3.0 PROGRAM DESCRIPTION

To achieve the objectives listed in Section 2.3, an extensive sampling and analysis program is conducted every year. The James A. FitzPatrick Nuclear Power Plant (JAFNPP) Radiological Environmental Monitoring Program (REMP) consists of sampling and analysis of various media that include:

- Air
- Fish
- Food Products
- Milk
- Shoreline Sediment
- Surface Waters
- Ground Waters

In addition, direct radiation measurements are performed using thermoluminescent dosimeters (TLDs). These sampling programs are outlined in Table 3.0-1. The JAF REMP sampling locations are selected and verified by an annual Land Use Census. The accuracy and precision of the program is assured by participation in an Interlaboratory Comparison Quality Assurance Program (ICQAP).

Sample collections for the radiological program are accomplished by a dedicated site environmental staff from both the Nine Mile Point Nuclear Stations (NMPNS) and James A. FitzPatrick Nuclear Power Plant (JAFNPP). The site staff is assisted by a contracted environmental engineering company, EA Engineering, Science and Technology, Inc. (EA).

TABLE 3.0-1

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

REQUIRED SAMPLE COLLECTION AND ANALYSIS

Exposure Pathway and/or Sample	Number of Samples [a] and Locations	Sampling and Collection Frequency [a]	Type and Frequency of Analysis
AIRBORNE			
Radioiodine And Particulates	Samples from 5 locations: a. 3 Samples from offsite locations in different sectors of the highest calculated site average D/Q (based on all licensed site reactors.). b. 1 sample from the vicinity of a community having the highest calculated site average D/Q (based on all licensed site reactors). c. 1 sample from a control location 9 to 20 miles distant and in the least prevalent wind direction[d].	Continuous sample operation with sample collection weekly, or as required by dust loading, whichever is more frequent.	Radioiodine Canisters: Analyze weekly for I-131. Particulate Samples: Gross beta radioactivity following filter change [b] composite (by location for gamma isotopic quarterly (as a minimum).
Direct Radiation[e]	32 stations with two or more dosimeters placed as follows: a. An inner ring of stations in the general area of the site boundary. b. An outer ring, in the 4 to 5 mile range from the site, with a station in each of the land based sectors. There are 16 land based sectors in the inner ring, and 8 land based sectors in the outer ring. c. The balance of the stations (8) are placed in special interest areas such as population centers, nearby residences, schools, and in 2 or 3 areas to serve as control stations.	Quarterly	Gamma dose monthly or quarterly.

TABLE 3.0-1 (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

REQUIRED SAMPLE COLLECTION AND ANALYSIS

Exposure Pathway and/or Sample	Number of Samples [a] and Locations	Sampling and Collection Frequency [a]	Type and Frequency of Analysis
WATERBORNE			
Surface[f]	a. 1 sample upstream.[d] b. 1 sample from the site's most downstream cooling water intake.	Composite sample over a one month period[g].	Gamma isotopic analysis monthly. Composite for Tritium analysis quarterly[c].
Sediment from Shoreline	1 sample from a downstream area with existing or potential recreational value.	Twice per year.	Gamma isotopic analysis semiannually[c].
INGESTION			
Milk	a. Samples from milk animals in 3 locations within 3.5 miles distant having the highest calculated site average D/Q. If there are none, then 1 sample from milk animals in each of 3 areas 3.5 to 5.0 miles distant having the highest calculated site average D/Q (based on all licensed site reactors)[h]. b. 1 sample from milk animals at a control location (9 to 20 miles distant and in a less prevalent wind direction)[d].	Twice per month, April through December (samples will be collected in January through March if I-131 is detected in November and December of the preceding year).	Gamma isotopic and I-131 analysis twice per month when milch animals are on pasture (April through December); monthly (January through March), if required[c].

TABLE 3.0-1 (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

REQUIRED SAMPLE COLLECTION AND ANALYSIS

Exposure Pathway and/or Sample	Number of Samples [a] and Locations	Sampling and Collection Frequency [a]	Type and Frequency of Analysis
FISH			
	a. 1 sample of each of 2 commercially or recreationally important species in the vicinity of a site discharge point.	Twice per year.	Gamma isotopic[c] analysis of edible portions.
	b. 1 sample of each of 2 species (same as in a. above or of a species with similar feeding habits) from an area at least 5 miles distant from the site[d].		
FOOD PRODUCTS			
	a. In lieu of the garden census as specified in Part 1, Section 5.2, samples of at least 3 different kinds of broad leaf vegetation (such as vegetables) grown nearest each of two different offsite locations of highest predicted site average D/Q (based on all licensed site reactors). One (1) sample of each of the similar broad leaf vegetation grown at least 9.3 miles distant in a least prevalent wind direction sector[d].	Once during harvest season.	Gamma isotopic[c] analysis of edible portions. (Isotopic to include I-131).

NOTES FOR TABLE 3.0-1

(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. Actual locations (distance and directions) from the site shall be provided in the Annual Radiological Environmental Operating Report. Calculated site averaged D/Q values and meteorological parameters are based on historical data (specified in the ODCM) for all licensed site 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 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 plant.

(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) 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 pocket 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 practical.

(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 that a representative sample is obtained.

(h) A milk sampling location as required in Table 3.0-1 is defined as a location having at least 10 milking cows present at a designated milk sample location. It has been found from past experience, and as a result of conferring with local farmers, that a minimum of 10 milking cows is necessary to guarantee an adequate supply of milk twice per month for analytical purposes. Locations with less than 10 milking cows are usually utilized for breeding purposes, which eliminates a stable supply of milk for samples as a result of suckling calves and periods when the adult animals are dry. In the event that 3 milk sample locations cannot meet the requirement for 10 milking cows, then a sample location having less than 10 milking cows can be used if an adequate supply of milk can reasonably and reliably be obtained based on communications with the farmer.

3.1 SAMPLE COLLECTION METHODOLOGY

3.1.1 SHORELINE SEDIMENTS

Shoreline sediment is collected at one area of existing or potential recreational value. One sample is also collected from a location beyond the influence of the site. Samples are collected as surface scrapings to a depth of approximately one inch. The samples are placed in plastic bags, sealed and shipped to the lab for analysis. Sediment samples are analyzed for gamma emitting radionuclides.

Shoreline sediment sample locations are shown in Section 3.3, Figure 3.3-5.

3.1.2 FISH

Samples of available fish species that are commercially or recreationally important to Lake Ontario; such as Lake Trout, Salmon, Walleye and Smallmouth Bass, are collected twice per year, once in the spring and again in the fall. Indicator samples are collected from a combination of the two onsite sample transects located offshore from the site. One set of control samples are collected at an offsite sample transect located offshore 8-10 miles west of the site. Available species are selected using the following guidelines:

1. A minimum of two species that are commercially or recreationally important are to be collected from each sample location. Samples selected are limited to edible and/or sport species when available.

2. Samples are composed of the edible portion only.

Selected fish samples are frozen immediately after collection and segregated by species and location. Samples are shipped frozen in insulated containers for analysis. Edible portions of each sample are analyzed for gamma emitting radionuclides.

Fish collection locations are shown in Section 3.3, Figure 3.3-5.

3.1.3 SURFACE WATER

Surface water samples are taken from the respective inlet canals of the James A. Fitzpatrick Nuclear Power Plant (JAFNPP) and NRG's Oswego Steam Station. The JAFNPP facility draws water from Lake Ontario on a continuous basis. This is used for the "downstream" or indicator sampling point for the Nine Mile Point site. The Oswego Steam Station inlet canal removes water from Lake Ontario at a point approximately 7.6 miles west of the site. This "upstream" location is considered a control location because of the distance from the site, as well as the result of the lake current patterns and current patterns from the Oswego River located nearby.

Samples from the JAFNPP facility are composited from automatic sampling equipment which discharges into a compositing tank or bottles. Samples are collected monthly from the compositor and analyzed for gamma emitters. Samples from the Oswego Steam Station are also obtained using automatic sampling equipment and collected in a holding tank. Representative samples from this location are obtained weekly and are composited to form a monthly composite sample. The monthly samples are analyzed for gamma emitting radionuclides.

A portion of the monthly sample from each of the locations is saved and composited to form quarterly composite samples, which are analyzed for tritium.

In addition to the sample results for the JAFNPP and Oswego Steam Station collection sites, data is presented for the Nine Mile Point Unit 1 and Unit 2 facility inlet canal samples and from the City of Oswego drinking water supply. The latter three locations are not required by the ODCM. These locations are optional sample points, which are collected and analyzed to enhance the surface water sampling program. Monthly composite samples from these three locations are analyzed for gamma emitting nuclides, and quarterly composite samples are analyzed for tritium.

Surface water sample locations are shown in Section 3.3 on Figure 3.3-4.

3.1.4 AIR PARTICULATE / IODINE

The air sampling stations required by the ODCM are located in the general area of the site boundary. The sampling stations are sited within a distance of 0.2 miles of the site boundary in sectors with the highest calculated deposition factor (D/Q) based on historical meteorological data. These stations (R-1, R-2, and R-3) are located in the E, ESE, and SE sectors as measured from the center of the Nine Mile Point Nuclear Station Unit 2 Reactor Building. The ODCM also require that a fourth air sampling station be located in the vicinity of a year-round community. This station is located in the SE sector at a distance of 1.8 miles and is designated as Station R-4. A fifth station required by the ODCM is a control location designated as Station R-5. Station R-5 is located 16.2 miles from the site in the NE meteorological sector.

