMP-1
108	108	ESE	1.8	1.1	Lake Road
109	109	ESE	1.8	1.1	Lake Road
111	111	SW	35.1	21.8	Sterling, NY - Control
112	112	S	19.1	11.9	EOF/Env. Lab, Oswego Cty Airport
113	113	S	39.7	24.7	Baldwinsville, NY – Control
Shoreline Sediment					
(NA)	SS1	E	1.9	1.2	Sunset Bay Shoreline
(NA)	SS2	SW	7.7	4.8	Langs Beach – Control
Surface Water					
(NA)	WS1	SW	12.2	7.6	OSS Inlet Canal
(NA)	WS2	ENE	0.8	0.5	JAFNPP Inlet Canal
(NA)	WS3	NW	0.5	0.3	NMP Unit 1 Inlet

Table 6.2-4—{Existing Environmental Monitoring Sites for NMPNS Unit 1 and Unit 2}

(Page 3 of 3)

Sample Type/No.	Map Code	NMP 2 Sector [1]	NMP 2 Distance [1]		Collection Site
			km	miles	
(NA)	WS4	WSW	12.6	7.8	Oswego City Water
(NA)	WS5	NNW	0.5	0.3	NMP Unit 2 Inlet
Groundwater					
MW 1-5	MW 1-5	NE	0.2	0.1	Downgradient Wells (5) – Indicator
GMXMW-1	GMXMW-1	SSE	0.5	0.3	Upland Well – Control
GMXMW-2	GMXMW-2	SSW	0.5	0.3	Upland Well – Control
Outfall 001	Outfall 001	NNE	0.3	0.2	NMP2 Dewatering System - Indicator
Fish					
(NA)	FH1	WNW	0.6	0.4	Nine Mile Point Transect
(NA)	FH2	ENE	1.3	0.8	Fitzpatrick Transect
(NA)	FH3	WSW	9.5	5.9	Oswego Transect - Control
Milk					
(NA)	M76	ESE	10.1	6.3	Milk Location #76
(NA)	M55	E	14.2	8.8	Milk Location #55
(NA)	M4	ESE	12.2	7.6	Milk Location #4
(NA)	M77	S	25.7	16.0	Milk Location (Summerville)
Food Product [2]					
(NA)	FP6	SE	3.1	1.9	Produce Location #6 (Bergenstock)
(NA)	FP1	E	2.7	1.7	Produce Location #1 (Culeton)
(NA)	FP2	E	3.1	1.9	Produce Location #2 (Vitullo)
(NA)	FP5	ESE	2.4	1.5	Produce Location #5 (C.S. Parkhurst)
(NA)	FP3	E	2.6	1.6	Produce Location #3 (C. Narewski)
(NA)	FP4	ESE	3.4	2.1	Produce Location #4 (P. Parkhurst)
(NA)	FP7	SW	24.1	15.0	Produce Location #7 (McMillen)
(NA)	FP8	SW	20.3	12.6	Produce Location #8 (Denman)
(NA)	FP9	S	2.6	1.6	Produce Location #9 (O'Connor)
(NA)	FP10	ESE	3.5	2.2	Produce Location #10 (C. Lawton)
(NA)	FP11	ESE	3.2	2.0	Produce Location #11 (C.R. Parkhurst)
(NA)	FP12	ESE	3.1	1.9	Produce Location #12 (Barton)
(NA)	FP13	SW	25.1	15.6	Produce Location #13 (Flack)
(NA)	FP14	E	3.1	1.9	Produce Location #14 (Koeneke)
(NA)	FP15	SE	2.7	1.7	Produce Location #15 (Whaley)
(NA)	FP16	SSW	1.9	1.2	Produce Location #16 (Murray)
(NA)	FP17	E	2.8	1.76	Produce Location #17 (Battles)
(NA)	FP18	E	2.4	1.52	Produce Location #18 (Kronenbitter)x

Notes:

(1) Sectors and distance based on Nine Mile Point Unit 2 Reactor Centerline

(2) Food Product samples need not necessarily be collected from all listed locations. Collected samples will be of the highest calculated site average D/Q.

Table 6.2-5—{NMP3NPP Radiological Environmental Monitoring Program}

(Page 1 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
1. Direct Radiation	32 routine monitoring stations [b], placed as follows: An inner ring of stations, one in each meteorological sector in the general area of the Site Boundary. An outer ring of stations, one in each land based meteorological sector in the 4 to 5 mi (6 to 8 km) range from the site. [c] The remaining stations to be placed in special interest areas such as population centers, nearby residences, schools, and in one or two areas to serve as a control station.	Quarterly	Gamma dose quarterly
2. Airborne Radioiodine and Particulates	Samples from 5 locations [d]: 3 samples from close to the 3 Site Boundary locations, in different sectors, of high calculated annual average ground-level D/Q. 1 sample from the vicinity of a year-round community having a high calculated annual average ground-level D/Q. 1 sample from a control location, as for example 15 to 30 km (9 to 20 mi) distance and in a non-prevalent wind direction.	Continuous sampler operation with sample collection weekly, or more frequently if required by dust loading.	Radioiodine Canister: I-131 analysis weekly Particulate Sampler: Gross beta radioactivity analysis following filter change[e] Gamma isotopic analysis [f] of composite (by location) once per 3 months.
3. Waterborne			
a. Surface [g]	1 sample upstream 1 sample from the site's downstream cooling water intake	Composite Sample [h] over 1-month period	Gamma isotopic analysis [f] monthly. Composite for tritium analysis quarterly.
b. Sediment from shoreline	1 sample from downstream area with existing or potential recreational value	Semiannually	Gamma isotopic analysis (f) of each sample
c. Ground Water	1 sample from 8 on-site locations near plant facilities with liquid radioactive inventory that could influence ground water	Quarterly	Gamma isotopic and tritium analysis of each sample
d. Drinking Water	One sample of each of one to three of the nearest water supplies that could be affected by NMP3NPP discharge [i] One sample from a control location	When I-131 analysis is performed, a composite sample over a two week period [h]; otherwise, a composite sample monthly.	(1) I-131 analysis on each composite sample when the dose calculated for the consumption of the water is greater than 1 mrem/year. [j] (2) Gross-beta and gamma isotopic analysis of reach composite sample [f] monthly. (3) Composite for tritium analysis quarterly.

Table 6.2-5—{NMP3NPP Radiological Environmental Monitoring Program}

(Page 2 of 2)

Exposure Pathway And/Or Sample	Number of Representative Samples and Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
4. Ingestion			
a. Milk	Samples from milk animals in 3 locations within 3 miles (5 km) distance having the highest dose potential. If there are none, then 1 sample from milk animals in each of 3 areas 3 to 5 miles (5 to 8 km) distant where doses are calculated to be greater than 1 mrem per year. [j] 1 sample from milk animals at a control location 9 to 20 miles (15 to 30 km) distant and in a non-prevalent wind direction	Semimonthly when animals are on pasture (April through December); monthly at other times.	Gamma isotopic analysis [f] and I-131 analysis of each sample
b. Fish	1 sample of each of 2 commercially or recreationally important species in the vicinity of plant discharge area. [k] 1 sample each of the same species in areas not influenced by plant discharge.	Sample in season, or semiannually if they are not seasonal	Gamma isotopic analysis [f] on edible portions
c. Food Products	(1) 1 sample of each principal class of food product in any area that is irrigated by water in which liquid plant wastes have been discharged [l] (2) Samples of 3 different kinds of broad leaf vegetation grown nearest to each of 2 different off-site locations of highest predicted annual average ground level D/Q if milk sampling is not performed. [n] [o] (3) 1 sample each of similar broad leaf vegetation grown 9 to 20 miles (15 to 30 km) in a non-prevalent wind direction	(1) At time of harvest[m] (2) Monthly during growing season (3) Monthly during growing season	Gamma isotopic [f] and I-131 analysis of each sample of edible portions (2) Gamma isotopic [f] and I-131 analysis (3) Gamma isotopic [f] and I-131 analysis

Notes:

(a) Deviations are permitted from the required sampling schedule if specimens are unobtainable due to circumstances such as hazardous conditions, seasonal unavailability and malfunction of automatic sampling equipment. If specimens are unobtainable due to sampling equipment malfunction, effort shall be made to complete corrective action prior to the end of the next sampling period.

(b) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. The frequency of analysis or readout for TLD systems will depend upon the characteristics of the specific system used and should be selected to obtain optimum dose information with minimal fading.

(c) At this distance, 8 windrose sectors (W, WNW, NW, NNW, N, NNE, NE, ENE) are over Lake Ontario.

(d) Optimal air sampling locations are based not only on D/Q but on factors such as population in the area, year-round access to the site, and availability of power.

(e) Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than ten times the yearly mean of control samples, Gamma Isotopic Analysis shall be performed on the individual samples.

(f) Gamma isotopic analysis is an analytical method of measurement used for the identification and quantification of gamma emitting radionuclides which may be attributable to the effluents from the facility.

(g) The upstream sample shall be taken at a distance beyond significant influence of the discharge. The downstream sample shall be taken in an area beyond but near the mixing zone, if possible.

(h) Composite sample aliquots shall be collected at time intervals that are very short (e.g., hourly) relative

to the compositing period (e.g., monthly) in order to assure a representative sample is obtained.

(i) Drinking water samples shall be taken only when drinking water is a dose pathway.

(j) The dose shall be calculated for the maximum organ and age group, using the methodology and parameters in the ODCM.

(k) In the event that 2 commercially or recreationally important species are not available after 3 attempts at collection, then 2 samples of one species or of other species not necessarily commercially or recreationally important may be utilized.

(l) Applicable only to major irrigation projects within 9 miles of the site in the general downcurrent direction.

(m) If harvest occurs more than once per year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be taken monthly. Attention shall be paid to including samples of tuberous and root food products.

(n) If broad leaf vegetation is unavailable, other vegetation will be sampled.

(o) Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the site boundary in each of two different direction sectors with high predicted D/Qs in lieu of the garden census.

Table 6.2-6—{Operational NMP3NPP Radiological Environmental Monitoring Program Locations}

(Page 1 of 3)

Sample Type/No. [(a), (b)]	Map Code	Required Minimum REMP [(c)]	NMP3NPP Sector [(d)]	NMP3NPP Distance [(d)]		Collection Site
				km	miles	
Airborne (Radioiodine & Air Particulates)						
AP1	AP1	Yes	S	0.8	0.5	AP1 On-Site Station
AP2	AP2	Yes	SSW	0.6	0.4	AP2 On-Site Station
AP3	AP3	Yes	SSW	4.8	3.0	AP3 Off-Site Station, Scriba
R-1	R-1	No	E	3.7	2.3	Nine Mile Point Road North
R-2	R-2	No	E	2.4	1.5	County Route 29 & Lake Road
R-3	R-3	No	ESE	2.6	1.6	County Route 29
R-4	R-4	No	SE	2.9	1.8	Village of Lycoming, NY
R-5	R-5	Yes	NE	27.2	16.9	Montario Point Road
D1	D1	No	ENE	1.4	0.9	D1 On-Site Station
H	H	No	ENE	2.3	1.4	H On-Site Station
I	I	No	ENE	2.1	1.3	I On-Site Station
J	J	No	E	2.1	1.3	J On-Site Station
K	K	Yes	E	1.4	0.9	K On-Site Station
G	G	No	SW	7.6	4.7	G Off-Site Station, St. Paul St.
D2	D2	No	ESE	15.0	9.3	D2 Off-Site Station, Rt. 64
E	E	No	SSE	11.4	7.1	E Off-Site Station, Rt. 4
F	F	No	S	11.3	7.0	F Off-Site Station, Dutch Ridge Rd.
Direct Radiation (TLD)						
TL1	TL1	Yes	S	0.8	0.5	NMP3NPP Site Boundary (e)
TL2	TL2	Yes	SSW	0.6	0.4	NMP3NPP Site Boundary (e)
TL3	TL3	Yes	W	0.3	0.2	NMP3NPP Site Boundary (e)
TL4	TL4	Yes	WNW	0.3	0.2	NMP3NPP Site Boundary (e)
TL5	TL5	Yes	NW	0.3	0.2	NMP3NPP Site Boundary (e)
TL6	TL6	Yes	NNW	0.5	0.3	NMP3NPP Site Boundary (e)
TL7	TL7	Yes	N	0.6	0.4	NMP3NPP Site Boundary (e)
TL8	TL8	No	NNE	0.6	0.4	NMP3NPP Site Boundary (e)
TL9	TL9	Yes	NNE	0.5	0.3	NMP3NPP Site Boundary (e)
TL10	TL10	Yes	NE	0.5	0.3	NMP3NPP Site Boundary (e)
TL11	TL11	Yes	ENE	0.5	0.3	NMP3NPP Site Boundary (e)
TL12	TL12	No	E	0.8	0.5	Lake Road
TL13	TL13	No	ESE	0.6	0.4	Switchyard
TL14	TL14	No	SE	1.0	0.6	Dirt road
TL15	TL15	No	SSE	1.3	0.8	Met Tower
TL16	TL16	Yes	SSW	4.8	3.0	Creamery Road (g)
3	3	No	ENE	1.5	0.9	NMP 1,2 On-Site Station D1
4	4	No	E	1.3	0.8	NMP 1,2 On-Site Station D2
5	5	No	E	1.1	0.7	NMP 1,2 On-Site Station E
8	8	No	NE	27.2	16.9	R-5 Off-Site Station
9	9	No	E	18.7	11.6	State Route 3
10	10	No	ESE	15.0	9.3	NMP 1,2 Off-Site Station D2
11	11	No	SSE	11.4	7.1	NMP 1,2 Off-Site Station E
12	12	No	S	11.3	7.0	NMP 1,2 Off-Site Station F
13	13	No	SW	7.6	4.7	NMP 1,2 Off-Site Station G
14	14	Yes	SW	19.5	12.1	Southwest Oswego – Control (g)
15	15	Yes	WSW	0.8	0.5	NMP 1,2 West Site Boundary (e)
18	18	No	NNE	0.6	0.4	Energy Information Center
19	19	No	ENE	3.1	1.9	NMP 1,2 East Site Boundary
23	23	No	ENE	2.4	1.5	H On-Site Station
24	24	No	ENE	2.1	1.3	NMP 1,2 On-Site Station I
25	25	No	E	2.1	1.3	NMP 1,2 On-Site Station J

Table 6.2-6—{Operational NMP3NPP Radiological Environmental Monitoring Program Locations}

(Page 2 of 3)

Sample Type/No. [a], [b]	Map Code	Required Minimum REMP [c]	NMP3NPP Sector [d]	NMP3NPP Distance [d]		Collection Site
				km	miles	
26	26	Yes	E	1.5	0.9	NMP 1,2 On-Site Station K (e)
31	31	No	NNE	1.0	0.6	North Fence NMP-1
39	39	No	NE	1.0	0.6	NorthFence NMP-1
49	49	Yes	SSE	31.4	19.5	Phoenix, NY – Control (g)
51	51	No	SW	10.9	6.8	Oswego Steam Station, East
52	52	Yes	SW	8.7	5.4	Fitzhugh Park Elementary School, East (g)
53	53	No	S	22.9	14.2	Fulton High School
54	54	No	ESE	15.6	9.7	Mexico High School
55	55	No	ENE	21.7	13.5	Pulaski Gas Substation, Rt. 5
56	56	Yes	ESE	8.7	5.4	New Haven Elementary School (g)
58	58	Yes	SW	4.0	2.5	County Route 1A and Alcan (g)
78	78	No	ENE	2.6	1.6	East Boundary, JAFNPP
79	79	No	E	2.4	1.5	County Route 29
80	80	Yes	ESE	2.6	1.6	County Route 29 (e)
81	81	Yes	SE	2.6	1.6	Miner Road (e)
82	82	Yes	SSE	1.9	1.2	Miner Road (e)
83	83	No	S	1.1	0.7	Lakeview Road
84	84	Yes	SW	0.6	0.4	Lakeview Road (e)
88	88	Yes	E	7.7	4.8	Hickory Grove Road (f)
89	89	Yes	ESE	7.4	4.6	Leavitt Road (f)
90	90	Yes	SE	6.9	4.3	Route 104 and Keefe Road (f)
91	91	Yes	SSE	7.7	4.8	County Route 51A (f)
92	92	Yes	S	6.8	4.2	Maiden Lane Road (f)
93	93	Yes	SSW	6.4	4.0	County Route 53 (f)
94	94	Yes	SW	6.3	3.9	County Route 1 and Kocher Road (f)
95	95	Yes	WSW	5.2	3.2	Lakeshore Camp Site (f)
96	96	No	S	5.2	3.2	Creamery Road
97	97	Yes	SE	2.9	1.8	County Route 29 (g)
98	98	Yes	E	2.4	1.5	Lake Road (g)
99	99	No	E	3.7	2.3	Nine Mile Point Road
100	100	No	E	2.4	1.5	County Route 29 and Lake Road
101	101	No	ESE	2.6	1.6	County Route 29
102	102	No	S	18.7	11.6	Oswego County Airport
103	103	No	NNE	0.6	0.4	Energy Center, East
104	104	No	E	2.7	1.7	Parkhurst Road
105	105	No	S	1.5	0.9	Lakeview Road
106	106	No	NNE	0.8	0.5	Shoreline Cove, West of NMP-1
107	107	No	NNE	0.8	0.5	Shoreline Cove, West of NMP-1
108	108	No	E	2.6	1.6	Lake Road
109	109	No	E	2.6	1.6	Lake Road
111	111	No	SW	34.3	21.3	Sterline, NY – Control
112	112	No	S	18.7	11.6	EOF/Env. Lab, Oswego County Airport
113	113	No	S	39.3	24.4	Baldwinsville, NY - Control
Shoreline Sediment						
(NA)	SS1	Yes	ENE	3.2	2.0	Sunset Bay Shoreline
(NA)	SS2	No	SW	6.3	3.9	Langs Beach – Control
Surface Water						
(NA)	WS1	Yes	WSW	10.9	6.8	OSS Inlet Canal
(NA)	WS2	Yes	ENE	2.1	1.3	JAFNPP Inlet Canal
(NA)	WS3	No	NNE	1.3	0.8	NMP Unit 1 Inlet
(NA)	WS4	No	WSW	11.6	7.2	Oswego City Water

Table 6.2-6—{Operational NMP3NPP Radiological Environmental Monitoring Program Locations}

(Page 3 of 3)

Sample Type/No. (a), (b)	Map Code	Required Minimum REMP (c)	NMP3NPP Sector (d)	NMP3NPP Distance (d)		Collection Site
				km	miles	
(NA)	WS5	No	NE	1.4	0.9	NMP Unit 2 Inlet
WS6	WS6	No	NW	0.8	0.5	NMP3NPP Inlet
Fish						
(NA)	FH1	Yes	NNE	1.1	0.7	NMP Transect
(NA)	FH2	Yes	ENE	2.4	1.5	Fitzpatrick Transect
(NA)	FH3	Yes	WSW	8.8	5.5	Oswego Transect - Control
Milk						
(NA)	M76	(h)	ESE	10.8	6.7	Milk Location #76
(NA)	M55	(h)	E	14.6	9.1	Milk Location #55
(NA)	M4	(h)	ESE	12.9	8.0	Milk Location #4
(NA)	M77	Yes	S	24.5	15.2	Milk Location (Summerville)
Food Product						
(NA)	FP6	(h)	ESE	3.2	2.0	Produce Location #6 (Bergenstock)
(NA)	FP1	(h)	ENE	3.4	2.1	Produce Location #1 (Culeton)
(NA)	FP2	(h)	E	4.0	2.5	Produce Location #2 (Vitullo)
(NA)	FP5	(h)	E	3.1	1.9	Produce Location #5 (C.S. Parkhurst)
(NA)	FP3	(h)	ENE	3.2	2.0	Produce Location #3 (C. Narewski)
(NA)	FP4	(h)	E	3.9	2.4	Produce Location #4 (P. Parkhurst)
(NA)	FP7	(h)	SW	23.3	14.5	Produce Location #7 (McMillen)
(NA)	FP8	(h)	SW	19.5	12.1	Produce Location #8 (Denman)
(NA)	FP9	(h)	SE	2.4	1.5	Produce Location #9 (O'Connor)
(NA)	FP10	(h)	ESE	4.0	2.5	Produce Location #10 (C. Lawton)
(NA)	FP11	(h)	ESE	3.5	2.2	Produce Location #11 (C.R. Parkhurst)
(NA)	FP12	(h)	E	3.7	2.3	Produce Location #12 (Barton)
(NA)	FP13	(h)	SW	24.3	15.1	Produce Location #13 (Flack)
(NA)	FP14	(h)	E	3.7	2.3	Produce Location #14 (Koeneke)
(NA)	FP15	(h)	ESE	3.1	1.9	Produce Location #15 (Whaley)
(NA)	FP16	(h)	SSW	1.0	0.6	Produce Location #16 (Murray)
(NA)	FP17	(h)	ENE	3.5	2.2	Produce Location #17 (Battles)
(NA)	FP18	(h)	ENE	3.1	1.9	Produce Location #18 (Kronenbitter)

Notes:

a. The same requirements as indicated for the operational program also apply to the NMP3NPP pre-operational period for 2 years prior to plant first criticality.

b. Key:AP#Airborne sampling station specific to NMP3NPP
TL# Direct Radiation, TLD station specific to NMP3NPP
WS# Surface Water sampling station specific to NMP3NPP
WG# Groundwater sampling station specific to NMP3NPP
(All other sampling stations are NMPNS Unit 1 and Unit 2 stations used by the NMP3NPP program. See Table 6.2-4. "NA" indicates no sample location number is assigned in the Units 1 & 2 ODCMs.)

c. Minimum NMP3NPP program requirements indicated as "Yes" refer to the requirements of Table 6.2-5. Other locations indicated as "No" are also included in the NMP3NPP REMP as non-required locations.

d. Sectors and distances are based on the NMP3NPP vent stack.

e. TLD placements per Table 6.2-5 for "inner ring" near to the site boundary.

f. TLD placements per Table 6.2-5 for "outer ring".

g. TLD placements per Table 6.2-5 for special interest locations and controls.

h. Milk and Food Product samples need not necessarily be collected from all listed locations. Samples will be collected in accordance with the results of the annual land use census and the requirements of Table 6.2-5.

