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ENVIRONMENTAL STATEMENT. OSWEGO STEAM STATION, UNIT 5.(U)

DEC 71

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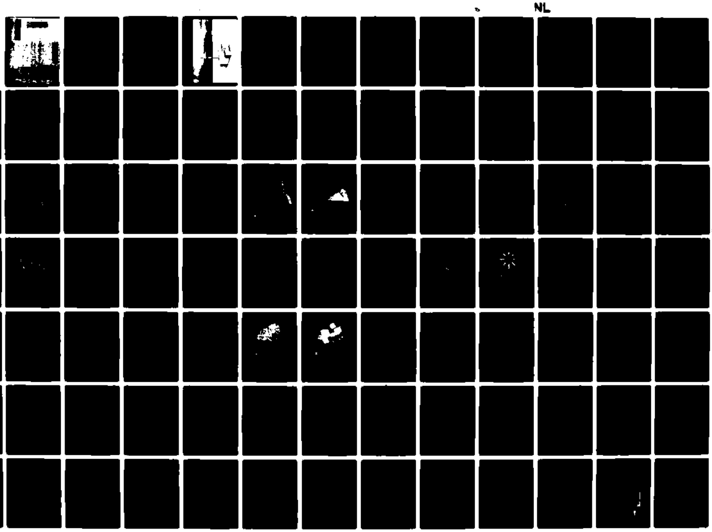


OSWEGO STEAM STATION - UN

AGARA MOHAWK POWER CORPO

BASIC DATA SUBMITTED BY

NIAGARA MOHAWK POWER CORPORA

IN CONSULTATION WITH

TONE & WEBSTER ENGINEERING CORP

AND

QUIRK, LAWLER & MATUSKY ENGINE

IN SUPPORT OF ITS APPLICATION

DISCLAIMER NOTICE

27 December 1971

Steam Generating Station Unit #5,
Oswego Harbor, New York

( ) Draft (X) Final Statement

Responsible Office: U.S. Army Engineer District, Buffalo, New York

1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action: Construction of a fifth oil-fueled electric generating unit with intake and discharge structures, together with other appurtenances.

3. a. Environmental Impacts: Occupation of approximately ten acres of land, discharge of quantities of heat, air-borne emissions, liquid effluents and sound energy, and the receipt and consumption of approximately 9 million barrels of fuel oil per year.

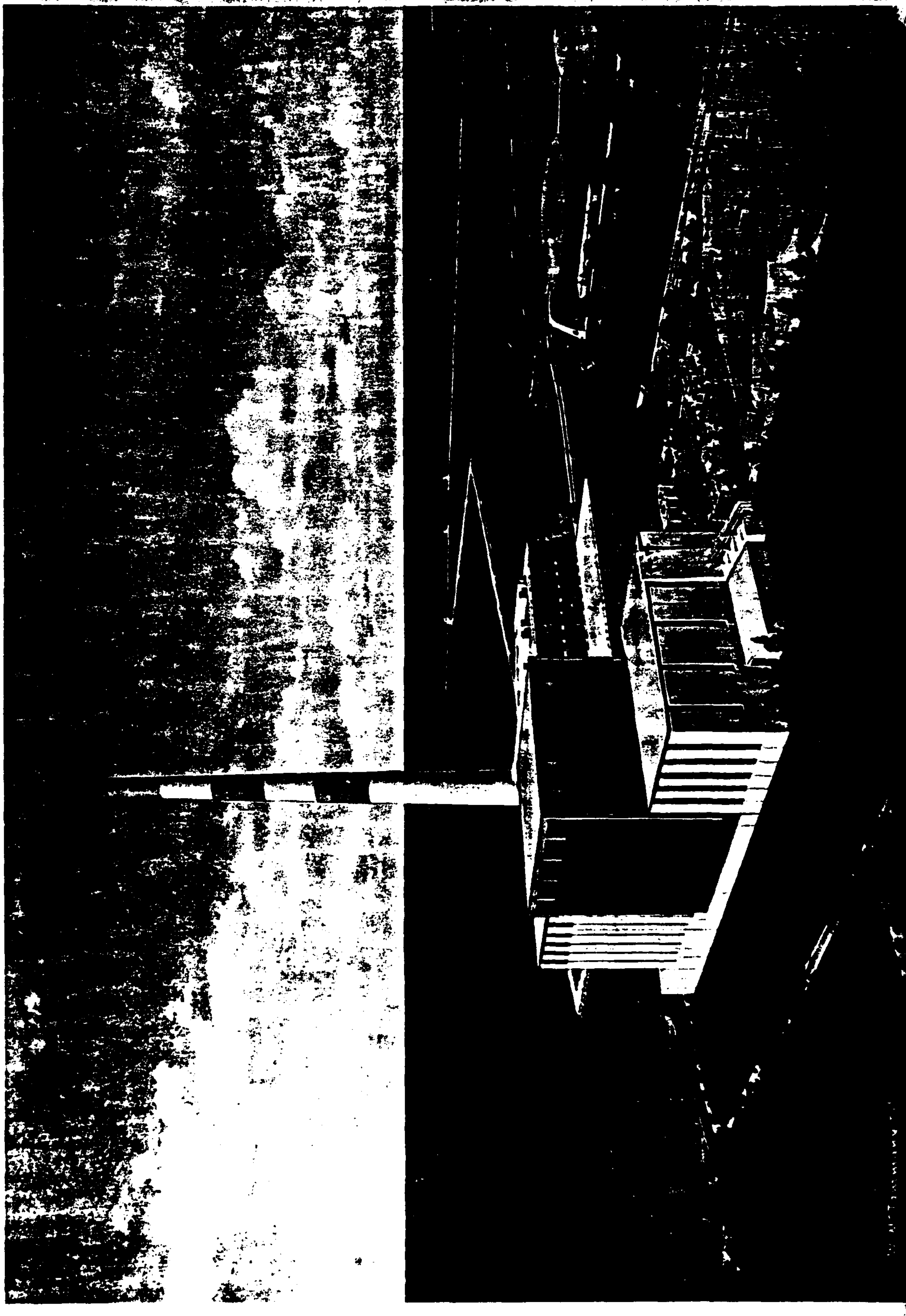
b. Adverse Environmental Effects: All impacts listed above are to some degree environmentally adverse except the receipt of fuel oil. The receipt and handling of the fuel oil are potentially adverse.