In addition to the five ODCM required locations, there are ten additional sampling stations. Six of these sampling stations are located within the site boundary and are designated as Onsite Stations D1, G, H, I, J, and K. These locations are within the site boundary of the NMPNS and JAFNPP. One air sampling station is located offsite in the southwest sector in the vicinity of the City of Oswego and is designated as Station G Offsite. Three remaining air sampling stations are located in the ESE, SSE, and SSW sectors and range in distance from 7.1 to 9.0 miles. These are designated as Offsite Stations D2, E and F respectively.

Each station collects airborne particulates using glass fiber filters (47 millimeter diameter) and radioiodine using charcoal cartridges (2x1 inch). The samplers run continuously and the charcoal cartridges and particulate filters are changed on a weekly basis. Sample volume is determined by use of calibrated gas flow meters located at the sample discharge. Gross beta analysis is performed on each particulate filter. Charcoal cartridges are analyzed for radioiodine using gamma spectral analysis. The particulate filters are composited quarterly by location and analyzed for gamma emitting radionuclides.

Air sampling station locations are shown in Section 3.3, Figures 3.3-2 and 3.3-3.

3.1.5 TLD (DIRECT RADIATION)

Thermoluminescent dosimeters (TLDs) are used to measure direct radiation (gamma dose) in the environment. Environmental TLDs are supplied and processed quarterly by the AREVA NP Environmental Laboratory. The laboratory utilizes a Panasonic based system using UD-814 dosimeters, which are constructed of rectangular teflon wafers impregnated with 25% $CaSO_4$:Dy phosphor. Each dosimeter contains three calcium sulfate elements and one lithium borate element.

1. **Environmental TLDs**

   Environmental TLDs are placed in five different geographical regions around site to evaluate effects of direct radiation as a result of plant operations. The following is a description of the five TLD geographical categories used in the NMPNS and JAFNPP Environmental Monitoring Program and the TLDs that make up each region:

TLD Geographical Category	Description
Onsite	TLDs placed at various locations within the site boundary, with three exceptions, are not required by the ODCM. (TLD locations comprising this group are: 3, 4, 5, 6, 7*, 18*, 23*, 24, 25, 26, 27, 28, 29, 30, 31, 39, 47, 103, 106 and 107)
Site Boundary	An inner ring of TLDs placed in the general area of the site boundary in each of the sixteen meteorological sectors. This category is required by the ODCM. (TLD locations comprising this group are: 7*, 18*, 23*, 75*, 76*, 77*, 78*, 79*, 80*, 81*, 82*, 83*, 84*, 85*, 86*, and 87*)

TLD Geographical Category	Description
Offsite	An outer ring of TLDs placed 4 to 5 miles from the site in each of the 8 land based meteorological sectors. This category is required by the ODCM. (TLD locations comprising this group are 88*, 89*, 90*, 91*, 92*, 93*, 94*, and 95*)
Special Interest	TLDs placed in special interest areas of high population density and use. These TLDs are located at or near large industrial sites, schools, or nearby towns or communities. This category is required by the ODCM. (TLD locations comprising this group are: 9, 10, 11, 12, 13, 15*, 19, 51, 52, 53, 54, 55, 56*, 58*, 96*, 97*, 98, 99, 100, 101, 102, 108, and 109)
Control	TLDs placed in areas beyond significant influence of the site and plant operations. These TLDs are located to the SW, S and NE of the site at distances of 12.6 to 24.7 miles. This category is also required by the ODCM. (TLD locations comprising this group are 8*, 14*, 49*, 111, 113)

* TLD location required by the ODCM

Although the ODCM requires a total of 32 TLD stations; environmental TLDs are also placed at additional locations not required by the ODCM, within the Onsite, Special Interest and Control TLD categories to supplement the ODCM required Direct Radiation readings.

Two dosimeters are placed at each TLD monitoring location. The TLDs are sealed in polyethylene packages to ensure dosimeter integrity and placed in open webbed plastic holders and attached to supporting structures, such as utility poles.

Environmental TLD locations are shown in Section 3.3, Figures 3.3-2 and 3.3-3.

2. **Independent Spent Fuel Storage Installation (ISFSI)**

In order to provide adequate spent fuel storage capacity at the FitzPatrick plant, Entergy constructed an Independent Spent Fuel Storage Installation (ISFSI) onsite. On April 25, 2002, the ISFSI facility was placed in service.

TLDs are used to monitor direct radiation levels in the vicinity of the ISFSI facility. Twelve TLD locations were established around the ISFSI pad on the perimeter fence. Six additional TLD locations are located at varying distances from the pad to determine dose rates at points of interest relative to the storage area and are designated as optional locations. Background data was collected starting in October, 2000 at eight of the TLD locations on the perimeter fence. The remaining locations were established in October 2001.

Two dosimeters are placed at each TLD monitoring location. The TLDs are sealed in polyethylene packages to ensure dosimeter integrity and placed in the field using a supporting structure such as a fence or other immovable object.

ISFSI TLD locations are shown in Section 3.3, Table 3.3.1.

3.1.6 MILK

Milk samples are routinely collected from farms during the sampling year. These farms include indicator locations and one control location. Samples are normally collected April through December of the sample year. If plant related radionuclides are detected in samples in November and December of the previous year, milk collections are continued into the following year starting in January. If plant related radionuclides are not detected in the November and December samples, then milk collections do not commence until April of the sampling year. Milk samples were not collected in January through March of 2007 as there were no positive detections of plant related radionuclides in samples collected during November and December of 2006.

The ODCM also requires that a sample be collected from a control location nine to twenty miles from the site and in a less prevalent wind direction. This location is in the south sector at a distance of 16 miles and serves as the control location.

Milk samples are collected in polyethylene bottles from a bulk storage tank at each sampled farm. Before the sample is drawn, the tank contents are agitated to assure a homogenous mixture of milk and butter fat. The samples are chilled, preserved, and shipped fresh to the analytical laboratory within thirty-six hours of collection in insulated shipping containers.

The milk sample locations are shown in Section 3.3, Figure 3.3-4. (Refer to Section 3.3, Table 3.3-1 for location designation and descriptions.)

3.1.7 FOOD PRODUCTS (VEGETATION)

Food products are collected once per year during the late summer harvest season. A minimum of three different kinds of broad leaf vegetation (edible or inedible) are collected from two different indicator garden locations. Sample locations are selected from available gardens identified in the annual census that have the highest estimated deposition values (D/Q) based on historical site meteorological data. Control samples are also collected from available locations greater than 9.3 miles distant from the site in a less prevalent wind direction. Control samples are of the same or similar type of vegetation when available.

Food product samples are analyzed for gamma emitters using gamma isotopic analysis.

Food product locations are shown in Section 3.3, Figure 3.3-5.

3.1.8 GROUND WATER MONITORING PROGRAM

The Nuclear Energy Institute (NEI) Ground Water Protection Initiative was established to determine the potential impact Nuclear Power Plants may have on the surrounding environment due to unplanned releases of radioactive liquids. Under NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document, August 2002, ground water monitoring is accomplished through sampling of the water table around the plant and analyzing it for gamma emitters and tritium. In November of 2007, JAF drilled 5 ground water wells along the north edge of the property next to the lake. Samples obtained from these wells are analyzed on a quarterly basis to determine gamma emitters and tritium concentrations.

During the operating year of 2007, there were no unplanned releases or spills of radioactive liquids on the JAF site. Ground water monitoring was conducted but not required by the NEI document.

Ground Water samples are analyzed for gamma emitters using gamma isotopic analysis and tritium using liquid scintillation detector.

Ground water results are documented in the Annual Radiological Environmental Release Report for 2007.

Ground Water sample locations are shown in Section 3.3, Figure 3.3-7.

3.2 ANALYSES PERFORMED

Environmental sample analyses are performed at the James A. FitzPatrick Nuclear Power Plant (JAFNPP) Environmental Laboratory or by a contract laboratory. The following analyses were performed:

1. Air Particulate Filter – Gross Beta
2. Air Particulate Filter Composites – Gamma Spectral Analysis
3. Airborne Radioiodine – Gamma Spectral Analysis
4. Direct Radiation using Thermoluminescent Dosimeters (TLDs) – Analyses performed by a contractor laboratory – AREVA NP Environmental Laboratory.
5. Fish – Gamma Spectral Analysis
6. Food Products (vegetation) – Gamma Spectral Analysis
7. Milk – Gamma Spectral Analysis and I-131
8. Shoreline Sediment – Gamma Spectral Analysis
9. Special Samples (soil, food, bottom sediment, etc.) – Gamma Spectral Analysis
10. Surface Water Monthly Composites – Gamma Spectral Analysis, I-131
11. Surface Water Quarterly Composite – Tritium
12. Ground Water Quarterly Samples – Tritium

3.3 SAMPLE LOCATIONS

Section 3.3 provides maps illustrating sample locations. Sample locations referenced as letters and numbers on the report period data tables are consistent with designations plotted on the maps.