Table 6.2-7—{Reporting Levels for Radioactivity Concentrations in Environmental Samples}

Analysis[a]	Water (pCi/L)	Airborne Air Particulate and Gases (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/L)	Food Products (pCi/kg, wet)
H-3 [b]	2×10^4				
Mn-54	1×10^3		3×10^4		
Fe-59	4×10^2		1×10^4		
Co-58	1×10^3		3×10^4		
Co-60	3×10^2		1×10^4		
Zn-65	3×10^2		2×10^4		
Zr-Nb-95	4×10^2				
I-131	2[c]	0.9		3	1×10^2
Cs-134	30	10	1×10^3	60	1×10^3
Cs-137	50	20	2×10^3	70	2×10^3
Ba-La-140	2×10^2			3×10^2	

Notes:

(a) These limits are for samples that have only one radionuclide detected. When a sample contains more than one radionuclide, the total level of radioactivity is limited to:

$$\frac{\text{Concentration (1)}}{\text{Reporting Level (1)}} + \frac{\text{Concentration (2)}}{\text{Reporting Level (2)}} + \ldots\ldots \leq 1.0$$

(b) For drinking water samples. This is a 40 CFR 141 value. If no drinking water pathway exists, a value of 3×10^4 pCi/L may be used.

(c) If no drinking water pathway exists, a value of 20 pCi/L may be used.

Table 6.2-8—{Lower Limits of Detection (LLD) for Environmental Media}

Exposure Pathway or Sample Type	Parameter	Units	LLD Requirement
Direct Radiation	Gamma Dose	mR	[a]
Radioiodine Canister	I-131	pCi/m^3	0.07
Air Particulate Filter	Gross Beta Activity	pCi/m^3	0.01
	Cs-134	pCi/m^3	0.05
	Cs-137	pCi/m^3	0.06
Waterborne Activity: Surface Water Ground Water Drinking Water	Gross Beta Activity	pCi/L	4
	H-3	pCi/L	2000 [b]
	Mn-54	pCi/L	15
	Fe-59	pCi/L	30
	Co-58	pCi/L	15
	Co-60	pCi/L	15
	Zn-65	pCi/L	30
	Zr-95/Nb-95	pCi/L	15
	I-131	pCi/L	1 [c]
	Cs-134	pCi/L	15
	Cs-137	pCi/L	18
	Ba-140/La-140	pCi/L	15
Waterborne Activity: Shoreline Sediment	Cs-134	pCi/kg, dry	150
	Cs-137	pCi/kg, dry	180
Ingestible Activity: Fish	Mn-54	pCi/kg, wet	130
	Fe-59	pCi/kg, wet	260
	Co-58	pCi/kg, wet	130
	Co-60	pCi/kg, wet	130
	Zn-65	pCi/kg, wet	260
	Cs-134	pCi/kg, wet	130
	Cs-137	pCi/kg, wet	150
Ingestible Activity: Milk	I-131	pCi/L	1
	Cs-134	pCi/L	15
	Cs-137	pCi/L	18
	Ba-140/La-140	pCi/L	15
Ingestible Activity: Food Products	I-131	pCi/kg, wet	60
	Cs-134	pCi/kg, wet	60
	Cs-137	pCi/kg, wet	80

Notes:

(a) LLD for TLDs used for environmental measurements shall be in accordance with the recommendations of Regulatory Guide 4.13**.**

(b) If no drinking water pathway exists, a value of 3000 pCi/L may be used.

(c) If no drinking water pathway exists, a value of 15 pCi/L may be used.

Table 6.2-9—{Typical Sample Sizes for Environmental Media}

Media	Approximate Weight/Volume[a]
Air Particulate	100 m^3 (3,531 ft^3)
Aquatic (Special)	2 kg (4.4 lb)
Aquatic Vegetation	2 kg (4.4 lb)
Benthic Organisms	2 kg (4.4 lb)
Biological Organisms	2 kg (4.4 lb)
Cattle Feed	1 - 2 kg (2.2-4.4 lb)
Charcoal Filter	100 m^3 (3,531 ft^3)
Fish	2 kg (4.4 lb)
Food Crop	0.5 – 1 kg (1.1-2.2 lb)
Fresh Water	1 quart (0.95 liters) [b]
Green Leafy Vegetation	0.5 – 1 kg (1.1-2.2 lb)
Ground Water	1 gallon (3.8 liters) [b]
Mixed Vegetation	0.5 – 1 kg (1.1-2.2 lb)
Sediment	Cores as Required [c]

Notes:

(a) The sample sizes in this table should only be used as representative of approximate sizes needed. These may vary significantly depending on the LLD of the radionuclides being measured.

(b) One gallon (3.8 liters) is needed for gamma spectrometry/tritium analysis ONLY. An additional gallon (3.8 liters) is required for a gross beta analysis.

(c) Six core sections having a minimum depth of 6 in (15.2 cm) by means of a 2 in (5.1 cm) ID coring device.

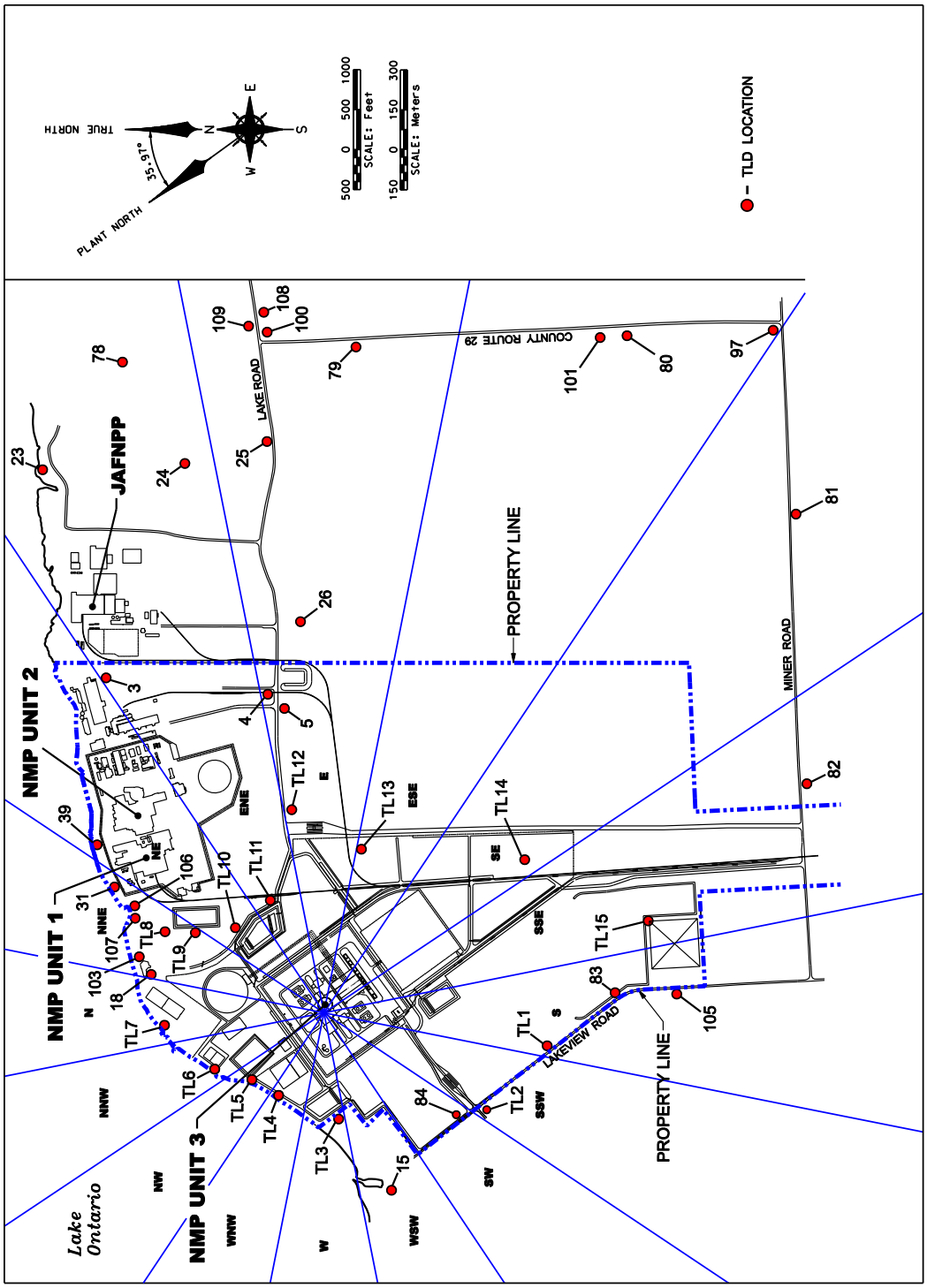


Figure 6.2-1—{Existing On-Site and Near Site NMPNS (Unit 1 and Unit 2) Radiological Monitoring Locations}

Figure 6.2-2—{Existing Off-Site NMPNS (Unit 1 and Unit 2) Radiological Monitoring Locations Within 8 Miles (13km) of Plant}

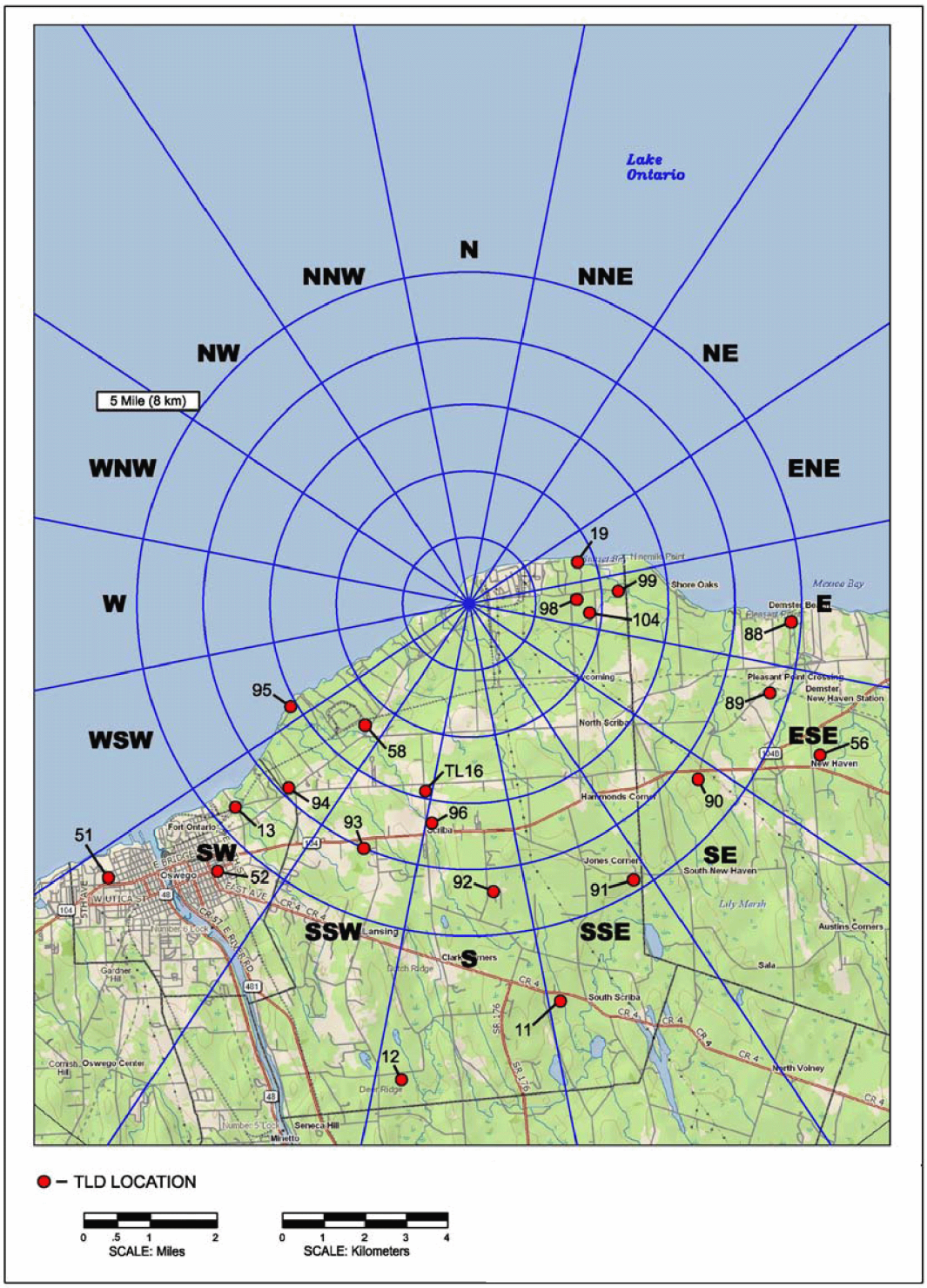
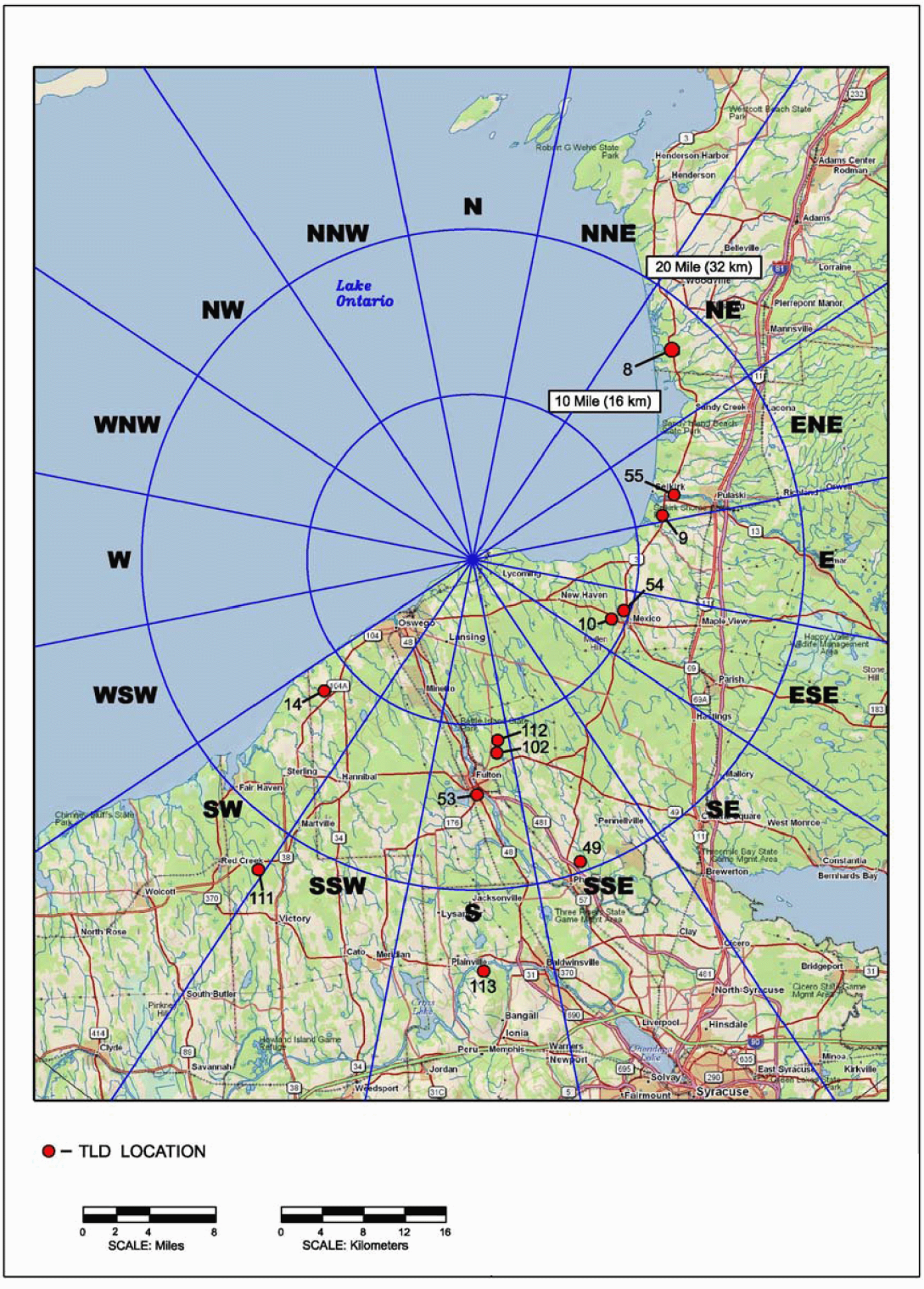


Figure 6.2-3—{Existing Off-Site NMPNS (Unit 1 and Unit 2) Radiological Monitoring Locations Beyond 8 Miles (13km) of Plant}



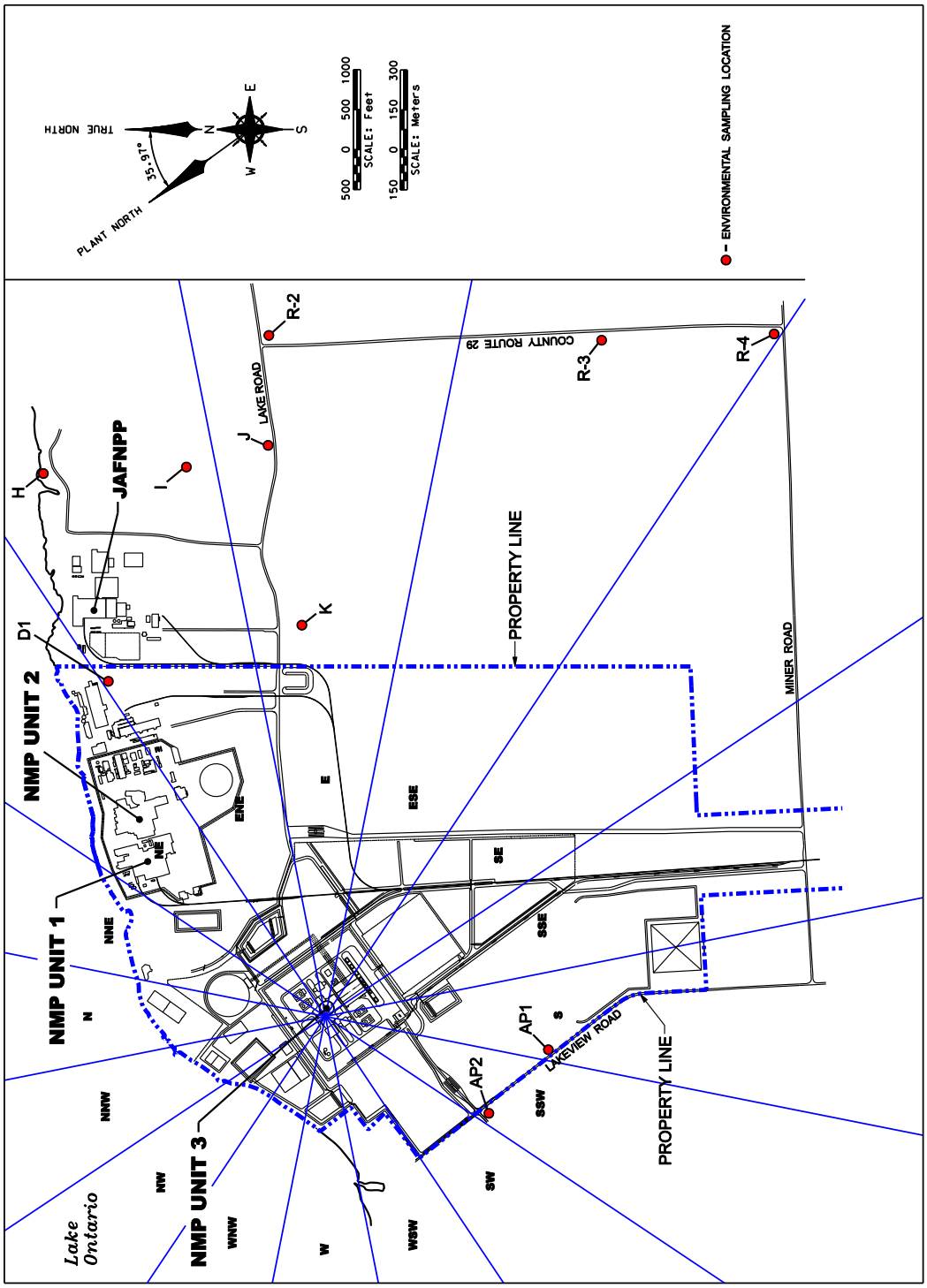


Figure 6.2-4—{Existing On-Site and Near-Site NMPNS (Unit 1 and Unit 2) Environmental Sampling Locations}

Figure 6.2-5—{Existing Off-Site NMPNS (Unit 1 and Unit 2) Environmental Sampling Locations Within 8 Miles (13 km) from Plant}

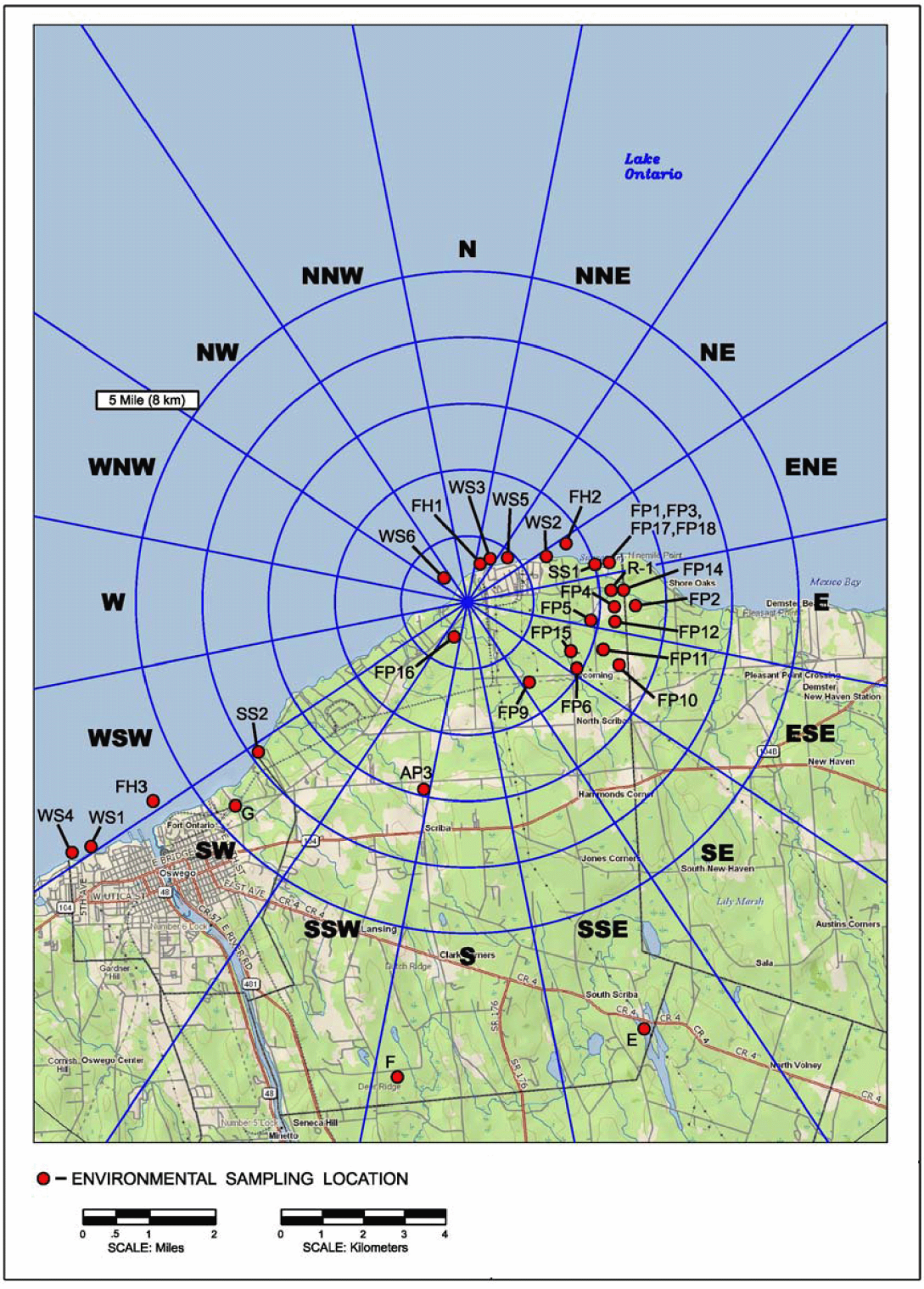


Figure 6.2-6—{Existing Off-Site NMPNS (Unit 1 and Unit 2) Environmental Sampling Locations Beyond 5 Miles (8km) from Plant}