4. Alternatives: Another location, no project, non-fossil fuel, and other types of cooling systems.

5. Comments requested:

Genesee Finger Lakes Regional Planning Board
Great Lakes Basin Commission
National Resource Economics Division, Dept. of Agriculture
Department of Commerce
Central New York Regional Planning Board
Bureau of Outdoor Recreation
Ninth Coast Guard District
Federal Highway Administration, Albany
National Park Service, Philadelphia
New York State Historic Trust
Federal Power Commission
Environmental Protection Agency, New York, NY
Environmental Protection Agency, Chicago, IL
New York State Environmental Conservation Department
National Marine Fisheries Service
Federal Aviation Administration
Bureau of Sport Fisheries and Wildlife
Great Lakes Laboratory, State Univ. College at Buffalo
Center for Great Lakes Studies, Univ. of Wisconsin, Milwaukee

6. Draft statement to CEQ 15 November 1971.
Final statement to CEQ ______________.



(6) Environmental Statement. Oswego Steam Station. Unit 5.

TABLE OF CONTENTS (CONT'D)

(11) 27 Dec 71

(9) Final rept.

APPENDICES

(12) 222

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TABLE OF CONTENTS

DRAFT ENVIRONMENTAL STATEMENT

OSWEGO STEAM STATION - UNIT 5

LIST OF FIGURES

LIST OF FIGURES (CONT'D)

LIST OF FIGURES (CONT'D)

LIST OF TABLES

1. PROJECT DESCRIPTION

The Oswego Steam Station of the Niagara Mohawk Power Corporation occupies a site containing approximately 91 acres in the City of Oswego, New York, on the shore of Lake Ontario. The location is shown in Fig. 1.0-1 and 1.0-2.

This site now contains four fossil fuel steam electric generating units with a total nameplate rating of 320 megawatts (Mw) and a maximum output of 407 Mw. These units were constructed during the period from 1938 to 1956, and were designed for coal firing. Beginning in June 1972, these existing units will be fired with oil. The existing units utilize once-through cooling systems discharging to Oswego Harbor. Each utilizes its own smokestack discharging 365 ft above ground level.

The proposed Unit 5 will consist of an oil-fired steam electric generating unit, with a nameplate rating of 816 Mw and a maximum output of 890 Mw. The frontispiece of this report illustrates the southwest view of the expanded Oswego Steam Station. A plot plan of a portion of the property is shown in Fig. 1.0-3.

Detailed design and engineering work will be undertaken during the remaining three years for completion of the project. Preliminary site preparation has started, and it is anticipated that erection of structural steel for the building will begin in April 1972. Offshore construction work for the circulating water intake and discharge structures is scheduled to begin in March 1972. All major construction work will be completed by July 1974. After testing all systems, the unit will be placed in commercial operation in October 1974.

1.1 POWER DEMANDS AND PROJECTIONS

In 1970, Niagara Mohawk's peak load occasioned by its own customers, including minor firm sales to a few villages, was 4,614 Mw. By 1975, Niagara Mohawk's peak is expected to be 5,855 Mw, an increase of 1,241 Mw or a growth rate of approximately 27 percent during the five year period 1970 through 1975. This 27 percent growth is quite conservative. It does not embrace speculative additions to Niagara Mohawk's load which might appear through demands for service by new industries with very large annual power requirements.

Niagara Mohawk's electric operations are conducted at what is probably a substantially higher annual load factor than those of the other major utilities serving the New York State area. In 1969, for example, Niagara Mohawk's load produced an annual load factor of 68 percent, and in 1970, which can be considered a recession year, its load produced an annual load factor of slightly over 67 percent.