This section also contains an environmental sample location reference table (Table 3.3-1). This table contains the following information:

1. Sample Medium
2. Location Designation, (this column contains the key for the sample location and is consistent with the designation on the sample location maps and on the sample results data tables)
3. Location Description
4. Degrees and Distance of the sample location from the site

3.3.1 LIST OF FIGURES

TABLE 3.3-1
2007 ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES & DISTANCE (1) & (2)		
Shoreline Sediment	05*	Figure 3.3-5	Sunset Bay	82º	at	1.4 miles
		Figure 3.3-5	Sunset Bay (3)	84º	at	1.2 miles
	06	Figure 3.3-5	Langs Beach, Control	232°	at	4.8 miles
Fish	02*	Figure 3.3-5	Nine Mile Point Transect	290°	at	0.4 miles
	03*	Figure 3.3-5	FitzPatrick Transect	62°	at	0.8 miles
	00*	Figure 3.3-5	Oswego Transect	237°	at	5.9 miles
Surface Water	03*	Figure 3.3-4	FitzPatrick Inlet	53°	at	0.6 miles
	08*	Figure 3.3-4	Oswego Steam Station Inlet	237°	at	7.6 miles
	09	Figure 3.3-4	NMP Unit 1 Inlet	319°	at	0.3 miles
	10	Figure 3.3-4	Oswego City Water	240°	at	7.8 miles
	11	Figure 3.3-4	NMP Unit 2 Inlet (Split intake with two locations)	336°	at	0.3 miles
				353°	at	0.3 miles
Air Radioiodine and	R-1*	Figure 3.3-2	R-1 Station, Nine Mile Point Road	92°	at	1.8 miles
Particulates	R-2*	Figure 3.3-3	R-2 Station, Lake Road	107°	at	1.1 miles
	R-3*	Figure 3.3-3	R-3 Station, Co. Rt. 29	133°	at	1.4 miles
	R-4*	Figure 3.3-3	R-4 Station, Village of Lycoming, Co. Rt. 29	145°	at	1.8 miles
	R-5*	Figure 3.3-2	R-5 Station, Montario Point Rd.	42°	at	16.2 miles
	D-1	Figure 3.3-3	D1 Onsite Station	71°	at	0.3 miles
	G	Figure 3.3-3	G Onsite Station	245°	at	0.7 miles
	H	Figure 3.3-3	H Onsite Station	73°	at	0.8 miles
	I	Figure 3.3-3	I Onsite Station	95°	at	0.8 miles
	J	Figure 3.3-3	J Onsite Station	109°	at	0.9 miles
	K	Figure 3.3-3	K Onsite Station	132°	at	0.5 miles
	G	Figure 3.3-2	G Offsite Station, Saint Paul Street	226°	at	5.4 miles
	D-2	Figure 3.3-2	D2 Offsite Station, Rt. 64	118°	at	9.0 miles
	E	Figure 3.3-2	E Offsite Station, Rt. 4	162°	at	7.1 miles
	F	Figure 3.3-2	F Offsite Station, Dutch Ridge Road	192°	at	7.6 miles

(1) Degrees and distance based on Nine Mile Point Unit 2 Reactor Centerline rounded to the nearest 1/10 of a mile.
(2) Degrees and Distances updated by Global Positioning System (GPS) in 2006.
(3) New sample location for 2007.
* Sample location required by ODCM

TABLE 3.3-1 (Continued)
2007 ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES & DISTANCE (1) & (2)		
Thermoluminescent	3	Figure 3.3-3	D1 Onsite	71°	at	0.3 miles
Dosimeters (TLD)	4	Figure 3.3-3	D2 Onsite	143°	at	0.4 miles
(Continued)	5	Figure 3.3-3	E Onsite	180°	at	0.3 miles
	6	Figure 3.3-3	F Onsite	213°	at	0.5 miles
	7*	Figure 3.3-3	G Onsite	245°	at	0.7 miles
	8*	Figure 3.3-2	R-5 Offsite Control	42°	at	16.2 miles
	9	Figure 3.3-2	D1 Offsite – State Route 3.	80°	at	11.4 miles
	10	Figure 3.3-2	D2 Offsite	118°	at	9.0 miles
	11	Figure 3.3-2	E Offsite	162°	at	7.1 miles
	12	Figure 3.3-2	F- Offsite	192°	at	7.6 miles
	13	Figure 3.3-2	G Offsite	226°	at	5.4 miles
	14*	Figure 3.3-2	DeMass Rd., SW Oswego - Control	227°	at	12.5 miles
	15*	Figure 3.3-2	Pole 66, W. Boundary - Bible Camp	240°	at	0.9 miles
	18*	Figure 3.3-3	Energy Info. Center - Lamp Post, SW	268°	at	0.4 miles
	19	Figure 3.3-2	East Boundary - JAF, Pole 9	83°	at	1.4 miles
	23*	Figure 3.3-3	H Onsite	73°	at	0.8 miles
	24	Figure 3.3-3	I Onsite	95°	at	0.8 miles
	25	Figure 3.3-3	J Onsite	109°	at	0.9 miles
	26	Figure 3.3-3	K Onsite	132°	at	0.5 miles
	27	Figure 3.3-3	N. Fence, N. of Switchyard, JAF	60°	at	0.4 miles
	28	Figure 3.3-3	N. Light Pole,N. of Screenhouse, JAF	68°	at	0.5 miles
	29	Figure 3.3-3	N. Fence, N. of W. Side	65°	at	0.5 miles
	30	Figure 3.3-3	N. Fence, (NW) JAF	57°	at	0.4 miles
	31	Figure 3.3-3	N. Fence, (NW) NMP-1	279°	at	0.2 miles
	39	Figure 3.3-3	N. Fence, Rad. Waste-NMP-1	298°	at	0.2 miles
	47	Figure 3.3-3	N. Fence, (NE) JAF	69°	at	0.6 miles
	49*	Figure 3.3-2	Phoenix, NY-Control	168°	at	19.7 miles
	51	Figure 3.3-2	Liberty & Bronson Sts., E of OSS	234°	at	7.3 miles
	52	Figure 3.3-2	E. 12th & Cayuga Sts., Oswego School	227°	at	5.9 miles
	53	Figure 3.3-2	Broadwell & Chestnut Sts. Fulton H.S.	183°	at	13.7 miles

(1) Degrees and distance based on Nine Mile Point Unit 2 Reactor Centerline rounded to the nearest 1/10 of a mile.
(2) Degrees and Distances updated by Global Positioning System (GPS) in 2006.
* Sample location required by ODCM

TABLE 3.3-1 (Continued)
2007 ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES & DISTANCE (1) & (2)		
Thermoluminescent	54	Figure 3.3-2	Mexico High School	115°	at	9.4 miles
Dosimeters (TLD)	55	Figure 3.3-2	Gas Substation Co. Rt. 5-Pulaski	75°	at	13.0 miles
(Continued)	56*	Figure 3.3-2	Rt. 104-New Haven Sch. (SE Corner)	124°	at	5.2 miles
	58*	Figure 3.3-2	Co Rt. 1A-Alcan (E. of E. Entrance Rd.)	222°	at	3.0 miles
	75*	Figure 3.3-3	Unit 2, N. Fence, N. of Reactor Bldg.	354°	at	0.1 miles
	76*	Figure 3.3-3	Unit 2, N. Fence, N. of Change House	25°	at	0.1 miles
	77*	Figure 3.3-3	Unit 2, N. Fence, N. of Pipe Bldg.	36°	at	0.2 miles
	78*	Figure 3.3-3	JAF. E. of E. Old Lay Down Area	85°	at	1.0 miles
	79*	Figure 3.3-3	Co. Rt. 29, Pole #63, 0.2 mi. S. of Lake Rd.	120°	at	1.2 miles
	80*	Figure 3.3-3	Co. Rt. 29, Pole #54, 0.7 mi. S. of Lake Rd.	136°	at	1.5 miles
	81*	Figure 3.3-3	Miner Rd., Pole #16, 0.5 mi. W. of Rt. 29	159°	at	1.6 miles
	82*	Figure 3.3-3	Miner Rd., Pole # 1-1/2, 1.1 mi. W. of Rt. 29	180°	at	1.6 miles
	83*	Figure 3.3-3	Lakeview Rd., Tree 0.45 mi. N. of Miner Rd.	203°	at	1.2 miles
	84*	Figure 3.3-2	Lakeview Rd., N., Pole #6117, 200ft. N. of Lake Rd.	226°	at	1.1 miles
	85*	Figure 3.3-3	Unit 1, N. Fence, N. of W. Side of Screen House	292°	at	0.2 miles
	86*	Figure 3.3-3	Unit 2, N. Fence, N of W. Side of Screen House	311°	at	0.1 miles
	87*	Figure 3.3-3	Unit 2, N. Fence, N. of E. Side of Screen House	333°	at	0.1 miles
	88*	Figure 3.3-2	Hickory Grove Rd., Pole #2, 0.6 mi. N. of Rt. 1	97°	at	4.5 miles
	89*	Figure 3.3-2	Leavitt Rd., Pole #16, 0.4 mi. S. of Rt.1	112°	at	4.3 miles
	90*	Figure 3.3-2	Rt. 104, Pole #300, 150 ft. E. of Keefe Rd.	135°	at	4.2 miles
	91*	Figure 3.3-2	Rt 51A, Pole #59, 0.8 mi. W. of Rt. 51	157°	at	4.9 miles
	92*	Figure 3.3-2	Maiden Lane Rd., Power Pole, 0.6 mi. S. of Rt. 104	183°	at	4.4 miles
	93*	Figure 3.3-2	Rt. 53 Pole 1-1, 120 ft. S. of Rt. 104	206°	at	4.4 miles
	94*	Figure 3.3-2	Rt. 1, Pole #82, 250 ft. E. of Kocher Rd. (Co. Rt. 63)	224°	at	4.4 miles
	95*	Figure 3.3-2	Alcan W access Rd., Joe Fultz Blvd, Pole #21	239°	at	3.7 miles
	96*	Figure 3.3-2	Creamery Rd., 0.3 mi. S. of Middle Rd., Pole 1-1/2	199°	at	3.6 miles
	97*	Figure 3.3-3	Rt. 29, Pole #50, 200ft. N. of Miner Rd.	145°	at	1.8 miles
	98	Figure 3.3-2	Lake Rd., Pole #145, 0.15 mi. E. of Rt 29	102°	at	1.2 miles