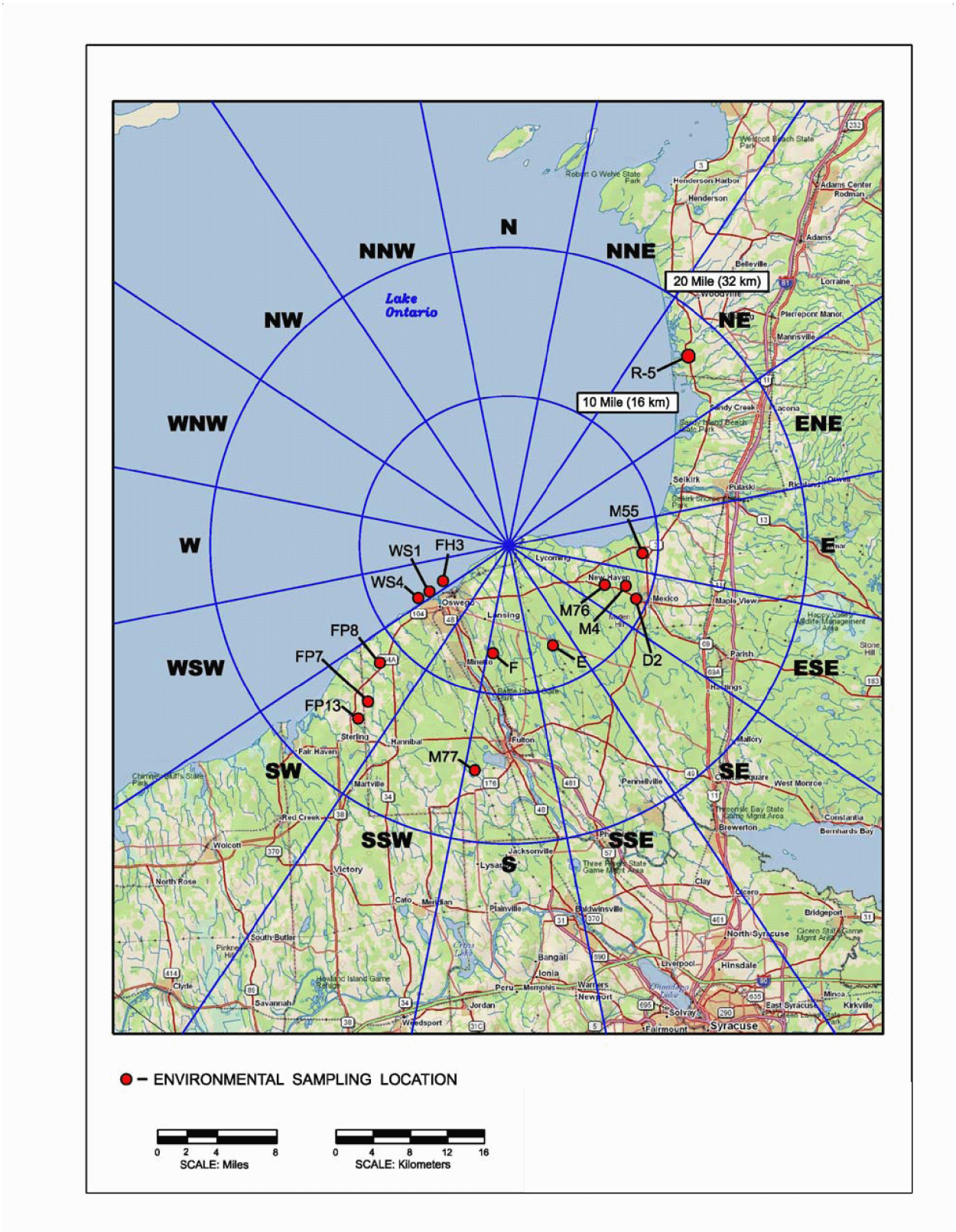
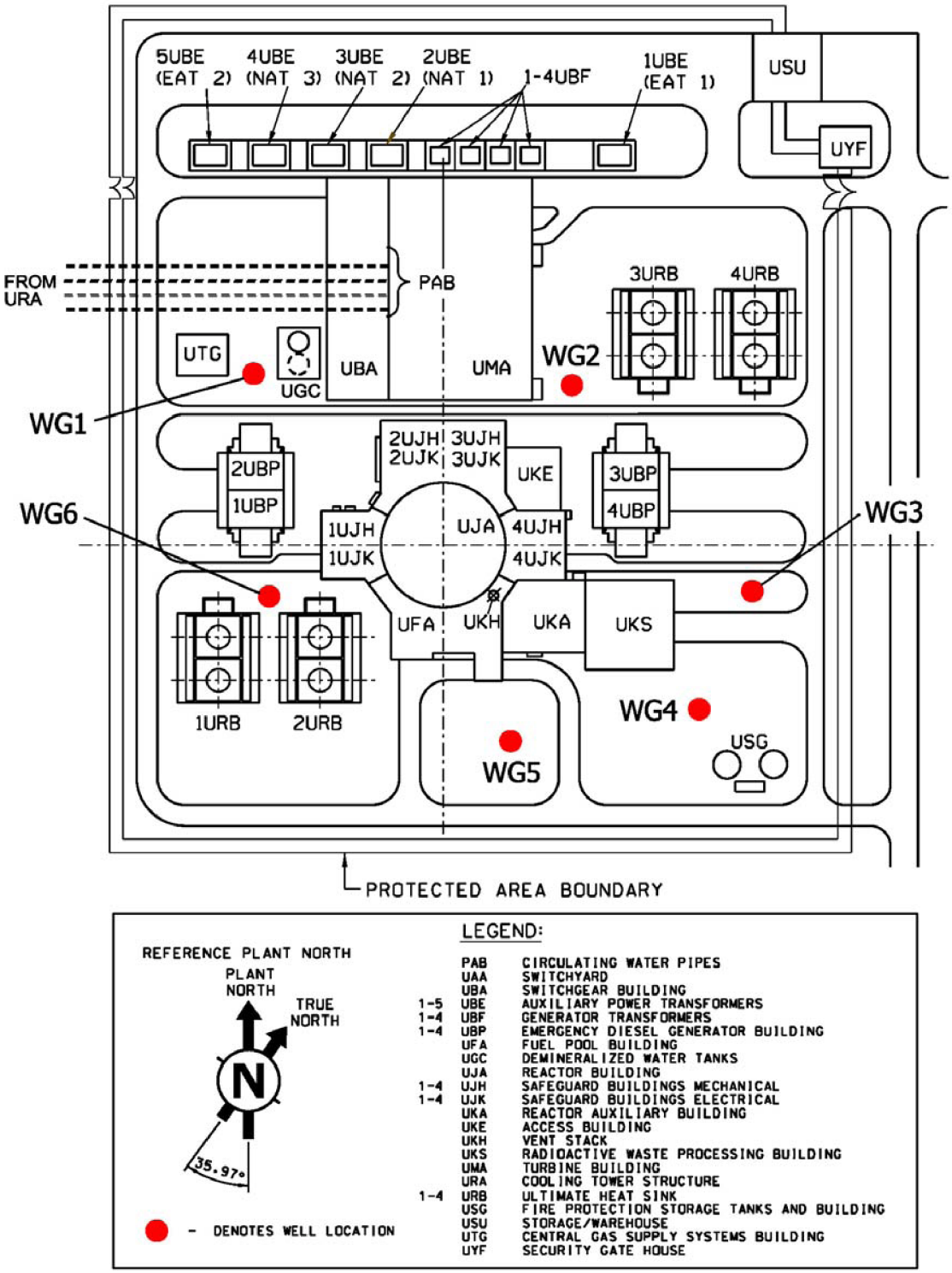


Figure 6.2-7—{NMP3NPP Ground Water Sampling Locations within the Protected Area}



6.3 HYDROLOGICAL MONITORING

{This section describes the hydrological monitoring program that will be implemented to monitor the effects of the NMP3NPP site. Elements of the hydrological program relating to thermal, radiological, and chemical monitoring are described separately in Section 6.1, Section 6.2, and Section 6.6, respectively.

This section includes the pre-application monitoring program that discusses the existing hydrological monitoring program at NMP Unit 1 and Unit 2 as well as the Unit 3 site and the programs to monitor NMP3NPP during the construction/pre-operational and operational phases.

Section 2.3.1 describes the vicinity watershed and stream flow data collected by the U.S. Geological Survey. Groundwater velocities, flow rates and sediment transport characteristics and shore erosion are discussed in Section 2.3.1. Section 2.3.2 describes surface and groundwater uses. Features of the NMP3NPP site, including boundaries and bathymetry of all surface water bodies adjacent to the site are provided in Section 2.3.1. The location of groundwater monitoring wells are provided in Figure 2.3-40 (for the construction site), Figure 2.3-13 (for other existing wells on-site), and Figure 2.3-18 (for regional monitoring wells). The existing thermal and biological monitoring stations are discussed in Section 6.1 and Section 6.6 for surface water. No thermal or biological monitoring stations exist for groundwater and none are planned. Figures showing major geomorphic features and regional geology are shown in Section 2.3.1 and Section 2.6.}

6.3.1 PRE-APPLICATION MONITORING

{Hydrological monitoring at the existing NMP site includes both surface water and groundwater. Both monitoring programs comply with and are controlled by regulatory permit requirements and conditions described below.

6.3.1.1 Surface Water

NMP Unit 1 and Unit 2 conduct hydrological monitoring of surface water in accordance with the State Pollutant Discharge Elimination System (SPDES) program (NYSDEC,2003a). Flows from storm water and plant-associated activities such as equipment blowdown and various system effluents are measured at different monitoring locations. Table 6.3-1 lists the monitoring locations and the permit flow requirements. Refer to Section 6.6 for a description of the monitoring locations as well as the SPDES monitoring program data analysis and quality control procedures.

In addition, water withdrawn from Lake Ontario that is used for plant system cooling is monitored as part of the Great Lakes Water Withdrawal Registration Program. Flow is monitored at the NMP Unit 1 and Unit 2 Intake Structure and reported to NYSDEC annually.

6.3.1.2 Groundwater

NMP Unit 1 and Unit 2 do not use groundwater in any of the water systems and there are no production wells on site. The Unit 1 Reactor Building has a peripheral drain for collecting any groundwater seepage which is then pumped to the Lake as discussed in Section 2.3.1. The Unit 2 Reactor Building area is actively dewatered as discussed in Section 2.3.1.

Thirty-eight groundwater observation wells were installed across the site as discussed in Section 2.3.1. The wells were located in order to provide adequate distribution with which to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well pairs were installed at selected locations to determine vertical gradients. Field

hydraulic conductivity tests (slug tests) were conducted in each observation well. Monthly water level measurements from the groundwater observations wells began in October 2007 and continued to March 2008.

To evaluate vertical hydraulic gradients, several observation wells were installed as well couplets. Well couplets are a pair of wells installed at the same location, with both wells monitoring a distinct water bearing interval. Six well couplets were installed to evaluate the hydraulic gradient between the Oswego Sandstone unit and the Pulaski Formation unit, and six well couplets were installed to evaluate the gradient between the Oswego Sandstone unit and Whetstone Gulf Formation unit.

Monthly water levels in the observation wells were measured to characterize seasonal trends in groundwater levels and flow directions for the NMP3NPP site. Results are discussed and shown in Section 2.3.1. Additional information on bathymetric characteristics of surface water, soil and groundwater characteristics, and transient hydrological parameters in the site vicinity are discussed in Section 2.3.1. Section 3.4 discusses the cooling system employed and its operational modes. Section 3.6 discusses the type of sanitary and chemical waste retention method. Section 2.7 discusses the meteorological parameters in the vicinity of the site.

Based on the results of groundwater elevation gauging, it was determined that no active dewatering system will be required for plant operations.}

6.3.2 CONSTRUCTION AND PRE-OPERATIONAL MONITORING

{Hydrological monitoring during NMP3NPP construction will include both surface water and groundwater. Both monitoring programs will comply with regulatory permit requirements and conditions described below. The objective of each program will be to establish a baseline for evaluating potential hydrologic changes, monitor anticipated impacts from site preparation and construction, and detect unexpected impacts.

6.3.2.1 Surface Water

Surface water on-site will be monitored as part of the NPDES Construction General Permit as described in Section 1.3. Conditions of the permit will include compliance with erosion/sediment control and storm water management plans, which will be detailed in a required Storm Water Pollution Prevention Plan (SWPPP). The SWPPP also requires inspections as well as monitoring and record keeping.

In addition, Lake Ontario surface water will be monitored during construction of both the NMP3NPP intake and discharge structures. Monitoring will be part of the U.S. Corps of Engineers 401 permit as described in Section 1.3 to ensure compliance with applicable water quality (e.g., turbidity) and sediment transport requirements.

6.3.2.2 Groundwater

Groundwater monitoring during NMP3NPP construction will include, as needed, data from groundwater observation wells installed across the NMP3NPP site as part of COL pre-application studies described in Section 2.3.1.2. The purpose will be to monitor the potential effects of dewatering on perched water levels.

Some of the existing NMP3NPP site area observation wells may be taken out of service prior to construction activities due to earth moving and construction requirements. Prior to construction activities, the observation well monitoring network will be evaluated in order to determine groundwater data gaps and needs created by the abandonment of existing wells. These data needs will be met by the installation of additional observation wells, if required.

Additionally, the hydrologic properties of the groundwater flow regimes of the shallow water bearing units (Surficial aquifer and Oswego Sandstone unit) will be impacted by the proposed earthmoving, regrading, and construction of infrastructure (buildings, parking lots, etc.). Revisions to the observation well network will be implemented to ensure that the resulting changes in the local groundwater regime from construction activities will be identified.

Disturbances to existing drainage systems will be avoided, if possible. Environmental controls (i.e., silt screens, dams, settling basins, and spill containment measures), will be implemented to reduce potential pollutants in storm water runoff and to minimize construction impacts to aquatic habitats. Prior to the start of construction, approval of storm water management and erosion/sediment control plans will be obtained in accordance with the NPDES Construction General Permit as described in Section 1.3. These controls will be incorporated into a Storm Water Pollution Prevention Plan (SWPPP). Similar to the existing SWPPP, storm water system manholes and handholds will continue to be periodically inspected and cleaned.}

6.3.3 OPERATIONAL MONITORING

{Hydrological monitoring during NMP3NPP operation will be designed, as needed, to monitor the potential impacts from plant operation as well as detect unanticipated operational impacts.

During NMP3NPP operation, plant water supply will be from the Lake Ontario at a new intake structure located approximately 2,800 feet of the NMP Unit 1 intake structure and 3,900 feet of the Unit 2 intake structure. The principle potable (fresh water) source will be from the Town of Scriba. The Town of Scriba receives water from the City of Oswego Water Treatment Plant, which treats water drawn from Lake Ontario (OWD, 2008). Consequently, NMP3NPP operation will not require use of groundwater. Operation of the new Intake Structure, however, will require monitoring and reporting as part of the Great Lakes Water Withdrawal Registration program as described in Section 1.3. In addition, discharge of effluents to Lake Ontario from NMP3NPP operation will require monitoring as discussed in Section 6.6.

The NMP3NPP Wastewater Treatment Plant (WWTP) will collect sewage and waste water generated from the portions of the plant outside of the radiological control areas of the power block and will treat them using an extensive mechanical, chemical, and biological treatment processes. The treated effluent will be combined with other plant effluents in the wastewater retention basin and discharged to Lake Ontario. The discharge will be in accordance with local and state safety codes. The dewatered sludge will be hauled off-site for disposal at municipal facilities. The treated wastewater will meet all applicable health standards, regulations and TMDLs set by the NYSDEC and the U.S. EPA. Table 3.6-4 lists anticipated liquid and solid effluents associated with the sewage treatment plant. Parameters are expected to include flow rates, pollutant concentrations, and the biological oxygen concentrations at the point of release.

Non-radioactive liquid effluents that could potentially drain to Lake Ontario are limited under the SPDES permit. An anticipated list of permitted outfalls is included in Table 3.6-6. Other non-radioactive liquid waste effluents from sources including laboratory chemicals and decontamination fluids are listed in Table 3.6-7. Table 3.6-1 provides information on the various chemicals anticipated to be used for the various plant water systems. All of these chemical additives will have limiting discharge concentrations specified in the SPDES permit that will require monitoring.

Chemical monitoring will be performed at the new outfall to assess the effectiveness of retention methods and effluent treatment systems, as well as to detect changes in water quality associated with plant operations. Similar to NMP Unit 1 and Unit 2, chemical monitoring will also be performed at storm water runoff outfalls and at internal monitoring points (i.e.,

sanitary waste effluents, wastewater retention basin influent and/or effluent). Effluent water chemistry will meet applicable Federal and State environmental regulatory requirements.

Finally, NRC regulations do not explicitly require routine, on-site groundwater monitoring during plant operation. However, a recent nuclear industry initiative by the Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI) and NRC assessment (NRC, 2006) of existing nuclear reactors indicates that regulations relating to groundwater monitoring during plant operation for present and future nuclear reactors may change. }

6.3.4 REFERENCES

{**NYSDEC, 2003a.** New York State Department of Environmental Conservation, Division of Environmental Permits, Region 7, State Pollutant Discharge Elimination System (SPDES) Permit No. NY-000 1015, July 21, 2003.

OWD, 2008a. City of Oswego official web site, Oswego Water Department, http://www.oswegony.org/DEPT_water.html. Date accessed on: June 11, 2008.

NRC, 2006a. Liquid Radioactive Release Lessons Learned Task Force, Nuclear Regulatory Commission, Final Report, September 1, 2006.}

Table 6.3-1—{NMP Unit 1 and Unit 2 NPDES Hydrological Monitoring Program}

Monitoring Station	Description	Parameter	Frequency	Sample Type
Outfall 001	Storm Drainage-Unit #2 and wastewater from internal Outfalls 001A, Outfall 007, & 040B	Flow	Monthly	Calculated
Outfall 001A	Decay Heat Cooling Tower Blowdown-Unit #2	Flow	1/Week	Measured
Outfall 002	Storm Drainage-Unit#2	Flow	Monthly	Calculated
Outfall 007 (A-G)	Floor and Equipment Drains- Unit #1 & Unit #2	Flow	Monthly	Estimated
Outfall 008	Screen Well Fish Diversion System-Unit #2	Note a		
Outfall 010	Condenser Cooling Water Unit #1 and wastewater from internal Outfall 011 & 010A	Flow	Continuous	Calculated
Outfall 011	Wastewater-Unit #1(Including Demineralization, Resin, Reverse Osmosis, Electro-Deionization, Filtration, Treated Rad. Wastewater)	Flow	Batch	Calculated
Outfall 010A	Unit #1 Forebay Cleaning Basins	Flow	2 / month During Discharge	Calculated
Outfall 020	Storm Drainage, Perimeter Drains, Condensation Water-Unit #1 and wastewater from internal Outfalls 010A, and 024	Flow	Monthly	Calculated
Outfall 021	Filter Backwash & Makeup Demineralizer Water Supply-Unit #1	Flow	Batch	Calculated
Outfall 023	Unit #1 Oil Spill Retention Basin	Flow	Each Discharge	Estimate
Outfall 024	Unit #1 Diesel Off Loading Pad Drainage	Flow	Each Discharge	Estimate
Outfall 025	Unit #2 Cooling Tower Emergency Overflow	Flow	Annual	Estimate
Outfall 026	Unit #2 Demineralized Test Water, City Water, Circulating Water and Service Water	Flow	Monthly	Estimate
Outfall 030	Sanitary waste water and wastewater from internal Outfall 026	Flow	2 / Month	Estimate
Outfall 040 h	Cooling Tower Blowdown and Service Water-Unit #2 and wastewater from internal Outfalls 001A, 026, 040A, and 041.)	Flow	Continuous	Calculated
Outfall 040A	Circulating Water Pumps Area Sumps-Unit #2	Flow	Monthly	Calculated
Outfall 040B	Unit #2 Forebay Cleaning Basins	Flow	2 / Month During Discharge	Calculated
Outfall 041	Wastewater-Unit #2 (Including Demineralization, Resin, Reverse Osmosis, Electrodeioniation, Filtration, Treated Rad. Wastewater	Flow	Monthly	Calculated

Note:

(a) No flow requirement

6.4 METEOROLOGICAL MONITORING

{This section describes the meteorological monitoring program that will be implemented for NMP3NPP. It includes the pre-application meteorological monitoring program, the pre-operational meteorological monitoring program, and the operational monitoring program.

The pre-application meteorological monitoring program is the existing meteorological monitoring program for Nine Mile Point (NMP) Unit 1 and Unit 2.