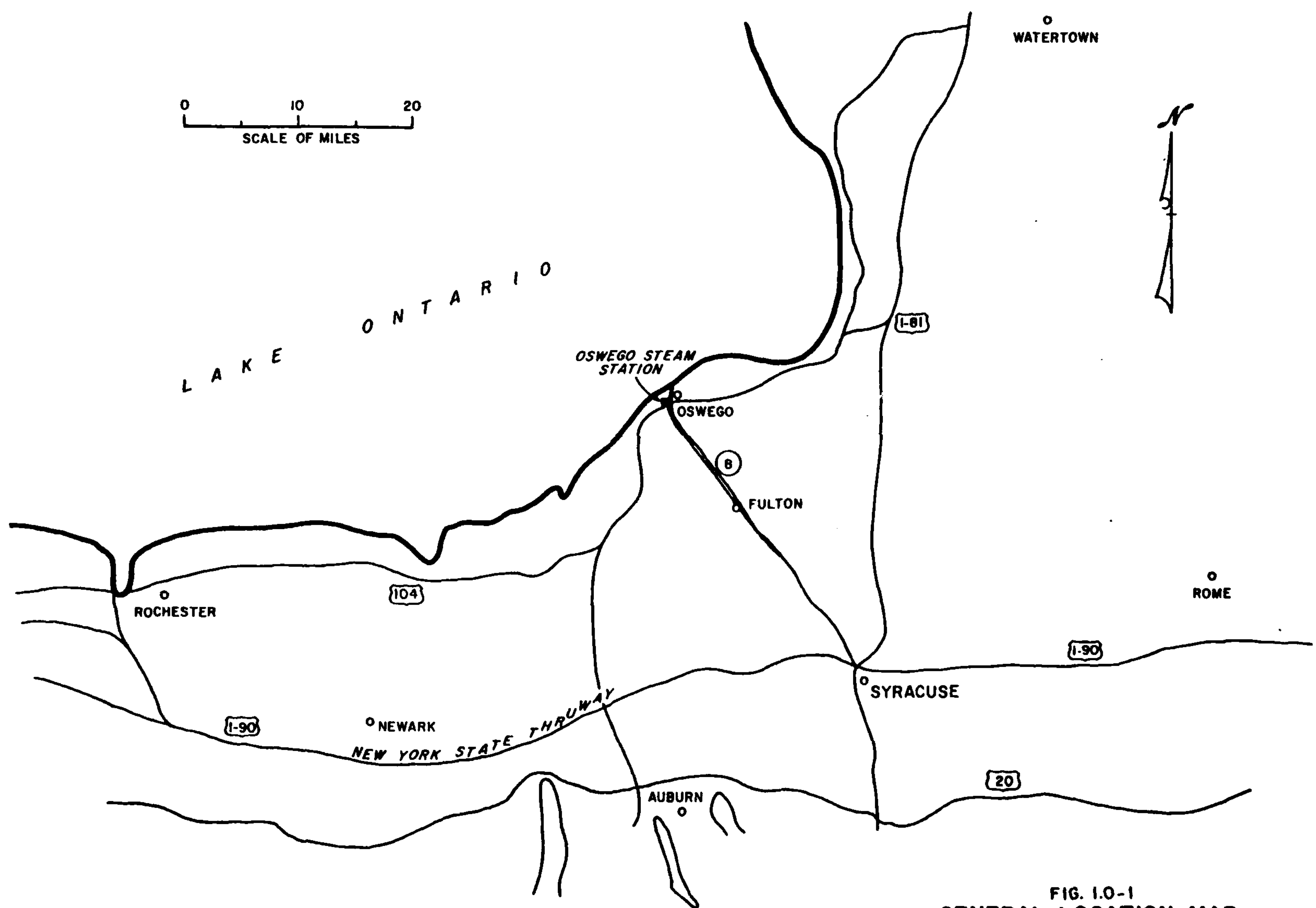


FIG. 1.0-1
GENERAL LOCATION MAP
NIAGARA MOHAWK POWER CORPORATION