(1) Degrees and distance based on Nine Mile Point Unit 2 Reactor Centerline rounded to the nearest 1/10 of a mile.
(2) Degrees and Distances updated by Global Positioning System (GPS) in 2006.
* Sample location required by ODCM

TABLE 3.3-1 (Continued)
2007 ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES & DISTANCE (1) & (2)		
Thermoluminescent	99	Figure 3.3-2	NMP Rd., 0.4 mi. N. of Lake Rd., Env. Station R1	92°	at	1.8 miles
Dosimeters (TLD)	100	Figure 3.3-3	Rt. 29 & Lake Rd., Env. Station R2	106°	at	1.1 miles
(Continued)	101	Figure 3.3-3	Rt. 29, 0.7 mi. S. of Lake Rd., Env. Station R3	133°	at	1.4 miles
	102	Figure 3.3-2	EOF/Env. Lab, Rt 176, E. Driveway, Lamp Post	175°	at	11.9 miles
	103	Figure 3.3-3	EIC, East Garage Rd., Lamp Post	268°	at	0.4 miles
	104	Figure 3.3-2	Parkhurst Rd., Pole #23, 0.1 mi. S. of Lake rd.	102°	at	1.4 miles
	105	Figure 3.3-3	Lake view Rd. Pole #36, 0.5 mi. S. of Lake Rd.	199°	at	1.4 miles
	106	Figure 3.3-3	Shoreline Cove, W. of NMP-1, Tree on W. Edge	274°	at	0.3 miles
	107	Figure 3.3-3	Shoreline Cove, W. of NMP-1, 30 ft SSW of #106	273°	at	0.3 miles
	108	Figure 3.3-3	Lake Rd., Pole #142, 300 ft E. of Rt. 29 S.	105°	at	1.1 miles
	109	Figure 3.3-3	Tree North of Lake Rd., 300 ft E. of Rt. 29 N	104°	at	1.1 miles
	111	Figure 3.3-2	Control, State Route 38, Sterling NY	214°	at	21.8 miles
	112	Figure 3.3-2	EOF/Env. Lab, Oswego County Airport	175°	at	11.9 miles
	113	Figure 3.3-2	Control, Baldwinsville, NY	178°	at	24.7miles
Cows Milk	76	Figure 3.3-4	Indicator Location	120°	at	6.3 miles
	55	Figure 3.3-4	Indicator Location	97°	at	8.7 miles
	4	Figure 3.3-4	Indicator Location	115°	at	7.6 miles
	77*	Figure 3.3-4	Control Location	190°	at	16.0 miles
Food Products	132*	Figure 3.3-5	Indicator Location	110°	at	2.0 miles
	133*	Figure 3.3-5	Indicator Location	83°	at	1.6 miles
	48*	Figure 3.3-5	Indicator Location	83°	at	1.5 miles
	142**	Figure 3.3-5	Indicator Location	143°	at	1.7 miles
	144**	Figure 3.3-5	Indicator Location	139°	at	1.6 miles
	C2*	Figure 3.3-5	Control Location	222°	at	15.4 miles
	484**	Figure 3.3-5	Indicator Location	125°	at	1.3 miles
Nearest Residence (NMP)	Based on NMP Unit 2 Centerline – Refer to Figure 3.3-5					
Nearest Residence (JAF)	Based on JAF Centerline – Refer to Figure 3.3-6					

(1) Degrees and distance based on Nine Mile Point Unit 2 Reactor Centerline
(2) Degrees and Distances updated by Global Positioning System (GPS) in 2006.
* Sample location required by ODCM
** Optional sample

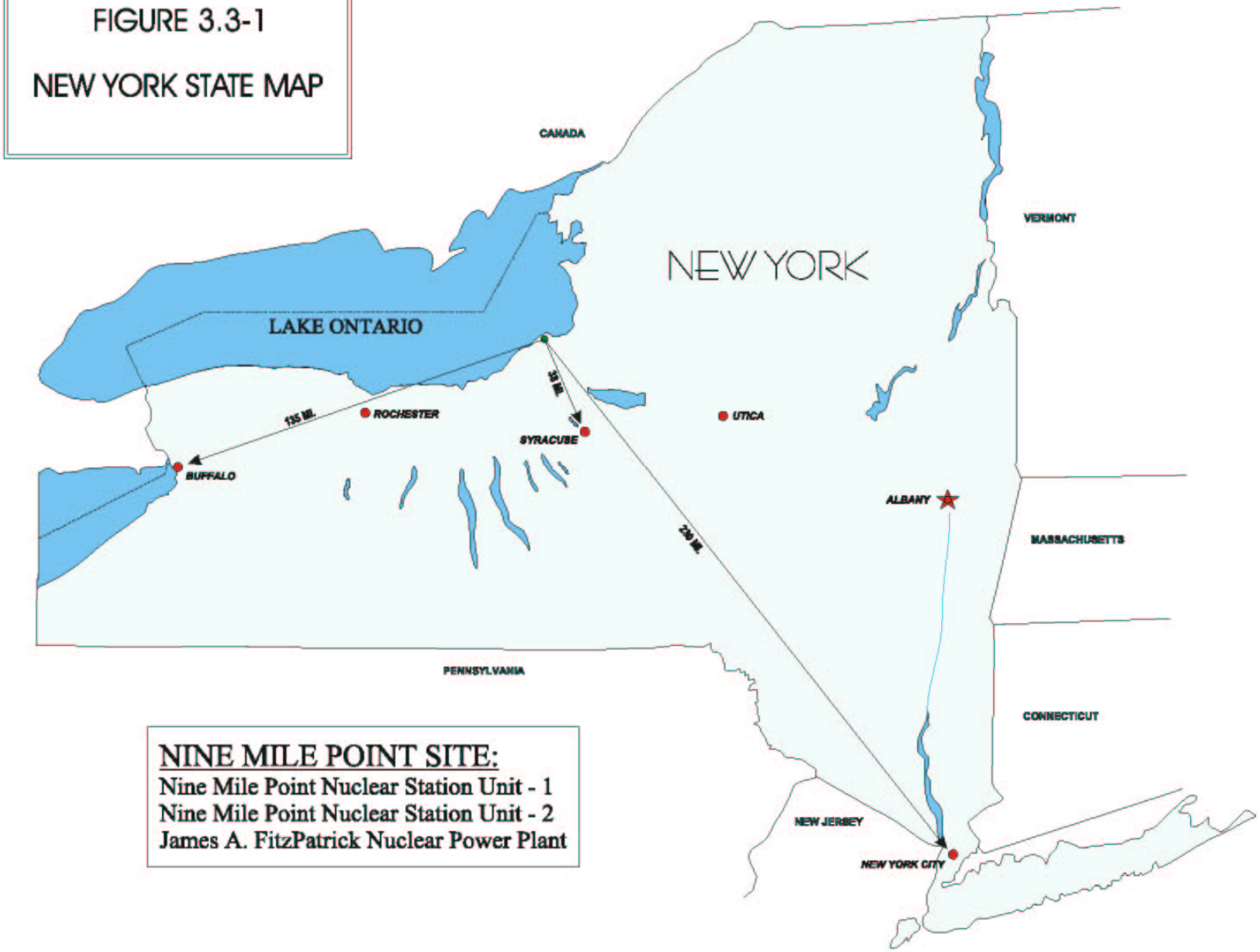
TABLE 3.3-1 (Continued)
2007 ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	LOCATION DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION
Thermoluminescent Dosimeters TLD) (Continued)	I-1*		ISFSI West Fence, South End of Storage Pad
	I-2*		ISFSI West Fence, Center of Storage Pad
	I-3*		ISFSI West Fence, North End of Storage Pad
	I-4*		ISFSI North Fence, West End of Storage Pad
	I-5*		ISFSI North Fence, Center of Storage Pad
	I-6*		ISFSI North Fence, East End of Storage Pad
	I-7*		ISFSI East Fence, North End of Storage Pad
	I-8*		ISFSI East Fence, Center of Storage Pad
	I-9*		ISFSI East Fence, South End of Storage Pad
	I-10*		ISFSI South Fence, East End of Storage Pad
	I-11*		ISFSI South Fence, Center of Storage Pad
	I-12*		ISFSI South Fence, West End of Storage Pad
	I-13H		ISFSI Building and Grounds Garage, East of Pad
	I-14H		ISFSI Tree ~100 yards South of Pad
	I-15H		ISFSI Transmission Line Tower South of Pad at East /West Access
	I-16H		ISFSI Perimeter Fence ~100 yards West of Pad on Pad Centerline
	I-17H		ISFSI North Fence of Main Switch Yard on Pad Centerline
	I-18H		ISFSI North Inner Perimeter Fence at Lake Shore on Pad Centerline
Ground Water Monitoring Wells	MW-5	Figure 3.3-7	North West edge of property
	MW-6	Figure 3.3-7	North / North West edge of property
	MW-7	Figure 3.3-7	North edge of property
	MW-8	Figure 3.3-7	North / North East edge of property
	MW-9	Figure 3.3-7	North East edge of property