The pre-operational meteorological monitoring program and the operational monitoring program will be similar and will utilize a new meteorological tower. The pre-operational meteorological monitoring program will begin prior to major plant construction of NMP3NPP and will ensure an operational meteorological tower is in place to support NMP Unit 1 and Unit 2 and the J.A FitzPatrick plant. The pre-operational meteorological monitoring program will begin shortly after the new tower is built and all the equipment have been installed and tested. The pre-operational meteorological monitoring program will obtain data from both the existing program for NMP Unit 1 and Unit 2 and also from the new meteorological tower. Collection of data from the NMP Unit 1 and Unit 2 program will be terminated after appropriate data has been obtained to establish a baseline for data from the new tower. The pre-operational program will continue with the new tower in operation until plant startup.

NMP on-site meteorological data were used as described below for the pre-application monitoring program. The other source of meteorological data used was from the U.S. National Weather Service (NWS). This data is certified by the National Climatic Data Center (NCDC, 2007). As such a description of the data collection program is not included. No other sources of data were used for the pre-application program.

The meteorological conditions of the NMP site and the surrounding area are taken into account by using on-site (NMP) and off-site (NWS) data sources. NMP Unit 1 began commercial operations in 1969 and Unit 2 in 1988. Therefore, the on-site meteorological program provides an extensive data base for pre-application monitoring.}

6.4.1 PRE-APPLICATION METEOROLOGICAL MEASUREMENT PROGRAM

{The pre-application meteorological monitoring program for NMP3NPP is the operational program for NMP Unit 1 and Unit 2. This program was designed in accordance with the guidance provided in Regulatory Guide 1.23 (Safety Guide 23) (NRC, 1972) and complies with the requirements of Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007).

6.4.1.1 Tower Location

The existing primary meteorological tower at NMP is located approximately 1.0 km (0.6 mi) west-southwest of NMP Unit 2 near the shore of Lake Ontario. The NMP site is a generally flat, featureless plain located on the south shore of the lake. The site area land elevation ranges from 79 m (260 ft) above mean sea level (AMSL) at the station area to 94 m (310 ft) AMSL at the southern boundary, about one mile from the tower. The terrain rises gradually from the site, reaching an elevation of 305 m (1,000 ft) AMSL approximately 30 km (19 mi) east of the site. A terrain elevation of 610 m (2,000 ft) is reached at a distance of approximately 80 km (50 mi) east of the site.

This tower is located in terrain characteristic of the area and based approximately the same elevation as finished plant grade of NMP Unit 1 and Unit 2 . The area around the tower is level, clear of underbrush, and covered with bluestone. Figure 6.4-1 shows the location of the existing on-site meteorological tower as well as the topography of the NMP site. The meteorological tower has been sited for NMP according to the guidance provided in Safety

Guide 23 (NRC, 1972). Figure 6.4-2 shows the general topographic features within 5 miles (8 km) of the NMP site.

Supplemental inland measurements are obtained from instrumentation at the Oswego County Airport near Fulton New York. This inland 9 m (30 ft) meteorological tower is located with good exposure in all directions and is situated away from all runways and buildings at the Oswego County Airport. Backup wind direction and speed instrumentation is located east of the J. A. FitzPatrick plant on a 27-m (90-ft) utility pole.

6.4.1.2 Tower Design

The existing primary meteorological tower is steel open-lattice construction reaching a height of 61 m (200 ft) and is instrumented at three levels: 9 m (30 ft), 30 m (100 ft) and 61 m (200 ft). Digital data processing is accomplished by a remote data acquisition system (RDAS) computer. The RDAS computer is located in an environmentally-controlled instrument cabinet at the meteorological tower. Processed data is then transmitted via modem to a central processing system (CPS) computer for access and storage. The CPS computer is housed in an environmentally-controlled meteorological computer building located at the north end of the NMP Unit 1 parking lot. Strip chart recorders display and record analog data. One set of strip chart recorders is located at the meteorological computer building. The control room at NMP Unit 1, NMP Unit 2, and the adjacent J. A. FitzPatrick plant have strip chart recorders for certain key parameters. In addition, the Technical Support Center has strip chart recorders for the 61-m (200-ft) and either the 9-m (30-ft) or 30-m (100-ft) wind direction and speed.

Wind direction, speed and sigma theta data from the backup J. A. FitzPatrick tower are displayed in both digital and analog form in the NMP2 Unit 2 control room. This data may be used as backup.

6.4.1.3 Instrumentation

The existing primary tower is instrumented with wind direction and speed sensors at three levels: 9 m (30 ft), 30 m (100 ft) and 61m (200 ft). Sigma theta is derived for each of the three wind levels. In addition, ambient temperature is measured at the 9-m (30-ft) level and temperature differences are determined between the 61-m (200-ft) and 9-m (30-ft) levels. Dew point temperature is obtained at the 9-m (30-ft) level. Near the base of the tower, precipitation and barometric pressure are also measured.Wind sensors consist of the Teledyne Geotech or Met One Instruments three-cup anemometer and vane. The ambient temperature and temperature difference systems consist of Teledyne Geotech or Met One Instruments platinum resistance temperature devices in aspirated housings. The dew point temperature is measured by a General Eastern chilled mirror system. Solid and liquid forms of precipitation are measured by a Belfort Instrument Company tipping bucket rain gauge with a heater for subfreezing operations. A Yellow Spring Instrument Company aneroid barometer measures station atmospheric pressure. Table 6.4-1 presents the existing primary meteorological tower instrument types and specifications and compares them with regulatory requirements from Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007). Table 6.4-2 presents the same data for the backup meteorological tower. Instrument specification data were obtained from the Nine Mile Point Unit 2 Updated Safety Analysis Report, Revision 10 dated November 1998 (NMP, 1998). The RDAS computer samples each sensor's analog processor at a rate of once per second and processes the data into 1-, 15-, and 60-min averages. The averaged data is then transmitted via modem to the CPS computer for access and storage. As stated in Section 6.4.1.2 above, strip chart recorders record and display analog data and are located in the meteorological computer building, the control rooms at NMP Unit 1 and Unit 2, the J. A. FitzPatrick plant, and at the Technical Support Center.

6.4.1.4 Instrument Maintenance and Surveillance Schedules

The existing instrumentation calibration schedules are specified to comply with Regulatory Guide 1.23 recommendations. Equipment checks are performed at least weekly. Charts are changed as required. Component checks and adjustments are performed when required. All meters and other equipment used in calibration are, in turn, calibrated at scheduled intervals. Inspection and maintenance of all equipment is accomplished in accordance with procedures in the instrument manufacturer's manuals. Inspection is implemented by qualified technicians that are capable of performing the maintenance, if required. The results of the inspections and maintenance performed are recorded in a log book.

6.4.1.5 Data Reduction and Compilation

The existing RDAS computer samples each sensor's analog processor at a rate of once per second and processes the data into 1-, 15-, and 60-min averages. The averaged data is then transmitted via modem to the CPS computer for access and storage. All data are subject to quality control checks by a meteorologist prior to tabulation of routine summaries of wind direction, speed and atmospheric stability. Other analyses are performed as warranted for special projects, in addition to the routine submittal of data for scheduled reports.

The 15-minute averaged data are available for use in the determination of magnitude and continuous assessment of the impact of releases of radioactive materials to the environment during a radiological emergency (as required in 10 CFR 50.47) (CFR, 2008). The hourly averaged data are available for use in:

1. Determining radiological effluent release limits associated with normal operations can be met for any individual located off site.

2. Determining radiological dose consequences of postulated accidents meet prescribed dose limits at the Exclusion Area Boundary (EAB) and Low Population Zone (LPZ).

3. Evaluating personnel exposures in the control room during radiological and airborne hazardous material accident conditions.

4. Determining compliance with numerical guides for design objectives and limiting conditions for operation to meet the requirement that radioactive material in effluents released to unrestricted areas be kept as low as is reasonably achievable.

5. Determining compliance with dose limits for individual members of the public.

Annual summaries of meteorological data in the form of joint frequency distributions of wind speed and wind direction by atmospheric stability class are kept on-site and are available upon request. A summary of the on-site meteorological data is presented in Section 2.3.2. Wind roses (graphical depictions of joint frequency distribution tables) summarizing data are also presented in Section 2.3.2.

Section 2.7 of the Environmental Report indicates that the site meteorological data represent long-term conditions at the site by comparing site meteorological statistics with similar statistics from surrounding National Weather Service (NWS) stations (Rochester, Oswego, and Syracuse, NY). The comparison noted:

- Rochester and Oswego, NY, are located in the same climatic division as the NMP3NPP site. (A climate division represents a region within a state that is as climatically homogeneous as possible, as determined by the U.S. National Climatic Data Center.)

- The annual average wind speed at the 30 ft (9 m) level at NMP3NPP site (8.7 mph) falls between the 33 ft (10 m) annual average wind speed measured at Syracuse (8.4 mph) and Rochester (9.1 mph).

- The annual precipitation measured at the NMP3NPP site is within the range of the NWS sites.

The monthly mean temperatures measured at the NMP3NPP site tend to be slightly higher in the winter months and slightly lower in the summer months than the corresponding temperature values measured at Rochester, Syracuse, and Oswego due to the effect of Lake Ontario and the lack of an urban heat island effect at the NMP3NPP site.

6.4.1.6 Nearby Obstructions to Air Flow

Downwind distances from the existing primary meteorological tower to nearby (within 1/2 mile or 0.8 km) obstructions to air flow were determined using U.S. Geological Survey topographical maps. Within 0.5 mi (0.8 km) of the tower the land rises from 260 ft (79 m) to 300 ft' (91 m). Lake Ontario lies in the west-northwest to northeast sectors. For a considerable distance to the west, east and south of the site, the topography is characterized by gently rolling terrain. The terrain rises gradually from the shoreline of Lake Ontario until it meets the Tug Hill Plateau, over 25 mi (40 km) east of the site, and the Onondaga Hills, approximately 40 mi (65 km) south of the site. Table 6.4-3 presents the distances to nearby obstructions to air flow in each downwind sector and the height of the obstruction. From the information provided, it can be seen that there are no significant nearby obstructions to airflow.

6.4.1.7 Deviations to Guidance from Regulatory Guide 1.23

{The pre-application meteorological monitoring program for NMP utilizing the existing primary tower does not deviate from the guidance provided in Safety Guide 23 (NRC, 1972). Table 6.4-1 presents detailed information on hte meteorological tower instruments types and specifications and compares them with regulatory requirements from Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007). Table 6.4-2 presents detailed information on the backup meteorlogical tower instruments types and specifications and compares them with regulatory requirements from Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007).}

6.4.2 PRE-OPERATIONAL, AND OPERATIONAL METEOROLOGICAL MEASUREMENT PROGRAM

{The pre-operational and operational meteorological monitoring program will comply with the requirements of Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007). A new primary meteorological tower will be located on the NMP site approximately 1.2 km (0.74 mi) south of the NMP3NPP containment building centerline. This will ensure the requirements of Regulatory Guide 1.23, Revision 1, March 2007 (NRC, 2007) will be satisfied. The pre-operational meteorological monitoring program and the operational monitoring program will be similar and will both require a new meteorological tower. The pre-operational meteorological monitoring program will begin prior to major plant construction of NMP3NPP and will ensure an operational meteorological tower is in place to support NMP Unit 1 and Unit 2 and the J.A FitzPatrick plant. The pre-operational meteorological monitoring program will begin shortly after the new tower is built and all the equipment have been installed and tested. The pre-operational meteorological monitoring program will obtain data from the existing program for Nine Mile Point (NMP) Unit 1 and Unit 2 (described in Section 6.4.1) and the new meteorological program. Collection of data from the NMP Unit 1 and Unit 2 program described in Section 6.4.1 will be terminated after appropriate data has been obtained to establish baseline for data from the new tower. The pre-operational program will continue with the new tower in operation until plant startup.

6.4.2.1 Tower Location

{The location of the new meteorological tower will be on the NMP site approximately 1.2 km (0.74 mi) south of the NMP3NPP containment building centerline. Figure 6.4-1 shows the location of the new meteorological tower, the existing meteorological tower, NMP Unit 1, NMP Unit 2, JAFNPP ,and the proposed NMP3NPP buildings as well as the topography of the NMP site. Figure 6.4-2 shows the general topographic features within 5 miles (8 km) of the NMP3NPP site.

The new meteorological tower is located on level, open terrain at a distance at least 10 times the height of any nearby obstruction that exceeds one-half the height of the wind measurement; i.e., the tower is located far enough away from NMP3NPP Unit 3 structures, other Unit structures, and topographical features to avoid airflow modifications. The terrain height difference between the meteorological tower and the NMP3NPP Unit 3 reactor area is approximately 35 ft (12 m). The distance between the meteorological tower and the NMP3NPP Unit 3 reactor is approximately 1,286 m (4,219 ft) while the height of the reactor building is approximately 62 m (203 ft). The distance between the meteorological tower and the NMP Unit 2 cooling tower is approximately 1711 m (6,513 ft) while the height of the NMP Unit 2 cooling tower is approximately 165 m (541 ft). Therefore the height of the NMP Unit 2 cooling tower is primarily driving the location of the cooling tower.

6.4.2.2 Tower Design

The new meteorlogical tower design complies with Regulation Guide 1.23 Revision 1 (NRC, 2007).

6.4.2.3 Instrumentation

The instrumentation for the new meteorological tower complies with Regulatory Guide 1.23, Revision 1 (NRC, 2007).

6.4.2.4 Instrument Maintenance and Surveillance Schedules

The instrument maintenance and surveillance schedules for the new meteorological tower will fully comply with Regulatory Guide 1.23, Revision 1 (NRC, 2007).

6.4.2.5 Data Reduction and Compilation

Data Reduction and Compilation for the new meteorological tower complies with Regulatory Guide 1.23, Revision 1 (NRC, 2007).

6.4.2.6 Nearby Obstructions to Air Flow

Downwind distances from the new primary meteorological tower to nearby (within 1/2 mile or 0.8 km) obstructions to air flow were determined using U.S. Geological Survey topographical maps. Lake Ontario lies in the west-northwest to northeast sectors. For a considerable distance to the west, east and south of the site, the topography is characterized by gently rolling terrain. The terrain rises gradually from the shoreline of Lake Ontario until it meets the Tug Hill Plateau, over 25 mi (40 km) east of the site, and the Onondaga Hills, approximately 40 mi (65 km) south of the site. Table 6.4-3 presents the distances to nearby obstructions to air flow in each downwind sector and the height of the obstruction. Figure 6.4-1 shows the location of the new meteorological tower, the exising meteorological tower, NMP Unit 1, NMP Unit 2, J.A. FitPatrick ,and the proposed NMP3NPP buildings as well as the topography of the NMP site. Figure 6.4-2 shows the general topographic features within 5 miles (8 km) of the NMP3NPP site.

Table 6.4-4 presents the building heights and distances from major structures to the new meteorological tower. The two tallest EPR structures are the Reactor Building and the Turbine Building. The Turbine Building is also the closest major EPR building to the new meteorology tower. The NMP3NPP cooling water tower and the NMP Unit 2 cooling tower are also identified in the table.

All EPR buildings are greater than a factor of ten times their respective heights away from the new meteorological tower. Both the NMP3NPP cooling tower and the NMP Unit 2 cooling tower are greater than a factor of ten times their respective heights away from the new meteorological tower. From the information provided, it can be seen that there are no significant obstructions to airflow.

6.4.2.7 Deviations to Guidance from Regulatory Guide 1.23

The meteorological tower is not sited at approximately the same elevation as finished plant grade. This was done in order to assure that the meteorological tower is located on level, open terrain at a distance at least 10 times the height of any nearby obstruction that exceeds one-half the height of the wind measurement; i.e., the tower is located far enough away from NMP3NPP, NMP Unit 1 and 2 structures and topographical features to avoid airflow modifications. Further discussion is provided in Section 6.4.2.1.}

6.4.3 REFERENCES

{**NMP, 1998.** Nine Mile Point Unit 2 Updated Safety Analysis Report, Revision 10, November 1998.

NRC, 1972. On-site Meteorological Programs, Safety Guide 23 (Regulatory Guide 1.23 Revision 0), Nuclear Regulatory Commission, February 1972.

NRC, 2007. Meteorological Monitoring Programs for Nuclear Power Plants, Regulatory Guide 1.23, Revision 1, Nuclear Regulatory Commission, March 2007.}

Table 6.4-1—{Existing Primary Meteorological Tower Instrument Types, Specifications and Accuracies for Pre-Operational}

Characteristics	Requirements*	Specifications
Wind Speed Sensor		
Make		Teledyne Geotech/Met One Instruments
Model		Sensor - 50.1B Cups - 52.1 Processor - 40.12c, 21.11 & 21.110
Starting Threshold	< 1 mph (0.45 m/s)	0.27 m/s
Range		0 - 100 mph
Accuracy	±0.45 mph (±0.2 m/s) or 5% of observed wind speed	Analog - ±0.23 m/s[1] Digital - ±0.08 m/s
Wind Direction Sensor		
Make		Teledyne Geotech/Met One Instruments
Model		Sensor - 50.2C/50.2D Vane - 53.2 Processor - 21.21, 21.210 & 21.211
Starting Threshold	< 1 mph (0.45 m/s)	0.3 m/s
Range		0 - 360/540 degrees
Accuracy	±5 degrees	Analog - ±3.06 degrees Digital - ±2.09 degrees
Temperature Sensors		
Make		Teledyne Geotech/Met One Instruments
Model		Sensor - Platinum RTD Processor - 21.32 & 21.320 Aspirated Thermal Radiation Shield 327
Range		Ambient: -40°C to +43°C Temperature Difference: -4°C to +11°C
Accuracy (ambient)	±0.5°C (±0.9°F)	Analog - ±0.22°C Digital - ±0.08°C
Accuracy (vertical temperature difference)	±0.1°C (±0.18°F)	Analog - ±0.08°C Digital - ±0.07°C
Precipitation Sensor		
Make		Belfort Instrument Company
Model		Tipping Bucket
Accuracy	±10% for a volume equivalent to 2.54 mm (0.1 in.) of precipitation at a rate < 50 mm/h (< 2 in./h)	Analog - ±0.2910 mm Digital - ±0.2843 mm
Dew Point Sensor		
Make		General Eastern
Model		1200EPS or E1
Range		-40°C to +43°C
Accuracy	±1.5°C (±2.7°F)	Analog - ±0.30°C Digital - ±0.22°C
Barometric Pressure		
Make		Sensor - Yellow Springs Instrument Company Processor - Teledyne Geotech
Model		Sensor - 2014-28/32-HA-3WH Processor - 40.61 & 21.61
Range		948 to 1084 mb
Accuracy	None Specified	Analog - ±0.546 mb Digital - ±0.433 mb

Notes:

* Accuracy requirements from Regulatory Guide 1.23, Revision 1, March 2007.

1. The analog wind speed system does not meet the accuracy requirement of Regulatory Guide 1.23, Revision 1; however the digital system does meet the accuracy requirement.

Table 6.4-2—{Backup Meteorological Tower Instrument Types, Specifications and Accuracies for Pre-Operational and Operational Programs}

Characteristics	Requirements	Specifications
Wind Speed Sensor		
Make		Teledyne Geotech/Met One Instruments
Model		Sensor - 50.1B Cups - 52.1 Processor - 40.12c, 21.11 & 21.110
Starting Threshold	< 1 mph (0.45 m/s)	0.27 m/s
Range		0 - 100 mph
Accuracy	±0.45 mph (±0.2 m/s) or 5% of observed wind speed	Analog - ±0.23 m/s[1] Digital - ±0.08 m/s
Wind Direction Sensor		
Make		Teledyne Geotech/Met One Instruments
Model		Sensor - 50.2C/50.2D Vane - 53.2 Processor - 21.21, 21.210 & 21.211
Starting Threshold	< 1 mph (0.45 m/s)	0.3 m/s
Range		0 - 360/540 degrees
Accuracy	±5 degrees	Analog - ±3.06 degrees Digital - ±2.09 degrees

Notes:

* Accuracy requirements from Regulatory Guide 1.23, Revision 1, March 2007.

1 The analog wind speed system does not meet the accuracy requirement of Regulatory Guide 1.23, Revision 1; however, the digital system does meet the accuracy requirement.

Table 6.4-3—{Distances from the Existing Primary Met Tower to Nearby Obstructions to Air Flow}

Downwind Sector*	Approximate Distance Miles (Meters)	Obstruction Height [1] Feet (Meters)
N	0.3 (483)	270 (82)
NNE	0.4 (644)	270 (82)
NE	0.5 (805)	260 (79)
ENE	0.5 (805)	260 (79)
E	0.4 (644)	290 (88)
ESE	0.2 (322)	290 (88)
SE	0.2 (322)	300 (91)
SSE	0.3 (483)	270 (82)
S	0.2 (322)	270 (82)
SSW	0.3 (483)	270 (82)
SW	0.2 (322)	270 (82)
WSW	0.5 (805)	270 (82)
W	0.5 (805)	270 (82)
WNW	0.5 (805)	260 (79)
NW	0.5 (805)	260 (79)
NNW	0.5 (805)	260 (79)

Notes:

*With respect to True North
[1]Plant and tower grade are 260 feet (79 meters).