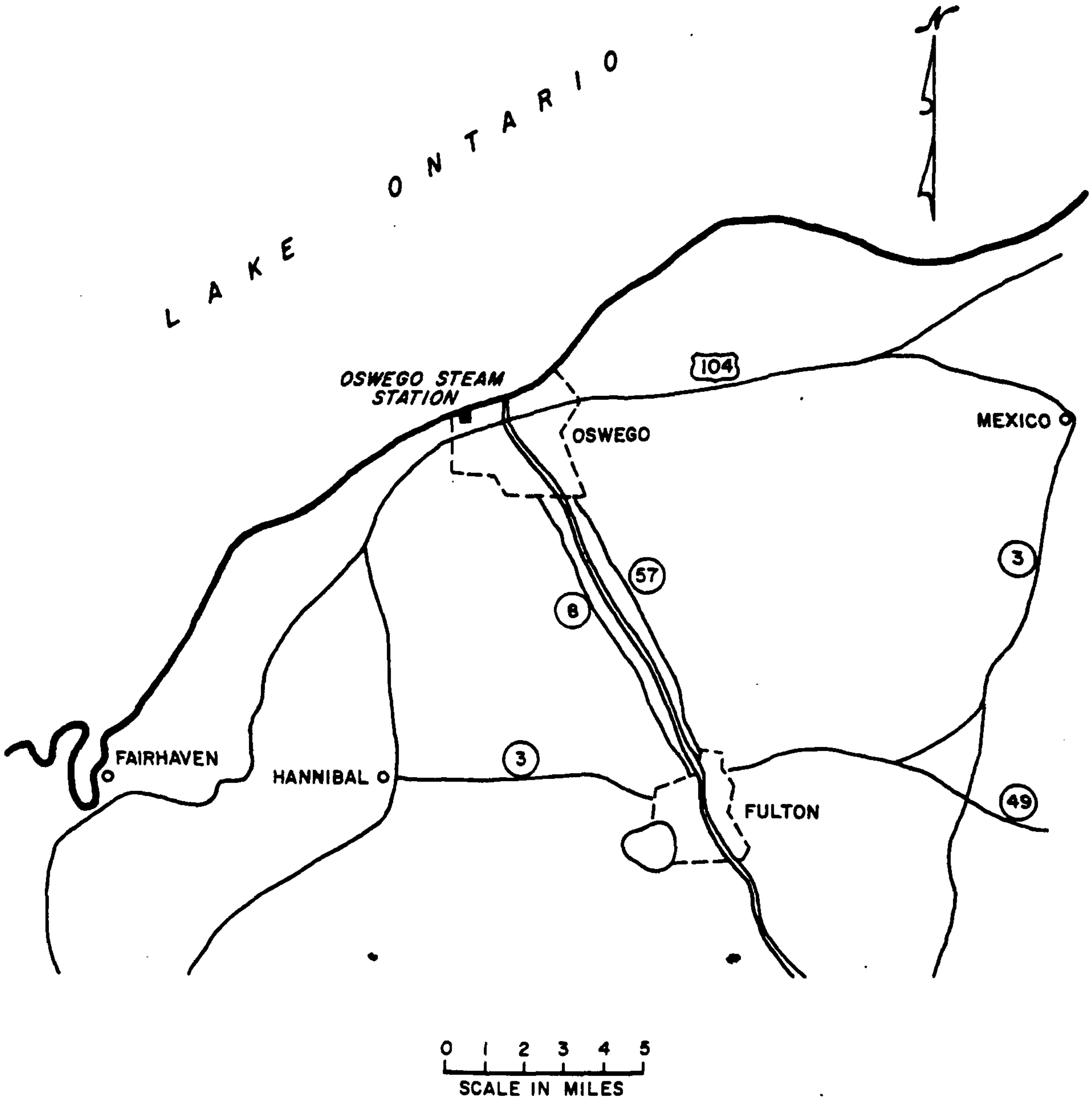
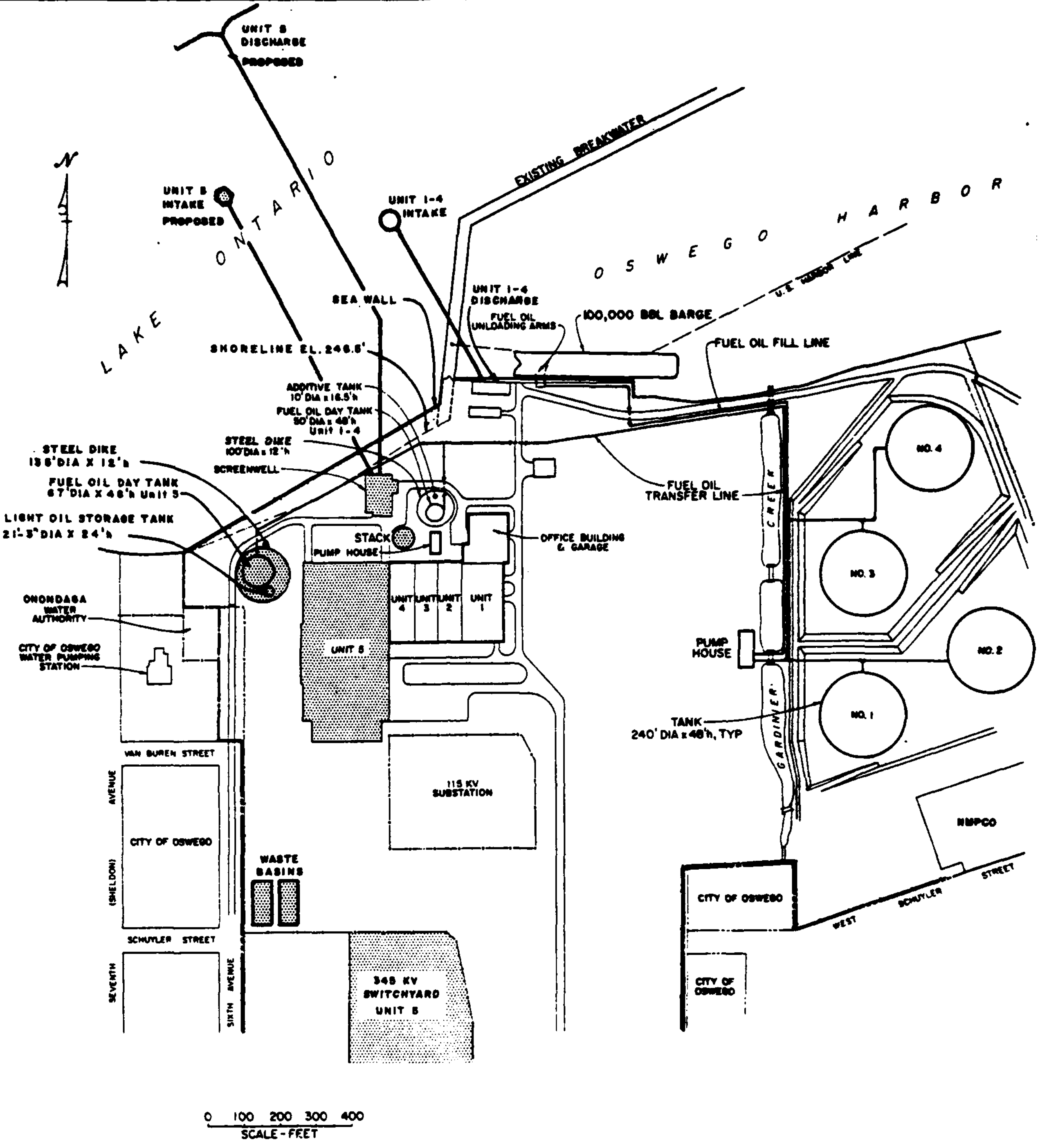