* Sample location required by ODCM
H indicates Optional TLD location

FIGURE 3.3-1

NEW YORK STATE MAP



NINE MILE POINT SITE:

Nine Mile Point Nuclear Station Unit - 1
Nine Mile Point Nuclear Station Unit - 2
James A. FitzPatrick Nuclear Power Plant

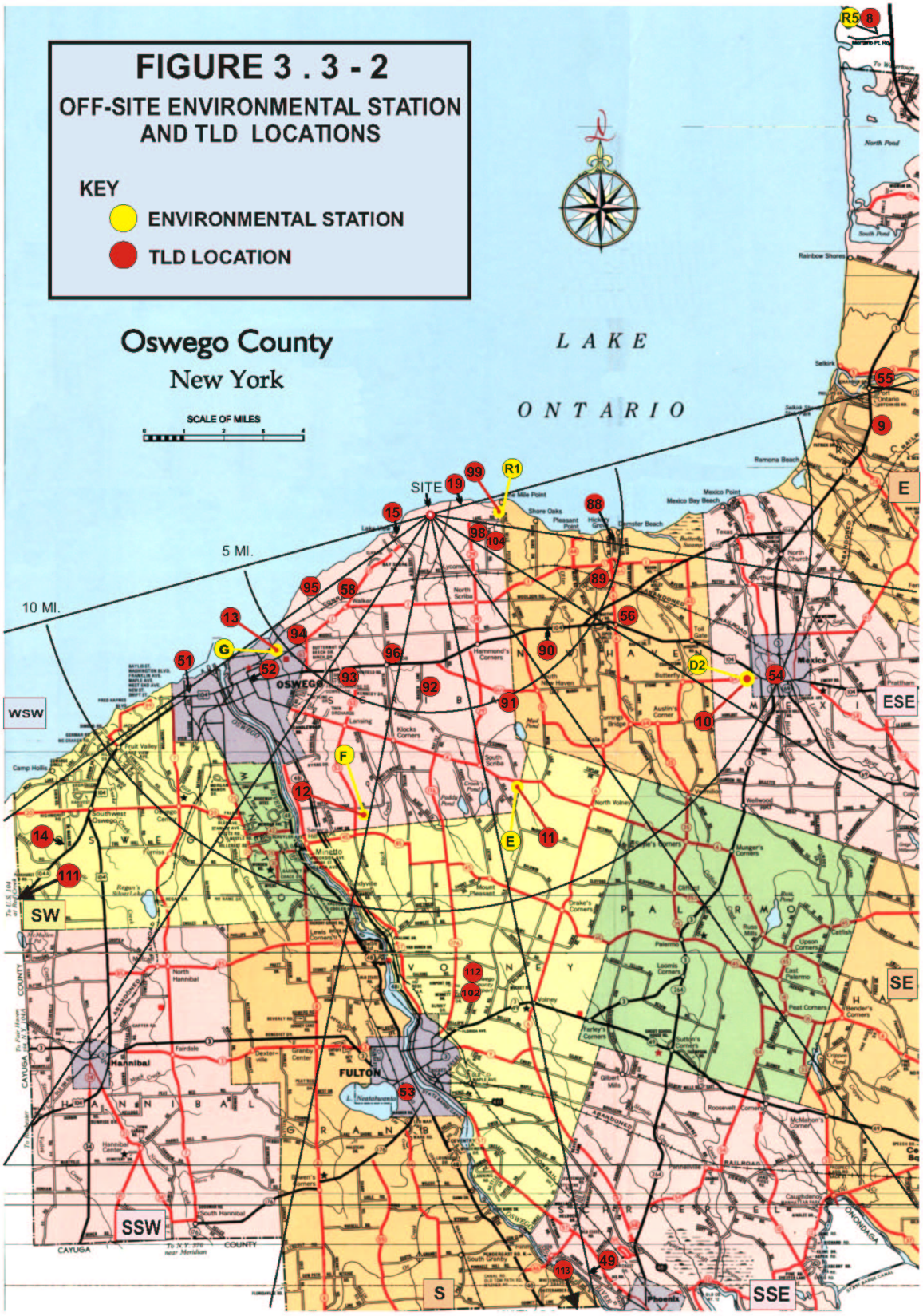
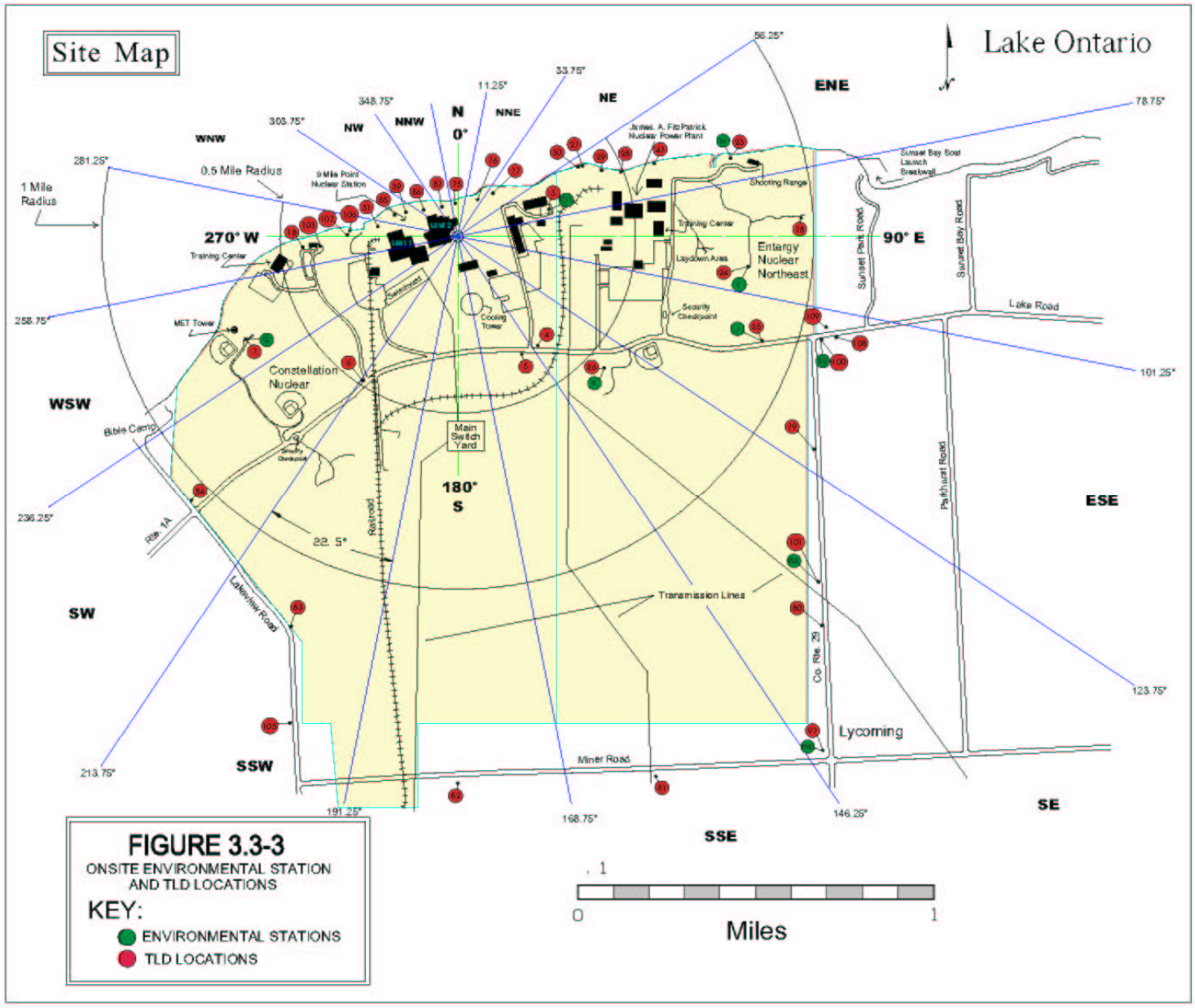
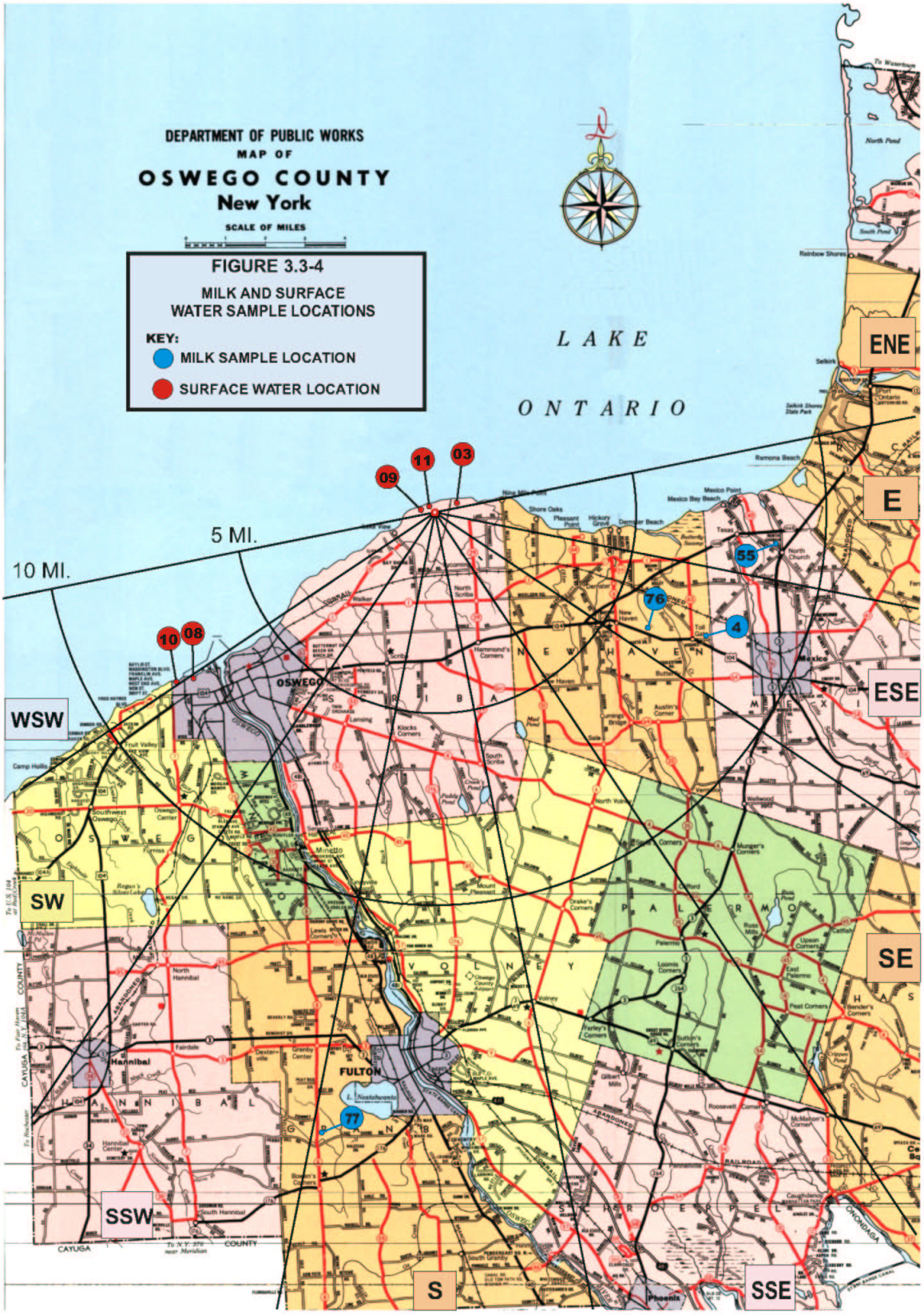
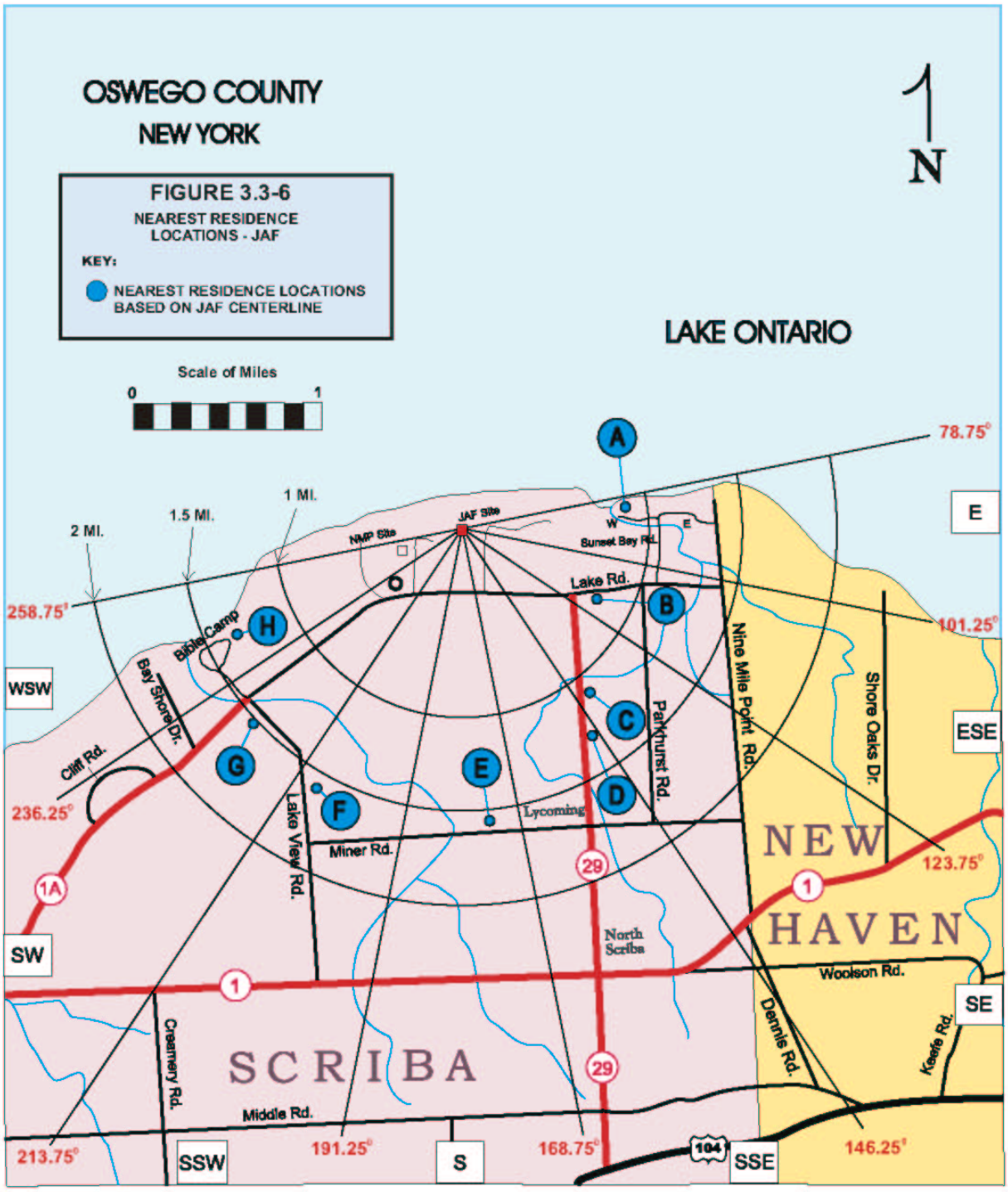