Table 6.4-4—{Distances from the New Meteorological Tower to Nearby Obstructions to Air Flow}

Downwind Sector*	Approximate Distance Miles (Meters)	Obstruction Height [1] Feet (Meters)
N	0.5 (805)	---
NNE	0.5 (805)	---
NE	0.5 (805)	310 (94)
ENE	0.5 (805)	313 (95)
E	0.5 (805)	314 (96)
ESE	0.5 (805)	315 (96)
SE	0.5 (805)	317 (97)
SSE	0.5 (805)	323 (98)
S	0.5 (805)	330 (101)
SSW	0.5 (805)	329 (100)
SW	0.5 (805)	321 (98)
WSW	0.5 (805)	307 (94)
W	0.5 (805)	---
WNW	0.5 (805)	---
NW	0.5 (805)	---
NNW	0.5 (805)	---

Notes:

* With respect to True North
1 New tower grade are 306 feet (93 meters)
-- indicates that all terrain lower than tower grade

Table 6.4-5—{Distances from Major Structures to the New Meteorological Tower}

Structure	Heights	Distances to New Meteorological Tower
EPR Reactor Building	62 m (203 ft) above grade	1286 m (4219 ft) (estimated)
EPR Turbine Building	55 m (180 ft) (estimated)	1091m (3581 ft) (estimated)
NMP3NPP Cooling Tower	54 m (177 ft)	1540 m (5052 ft)
NMP Unit 2 Cooling Tower	165 m (541 ft)	1711 m (5613 ft)

Figure 6.4-1—{Topography Within 1-Mile of the NMPNS Site}

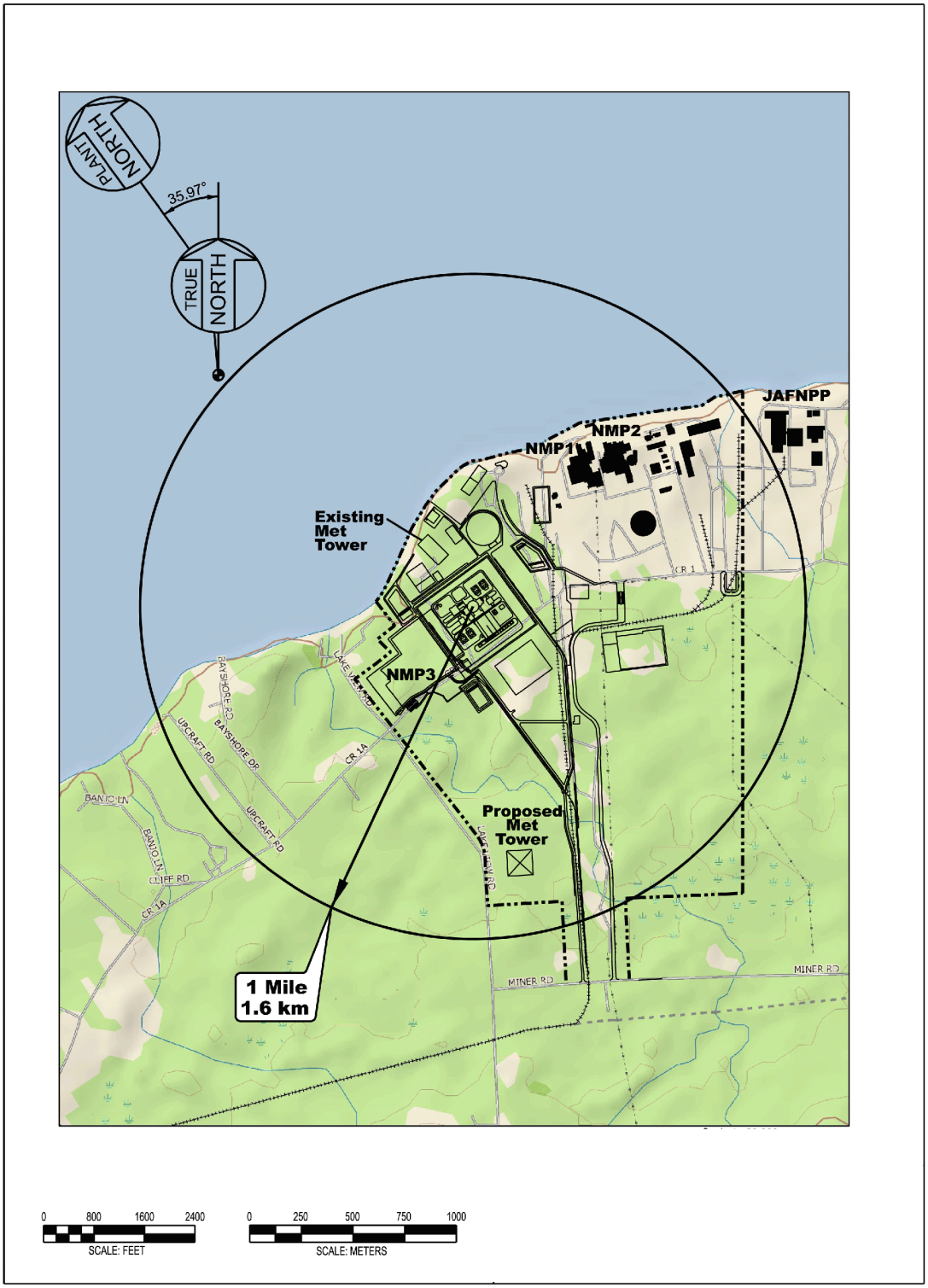
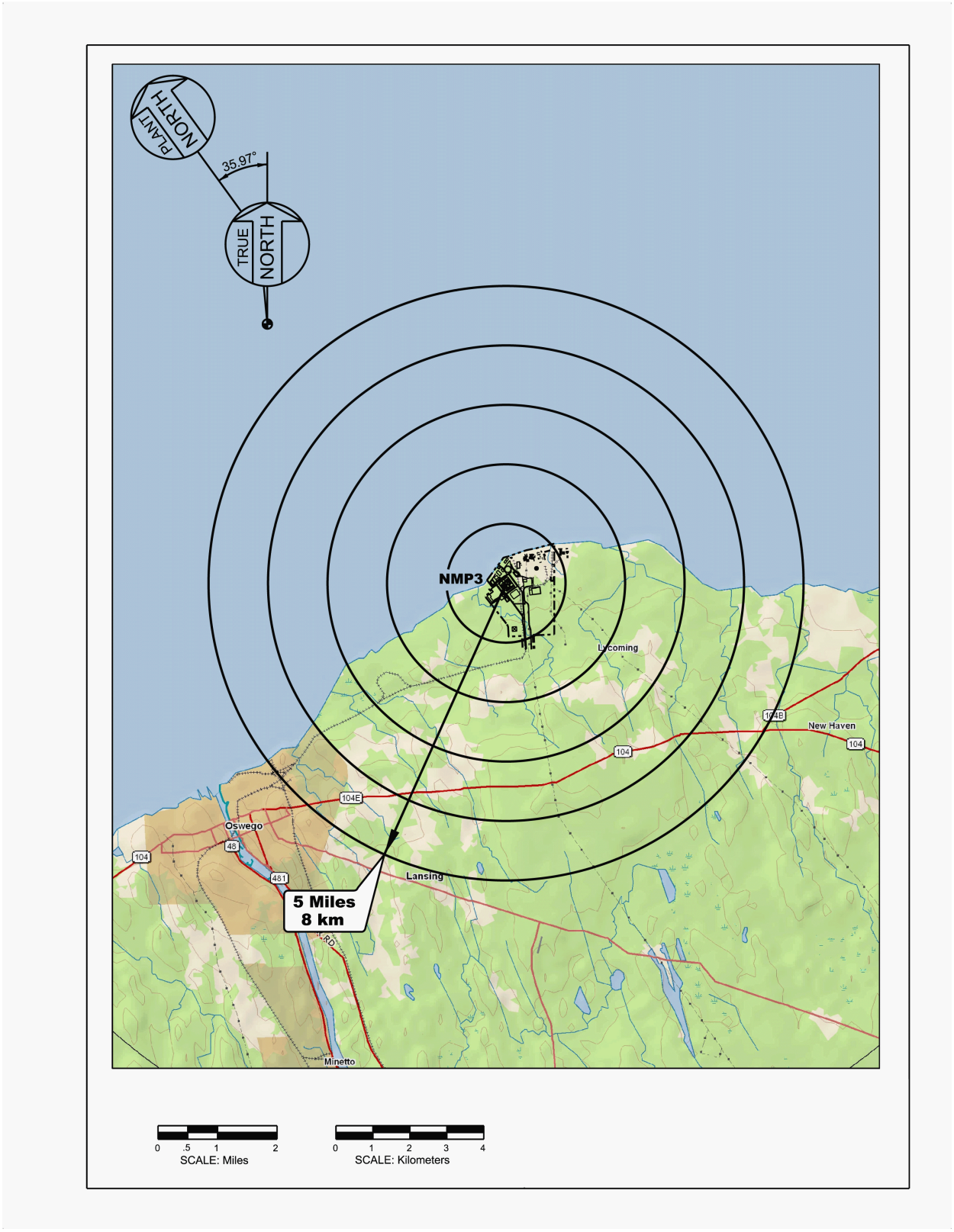


Figure 6.4-2—{Topography Within 5 mi of the NMPNS Site}



6.5 ECOLOGICAL MONITORING

{The following sections present information regarding ecological monitoring for terrestrial ecology, land use, and aquatic ecology of the NMP3NPP site areas likely to be affected by site preparation, construction, and operation and maintenance of NMP3NPP. The monitoring programs are designed based on anticipated environmental impacts through the various stages of NMP3NPP project implementation. This section complies with NRC Regulatory Guide Sections 4.7 and 4.11 regarding general site suitability studies and terrestrial environmental studies to allow reasonably certain predictions that there are no significant impacts to the terrestrial ecology associated with the construction or operation of NMP3NPP.

Monitoring programs to detect changes in the ecology begin before application submittal and continue during site preparation and construction and throughout station operation and maintenance. The monitoring programs cover elements of the ecosystem where a causal relationship between station construction and operation and adverse changes are established or strongly suspected. An evaluation of the standardization, adequacy and accuracy of data collection and analytical methods used in the monitoring programs is included.}

6.5.1 TERRESTRIAL ECOLOGY AND LAND USE

{The following sections present information on monitoring programs for terrestrial ecology and land use likely to be affected by site preparation, construction, or operation and maintenance of the facility. The monitoring programs are designed based on anticipated environmental impacts through the various stages of project implementation.

6.5.1.1 Pre-application Monitoring

Section 2.2.1 describes the site features and land use including a map showing these features. Section 2.2.2 describes the existing and proposed transmission line corridors and Section 2.4.1 describes the field studies performed to determine the major plant communities and important species and habitats. Note that the details of the type, frequency and duration of observations or samples taken at each location are contained in the individual reports for the field studies discussed in Section 2.4.1. The field studies and Section 2.4.1 discuss the distribution and abundance of important species and habitats. Critical life history information including parameters such as feeding areas, wintering areas and migration routes are also discussed in Section 2.4.1. Descriptions of modifications that may affect existing patterns of plant and animal communities including the development of cooling ponds and reservoirs, cooling towers, transmission line corridors and access routes is discussed in Section 4.3.1.

Wetland vegetation was identified and inventoried using the methods defined in the 1987 Corps of Engineers' Wetland Delineation Manual (USACE, 1987). Soils were examined using hand-held soil augers, and wetland data transects were conducted at appropriate locations along the wetland/upland boundary to verify vegetation, soil, and hydrology conditions at the wetland boundaries. Wetland/upland boundaries were flagged using pink flagging labeled alphanumerically. Photographs were taken periodically of the wetland boundary and the wetland interior.

Mitigation of unavoidable wetland impacts will be guided by the permit requirements of the U.S. Army Corps of Engineers according to the current regulations under Section 404 of the Federal Water Pollution Control Act. Section 1.3 contains a list of the permits required for this project as well as the applicable Federal and State regulations. Monitoring of mitigation success will be defined and executed with reference to these regulations. Wetlands likely to be affected by NMP3NPP site preparation and construction were evaluated to determine their functions and values by a methodology accepted by the U.S. Army Corps of Engineers (USACE) (USACE,

1995) as described above. Functions identified will be used as the basis of mitigating loss of wetlands during site development.

As an essential record of overall project area baseline conditions, field surveys and aerial photography of the proposed site and transmission line system were obtained prior to construction. The resulting map of vegetation types and moisture regime (uplands vs. wetlands) served as a guide to identify suitable habitats of Federal and State-listed species of plants and animals. Following the results of a listed-species field survey, access roads and staging areas within the proposed site were located so as to avoid such habitats to the extent possible. Management plans will be prepared that aim to enhance or at least perpetuate the habitat for target species. Repeated aerial photography every five years including some field observations to verify the information gathered from photo interpretation will serve as a record of forest regrowth in restored areas after completion of construction as proposed in Section 4.3.1.4. It would also provide evidence of any erosion around construction and other work areas, and indicate changes in vegetation that may call for corrective action (e.g., wind throws) or aid in the scheduling of routine transmission corridor right-of-way management.

Areas impacted by construction of NMP3NPP, including the transmission system rights-of-way are currently largely undeveloped. Forested areas will be impacted by construction activities. Periodic field observations will be performed following completion of construction to monitor re-growth of vegetation.

The New York Natural Heritage Program (NYNHP), operated by the New York Department of Environmental Services, was consulted for information on known occurrences of Federally-listed and State-listed threatened, endangered, or special status species and critical habitats (NYSDEC, 2008). Additionally, the USFWS NY Field Office's website (USFWS, 2008) was consulted for a listing of all species with federal status known to occur in Oswego County. Subsequent to the check of the website, contact was made with USFWS NYFO personnel, regarding the status of bog turtles in the vicinity of NMP. A survey to determine bog-turtle habitat suitability on-site was recommended. Additional consultations with USFWS will be required as part of the project's permitting phase, as well as the requirements of the Fish and Wildlife Coordination Act of 1958 and the Migratory Bird Treaty Act.

6.5.1.1.1 Wetlands

Wetland vegetation was identified and inventoried using the methods defined in the 1987 Corps of Engineers' Wetland Delineation Manual (USACE, 1987). Soils were examined using hand-held soil augers, and wetland data transects were conducted at appropriate locations along the wetland/upland boundary to verify vegetation, soil, and hydrology conditions at the wetland boundaries. Wetland/upland boundaries were flagged using pink flagging labeled alphanumerically. Photographs were taken periodically of the wetland boundary and the wetland interior.

6.5.1.1.2 Cover Type

For the vegetation survey, plots were established at widely spaced locations throughout the site to obtain representative data for the site and to determine approximate boundaries of the vegetation cover types. Most of the plots were located within upland areas, given that vegetative data for wetlands were available from the 2007 wetlands investigation conducted by ENSR. In addition to the plot surveys, common species were identified within the transmission line corridor located in the eastern portion of the study area.

6.5.1.1.3 Wildlife

An initial general survey of the site conducted to determine the habitat types present and assess their general suitability for rare, threatened or endangered species was followed by a general wildlife survey of the site. The second survey was focused on recording wildlife species present the habitats located within the proposed project footprint. A survey of the resident breeding birds conducted during the 2008 breeding season sampled the major habitat types present throughout the entire site. Additionally, all wildlife species seen or heard during the two flora surveys were noted. Standard point count methods were used to conduct the bird survey.

6.5.1.1.4 Rare Plants

No known occurrences of State or Federally listed threatened or endangered plant species were identified at the site following consultation with the agencies described above. (NYSDEC, 2008 and USFWS, 2008). Surveys for rare plants were performed at the NMP3NPP site during October 2007 and July 2008. Rare species information prepared as part of the License Renewal Application (NRC, 2006a) was used to narrow the search for list plant species primarily to three that are associated with wetlands similar to those on site: Angled Spikerush (Elocharis quadrangulata), Blurit Spikerush (E. obtusa var ovata), and Slender Bulrush (Soirpus heterochaetus, all State-listed as endangered. No State or Federally listed threatened or endangered species were observed during these surveys. Plant species considered to be exploitably vulnerable in the state due to over collection were observed at the NMP3NPP site 2007 and 2008 and are described in Section 6.5.1.2.

6.5.1.1.5 Bog Turtle Habitat Suitability

The NMP3NPP site is located within the "Prairie PenInsula/Lake Plain Recovery Unit"(PPLPRU) of the northern population of the Bog Turtle (HSFWS, 2001). In July 2008, a Phase I Bog Turtle field survey was conducted in accordance with protocols established by USFWS and the “Bog Turtle (Clemmys muhlenbergii) Northern Population Recovery Plan." The study assessed the suitability of on-site wetlands as habitat for the Bog Turtle and concluded that the physical features and vegetation of the on-site wetlands were not consistent with Bog Turtle habitat found in the PPLRU. Given the lack of appropriate habitat, further surveys for this species were not recommended.

6.5.1.1.6 Land Use

Land use pre-application monitoring was designed to assess the current land use practices and demographics in the vicinity of the project site. Accordingly, pre-application monitoring consisted of documenting vicinity and regional conditions by examining existing maps and reports. The NMP3NPP site land use is presented in Section 2.2.1 and graphically depicted in Figure 2.2-1. Land use/cover within the 6 mi (10 km) site vicinity is presented in Table 2.2-2 and shown on Figure 2.2-2. Highways and utility right-of-ways that cross the site and vicinity are shown on Figure 2.2-7 and Figure 2.1-3. Special land uses such as recreation within the site and vicinity are shown in Figure 2.2-4. There are no known mineral resources within the site or adjacent to its boundary.

6.5.1.2 Site Preparation, Construction and Pre-Operational Monitoring

A description of site preparation and construction impacts on terrestrial resources, including wetlands, is discussed in Section 4.3.1. Site preparation will eliminate all habitats within the project footprint and therefore the primary impact of the project on terrestrial ecology will effectively occur during this phase of construction. Mitigating wetlands lost to NMP site development will commence concurrently with project construction. Mitigating plans will be developed in consultation with the federal, state, and local resource agencies, as described in

Section 4.3.1. Remaining wetlands will be monitored during site preparation, construction and pre-operation to detect impacts and implement remedial measures if needed, in accordance with guidelines developed by the USACE and the State of New York and specified in required permits listed in Table 1.3-1. Additional monitoring requirements including program elements, actions and reporting levels will be specified in the NMP Stormwater Pollution Prevention Plan as noted in Section 2.3.3. This plan will be implemented as soon as site preparation commences in order to minimize impacts to wetlands, streams, and aquatic ecology.

Important species and habitat determined to be present on-site and discussed in Section 2.4.1 and Section 4.3.1 are as follows:

Important Habitats: The habitats on the NMP site that meet the criteria of important under NUREG-1555 (NRC, 1999) consist of forested wetlands, scrub-shrub wetlands, and emergent wetlands, all of which are protected under federal law, and some of which are protected under state regulations as well.

Animals: The following animal species meet the criteria of important under NUREG-1555 (NRC, 1999). White-tail deer (Odocoileus virginianus) are considered economically important, pied-billed grebe (Podilymbus podiceps) is listed as a State threatened species, osprey (Pandion haliaetus), golden-winged warbler (Vermivora chrysoptera), and grasshopper sparrow (Ammodramus savannarum) are listed as State species of special concern, and the northern leopard frog (Rana pipiens) and the pickerel frog (R. palustris) were chosen as ecological indicators.

Important Plant Species: The following plant species meet the criteria of important under NUREG-1555 (NRC, 1999). Green Ash (Fraxinus pennsylvanicum), Sugar Maple (Acer saccharum), American Beech (Fagus grandifolia), Silky Dogwood (Cornus amomum), and Poison Ivy (Toxicodendron radicans) were identified in Section 2.4.1 as important because they are key contributors to the overall structure and ecological function of forested plant communities on the NMP site. Sugar Maple is also considered economically important, and Sugar Maple and Amercian Beech may serve as biological indicators of ecosystem stability. Trillium (Trillium sp.), baneberry (Actaea sp.), ground cedar (Diphasiastrum sp.), and native fern species (including Cinnamon Fern (Osmunda cinnamomea), Interrupted Fern (Osmunda claytoniana), Royal Fern (Osmunda regalis), Christmas Fern (Polystichum acrostichoides), Lady Fern (Athyrium filix-femina), Woodfern (Dryopteris spinulosa complex), and Marsh Fern (Thelypteris palustris)) are considered important plant species because they are listed as exploitably vulnerable by the New York Natural Heritage Program. These species are protected by the State of New York due to concerns about over collection. Trillium, baneberry, and the aforementioned fern species may also be considered biological indicators of ecosystem stability.

The only important habitat present is wetlands, and impacts to wetlands will be minimized, mitigated and monitored as discussed above. The only important species on-site that may require monitoring during site preparation and construction is the osprey. If required by the NYDEC or the USFWS, osprey activity at the nest may be monitored during the nesting season to detect disturbance-related impacts, and develop remedial measures as needed. Alternatively, NYDEC or USFWS may request that all disturbances to the nest site from site preparation and construction could be restricted to the non-nesting season.

Land Use: As described in Section 4.1, impacts to land use during this phase of the project will result in Approximately 224.7 acres (91 hectares) being permanently dedicated to NMP3NPP and its supporting facilities, and lost to other uses until after decommissioning. However, the proposed action does not alter the site's general use, conforms to all applicable local, state, and

Federal land use requirements and restrictions, the stated goal of the Oswego County comprehensive plan to concentrate infrastructure and development in employment centers.

6.5.1.3 Operational Monitoring

Operation and maintenance impacts of the proposed transmission system are addressed in Section 5.6.1. There are no continuous monitoring programs required for terrestrial ecology in this phase of the project, as no significant on-going impacts to the local terrestrial ecosystems are anticipated during operations.

Repeated aerial photography backed by field observations every five years will serve as a record of forest re-growth discussed in Section 4.2.1.5. This type of monitoring would also provide evidence of any erosion around future construction and other work areas, and indicate changes in vegetation that may call for corrective action or aid in the scheduling of routine transmission corridor right-of-way management.

In accordance with the baseline studies performed during the pre-application time frame and existing plant experience at the NMP site, no additional monitoring programs are proposed for:

- Bird collisions with plant structures, transmission lines and towers, and cooling towers;
- Salt deposition impacts on vegetation growth and habitat modifications; and
- Impacts to important species and habitats.

These parameters have all been determined to have a small impact on terrestrial ecology as discussed in Section 4.1, Section 4.3.1, and Section 5.3.3.2. Note that there is a commitment to place flashing lights or reduce lighting on the large cooling tower to minimize bird collisions once this structure is built.

As described in Section 5.6.1, there are no continuous monitoring programs required for land use in this phase of the project, as no significant on-going impacts to the local land use practices are anticipated during operations.}

6.5.2 AQUATIC ECOLOGY

{The following sections present information regarding ecological monitoring for aquatic ecology likely to be affected by site preparation, construction, or operation and maintenance of the facility. The monitoring programs are designed based on anticipated environmental impacts through the various stages of project implementation.

Section 2.3.3 documents the pre-existing water quality characteristics of the freshwater bodies in the vicinity of the plant and Lake Ontario. The principle aquatic ecological features of the NMP3NPP site and vicinity are described in Section 2.4.2, including freshwater systems on the NMP3NPP site and the intake and discharge areas of the lake. Impacts to aquatic systems from construction of the facilities are described in Section 4.3.2. Impacts to aquatic systems from operation of the cooling system are described in Section 5.3.1.2 and Section 5.3.2.2. Impacts from waste discharges are described in Section 5.5.

6.5.2.1 Pre-application Monitoring

Pre-application monitoring has been conducted, consisting of impingement and entrainment sampling at NMP Unit 1 and Unit 2 and JAFNPP as recent as 2007, and data collected and reported in Section 2.4.2. The data provides a sufficient basis for describing the ecological

resources existing on and in the vicinity of the NMP site. Sampling locations, sampling methods and quality control is discussed in these reports and in Section 2.4.2.

No rare or unique aquatic species have been identified in nearby freshwater systems. The most common aquatic macroinvertes include amphipod Crangonyx sp. and isopod Caecidotea sp. Table 2.4-2 lists the fish species identified in on-site water bodies during June 2008. The most commonly found fish species included central mudminnow (Umbra limi) and western grass pickerel (Esox americanus vermiculatus), which were captured in most sampling water bodies. White sucker (Catostomus commersoniii) were the most numerous species captured. Table 2.4-6 provides a list of important species and habitat found in Lake Ontario. Figure 2.4-1 is a map showing Lakeview Creek and on-site water bodies in the NMP3NPP vicinity that are likely to be affected.