FIG. 1.0-2

VICINITY MAP
OSWEGO, NEW YORK
NIAGARA MOHAWK POWER CORPORATION



PROPOSED

FIG. 1.0-3

PLOT PLAN

OSWEGO STEAM STATION UNITS 1, 2, 3, 4 & 5

NIAGARA MOHAWK POWER CORPORATION

Niagara Mohawk and the other members of the New York Power Pool are coordinating operation of their generating facilities and planning an optimum mix of new generating units and related transmission facilities. The next few years will present problems in planning an orderly expansion of power supply facilities to meet the ever increasing requirements of consumers in the state. These problems stem from the existing uncertainties of providing new dependable generating capabilities within the original time periods specified. Difficulties in maintaining construction schedules and optimum quality control measures are the main cause of the uncertainty.

A shortage of power availability existing in the New York Power Pool in 1970 is expected to continue until sufficient generation and transmission can be added. This shortage of power availability results from an inability to meet the New York Power Pool reliability criterion which requires that available capacity exceed demand on all but one day in ten years (99.9615 percent of the time). This goal is expected to be achieved by 1973, based upon generation facilities now under construction, and which will be commercially available and dependable at that time.

Recent studies, utilizing data gathered on the relatively poor availability experienced in 1970, indicate that if Oswego Unit 5 is not commercially in service in the winter of 1974, the generation in the state will be insufficient to meet the 99.9615 percent reliability criterion. The lack of adequate reserve capacities has made it impossible for some utilities in the pool to undertake normal yearly maintenance work. If this situation continues for a significant length of time, the probability of forced outages of existing capacity will obviously increase.

1.2 PLANT DESCRIPTION

Unit 5 will be an extension of the Oswego Steam Station which now consists of Units 1 through 4. The new unit will be completely enclosed and will contain an oil-fired steam generator designed to produce 6,300,000 pounds of steam per hour at 2,600 pounds per square inch (psi) gage pressure (normal operation at 2,480 psi gage) and 1,005 F with a single reheat to 1,005 F (1,005/1,005 F) and a reheat turbine-generator with a guaranteed rating of 816 Mw at 2,285 psi gage, 1,000/1,000 F, 2 inches of mercury (in. Hg) exhaust. The maximum capability of the unit will be 890 Mw at 2,400 psi gage. A general cross section of the building showing major equipment is shown in Fig. 1.2-1.

Steam generated in the boiler will leave the superheater section at 2,480 psi gage pressure and a final superheat temperature of 1,005 F. The steam will pass to the turbine where its heat energy will be converted to mechanical energy to drive the turbine shaft. The steam will then return to the steam generator and be reheated to 1,005 F. It will again pass to the turbine where additional mechanical energy will be imparted to the shaft.