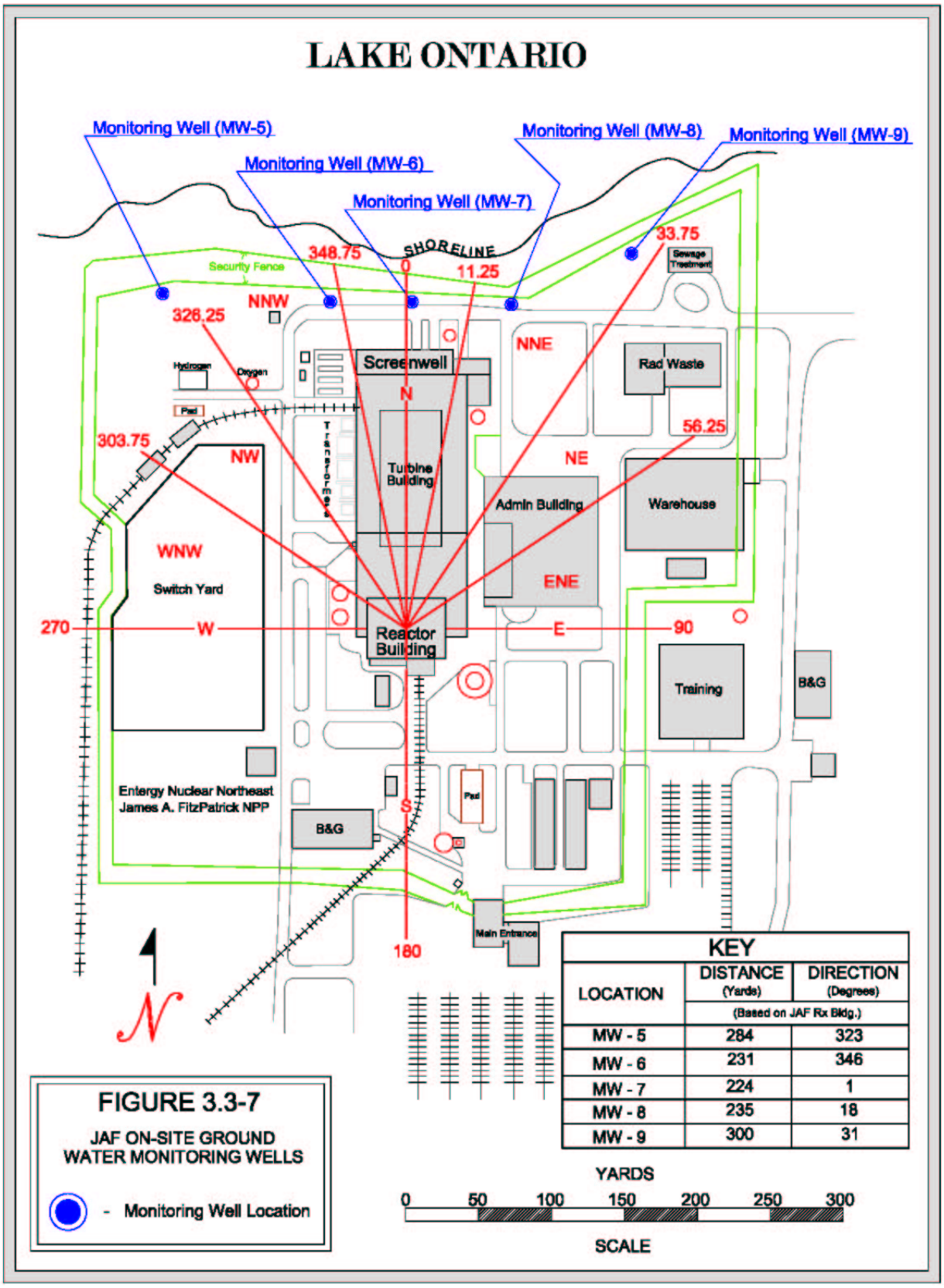
FIGURE 3 . 3 - 2
OFF-SITE ENVIRONMENTAL STATION AND TLD LOCATIONS
KEY
ENVIRONMENTAL STATION
TLD LOCATION
Oswego County
New York
SCALE OF MILES
LAKE ONTARIO
SITE
5 MI.
10 MI.
OSWEGO
FULTON
Hannibal
Mexico
Phoenix
N
NNE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW


Site Map
Lake Ontario
N
0°
NNE
NE
ENE
11.25°
33.75°
56.25°
78.75°
NNW
348.75°
NW
303.75°
WNW
281.25°
270° W
90° E
258.75°
101.25°
WSW
ESE
236.25°
123.75°
SW
SSW
213.75°
191.25°
168.75°
146.25°
SSE
SE
180°
S
1 Mile Radius
0.5 Mile Radius
9 Mile Point Nuclear Station
James. A. FitzPatrick Nuclear Power Plant
Shooting Range
Sunset Bay Boat Launch Breakwall
Sunset Park Road
Sunset Bay Road
Training Center
Entergy Nuclear Northeast
Laydown Area
Lake Road
Security Checkpoint
Cooling Tower
MET Tower
Constellation Nuclear
Bible Camp
Main Switch Yard
Parkhurst Road
Rte. 1A
Railroad
22. 5°
Lakeview Road
Transmission Lines
Co. Rte. 29
Lycoming
Miner Road
FIGURE 3.3-3
ONSITE ENVIRONMENTAL STATION AND TLD LOCATIONS
KEY:
ENVIRONMENTAL STATIONS
TLD LOCATIONS
0
1
Miles


DEPARTMENT OF PUBLIC WORKS
MAP OF
OSWEGO COUNTY
New York
SCALE OF MILES
FIGURE 3.3-4
MILK AND SURFACE
WATER SAMPLE LOCATIONS
KEY:
MILK SAMPLE LOCATION
SURFACE WATER LOCATION
LAKE
ONTARIO
5 MI.
10 MI.
09
11
03
10
08
55
76
4
77
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
OSWEGO
FULTON
Hannibal
Phoenix


DEPARTMENT OF PUBLIC WORKS
MAP OF
OSWEGO COUNTY
New York
SCALE OF MILES
FIGURE 3.3-5
NEAREST RESIDENCE, FOOD PRODUCT, FISH AND SHORELINE SEDIMENT SAMPLE LOCATIONS
KEY:
FISH
FOOD FRODUCT
SHORELINE SEDIMENT
NEAREST RESIDENCE NMP-UNIT 2 CENTER LINE
LAKE ONTARIO
5 MI.
10 MI.
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
OSWEGO
FULTON
Hannibal
CAYUGA COUNTY
OSWEGO COUNTY


OSWEGO COUNTY
NEW YORK
FIGURE 3.3-6
NEAREST RESIDENCE
LOCATIONS - JAF
KEY:
NEAREST RESIDENCE LOCATIONS
BASED ON JAF CENTERLINE
N
LAKE ONTARIO
Scale of Miles
0
1
78.75°
101.25°
123.75°
146.25°
168.75°
191.25°
213.75°
236.25°
258.75°
E
ESE
SE
SSE
S
SSW
SW
WSW
1 Mi.
1.5 Mi.
2 Mi.
A
B
C
D
E
F
G
H
JAF Site
NMP Site
W
E
Sunset Bay Rd.
Lake Rd.
Nine Mile Point Rd.
Shore Oaks Dr.
Parkhurst Rd.
Lycoming
Miner Rd.
Lake View Rd.
Bay Shore Dr.
Cliff Rd.
Bible Camp
North Scriba
Woolson Rd.
Dennis Rd.
Keefe Rd.
Creamery Rd.
Middle Rd.
NEW HAVEN
SCRIBA
1A
1
29
104


LAKE ONTARIO
Monitoring Well (MW-5)
Monitoring Well (MW-6)
Monitoring Well (MW-7)
Monitoring Well (MW-8)
Monitoring Well (MW-9)
SHORELINE
Security Fence
348.75
0
11.25
33.75
Sewage Treatment
NNW
326.25
NNE
Screenwell
Rad Waste
Hydrogen
Oxygen
Pad
N
303.75
NW
Transformers
Turbine Building
56.25
NE
Admin Building
Warehouse
WNW
Switch Yard
ENE
270
W
Reactor Building
E
90
Training
B&G
Entergy Nuclear Northeast
James A. FitzPatrick NPP
B&G
S
Pad
Main Entrance
180
KEY
LOCATION
DISTANCE (Yards)
DIRECTION (Degrees)
(Based on JAF Rx Bldg.)
MW - 5 284 323
MW - 6 231 346
MW - 7 224 1
MW - 8 235 18
MW - 9 300 31
YARDS
0 50 100 150 200 250 300
SCALE
FIGURE 3.3-7
JAF ON-SITE GROUND WATER MONITORING WELLS
- Monitoring Well Location

3.4 LAND USE CENSUS

The ODCM requires that a milch animal census and a residence census be conducted annually out to a distance of five miles. Milch animals are defined as any animal that is routinely used to provide milk for human consumption.

The milch animal census is an estimation of the number of cows and goats within an approximate ten mile radius of the Nine Mile Point Site. The census is done once per year in the summer. It is conducted by sending questionnaires to previous milch animal owners, and by road surveys to locate any possible new owners. In the event that questionnaires are not answered, the owners are contacted by telephone or in person. The Oswego County Cooperative Extension Service was also contacted to provide any additional information.

The residence census is conducted each year to identify the closest residence in each of the 22.5 degree meteorological sectors out to a distance of five miles. A residence, for the purposes of this census, is a residence that is occupied on a part time basis (such as a summer camp), or on a full time, year round basis. Several of the site meteorological sectors are over Lake Ontario, therefore, there are only eight sectors over land where residences are located within five miles.

In addition to the milch animal and residence census, a garden census is performed. The census is conducted each year to identify the gardens near the site that are to be used for the collection of food product samples. The results of the garden census are not provided in this report. The results are used only to identify appropriate sample locations. The garden census is not required by the ODCM if broadleaf vegetation sampling and analysis are performed.

3.5 CHANGES TO THE REMP PROGRAM

The following changes were implemented during the 2007 sampling program:

3.5.1 Food Product Sampling Program

During the reporting period, one new food product location was added and one food product location was removed from the Environmental Monitoring locations. These locations are used to implement the requirements of the ODCM, Part 1, Table 5.1-1. Sample locations selected were based on the 2007 annual land use census and were utilized to implement the 2007 food product requirements.

3.5.2 Milk Sampling Program

During the reporting period, one of the milk sample locations ceased milk production in May of 2007. Samples were obtained from Sample Location #4 during April and May of 2007. This location was used to implement the requirements of ODCM, Part 1, Table 5.1-1 even though its distance from the plant was greater then 5 miles.

3.5.3 Ground Water Monitoring Program

During the reporting period, 5 ground water monitoring wells were drilled along the northern edge of the site property. Samples obtained from these wells were analyzed for gamma emitters and tritium. These wells are used to implement the NEI Ground Water Protection Initiative.

3.6 DEVIATION AND EXCEPTIONS TO THE PROGRAM

The noted exceptions to the 2007 sample program address only those samples or monitoring requirements which are required by the ODCM, Part I, Table 5.1-1. This section satisfies the reporting requirements of ODCM, Part I, Section 5.1.1.c.1.