One important species identified in Lakeview Creek was rainbow trout (Oncorhynchus mykiss). This species is important due to its value as a sport fishery in Lake Ontario and its tributaries. The presence of young of the year and yearling fish in Lakeview Creek suggest it has value as a spawning and nursery stream for wild rainbow trout . These fish are considered intolerant of degraded habitat conditions in the northeast (Barbour, 1999) and might be affected by any construction practices affecting the creek. Rainbow trout are stocked by the New York State Department of Environmental Conservation (NYSDEC) and while there is some natural reproduction in New York's Lake Ontario tributaries it is unlikely that Lakeview Creek is a major contributor to the population.

Several important species may be present in the vicinity of NMP3NPP in the near shore waters of Lake Ontario periodically. These species listed as important due to their value as commercial or recreational fisheries, from their protected status, or value to the Lake ecosystem. None of these species are found exclusively in the vicinity of NMP3NPP and are generally distributed in larger ranges throughout Lake Ontario.

Critical life history information including parameters such as spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration routes are discussed in Section 2.4.2. Descriptions of modifications that may affect existing patterns of plant and animal communities such as dams, impoundments, dredging, filling of wetlands, and clearing of stream banks are discussed in Section 4.3.2.

There are no continuous monitoring programs required for aquatic ecology in this phase of the project beyond those in effect for NMP Unit 1 and Unit 2. The surveys performed to establish baseline conditions follow the guidelines published by the U.S. Department of Environmental Protection as referenced in the aquatic field study report (Barbour, 1999).

6.5.2.2 Construction and Pre-Operational Monitoring

Construction and preoperational monitoring programs are proposed for resources that may affect aquatic ecology, including thermal monitoring (as discussed in Section 6.1), hydrological monitoring (as discussed in Section 6.3) and chemical monitoring (as discussed in Section 6.6). No aquatic ecology monitoring for NMP3NPP site preparation and plant construction are proposed. For Lake Ontario, the current aquatic ecology monitoring for NMP Unit 1 and Unit 2 will continue. Preoperational monitoring mainly consists of water quality monitoring of discharges from dewatering operations, which are pumped to a stormwater discharge point. Approval of stormwater management and erosion/sediment control plans will be obtained in accordance with the State Pollution Discharge Elimination System (SPDES) permit. The New York State Department of Environmental Conservation will issue a new permit to include pollutants typically found at a construction site such as turbidity and petroleum hydrocarbons.

Stormwater discharges from impervious surfaces at the new facility will be controlled and minimized by provisions of the Storm Water Pollution Prevention Plan. This plan calls for periodic monitoring and record keeping of the engineered controls to ensure they are effective in minimizing runoff volume and contaminants and evaluating the need to repair or replace the installed stormwater controls such as silt fences, hay bales, berms and settling ponds. The U.S. Army Corps of Engineers 404 Permit may contain requirements for aquatic monitoring as it relates to chemical spills or control of sediments discharging into water bodies. Implementation of the Spill Prevention, Control and Countermeasures Plan requires periodic monitoring and record keeping ensuring spill controls are established and maintained to minimize impacts to the aquatic environment.

Details as to monitoring program elements, sampling procedures and equipment, data analysis, quality control and reporting will be contained in the various permits and approvals required for construction.

NMP3NPP will be designed to meet the Phase I, New Facility requirements published at 40 CFR 125.80 to 89, under Track I (CFR, 2007a). The cited EPA requirements meet the Clean Water Act 316(b) (CFR, 2007a, USC, 2002) rules to verify there will be minimal increases in fish and benthic community impingement and entrainment for the new intake structure .

6.5.2.3 Operational Monitoring

Operational aquatic ecology monitoring will be required as a condition of a new SPDES permit (CFR, 2007d) and for compliance with the Clean Water Act 316(b) (USC, 2002). The permit will require flow and temperature monitoring and monitoring of certain chemical constituents in the discharge.

Data has been collected for over 30 years in support of NMP Unit 1 and Unit 2, and the most recent SPDES permit requires impingement and entrainment studies to be conducted at Unit 1. The most recent data available for impingement and entrainment at the NMP facility is from 1997. An impingement and entrainment study was conducted in 2006 and 2007 although the report has not been finalized. Data collected in 2006 and 2007 from the JAF, located adjacent to NMP, are also available. In addition, several organizations conduct surveys on the aquatic ecology of Lake Ontario as part of ongoing lake-wide monitoring. This monitoring is described in Section 2.4.2. None of these Lake Ontario monitoring programs collect data in the vicinity of the plant and therefore are not applicable for baseline data or to augment monitoring data related to the plant intake and discharge effects.

The Clean Water Act Section 316(b) (EPA, 2007) requires that the location, design, construction and capacity of a cooling water intake structure reflect the best technology available (BTA) (CFR, 2007d) for minimizing adverse environmental impacts. The Phase II Rule, 40 CFR 125, addresses existing sources of cooling water intake at steam electric plants. A Proposal for Information Collection (PIC) for NMP Unit 1 and Unit 2] was created in accordance with 40 CFR Section 125.95(b)(1) of the Phase II Rule (CFR, 2007e). The PIC was prepared before the start of information collection activities and identifies a plan to address the information requirements of the Comprehensive Demonstration Study (CDS), 40 CFR 125.95(a)(2) (CFR, 2007e) to ensure that the CDS will meet the requirements of the Phase II Rule.

A separate SPDES application will be prepared for NMP3NPP. The SPDES permitting process will involve participation and consultation from appropriate Federal and state regulatory agencies. The NMP3NPP cooling water intake structure is designed to meet the Clean Water Act Section 316(b) Phase I requirements for new facilities under Track 1 (closed cycle cooling and intake screen velocity less than or equal to 0.5 fps (0.15 mps)). NMP Unit 1 withdraws more than 50 million gallons per day (maximum 431.2 million gallons per day) from Lake Ontario, thus

subjecting it to the Phase II Rule. The performance standards for NMP Unit 1 call for a minimum reduction of 80% for impingement mortality, and a minimum reduction of 60% for entrainment. These reductions are calculated from a theoretical baseline cooling water intake with no operational or design features for fish conservation. However, a recent court decision has remanded much of the Phase II rule back to EPA for reconsideration. Until this issue can be resolved, the EPA has requested permit writers to use "Best Professional Judgment" in writing NPDES permits. It is expected that the remanded Phase II rule will influence the Best Professional Judgment of the permit writers. Unit 2 uses a closed-cycle cooling system with a natural draft cooling tower and is therefore already in compliance with the Phase II rule. NMP Unit 1 and Unit 2 are currently operating under NYSDEC Pollution Discharge Elimination System (SPDES) Discharge Permit no. 7-3556-00013, with a permit expiration date of 1 December 2009. A new SPDES permit will be required for NMP3NPP.

Impingement and impingement mortality rates have been monitored at NMP Unit 1 since 1972. Results through 2006 indicate that cooling water is withdrawn from an aquatic community consisting of both cold and warm water fish. Alewife has been the dominant species in over three decades of impingement sampling, excluding the years 1979, 1982, and 1989 when rainbow smelt was dominant and in 1978 and 1997 when threespine stickleback was dominant. Data from 1997, the most recent available data at NMP, shows that three spine sticklebacks were the most dominant species impinged, comprising 91.6% of all fish. All together, threespine stickleback, alewife, and rainbow smelt made up 99% of the impingement totals in 1997. The most recent data available, collected in 2004 from the JAFNPP adjacent to NMP, shows that in 2004 the majority of fish impinged were also threespine stickleback and alewife (NYDEC, 2008).

Historically, the greatest impingement rates occur during the spring (April, May, and June) coinciding with inshore movements of spawning alewife and rainbow smelt. However in, 1997 at NMP and in 2004 at JAF, high rates of threespine stickleback impingement, decreased abundance of alewife and rainbow smelt, and plant outages from March to June changed this trend. Increases in impingement rates of some species increased during these months and threespine stickleback became a more important part of the impingement community (NYDEC, 2008).

Important species as listed in Section 2.4.2 that were captured during impingement sampling at NMP in 1997 include: brown trout, lake trout, smallmouth bass, white perch, and yellow perch. No federal or state protected species were captured in 1997 at NMP or in 2004 at JAF (NYDEC, 2008).

Entrainment data were most recently collected in 1997 at NMP and 2006-2007 at JAF (NYDEC, 2008). At NMP, Alewife was the dominant species collected, accounting for 96% of all organisms collected. The next most abundant species collected were tessellated darter (2.1%) and threespine stickleback (1.2%). Entrainment studies were also conducted during 2007 although the resulting report has not been finalized. At JAFNPP, alewife (65%), round goby (12%), and common carp (11%) were the most common fish entrained.

Circulating water for NMP Unit 1 is obtained through a single hexagonal intake with a velocity cap located approximately 850 ft offshore. Unit 2 at NMP is a closed cycle cooling system using a natural draft cooling tower. However, it was originally designed as a once through cooling system and has two offshore intakes located approximately 1325 ft and 1390 ft offshore.

While the addition of NMP3NPP would increase water withdrawal, discharge rates, and thermal loading to Lake Ontario, the operation of the additional new unit would not increase withdrawal and discharge rates substantially over existing conditions. The planned new intake

and discharge locations are located in the vicinity of the existing intake and discharge structures. Therefore, no additional monitoring programs are recommended in addition to the information required by the SPDES permit and 40 CFR 125.80 to 40 CFR 125.89 (CFR, 2007a). These would include at a minimum:

- Source water physical and cooling water intake structure data and source water baseline characterization (40 CFR 122.21(r)) (CFR, 2007b)
- Flow reduction, velocity, and source waterbody flow information (40 CFR 125.86) (CFR, 2007a)
- Design and construction technology plan (40 CFR 125.85) (CFR, 2007a).

It is possible that the NMP3NPP SPDES permit would require impingement and entrainment monitoring. Impingement samples would be collected to monitor impingement rates (simple enumeration) for each species over a 24 hour period and no less than once per month when the cooling water intake structure is in operation (CFR, 2007c). Entrainment samples would be collected to monitor entrainment rates (simple enumeration) for each species over a 24 hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified during the Source Water Baseline Biological Characterization required by 40 CFR 122.21(r)(3) (CFR, 2007b). Samples would be collected only when the cooling water intake structure is in operation.

The SPDES permit is required for the entire duration of plant operation. The permit is required to be renewed every five years with provisions for updating monitoring programs and parameters, as necessary. The SPDES permit builds upon the methodology and informational outputs of the previous monitoring programs and studies.

As noted in Section 5.5.1.2, the discharges to surface waters from plant operations will include cooling water blow down, permitted wastewater from auxiliary systems, and stormwater runoff. Concentrations of chemicals in the cooling water discharge will be controlled by the SPDES permit. Additional sanitary wastes from NMP3NPP operations will be accommodated at a new sewage treatment plant, with effluent discharge also controlled by a SPDES permit. Note that the additional cooling water discharges from the new unit are expected to be minor compared to the existing once-through cooling water discharges for NMP Unit 1. Additional intake water requirements will also be minor compared to the existing intake flow.

Stormwater discharges from impervious surfaces at the new facility will be controlled and minimized by provisions of the Storm Water Pollution Prevention Plan and the Spill Prevention, Control and Countermeasures Plan. A Stormwater Pollution Prevention Plan is required to be implemented at an industrial site under NYSDEC regulations. The plan is submitted with an application for a general stormwater permit. The plan provides detailed descriptions of various best management practices that can be implemented on site to reduce stream channel erosion, pollution, siltation and sedimentation and local flooding. A Spill Prevention, Control and Countermeasures Plan is required by US EPA regulation 40 CFR 112 (EPA, 2007). The plan describes measures to prevent, contain and clean up oil, gasoline, and chemical spills. The plans are certified by a Professional Engineer and kept on site available for inspection by the US EPA or NYSDEC.

Lake Ontario water will be used for makeup to plant cooling. Flow is monitored monthly and reported semi-annually. NMP3NPP operation will not require use of groundwater. Discharge effluents from NMP3NPP are monitored under the SPDES permit.

A recent nuclear industry initiative by the Nuclear Energy Institute and NRC assessment (NRC, 2006) of existing nuclear reactors indicates that requirements related to groundwater monitoring during plant operation may change for present and future nuclear reactors. Therefore, this developing issue will continued to be followed and future requirements will be addressed, as applicable.}

6.5.3 REFERENCES

{**Barbour, 1999.** Rapid Bioassessment Proocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C. 1999. Barbour, MT., J.Gerritsen, B.D. Snyder, and J.B. Stribling.

CFR, 2007a. Title 40, Code of Federal Regulations, Sections 125.80-89, Track 1, Requirements Applicable to Cooling Water Intake Structures for New Facilities Under Section 316(b) of the Act, 2007.

CFR, 2007b. Title 40, Code of Federal Regulations, Section 122.21(r)(3), Application Requirements for Facilities with Cooling Water Intake Structures - Cooling Water Intake Structure Data, 2007.

CFR, 2007c. Title 40, Code of Federal Regulations, Section 125.84(b), Track 1 Requirements for New Facilities that Withdraw Equal to or Greater than 10 MGD, or (c)(1), Track 1 Requirements for New Facilities that Withdraw Equal to or Greater than 2 MGD and Less than 10 MGD and that Choose Not to Comply with Paragraph (b) of this Section, 2007.

CFR, 2007d. Title 40, Code of Federal Regulations, Section 125, Criteria and Standards for the National Pollutant Discharge Elimination System, 2007.

CFR, 2007e. Title 40, Code of Federal Regulations, Section 125.95(a) and (b), As an Owner of Operator of a Phase II Existing Facility, What Must I Collect and Submit When I Apply for my Reissued NPDES Permit? - Comprehensive Demonstration Study, 2007.

EPA, 2007. US Environmental Protection Agency, Title 40 CFR Section 112.3, Requirements to Implement a Spill Prevention, Control and Countermeasures Plan, 2007.

NMP, 1984. Nine Mile Point Unit 2 ER-OLS. Niagara Mohawk. March, 1984.

NRC, 1999. Standard Review Plans for Environmental Reviews for Nuclear Power Plants, NUREG-1555, Nuclear Regulatory Commission, October 1999

NRC, 2006. Liquid Radioactive Release, Lessons learned Task Force- Final Report, Nuclear Regulatory Commission, September 1, 2006.

NRC, 2006a. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. Supplement 24. Regarding Nine Mile Point Nuclear Station, Unit 1 and Unit 2. Final Report. U.S. Nuclear Regulatory Commision. Office of Nuclear Reactor Regulation.

NYDEC, 2008. 316(b) Studies Performed during 2006 and 2007 at the JAFNPP (SPDES Permit No. NY 0020209) Lycoming, New York. Prepared for Entergy Nuclear FitzPatrick, LLC 227 Lake Road East, Oswego, NY 13126.

NYSDEC, 2008. Letter from NY Natural Heritage Program to George Wrobel of UniStar Nuclear Energy, dated May 14, 2008.

USACE, 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Corps of Engineers (USACE) Waterways Experiment Station. Vicksburg, MS.

USC, 2002. U.S. Code, Federal Water Pollution Control Act, Section 316(b), Thermal Discharges, as Amended, November 27, 2002.

USFWS, 2001. Bog Turtle (Clemmys muhlenbergii), Northern Population , Recovery Plan. Hadley, Massachusetts. 103 pp.

USFWS, 2008. Oswego County Federally Listed Endangered and Threatened Species and Candidate Species. Website: http://www.fws.gov/northeast/nyfo/es/CountyLists/OswegoDec2006.htm Date accessed: Feb 28, 2008.}

6.6 CHEMICAL MONITORING

{Chemical monitoring of surface water and groundwater is performed to control and minimize adverse impacts to the groundwater and Lake Ontario and will be implemented in three phases: pre-application, construction and preoperational, and operational monitoring. The scope for each monitoring phase will be predicated by the findings for the preceding phase.

Section 6.1 discusses thermal monitoring requirements and Section 6.3 discusses flow sampling requirements. }

6.6.1 PRE-APPLICATION MONITORING

{Pre-application monitoring provides a baseline for assessment of effects from pre-operation and operation of NMP3NPP on the aquatic environment in the vicinity of the NMP site. Information on past studies performed to determine the characteristics of surface water are discussed in ER Section 2.3.3.

6.6.1.1 Surface Water

The following water quality databases, maintained by federal agencies, state agencies, non-profit groups, and power corporations were accessed to locate available and applicable water quality data relevant to the Lake Ontario in the area of the NMP3NPP site:

- U.S. Atomic Energy Commission. Final Environmental Statement Related to the Operation of Nine Mile Nuclear Station Unit 1 (AEC, 1974),
- Environmental Report Operating License Stage Nine Mile Point Nuclear Station Unit 2. (NMPC, 1985),
- Heritage Station Application for Certification of a Major Generating Facility Under Article X of the New York State Public Service Law (Heritage Power, 2000),
- U.S. Environmental Protection Agency, Great Lakes Monitoring Limnology Program. (EPA, 2005),
- Monroe County Water Authority 2000 Water Quality Monitoring Program Summary (MCWA, 2001), and
- Service Water System Water Quality Data (intake water from Lake Ontario).

Other monitoring programs in place within the region include the Statewide Waters Monitoring Program (SWMP) which monitors waters in the Salmon-Sandy Hydrologic Unit and Lake Ontario. SWMP consists of component programs, including the Rotating Integrated Basin Studies (RIBS) program for rivers and streams, the Lake Classification and Inventory program (LCI), the Citizens Statewide Lake Assessment Program (CSLAP), which uses volunteers to conduct additional lake monitoring, the Stream Biomonitoring Program and Toxicity Testing Program which provides biological monitoring components, and a Regulatory Sampling Program to monitor point source compliance (NYSDEC, 2006).

Based on a review of current literature, state, federal and non-profit groups do not appear to be monitoring water quality in the waters adjacent to NMP within the area of influence.

Lake Ontario has been designated by NYSDEC as Class A - Special Waters (International Boundary Waters). Its waters are suitable for use as a source for drinking water, for culinary or food-processing purposes, for primary and secondary contact recreation, and fishing. In addition, Class A-Special Waters are suitable for fish, shellfish, and wildlife propagation and survival.

Pursuant to the Federal Water Pollution Control Act (USC, 2007), the water quality of the effluent discharges to Lake Ontario is regulated through the National Pollutant Discharge Elimination System (NPDES). NMP Unit 1 and Unit 2 maintain a current State Pollutant Discharge Elimination System (SPDES) permit. When the permit required renewal in 2004, the New York State Department of Environmental Conservation (NYSDEC) did not identify any major issue that would prevent the permit renewal, and it was granted at that time. SPDES data collected in 2007 and 2008 were reviewed to determine the nature of effluent discharges from the NMP site.

NMP Unit 2 cooling tower circulating water samples have been collected and analyzed periodically for water quality parameters including pH, alkalinity, sulfate, chloride, hardness, calcium hardness, magnesium, copper, iron, sodium, zinc, manganese, and phosphate to support monitoring of cooling water treatment. A summary of this monitoring data is included in Section 2.3.3 and is summarized as follows:

Based on the 2007 Intake System Water Quality data, water quality in the lake near NMP has not changed appreciably (Table A.2.3.3-5). The following measured parameters were compared to the 1973 through 1980 data for Lake Ontario: chloride, copper, iron, manganese, ortho phosphate, pH, silica, sodium, specific conductance, sulfur, and zinc. All parameters were found to be within the noted 1973 to 1980 range with the exception of silica, and sulfur which were slightly higher but not exceeding the New York State Standard. Copper and pH values were reported to be slightly lower than the 1973 to 1980 data, within acceptable state limits.

The 1984 ER-OLS reported water temperatures with seasonal variations directly related to air temperature. Water temperature was measured monthly or twice monthly in Lake Ontario in the water quality monitoring program. In addition, continuous in situ monitoring was conducted. Long-term trends indicate no significant change in water temperature over time. Seasonal water temperature variations were also noted. Spatial temperature variations are evident in the raw data presented in the 1984 report. The Nine Mile Point Unit 1 (Unit 1) discharge elevates lake surface temperature, particularly in the nearshore region

The New York State standard for Class A - Special Waters requires a dissolved oxygen concentration not less than 6 mg/l [Ref. 5.2-13]. Dissolved oxygen levels were above this standard during all sampling at all locations, except the minimum value reported in 1973 of 5.8

mg/l DO. Dissolved oxygen levels were above the EPA [Ref. 5.2-14] criterion of not less than 5 mg/l for the protection of aquatic life

Nine Mile Point data indicate a maximum variation of 2.5 pH units seasonally, with no apparent long-term trends. The New York State standard for Class A – Special Waters requires a pH range of 6.7 to 8.5 [Ref. 5.2-13]. All yearly mean values are in the range of 8.0 to 8.4 (slightly alkaline), which is typical of the results from other Lake Ontario studies. Annual maximum pH values have consistently exceeded the classification upper bound of 8.5. It is likely that the high pH data reflect photosynthetic activity near the water surface.

Data indicate an increase in specific conductance over the 6 years reported. Specific conductance of Lake Ontario water has been increasing yearly at a rate of 13 micromhos/cm per decade over the last 30 years. The Nine Mile Point data reflect the preceding trend of increasing specific conductance over time.

Turbidity values collected during the 6-year sampling program indicate no trend in the season-to-season measured turbidity. Annual variations in turbidity are generally restricted in range, with the exception of the 0 to 52 NTU range reported in 1973. Turbidity variations can be attributed to spring and fall overturns, and algal blooms in the summer season. During 1967, turbidity values for Lake Ontario ranged from 0.2 to 2.5 NTU; increases followed phytoplankton blooms. From 1965 to 1975, the overall mean turbidity value based on several studies in eastern Lake Ontario was 0.87 NTU. The Nine Mile Point data indicate a higher yearly mean and maximum value for turbidity than the data reported from other studies, but still below the State Standard of 5 NTU.

Lakewide data indicate Total Dissolved Solids (TDS) levels have remained stable since 1971. All mean TDS concentrations for 1973 through 1978 have been in excess of the 200 mg/l standard for New York State Class A - Special Waters. In 1980, the lake as a whole was in excess of the 200 mg/l standard for TDS. Lake Ontario's downstream position in the Great Lakes chain is thought to explain its relatively elevated TDS levels.

TDS concentrations measured in the Nine Mile Point studies exhibited seasonal fluctuations, with spring peaks, and failed to indicate any impact due to power plants' discharges on regional TDS values. Spatial distributions indicate that the Oswego River discharge plume elevates TDS values in the western (NMPW transect) region of the Nine Mile Point study area.