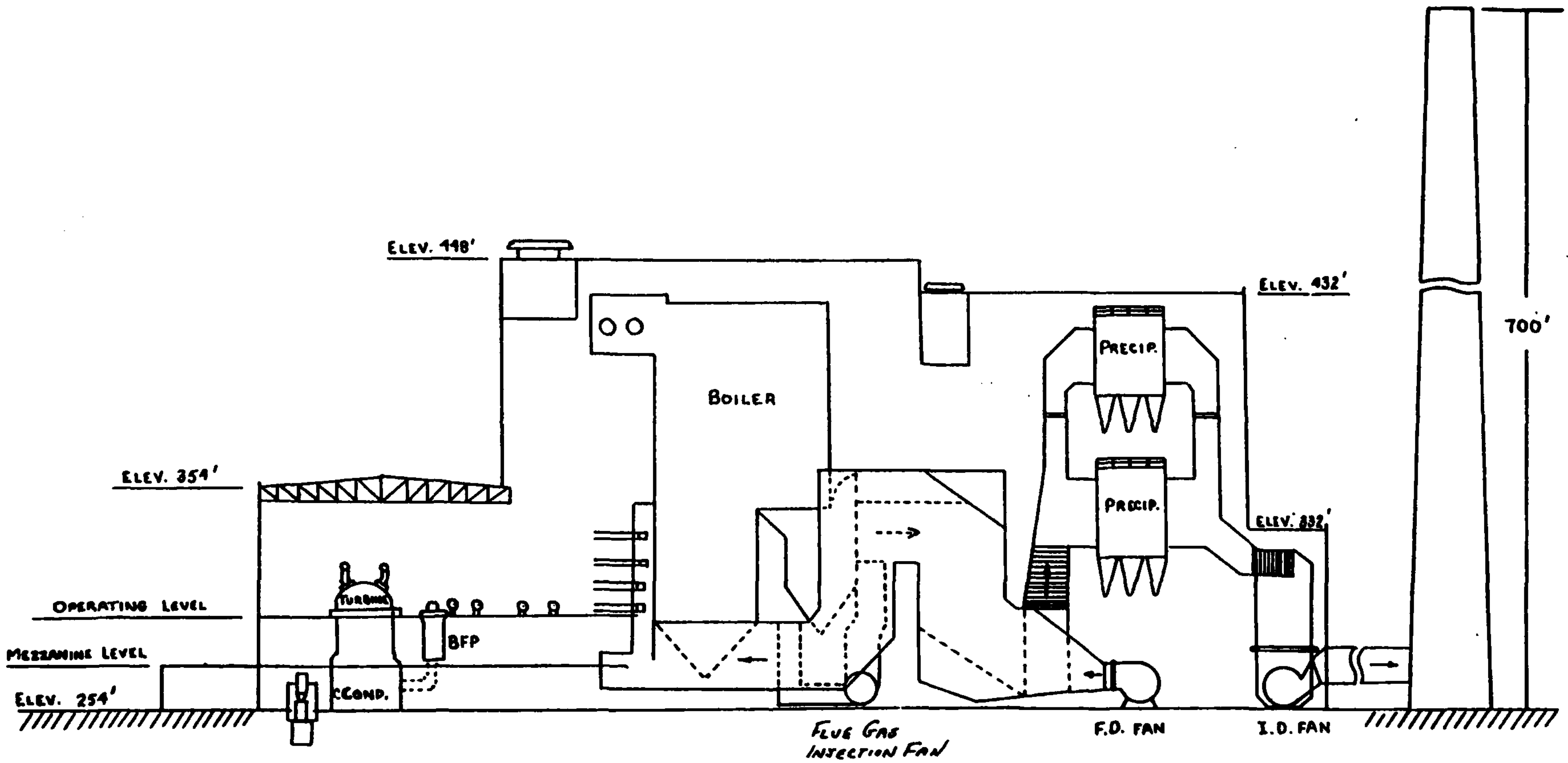


FIG. 1.2-1

EAST CROSS - SECTION

OSWEGO STEAM STATION UNIT NO. 5

NIAGARA MOHAWK POWER CORPORATION

The mechanical energy produced in the turbine will be transmitted to the generator via a common shaft, and be converted into electrical energy.

After giving up its heat energy, the steam will pass to the single pass steam condenser where it will be cooled to its condensation temperature and converted back into water. This water will then be raised to a high pressure by the boiler feedpumps for reuse in the steam generator. A portion of the condensate will be continuously removed to prevent buildup of solids within the boiler and be replaced with treated lake water.

A circulating water system will supply relatively cool lake water to reduce the steam to condensate for reuse in the boiler. The circulating water system will be of the once-through type, taking water from and returning it to Lake Ontario via intake and discharge structures located on the lake bottom several hundred feet offshore. Water will be taken from the intake structure to the screenwell, where floating and suspended material will be removed. The water will then be pumped to the steam condenser. After receiving heat in the condenser, the water will be returned to the lake and dispersed by a submerged flow diffuser.

In the boiler, steam will be generated from the heat released by the combustion of fuel oil. Air will be taken from outside the boilerhouse and be pressurized for passage through the duct work. In the furnace section of the boiler, this air will be mixed with fuel and ignited. After transfer of its heat energy to the steam, the resulting flue gases will pass out of the boiler to the electrostatic precipitators. These precipitators will remove most of the dust and ash produced during combustion. The gases will then be drawn through the induced draft fans and be discharged to the atmosphere through the stack.

A single flue stack will be provided. The existing stacks on Units 1 through 4 will be retired, and these units will be connected to the new stack. Unit 5 will also be connected to this stack.

Fuel oil facilities will consist of unloading equipment for receiving oil from barges delivered to the plant dock by tugboat, four 240 ft diam by 48 ft high fuel oil storage tanks, fuel oil pumphouses, day tanks, and interconnecting piping systems.

Fuel oil received by barge at the dock area will be stored in four onsite storage tanks. Additional offsite storage may be required to prevent disruption of service when fuel deliveries are halted by freezing of the water access routes. Offsite storage requirements will be predicated on the oil delivery program to be worked out with oil suppliers and transportation firms. The oil will be pumped from the storage tanks to smaller day tanks and then to the boiler.

Electric power will be transmitted from the turbine-driven generator to the step-up transformers which will increase voltage from 21,000 to 345,000 for transmission. The power will then be sent to the switchyard and finally to the power transmission lines. A portion of the generator output will be converted to 13,800 v and to lower voltages for powering all subsystems in the power plant.

A new 345 kv low profile switchyard will be connected to the Unit 5 generator via two half-size step-up transformers with three outgoing lines.

The shoreline of the northern portion of the power plant site will be protected by the construction of a seawall. This seawall will join the outer west breakwater and extend approximately 850 ft along the property line to the shore. It will be a maximum of 128 ft from the shore at any point. The top of the seawall will be approximately 5 ft above final grade surrounding the facility and approximately 14 ft above lake low water datum. It will be constructed with excavated rock, and protected with clean stone riprap with spalls no smaller than 1 in. in size to control turbidity of the lake during construction.

Of the 91 acres of property, approximately 53 acres will be landscaped or planted. The remaining area is occupied by the facilities. Specimen trees will be used to screen and outline the perimeter and interior spaces. In addition, some group plantings of small trees and large growing shrubs will be used to achieve solid effects and to break up wide areas. The principal open areas will be planted with grasses and hardy vegetative ground cover. Public approaches will be treated formally with lawns and shrubs.

MAIN POWERHOUSE

The turbine and boiler rooms will have a structural steel frame enclosed with insulated metal siding. Concrete block masonry will be used as required for heat retention, sound attenuation, or fireproofing. A 3 ft high concrete wall will be used above the ground level around the perimeter of the building. Walls above this level will be of colored insulated metal siding, augmented with colored trim. The roofs will consist of precast concrete panel decking, insulated as required for temperature or sound attenuation, and finished with asphalt smooth-surface roofing.