3.6.1 ODCM Program Deviations

The following are deviations from the program specified by the ODCM:

1. Environmental Air sample station R-2 offsite flow control valve was found chattering during the sample period of 1/30/07 to 2/6/07. The volumetric flow rate was outside of the acceptable range of the procedure. The sample pump was replaced and flowrate returned to acceptable range. Total air sample station out of service time was 15mins.

2. The air sampling pump at the R-1 and R-2 Environmental Sampling Station was inoperable for approximately 6 hours during the sample period of 7/3/07 to 7/10/07. The air sample pump was running at the time of sample collection. The sample pump out of service time was determined based on the sample pump run time integrator. The inoperability of the pump was due to loss of power to the sampler. No corrective actions were required to restore unit to service.

3. Continuous sampling was not maintained at Environmental Air sample stations R-1 Offsite and R-2 Offsite. During the sample period from 9/11/07 to 9/18/07, a period of 3.7 hours was lost due to a power outage. Pumps were found running during the weekly sample change out.

4. A loss of sample collection occurred at the R-1 Offsite station for a duration of 1.9 hrs and R-2 Offsite station for a duration of 1.2 hrs. The loss of sample is based on the station's air pump integrating time and was determined to be due to a power outage in the area.

3.6.2 Air Sampling Station Operability Assessment

The ODCM required air sampling program consists of 5 individual sampling locations. The collective operable time period for the air monitoring stations was 43,657 hours out of a possible 43,680 hours. The air sampling availability factor for the report period was 99.95%.

3.7 STATISTICAL METHODOLOGY

There are a number of statistical calculation methodologies used in evaluating the data from the environmental monitoring program. These methodologies include determination of standard deviation, the mean and associated error for the mean, and the lower limit of detection (LLD).

3.7.1 ESTIMATION OF THE MEAN AND STANDARD DEVIATION

The mean ($\overline{X}$) and standard deviation (s) were used in the reduction of the data generated by the sampling and analysis of the various media in the JAFNPP Radiological Environmental Monitoring Program (REMP). The following equations were utilized to compute the mean ($\overline{X}$) and the standard deviation (s):

1. **Mean**

$$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{N}$$

Where,

$\overline{X}$ = estimate of the mean

i = individual sample

N, n = total number of samples with positive indications

X_i = value for sample i above the lower limit of detection.

2. **Standard Deviation**

$$\mathbf{s} = \left[\frac{\sum_{\mathbf{i=1}}^{\mathbf{n}} (\mathbf{X_i} - \overline{\mathbf{X}})^2}{(\mathbf{N} - 1)} \right]^{1/2}$$

Where,

$\overline{X}$ = mean for the values of X

s = standard deviation for the sample population

3.7.2 ESTIMATION OF THE MEAN & THE ESTIMATED ERROR FOR THE MEAN

In accordance with program policy, when the initial count indicates the presence of a plant related radionuclide(s) in a sample, two recounts of the sample may be required. When a radio-nuclide is positively identified in two or more counts, the analytical result for the radionuclide is reported as the mean of the positive detections and the associated propagated error for that mean. In cases where more than one positive sample result exists, the mean of the sample results and the estimated error for the mean are reported in the Annual Report.

The following equations were utilized to estimate the mean ($\overline{X}$) and the associated propagated error.

1. **Mean**

$$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{N}$$

Where,

$\overline{X}$	=	estimate of the mean
i	=	individual sample
N,n	=	total number of samples with positive indications
X_i	=	value for sample i above the lower limit of detection

2. **Error of the Mean (Reference 18)**

$$ERROR\ \ MEAN = \frac{\left[\sum_{i=1}^{n} (ERROR)^2\right]^{1/2}}{\mathbf{N}}$$

Where,

ERROR MEAN	=	propagated error
i	=	individual sample
ERROR	=	1 sigma* error of the individual analysis
N, n	=	number of samples with positive indications

* Sigma (σ)

Sigma is the Greek letter used to represent the mathematical term Standard Deviation.

Standard Deviation is a measure of dispersion from the arithmetic mean of a set of numbers.

3.7.3 LOWER LIMIT OF DETECTION (LLD)

The LLD is the predetermined concentration or activity level used to establish a detection limit for the analytical procedures.

The LLDs are specified by the ODCM for radionuclides in specific media and are determined by taking into account the overall measurement methods. The equation used to calculate the LLD is:

$$LLD = \frac{4.66\ S_b}{(E)(V)\ (2.22)\ (Y)\ \exp\ (-\lambda\Delta t)}$$

Where:

LLD = the a priori lower limit of detection, as defined above (in picocuries per unit mass or volume)

sb = the standard deviation of the background counting rate or of the counting rate of a blank sample, as appropriate (in counts per minute)

E = the counting efficiency (in counts per disintegration)

V = the sample size (in units of mass or volume)

2.22 = the number of disintegrations per minute per picocurie

Y = the fractional radiochemical yield (when applicable)

λ = the radioactive decay constant for the particular radionuclide

Δt = the elapsed time between sample collection (or end of the sample collection period) and time of counting

The ODCM LLD formula assumes that:

1. The counting times for the sample and background are equal
2. The count rate of the background is approximately equal to the count rate of the sample

In the ODCM program, LLDs are used to ensure that minimum acceptable detection capabilities are met with specified statistical confidence levels (95% detection probability with 5% probability of a false negative). Table 3.8-1 lists the ODCM program required LLDs for specific media and radionuclides as specified by the NRC. The LLDs actually achieved are routinely lower than those specified by the ODCM.

3.8 COMPLIANCE WITH REQUIRED LOWER LIMITS OF DETECTION (LLD)

ODCM, Part 1, Table 5.1-3 specifies the detection capabilities for environmental sample analysis (see report Table 3.8-1). ODCM, Part 1, Section 6.1 requires that a discussion of all analyses for which the required LLDs specified were not routinely achieved be included in the Annual Radiological Environmental Operating Report. Section 3.8 is provided pursuant to this requirement.

3.8.1 All sample analyses performed in 2007 as required by the ODCM, achieved the Lower Limit of Detection (LLD) as specified by ODCM, Part 1, Table 5.1-3. See report Table 3.8-1 for required LLD values.

TABLE 3.8-1

REQUIRED DETECTION CAPABILITIES FOR
ENVIRONMENTAL SAMPLE ANALYSIS
LOWER LIMIT OF DETECTION (LLD)

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Food Products (pCi/kg, wet)	Sediment (pCi/kg, dry)
Gross Beta	4	0.01				
H-3	3000 (a)					
Mn-54	15		130			
Fe-59	30		260			
Co-58, Co-60	15		130			
Zn-65	30		260			
Zr-95, Nb-95	15					
I-131	15 (a)	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba/La-140	15			15		

(a) No drinking water pathway exists at the Nine Mile Point site under normal operating conditions due to the direction and distance of the nearest drinking water intake. Therefore, an LLD value of 3000 pCi/liter is used for H-3 and an LLD value of 15 pCi/liter is used for I-131.

3.9 REGULATORY LIMITS

Two federal agencies, the Nuclear Regulatory Commission and Environmental Protection Agency, have responsibility for regulations promulgated for protecting the public from radiation and radioactivity beyond the site boundary.

3.9.1 The Nuclear Regulatory Commission (NRC):

The NRC, in 10 CFR 20.1301, limits the levels of radiation in unrestricted areas resulting from the possession or use of radioactive materials such that they limit any individual to a dose of:

- less than or equal to 100 mrem per year to the total body

In addition to this dose limit, the NRC has established design objectives for nuclear plant licensees. Conformance to these guidelines ensures that nuclear power reactor effluents are maintained as far below the legal limits as is reasonably achievable.

The NRC; in 10CFR 50, Appendix I, establishes design objectives for the dose to a member of the general public from radioactive material in liquid effluents released to unrestricted areas to be limited to:

- less than or equal to 3 mrem per year to the total body
  or
- less than or equal to 10 mrem per year to any organ

The air dose due to release of Noble gases in gaseous effluents is restricted to:

- less than or equal to 10 mrad per year for gamma radiation or
- less than or equal to 20 mrad per year for beta radiation

The dose to a member of the general public from Iodine-131, tritium, and all particulate radionuclide's with half-lives greater than 8 days in gaseous effluents is limited to:

- less than or equal to 15 mrem per year to any organ

The NRC, in 10CFR72.104(a), establishes criteria for radioactive materials in effluents and direct radiation from an Independent Spent Fuel Storage Installation (ISFSI).

During normal operations and anticipated occurrences, the annual dose equivalent to any real individual who is located beyond the controlled area must not exceed:

- 25 mrem per year to the total body
- 75 mrem per year to the thyroid
  and
- 25 mrem per year to any other organ as a result of :
  1. Planned discharges of radioactive material, radon and its decay products excepted, to the environment
  2. Direct radiation from ISFSI
  3. Any other radiation from fuel cycle operation in the region

3.9.2 Environmental Protection Agency (EPA)

The EPA, in 40CFR190.10, Subpart B, sets forth the environmental standards for the uranium fuel cycle. During normal operation, the annual dose to any member of the public from the entire uranium fuel cycle shall be limited to:

- less than or equal to 25 mrem per year to the total body
- less than or equal to 75 mrem per year to the thyroid
  and
- less than or equal to 25 mrem per year to any other organ