Average values for Total Suspended Solids (TSS) measured between 1973 and 1978 ranged from <2.3 mg/l to 10.6 mg/l, with the lowest values occurring during the last two years of sampling. No trends were otherwise evident in the data.

Available concentration data for the cations calcium, magnesium, potassium, and sodium, show no apparent trends over time, with the exception of unusually high concentrations of sodium and potassium in 1974 [Ref. 5.2-2]. Anions monitored during the same study included total alkalinity, chlorides, fluorides, and sulfates. No important long-term or seasonal trends were observed for anions in the study area.

Required aquatic nutrients include nitrogen, phosphorus, and silica compounds. However, concentrations of these nutrients in excess of requirements can promote degradation of water quality. Species of nitrogen measured during these studies included ammonia, nitrate, and organic nitrogen. Phosphorus species included total orthophosphate and total phosphorus. The relative concentrations of nitrogen, phosphorus, and silica compounds provide important data for assessing the availability of these nutrients for primary production.

The New York State Class A - Special Waters standard for ammonia is 2.0 mg/l [Ref. 5.2-13]. All values reported in 1973 through 1978 for the study area are well below this standard. Long-term trends indicate a decrease in mean and maximum yearly ammonia from 1973 through 1978. Seasonally, nitrate concentrations were at their lowest levels during the summer months, which may be attributed to uptake by plankton, and no season-to-season trends were apparent for nitrate over the 6-year sampling program.

Nitrate concentrations in Lake Ontario appear to be slightly lower in recent years than in the 1960s; however, the long-term trend indicates a gradual increase. A mean of 0.3 mg/l-N was reported for lakewide nitrate values in 1965. Values reported for Mexico Bay, immediately to the east of NMP, in 1965 ranged from 0.1 to 0.47 mg/l-N, with a mean of 0.28 mg/l-N. Total organic nitrogen values were reported in 1973, 1976, 1977, and 1978. Data indicate an apparent decrease in total organic nitrogen in Nine Mile Point waters during this period. Total nitrogen concentration, the sum of ammonia, nitrate, and total organic nitrogen species, remained relatively constant over the 6-year sampling program. In general, it appears that total nitrogen concentrations in the study area have remained at a nearly constant level throughout the sampling program.

Lake Ontario water column phosphorus concentrations have been decreasing in a stepwise manner for 10 years. From 1972 to 1974, 1975 to 1977, and 1978 to 1980, phosphorus concentrations did not change significantly. Historically, these plateaus were followed by definite decreases in phosphorus concentrations. No long-term trends are evident for total orthophosphate and total phosphorus concentrations. Orthophosphate exhibited minimum values during the summer and fall months, as would be expected due to phytoplanktonic nutrient utilization. Total phosphorus measurements varied irregularly throughout the sampling period.

Indicators of contamination include: bacteria, biochemical and chemical oxygen demand, organic carbon, cyanide, and phenols. The New York State standard for coliforms is less than 1,000/100 ml total coliforms and less than 200/100 ml fecal coliforms [Ref. 5.2-13]. The Lake Ontario study area is well within the coliform bacteria standards on an annual average basis. The Biochemical Oxygen Demand (i.e., 5-day BOD) concentrations remained extremely low throughout the 1973 through 1978 study period. The 6-year mean concentration of 1.9 mg/l is comparable with a lakewide mean of less than 2 mg/l. Chemical oxygen demand concentrations were similarly low; the maximum yearly mean was 13 mg/l, which is less than the 17 mg/l mean concentration reported for eastern Lake Ontario from 1965 through 1972. Total organic carbon concentrations were also very low, indicative of little organic pollution of Lake Ontario water within the study area.

Cyanide concentrations were usually below detection limits throughout the water quality monitoring period of 1973 through 1978. The maximum reported value of 7 µg/l is well within the 200 µg/l state standard. Phenol concentrations were present in trace quantities, usually at or below the detection limit, from 1967 through 1978. The data indicate no significant phenol flux to the Nine Mile Point regional waters. Cadmium concentrations were observed to be at or below the laboratory detection limits during the last 5 years of the sampling program. The 1973 data indicated the maximum value of 67µg/l exceeded the 5. µg/l limit.

All yearly mean concentrations of copper were less than the 200 µg/l standard [Ref. 5.2-13], except during 1974. In 1974, sample contamination was reported to have occurred during analysis. Maximum values reported from 1975 through 1978 were well below the 200 µg/l copper limit. All mean annual iron concentrations in the study area are less than the standard of 300 µg/l. Maximum iron concentrations reported from 1973 through 1977 exceeded the standard. Near the end of the monitoring program, a trend toward decreasing iron

concentrations can be noted, with the 1978 maximum of 220 µg/l. Excluding 1974 data, zinc concentrations ranged, on an average yearly basis, from less than 14 µg/l to 50.6 µg/l. No long-term trends were evident in the data. Maximum zinc concentrations in 1973 and 1978 exceeded the state standard of 300 µg/l in 1978, but NYSDEC no longer has a standard for zinc for this class of water.

6.6.1.2 Groundwater

Thirty-eight groundwater observation wells were installed across the site as discussed in Section 2.3.1. The wells were located in order to provide adequate distribution with which to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well pairs were installed at selected locations to determine vertical gradients. Field hydraulic conductivity tests (slug tests) were conducted in each observation well. Monthly water level measurements from the groundwater observations wells began in October 2007 and continued to August 2008.

To evaluate vertical hydraulic gradients, several observation wells were installed as well couplets. Well couplets are a pair of wells installed at the same location, with both wells monitoring a distinct water bearing interval. Six well couplets were installed to evaluate the hydraulic gradient between the Oswego Sandstone unit and the Pulaski Formation unit, and six well couplets were installed to evaluate the gradient between the Oswego Sandstone unit and Whetstone Gulf Formation unit.

Well water quality data are described in Section 2.3.3.2.}

6.6.2 CONSTRUCTION AND PREOPERATIONAL MONITORING

{Chemical monitoring during construction will aid in controlling adverse impacts to Lake Ontario, the on-site streams and on-site wetlands and will provide additional water quality data that can be used to measure water-quality changes from operation of the new unit. Accordingly, chemical monitoring of surface water during construction related activities for the new unit will be an extension of more than 30 years of pre-application monitoring. Construction and pre-operational chemical monitoring will be performed during the planned six-year period for site preparation and plant construction. In accordance with the existing SPDES permit, the NYSDEC will be notified regarding the proposed plant expansion. Sample collection, laboratory analyses, data evaluation and reporting practices will comply with permit modifications.

Although storm water discharges will increase during construction, primarily due to water pumped from excavation sumps, disturbance to existing drainage systems will be avoided, if possible. Environmental controls (i.e., silt screens, dams, settling basins, and spill containment measures), will be implemented to reduce potential pollutants in storm water runoff and to minimize construction impacts to aquatic habitats. Prior to the start of construction, approval of storm water management and erosion/sediment control plans will be obtained in accordance with the SPDES Construction General Permit and an Erosion and Sediment Control Plan (ER Section 1.3). These controls will be incorporated into a Storm Water Pollution Prevention Plan (SWPPP). Similar to the existing plant's SWPPP, storm water system manholes and handholds will continue to be periodically inspected and cleaned. Stormwater from the facilities and peripheral areas including the construction parking and laydown areas will be collected through a network of storm sewers, ditches and culverts and will be drained to three stormwater ponds. The SWPPP will include details on stormwater sampling procedures, QA/QC measures for sample collection, handling and analysis, and field and laboratory methods to assess stormwater quality. Field and laboratory data associated with stormwater monitoring during construction will be of sufficient quality and quantity to comply with regulatory and

SPDES permit requirements and demonstrate the effectiveness of stormwater pollution control measures.

Groundwater monitoring (water level observation) of the NMP area is currently being implemented through the use of the groundwater observation wells installed in 2007 for the NMP area subsurface investigation and through periodic review of water levels from selected wells within the groundwater level monitoring network. Some of the existing NMP area observation wells will be taken out-of-service prior to construction activities due to anticipated earth moving and construction requirements. Prior to construction activities, the observation well monitoring network will be evaluated in order to determine groundwater data gaps and needs created by the abandonment of existing wells. These data needs will be met by the installation of additional observation wells, if required. Additionally, the hydrologic properties and groundwater flow regimes of the shallow water bearing units (Surficial aquifer, and to lesser extent, the Oswego unit will be impacted by the proposed earthmoving, regarding, and construction of infrastructure (buildings, parking lots, etc.). Revisions to the observation well network will be implemented to ensure that the resulting changes in the local groundwater regime from construction activities will be identified. No chemical monitoring is planned at the time for groundwater.}

6.6.3 OPERATIONAL MONITORING

{Operational monitoring will commence from the date of the first appropriation and use of Lake water and continue as long as required by the SPDES permit applicable for the new plant. Although operational monitoring elements will be developed in consultation with the NYSDEC, it is anticipated that sampling locations, frequency and analyses will be similar to those for NMP Unit 1 and Unit 2.

Similar to NMP Unit 1 and Unit 2, the NMP3NPP Intake Structure will house debris screens, screen wash pumps, make-up water pumps and related equipment so that a new outfall for intake screen backwash will be likely. However, similar to NMP Unit 1 and Unit 2, chemical monitoring at the new outfall will be limited by the new SPDES permit to certain chemical parameters to ensure that the differences between the intake water and discharge water are within the limits specified in the permit.

NMP3NPP will utilize a closed-loop cooling water system consisting of one, mechanical draft cooling tower for the circulating water cooling system. Prior to discharge into the Lake, CWS cooling tower blowdown will be directed into a retention basin, provided as an intermediate discharge reservoir, and held for a period of time to reduce the concentration of solids and chlorine in the water. Essential Service Water System (ESWS) cooling tower blowdown, and other wastewater will also collect in the retention basin. Piping will transfer retention basin wastewater by gravity to the new Discharge Structure, which will provide a flow path for the discharge of water into the Lake via a submerged outfall.

The NMP3NPP Wastewater Treatment Plant (WWTP) will collect sewage and wastewater generated from the portions of the plant outside the radiological control areas of the power block and will treat them using extensive mechanical, chemical and biological treatment processes. The treated effluent will be combined with the discharge stream from the on-site wastewater retention basin and discharged to Lake Ontario. The discharge will be in accordance with local and state safety codes and in accordance with a SPDES permit. The dewatered sludge will be hauled off-site for disposal at municipal facilities. The treated wastewater will meet all applicable health standards, regulations and SPDES permit requirements.

Table 3.6-3 lists the anticipated liquid and solid effluents associated with the WWTP. Parameters are expected to include flow rates, pollutant concentrations, and the biochemical oxygen demand at the point of release.

Non-radioactive liquid effluents that could potentially drain to Lake Ontario are limited under the SPDES permit. Table 3.6-1 provides information on the various chemicals to be used for the various plant water systems. All of these chemical additives will have limiting discharge concentrations specified in the SPDES permit that will require monitoring.

Chemical monitoring will be performed at the new outfall to assess the effectiveness of retention methods and effluent treatment systems, as well as to detect changes in water quality associated with new plant operations. Similar to the existing plant, chemical monitoring will also be performed at storm water runoff outfalls and at internal monitoring points (i.e., sanitary waste effluents, wastewater retention basin influent and/or effluent). Effluent water chemistry will meet all applicable federal and state environmental regulatory requirements.

The following discussion provides a basis for the type of data and information that is expected to be required by the SPDES permit for NMP3NPP. The NMP Unit 1 and 2 SPDES permit specifies the monitoring conditions that the existing plant must meet to protect water quality. It is expected that the SPDES permit requirements for NMP3NPP will be similar. Pursuant to the existing plant's SPDES permit 7-3556-00013 (NYSDEC, 2004a), effective as of December 1, 2004, discharges to the Lake are allowed at Outfalls 001, 001A, 002, 007, 008, 010, 011, 010A, 020, 021, 023, 024, 025, 026, 030, 040, 040A, and 041. Table 6.6-1 summarizes the required sampling protocol for the existing monitoring stations. A map showing the monitoring station locations is provided in Section 6.1.

Outfalls 001 and 002 monitor discharged stormwater from NMP Unit 2 storm drainage. Outfall 001A, monitors Unit 2 decay heat cooling tower blowdown. Outfall 007 monitors NMP floor and equipment drains and includes outfalls 007A through 007G. Outfall 008 monitors water from the Unit 2 screen well fish diversion system. Outfall 010A monitors discharges from the Unit 1 forebay cleaning basin. Outfall 011 monitors demineralizer, deionizer filtration and treated radioactive wastewaters from Unit 1. Outfall 023 monitors discharges from the Unit 1 oil spill retention basin. Outfall 024 monitors discharges of water drained from the Unit 1 diesel off-loading pad. Outfall 025 monitors discharges of emergency overflows from the Unit 2 cooling tower. Outfall 026 monitors Unit 2 resin regeneration, demineralized test water and reverse osmosis wastewaters. Outfall 030 monitors discharges from the Unit 1 and 2 sanitary wastewater treatment plant. Outfall 040 monitors cooling tower blowdown and service water discharges from Unit 2 that discharge to the Lake through the submerged diffuser. Outfall 040A monitors discharges from sumps in the Unit 2 circulating water pump area. Outfall 040B monitors discharges from the Unit 2 forebay cleaning basin. Outfall 041 monitors wastewater from Unit 2 including demineralizer, deionization and filtration wastewater flows and treated radioactive wastewaters. Discharges from Outfalls 001A, 007 and 040B discharge to the Lake through Outfall 001. Discharges from Outfalls 010A and 011 discharge to the Lake through Outfall 010. Discharges from Outfalls 010A and 024 discharge to the Lake through Outfall 020. Discharge from Outfall 26 discharges to the Lake from Outfall 030. Discharges from Outfalls 001A, 026, 040A and 041 discharge to the Lake through Outfall 040.

Sampling for SPDES permit requirements will be performed in accordance with the quality standards outlined in a Chemical Quality Assurance (QA) and Quality Control (QC) Program. This Chemical QA and QC Program will provide performance instructions for chemical/reagent control, instrumentation control, program control (e.g., sampling methodologies, analysis), minimum quantifiable concentration control, use and evaluation of charts, and data reporting.

Samples representative of the system or discharge stream will be collected and preserved as necessary to prevent contamination or deterioration. Sampling and analytical methods conform to procedures for the analysis of pollutants as identified in Title 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants"(CFR, 2007). To ensure accuracy of measurements, monitoring and analytical instrumentation is maintained and periodically calibrated in accordance with manufacturer specifications or those per the Chemical QA and QC Program, whichever are more restrictive. The Chemical QA and QC Program will also provide instructions for calibration standards, prepared or purchased, used for preparing calibration curves and performing calibration checks. Statistical reliability will be achieved by calculating the mean and standard deviation of the data at a 95 percent confidence level. Data quality objectives will include producing accurate, reliable and cost effective measurements and data, adequate for their intended use.

Monthly monitoring results are summarized on Discharge Monitoring Reports and submitted to the NYSDEC. Sampling data collected during pre-application monitoring serve to document existing water quality conditions.

There are currently no plans to monitor groundwater for chemicals during the operational phase of NMP3NPP.}

6.6.4 REFERENCES

{**AEC, 1974.** U.S. Atomic Energy Commission. Final Environmental Statement Related to the Operation of Nine Mile Nuclear Station Unit 1. Niagara Mohawk Power Corporation. Docket No. 50-220. Directorate of Licensing. Washington, D.C. January 1974.

CFR, 2007. Title 40, CFR Part 136, Code of Federal Regulations, Guidleines Establishing Test Procedures for the Analysis of Pollutants, 2007.

EPA, 2005. U.S. Environmental Protection Agency. Great Lakes Monitoring Limnology Program. Accessed at: http://www.epa.gov/glnpo/monitoring/limnology/#tp on February 8, 2005. (Accession No. ML060940275).

Heritage Power, 2000. Heritage Station Application for Certification of a Major Generating Facility Under Article X of the New York State Public Service Law.

MCWA, 2001. Monroe County Water Authority 2000 Water Quality Monitoring Program Summary. Rochester, New York.

NMPC, 1985. Niagara Mohawk Power Corporation. Environmental Report Operating License Stage Nine Mile Point Nuclear Station Unit 2. Volume 1. February 8, 1985.

NYSDEC, 2004a. SPDES Discharge Permit No. 7-3556-00013, dated June 8, 2004.

NYSDEC,2006. New York State Department of Environmental Conservation. New York State Water Quality 2006 - Submitted Pursuant to Section 305(b) of theFederal Clean Water Act Amendments of 1977 (PI 95-217). Albany, New York. January 2007. http://www.dec.ny.gov/docs/water_pdf/305breport2006.pdf accessed 17 june 2008.

USC, 2007. Title 33, Chapter 26, Subchapter IV 1342, United States Code, National Pollution Discharge Elimination System, 2007.}

Table 6.6-1—{SPDES Permit Required Water Sampling Protocol }

(Page 1 of 3)

Monitoring Station[a]	Monitoring Location[b]	System(s) Sampled[b]	Parameter Sampled	Sample Type	Sampling Frequency
Outfall 001[c]	Upstream of discharge to lake	Storm Drainage-Unit #2 and wastewater from internal Outfalls 001A, Outfall 007, & 040B.	EVAC ®	Grab	One Treatment
Outfall 001A	Near Unit 2 Reactor Building	Decay Heat Cooling Tower Blowdown-Unit #2	TRC[d]	Grab	Monthly
Outfall 002	Upstream of discharge to lake	Storm Drainage-Unit #2	No Monitoring	No Monitoring	No Monitoring
Outfall 007 [c,d] (A-G)	007A – Manhole #110 U2 Chiller Bldg 007B – U1 Admin Bldg Sump 007C – U2 2DFM-Sump 2B 007D – U2 SWP 2DFM Sump 2A 007E – U2 Control Bldg 2DFM Sump 4 007F - Manhole #103 Screenhouse West 007G - Manhole #207 Screenhouse North	Floor and Equipment Drains- Unit #1 & Unit #2	Total Aluminum	Grab	Monthly
			TSS	Grab	2 / Month
			Oil & Grease	Grab	2 / Month
			pH	Grab	2 / Month
			Iron	Grab	2 / Month
			Zinc	Grab	Quarterly
Outfall 008	Upstream of discharge to lake	Screen Well Fish Diversion System—Unit #2	No Monitoring	No Monitoring	No Monitoring
Outfall 010[c]	Upstream of discharge to lake	Condenser Cooling Water Unit #1 and wastewater from internal Outfall 011 & 010A.	TRO	Grab	Batch
			Copper	Grab	Monthly
			Spectrus CT ® 1300	Multiple Grab	Duration of Chemical Application and Discharge
			Calgon H-130M ®	Multiple Grab	Duration of Chemical Application and Discharge
			EVAC ®	Multiple Grab	Duration of Chemical Application and Discharge

Table 6.6-1—{SPDES Permit Required Water Sampling Protocol }

(Page 2 of 3)

Monitoring Station[a]	Monitoring Location[b]	System(s) Sampled[b]	Parameter Sampled	Sample Type	Sampling Frequency
Outfall 011	Upstream of discharge to lake	Wastewater-Unit #1(Including Demineralization, Resin, Reverse Osmosis, Electrodeionization, Filtration, Treated Rad. Wastewater)	Oil & Grease	Grab	Quarterly
				Grab	Batch Before Discharge
			TSS	Grab	Quarterly
				Grab	Batch Before Discharge
			pH	Grab	Batch Before Discharge
Outfall 010A	Unit 1 Forebay	Unit #1 Forebay Cleaning Basins	Oil and Grease	Grab	2 / Month During Periods of Discharge
			TSS	Grab	2 / Month During Periods of Discharge
Outfall 020[c]	Upstream of discharge to lake	Storm Drainage, Perimeter Drains, Condensation Water-Unit #1 and wastewater from internal Outfalls 010A, and 024.	Oil and Grease	Grab	Quarterly
			TSS	Grab	Batch Each Discharge
			pH	Grab	Batch Each Discharge
Outfall 021	Upstream of discharge to lake	Filter Backwash & Makeup Demineralizer Water Supply-Unit #1	Oil and Grease	Grab	Batch Each Discharge
Outfall 023	Oil Spill Retention Basin	Unit #1 Oil Spill Retention Basin	Oil and Grease	Grab	Each Discharge
			pH	Grab	Each Discharge
Outfall 024	Loading Pad	Unit #1 Diesel Off Loading Pad Drainage	Oil and Grease	Grab	Each Discharge
			pH	Grab	Each Discharge
Outfall 025	Unit 2 Cooling Tower	Unit #2 Cooling Tower Emergency Overflow	pH	Grab	Each Discharge
			Copper	Grab	Each Discharge
Outfall 026	Upstream of Outfall 040 and WWTP	Unit #2 Demineralized Test Water, City Water, Circulating Water and Service Water	No Monitoring	No Monitoring	No Monitoring
Outfall 030	Upstream of discharge to lake	Sanitary wastewater and wastewater from internal Outfall 026	BOD5	Grab	2 / Month
			TSS	Grab	2 / Month
			Fecal Coliform	Grab	2 / Month
			pH	Grab	2 / Month
			Settleable Solids	Grab	2 / Month
			TRC	Grab	2 / Month

Table 6.6-1—{SPDES Permit Required Water Sampling Protocol }

(Page 3 of 3)

Monitoring Station[a]	Monitoring Location[b]	System(s) Sampled[b]	Parameter Sampled	Sample Type	Sampling Frequency
Outfall 040 [c]	Upstream of discharge to lake	Cooling Tower Blowdown and Service Water-Unit #2 and wastewater from internal Outfalls 001A, 026, 040A, and 041.)	FAC	Grab	Batch
			Copper	Grab	Weekly
			Inhibitor AZ8104	Grab	Batch
			Cuprostat pf	Grab	Batch
			Phosphorus	Grab	Monthly
			pH	Grab	2 / Week
			TRO	Grab	Batch
			Spectrus CT ® 1300	Multiple Grab	Duration of Chemical Application and Discharge
			Calgon H-130M ® (Whole Product)	Multiple Grab	Duration of Chemical Application and Discharge
			EVAC ® (Whole Product)	Multiple Grab	Duration of Chemical Application and Discharge
			Iron	Grab	Quarterly
Outfall 040A	Radwaste Treatment Bldg 2DFM Sumps	Circulating Water Pumps Area Sumps-Unit #2	Oil and Grease	Grab	Monthly
Outfall 040B	Unit 2 Forebay	Unit #2 Forebay Cleaning Basins	Oil and Grease	Grab	2 / Month During Periods of Discharge
			TSS	Grab	2 / Month During Periods of Discharge
Outfall 041	Upstream of discharge to lake	Wastewater-Unit #2 (Including Demineralization, Resin, Reverse Osmosis, Electrodeionization, Filtration, Treated Rad. Wastewater)	Oil and Grease	Grab	Quarterly
				Grab	Batch
			TSS	Grab	Quarterly
				Grab	Batch
			pH	Grab	Batch
			Conductivity	Grab	Batch

Key:

BOD – Biochemical Oxygen Demand
TSS - Total Suspended Solids
TRC – Total Residual Chlorine

Notes:

a. Refer to Section 6.1 for a map showing the location of the monitoring stations.
b. Monitoring station locations and systems sampled are specified in the SPDES permit.
c. Includes discharges from internal monitoring points.
d. Discharge from the two switchyard oil separators is sampled before combination with wastewater stream from 020.