Foundations for the powerhouse will be of reinforced concrete. Major column and equipment foundations will be founded on the sandstone rock formation which lies about 10 ft below ground grade. Minor foundations will be founded on compacted fill or suitable undisturbed materials.

CIRCULATING WATER SYSTEM

Circulating water for Unit 5 will be taken from Lake Ontario via a submerged inlet, circulated through the condensers, and returned to the lake through a submerged jet diffuser (Ref. 1). Fig. 1.2-2 shows the proposed locations of intake and discharge structures in Lake Ontario. The intake structure will be hexagonally shaped and will be located approximately 850 ft from the existing shoreline.

At the low water datum of 243 ft (International Great Lakes Datum, 1955), the water is 22 ft deep and the clearance between the top of the intake structure and the water surface will be 12 ft. Details of the intake structure are shown in Fig. 1.2-3.

The pertinent dimensions of the intake structure include a 3 ft sill at the bottom to prevent silting of the intake, a 2 ft roof thickness and a 5 ft high by 21.17 ft aperture on each of the six sides. The intake aperture will be equipped with heated bar racks to prevent the formation of frazil ice. The intake is designed so that the horizontal approach velocity will be 1.0 feet per second (fps) when the generating unit is operated at maximum output. There will be negligible vertical approach velocity.

The discharge diffuser will be located 1,360 ft offshore and will be oriented parallel to the east-west line of the existing breakwater. As shown in Fig. 1.2-2, each branch tunnel will have three vertical steel risers spaced 40 ft apart. These risers will extend through a vertical rock shaft and terminate in a diffuser head. Each diffuser head will consist of two horizontal discharge nozzles, 2 ft in diameter at the tip, diverging at a horizontal angle of 20 deg (see Fig. 1.2-4).

Circulating water will be discharged from 12 nozzles at an initial discharge velocity of 16.8 fps. The relatively high velocities in the nozzles, as compared to those in the branch tunnel, in conjunction with the symmetrical geometry of the diffuser head will produce equal flows from all nozzles. Port centerlines are elevated 5 ft above the lake bottom to prevent bottom scour and to ensure sufficient ambient water below the jet. Fig. 1.2-5 shows that the average depth to the nozzle centerline will be approximately 22 ft.

Intake and discharge tunnels will pass through rock approximately 100 ft below the lake bottom to a screenwell and pumphouse located onshore. A fish refuge area will be provided in the forebay of the screenwell. Circulating water pumps will withdraw water from the bays in the pumphouse. This structure will also contain trash racks and traveling screens located in front of the condenser circulating water pumps.

Unit 5 will require a total circulating water flow of 635 cubic feet per second (cfs) when the plant is operating at maximum