6.7 SUMMARY OF MONITORING PROGRAMS

{This section summarizes the monitoring environmental programs described in Chapter 6. The summary is divided into three sections:

- Pre-application monitoring
- Construction and Pre-Operational monitoring
- Operational monitoring}

6.7.1 PRE-APPLICATION MONITORING

{Pre-Application monitoring for NMP3NPP will be fulfilled by the ongoing thermal, radiological, hydrological, meteorological, ecological, and chemical monitoring programs (Section 6.1 through 6.6) for the existing NMP Unit 1 and Unit 2. This represents 38 years of monitoring for the site. Pre-application ecological monitoring was provided through field studies. Summaries of the pre-application monitoring activities are included in Table 6.7-1 through Table 6.7-7}.

6.7.2 CONSTRUCTION AND PRE-OPERATIONAL MONITORING

{The current thermal, radiological, hydrological, meteorological, and chemical monitoring programs will be continued through the construction and preoperational phases of NMP3NPP. Construction and pre-operational ecological monitoring will be provided by follow up field studies and monitoring of intake structure impingement and entrainment, and quality monitoring for water withdrawn from the Lake Ontario. Summaries are included in Table 6.7-1 through Table 6.7-7.}

6.7.3 OPERATIONAL MONITORING

{While specific operational monitoring requirements and programs for NMP3NPP have not yet been fully established, they will be similar to and tiered from or added to those monitoring programs described in the previous sections which currently monitor the impacts of NMP Unit 1 and Unit 2 on the surrounding environment. Summaries are included in Table 6.7-1 through Table 6.7-7.

The existing and future operational monitoring programs could be modified as a result of future consultations with state regulatory agencies. The need for modifications to established monitoring locations, parameters, collection techniques, or analytical procedures will be assessed prior to and during the course of operation, as is done now for NMP Unit 1 and Unit 2.}

6.7.4 REFERENCES

{None}

Table 6.7-1—{Thermal Monitoring}

Phase	Summary	Permit
Pre-Application	The State Pollutand Discharge Elimination System (SPDES) permit for NMP Unit 1 and Unit 2 require thermal monitoring monitoring for NMP Unit 1 and Unit 2. For both units, computer data logging at least hourly, is performed to verify compliance during normal operating hours. During unusual operating conditions or in situations where the hourly data is near the outfall limitation, chart recorder data will be reviewed and utilized to demonstrate compliance. NMP Unit 1 has the discharge pipe and intake-discharge temperatures difference recorded continuously. NMP Unit 1 also records the decay heat cooling tower blowdown temperature on a monthly basis as a grab sample. NMP Unit 2 only records the discharge pipe and intake-discharge temperatures difference continuously.	SPDES Permit issued for NMP Unit 1 and Unit 2
Construction and Pre-Operational	Thermal monitoring data collected during the construction and pre-operational monitoring program will supplement pre-application monitoring data and further serve to establish baseline lake water temperature conditions for comparative purposes in assessing potential environmental impact from new plant operations. Construction related discharges will consist mainly of drainage that collects in sumps at the bottom of excavations, which will be pumped to a storm water discharge point. Therefore, no change in thermal discharges is expected during the preoperational monitoring program. The New York State Department of Environmental Conservation (NYSDEC) will be notified of pending construction activities and approval of storm water management and erosion/sediment control plans will be obtained in accordance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit as described in Section 1.3.	SPDES Permit Issued for NMP Unit 1 and Unit 2 General SPDES Construction Permit
Operational	Thermal monitoring for NMP3NPP will conform to the requirements of a SPDES permit to be issued to include NMP3NPP.	SPDES Permit issued for NMP3NPP Operation

Table 6.7-2—{Radiological Monitoring}

Pre-application monitoring for the NMP3NPP site location will be provided by the existing Radiological Environmental Monitoring Program (REMP) for NMP Unit 1 and Unit 2. Annual reporting of these REMP activities, detected radioactivity, trends, and plant related impacts will continue through the construction and operation of NMP3NPP. Existing sampler locations, sampling frequency, and type of analysis are described further in Table 6.2-2 through Table 6.2-4.

Construction and pre-operational radiological monitoring will be a continuation of the pre-application monitoring program. Changes to the existing NMP Unit 1 and 2 REMP may result from the location of NMP3NPP near the NMP Unit 1 and Unit 2 inner ring of on-site sample locations. NMP3NPP is centered approximately 0.6 miles (1.0km) southwest from the centerline between NMP Unit 1 and Unit 2. This creates the potential need to re-locate existing NMP Unit 1 and 2 sample sites if interferences during plant construction of NMP3NPP are identified. As an example, existing thermoluminescent dosimeters (TLD) sample site 7 (0.7 miles WSW of Unit 2), may need to be moved since it falls within the area of the NMP3NPP site that will likely be physically affected by construction activities (i.e., the removal of the meteorological tower).

For the operational phase, the NMP3NPP REMP includes the addition of several new sampling locations in order to meet the sampling criteria of Table 6.2-5 as related to the specific location of the NMP3NPP facilities and its effluent release points (the plant vent stack located next to the NMP3NPP Containment, and the NMP3NPP liquid effluent discharge line located offshore in Lake Ontario).

Effluent Exposure Pathways	REMP Sampling Media	Phase
Liquid Effluents:		
Ingestion of fish	Commercial & recreational fish species	All Phases
Ingestion of water	Drinking waters	All Phases
Shoreline exposure (external direct)	Sediments from shoreline	All Phases
Swimming & boating (external direct)	Surface waters	All Phases
Gaseous Effluents:		
Cloud immersion (external direct)	Thermoluminescence Dosimetry (TLD)	All Phases
Ground plane (external direct)	Thermoluminescence Dosimetry (TLD)	All Phases
Inhalation	Air particulate sampling, Iodine sampling	All Phases
Ingestion of agricultural products	Broadleaf vegetation	All Phases
Ingestion of dairy products	Milk	All Phases

Table 6.7-3—{Hydrological Monitoring}

(Page 1 of 2)

Phase	Surface Water	Ground Water
Pre-Application	Hydrological monitoring of surface water in accordance with the New York State Pollutant Discharge Elimination System (SPDES) program. Storm water and plant-associated activities such as equipment blowdown and various system effluents are measured at different monitoring locations. Refer to Section 6.6 for a description of the monitoring locations as well as the SPDES monitoring program data analysis and quality control procedures. Water withdrawn from Lake Ontario that is used for plant system cooling is monitored as part of the Great Lakes Water Withdrawal Registration Program. Flow is monitored at the NMP Unit 1 and Unit 2 Intake Structure and reported to NYSDEC annually.	The principle potable (fresh water) source is from municipal water from the Town of Scriba. NMP Unit 1 and Unit 2 do not use groundwater in any of the water systems. There are no production wells on site. Thirty eight (38) Groundwater observation wells were installed across the site as discussed in Section 2.3.1. The wells were located to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well pairs were installed at selected locations to determine vertical gradients. Twelve well couplets were installed to evaluate the hydraulic gradient between geological formations. Monthly water levels in the observation wells were installed across the site to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Based on the results of groundwater elevation gauging, it was determined that no active dewatering system will be required for plant operations.
Construction and Pre-Operation	Surface water on-site will be monitored as part of the SPDES Construction General Permit The SWPPP will also require inspections as well as monitoring and record keeping. Lake Ontario surface water will be monitored during construction of both the NMP3NPP intake and discharge structures. Monitoring will be part of the US Army Corps of Engineers 401 permit.	Groundwater monitoring, using groundwater observation wells monitor the potential effects of dewatering on groundwater levels. Revisions to the observation well network will be implemented to ensure that the resulting changes in the local groundwater regime from construction activities will be identified. Prior to the start of construction, approval of stormwater water management and erosion/sediment control plans will be obtained in accordance with the NPDES Construction General Permit. These controls will be incorporated into a stormwater pollution prevention plan (SWPPP).

Table 6.7-3—{Hydrological Monitoring}
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Phase	Surface Water	Ground Water
NMP3NPP Operation	During NMP3NPP operation, plant water supply will be from Lake Ontario at a new intake structure. Operation of the new Intake Structure will require monitoring and reporting as part of the Great Lakes Water Withdrawal Registration program as described in Section 1.3. The NMP3NPP Wastewater Treatment Plant (WWTP) will collect sewage and waste water. The treated effluent will be combined with other plant effluents in the wastewater retention basin and discharged to Lake Ontario. The dewatered sludge will be hauled off-site for disposal at municipal facilities. The treated wastewater will meet all applicable health standards, regulations and TMDLs set by the NYSDEC and the U.S. EPA. NRC regulations do not explicitly require routine, on-site groundwater monitoring during plant operation. However, a recent nuclear industry initiative by the Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI) and NRC assessment of existing nuclear reactors indicates that regulations relating to groundwater monitoring during plant operation for present and future nuclear reactors may change.	The principle potable (fresh water) source is from municipal water from the Town of Scriba. Consequently, NMP3NPP operation will not require use of groundwater.

Table 6.7-4—{Meteorological Monitoring}

Phase	Primary Tower	Backup Tower	Detailed Descriptions
Pre-Application	Wind Speed and Direction Sensors and Sigma Theta (standard deviation of wind direction) at all levels, Ambient Temperature at 30 ft (9 m) level and temperature differences between the 200 ft (61 m) and 30 ft (9 m) levels, Dew Point Sensor at the 30 ft (9 m) level, and Precipitation and Barometric Pressure near the base of the tower. (1)	Wind Speed Sensor, Wind Direction Sensor(2)	Table 6.4-1 Table 6.4-2
Pre-Operation and Operation	Wind Speed and Direction Sensors and Sigma Theta (standard deviation of wind direction) at all levels, Ambient Temperature at 30 ft (9 m) level and temperature differences between the 200 ft (61 m) and 30 ft (9 m) levels, Dew Point Sensor at the 30 ft (9 m) level, and Precipitation and Barometric Pressure near the base of the tower.(1) A new tower will replace the existing primary tower and will be located as indicated in Figure 6.4-1	Wind Speed Sensor, Wind Direction Sensor(2) None	Table 6.4-1 Table 6.4-2 Refer to Section 6.4.2

Notes:

1. 200 ft (61 m), 100 ft (30 m), and 30 ft (9 m)) elevations above ground level (The existing primary tower for NMP Unit 1 and Unit 2.
2. 90 ft (27 m) elevation above ground level east of the J. A. Fitzpatrick Plant

Table 6.7-5—{Terrestrial Ecology Monitoring}

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	Summary	Permits
Pre-Application	Due to the location of NMP3NPP, the loss of habitat is not expected to have a significant impact on the surrounding terrestrial ecosystem. Pre-application monitoring consisted of documenting on-site conditions, including the results of a wetland investigation and aerial photos as well as additional terrestrial ecology studies to document the distribution of wetlands, cover type, wildlife species, rare plants, and bog-turtle habitat suitability. Wetlands: Wetland vegetation was identified and inventoried using the methods defined in the 1987 Corps of Engineers' Wetland Delineation Manual. Mitigation of unavailable wetland impacts will be guided by the permit requirements of the U.S. Army Corps of Engineers. Cover Type: For the vegetation survey, plots were established at widely spaced locations throughout the site to obtain data and to determine boundaries of the vegetation cover types. In addition to the plot surveys, common species were identified within the transmission line corridor located in the eastern portion of the study area. Wildlife: Surveys of the site were conducted to determine habitat types suitable for rare, threatened or endangered species, followed by a general wildlife survey of the site. A second survey focused on recording wildlife species present in the habitats within the proposed project footprint.	US Army Corps of Engineers United States Fish and Wildlife Service (USFWS), New York Field Office (NYFO) New York Department of Environmental Services, New York Natural Heritage Program (NYNHP)
Pre-Application (Continued)	Rare Plants: No known occurrences of State or Federally listed threatend or endangered plant species were identified at the site. Plant species considered to be exploitably vulnerable in the state due to over collection are descrbed in Section 6.5.1.2. Bog Turtle Habitat: A study assessed the suitability of on-site wetlands as habitat for the Bog Turtle and concluded that the physical features and vegetation of the on-site wetlands wer not consistent with Bog Turble habitat. Land Use: Land use pre-application monitoring was designed to assess the current land use practices and demographics in the vicinity of the project site and consisted of documenting vicinity and regional conditions by examining existing maps and reports. There are no known mineral resources within the site or adjacent to its boundary.	

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Table 6.7-5—{Terrestrial Ecology Monitoring}

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	Summary	Permits
Construction and Pre-Operation	Site preparation will eliminate all habitats within the project footprint and therefore the primary impact of the project on terrestrial ecology will effectively occur during this phase of construction. Mitigating wetlands lost to the site development will commence concurrently with project construction. This plan will be implemented as soon as site preparation commences in order to minimize impacts to wetlands, streams, and aquatic ecology. Important species and habitat determined to be present on-site and discussed in Sections 2.4.1 and 4.3.1 are as follows: Important Habitats: The habitats on the NMP site that meet the criteria of important under NUREG-1555 are listed in Section 6.5.1.2. Animals: The following animal species meet the criteria of important under NUREG-1555 are listed in Section 6.5.1.2. Important Plant Species: The plant species meet the criteria of important under NUREG-1555 are listed in Section 6.5.1.2. These species are protected by the State of New York due to concerns about over collection. Land Use: As described in Section 4.1, impacts to land use during this phase of the project will result in approximately 224.7 acres (91 hectares) being permanently dedicated to NMP3NPP and its supporting facilitie.s. The proposed action does not alter the site's general use, conforms to all applicable local, state, and Federal land use requirements and restrictions, the stated goal of the Oswego County comprehensive plan to concentrate infrastructure and development in employment centers.	US Army Corps of Engineers United States Fish and Wildlife Service (USFWS), New York Field Office (NYFO) New York Department of Environmental Services, New York Natural Heritage Program (NYNHP)
Operation	Operation and maintenance impacts of the proposed transmission system are addressed in Section 5.6.1. There are no continuous monitoring programs required for terrestrial ecology in this phase of the project. Repeated aerial photography backed by field observations every five years will serve as a record of forest re-growth. This type of monitoring would also provide evidence of any erosion around future construction and other work areas, and indicate changes in vegetation that may call for corrective action or aid in the scheduling of routine transmission corridor right-of-way management. In accordance with the baseline studies performed during the pre-application timeframe and existing plant experience at the NMP site, no additional monitoring programs are proposed for: ♦ Bird collisions with plant structures, transmission lines and towers, and cooling towers; ♦ Salt deposition impacts on vegetation growth and habitat modifications; and ♦ Impacts to important species and habitats. These parameters have all been determined to have a small impact on terrestrial ecology and there are no continuous monitoring programs required for land use in this phase of the project, as no significant on-going impacts to the local land use practices are anticipated during operations.	US Army Corps of Engineers United States Fish and Wildlife Service (USFWS), New York Field Office (NYFO) New York Department of Environmental Services, New York Natural Heritage Program (NYNHP)

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Table 6.7-6—{Aquatic Ecology Monitoring}

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	Summary	Permit
Pre-Application Monitoring	Preapplication monitoring has been conducted, consisting of impingement and entrainment sampling at NMP Unit 1 and Unit 2 and JAFNPP. No rare or unique aquatic species have been identified in nearby freshwater systems. One important species identified in Lakeview Creek was rainbow trout. This species is important due to its value as a sport fishery in Lake Ontario and its tributaries. The presence of young of the year andyearling fish in Lakeview Creek suggest it has value as a spawning and nursery stream for wild rainbow trout. It is unlikely that Lakeview Creek is a major contributor to the population. Several important species are present in the vicinity of NMP in the nearshore waters of Lake Ontario periodically due to their value as commercial or recreational fisheries, from their protected status, or value to the Lake ecosystem. None of these species are found exclusively in the vicinity of NMP3NPP. There are no continuous monitoring programs required for aquatic ecology in this phase of the project beyond those in effect for NMP Unit 1 and Unit 2. The surveys performed to establish baseline conditions follow the guidelines published by the New York State Department of Environmental Conservation and the U.S. Department of Environmental Protection as referenced in the aquatic field study report.	General SPDES Operations Permit for NMP Unit 1 and Unit 2
Pre-Operation and Construction Monitoring	The current aquatic ecology monitoring for NMP Unit 1 and Unit 2 will continue. The New York State Department of Environmental Conservation will issue a new permit to include pollutants typically found at a construction site such as turbidity and petroleum hydrocarbons. Stormwater discharges from impervious surfaces at the new facility will be controlled and minimized by provisions of the Storm Water Pollution Prevention Plan. NMP3NPP will be designed to meet the Phase I, New Facility requirements published at 40 CFR 125.80 to 89, under Track I. The cited EPA requirements meet the Clean Water Act 316(b) rules to verify there will be minimal increases in fish and benthic community impingement and entrainment for the new intake structure.	General SPDES Construction Permit Army Corps of Engineers 404 Permit Spill Prevention, Control and Countermeasures Plan

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Table 6.7-6—{Aquatic Ecology Monitoring}

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	Summary	Permit
Operation Monitoring	Operational aquatic ecology monitoring will be required as a condition of a new SPDES permit and for compliance with the Clean Water Act. The Clean Water Act requires that the location, design, construction and capacity of a cooling water intake structure reflect the best technology available (BTA) for minimizing adverse environmental impacts. The Phase II Rule, 40 CFR 125, addresses existing sources of cooling water intake at steam electric plants. A separate SPDES application will be prepared for NMP3NPP. The NMP3NPP cooling water intake structure is designed to meet the Clean Water Act Section 316(b) Phase I requirements. The Phase II rule has been remanded back to EPA for reconsideration. Until this issue can be resolved, the EPA has requested permit writers to use "Best Professional Judgment" in writing NPDES permits. It is expected that the remanded Phase II rule will influence the Best Professional Judgment of the permit writers. Impingement species are discussed in Section 6.5.2.3. Historically, the greatest impingement rates occur during the spring (April, May, and June). It is possible that the NMP3NPP SPDES permit would require impingement and entrainment monitoring. As noted in Section 5.5.1.2, the discharges to surface waters from plant operations will include cooling water blow down, permitted wastewater from auxiliary systems, and stormwater runoff. Concentrations of chemicals in the cooling water discharge will be controlled by the SPDES permit. Additional sanitary wastes from NMP3NPP operations will be accommodated at a new sewage treatment plant, with effluent discharge also controlled by a SPDES permit. Additional intake water requirements will also be minor compared to the existing intake flow.	SPDES issued for NMP3NPP Operations
Operation Monitoring (Continued)	Stormwater discharges from impervious surfaces at the new facility will be controlled and minimized by provisions of the Storm Water Pollution Prevention Plan and the Spill Prevention, Control and Countermeasures Plan under NYSDEC regulations. A Spill Prevention, Control and Countermeasures Plan is required by US EPA regulation 40 CFR 112. The plan describes measures to prevent, contain and clean up oil, gasoline, and chemical spills. Lake Ontario water will be used for makeup to plant cooling. Flow is monitored monthly and reported semi-annually. NMP3NPP operation will not require use of groundwater. Discharge effluents from NMP3NPP are monitored under the SPDES permit. The operation of the additional new unit would not increase withdrawal and discharge rates substantially over existing conditions. Additional sanitary wastes from NMP3NPP operations will be accommodated at a new sewage treatment plant, with effluent discharge also controlled by a SPDES permit. Additional intake water requirements will also be minor compared to the existing intake flow.	

Table 6.7-7—{Chemical Monitoring}

	Summary	Permit
Pre-Application	Pre-application monitoring provides a baseline for assessment of effects from pre-operation and operation of NMP3NPP on the aquatic environment in the vicinity of the site. Information on past studies performed to determine the characteristics of surface water are discussed in Section 2.3.3 and Section 6.6. Surface Water State, federal, non-profit groups and power corporation water quality datasets were accessed to locate available and applicable water quality data relevant to Lake Ontario water in the area of the NMP3PP site. These are detailed in Section 6.6.1. These organizations do not appear to be monitoring water quality in the waters adjacent to the NMP3NPP with the area of influence State, federal, non-profit groups do not appear to be monitoring water quality in the waters adjacent to NMP within the area of influence. Under the Federal Water Pollution Control Act, the water quality of the effluent discharges to Lake Ontario is regulated through the National Pollutant Discharge Elimination System (NPDES). NMP Unit 1 and Unit 2 maintain a current State Pollutant Discharge Elimination System (SPDES) permit.	Existing SPDES permit for NMP Unit 1 and Unit 2
Pre-Application (Continued)	Groundwater Groundwater observation wells were installed to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well pairs were installed at selected locations to determine vertical gradients. Well couplets were installed to evaluate the hydraulic gradient between the Oswego Sandstone unit and the Pulaski Formation unit, and to evaluate the gradient between the Oswego Sandstone unit and Whetstone Gulf Formation unit. Well water quality data are described in Section 2.3.3.2.	
Construction and Pre-Operational	Chemical monitoring of surface water during construction related activities for the new unit will be an extension of pre-application monitoring. In accordance with the existing SPDES permit, the NYSDEC will be notified regarding the proposed plant expansion. Prior to the start of construction, approval of storm water management and erosion/sediment control plans will be obtained in accordance with the SPDES Construction General Permit and an Erosion and Sediment Control Plan (ER Section 1.3). These controls will be incorporated into a Storm Water Pollution Prevention Plan (SWPPP), similar to the existing plant's SWPPP.	General SPDES Construction Permit
Operation	Operational chemical monitoring of the new NNP3NPP outfall, stormwater runoff outfalls, and at internal monitoring points (i.e, sanitary waste effluents, waste water retention basin influent/effluent) will be conducted in accordance with the new SPDS permit of NMP3NPP to determine the effectiveness of the retention methods and effluent treatment systems and to detect changes in water quality associated with NMP3NPP operation.	SPDES issued for NMP3NPP Operations

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