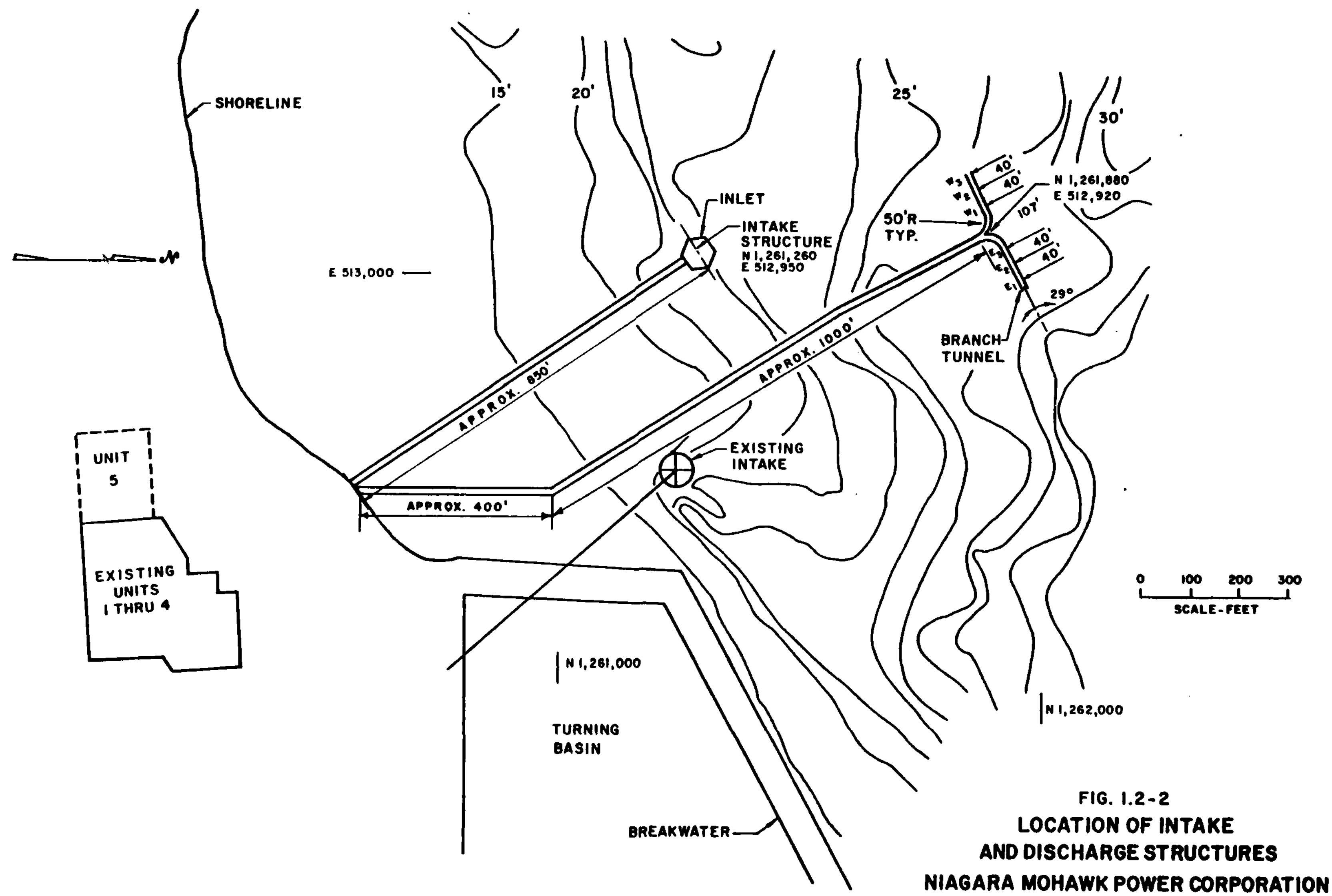


FIG. 1.2-2
LOCATION OF INTAKE
AND DISCHARGE STRUCTURES
NIAGARA MOHAWK POWER CORPORATION

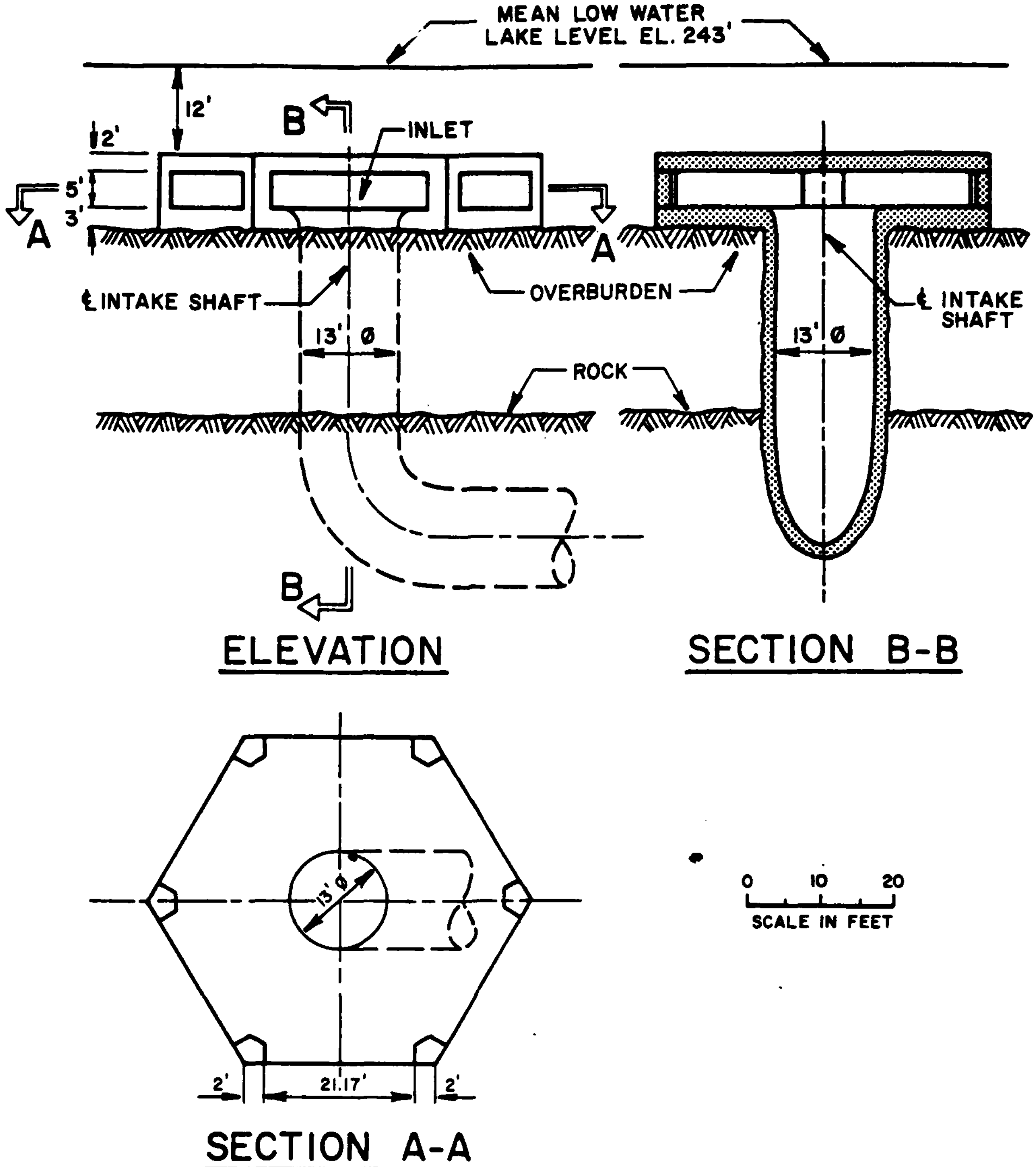


FIG. 1.2-3
INTAKE STRUCTURE
NIAGARA MOHAWK POWER CORPORATION

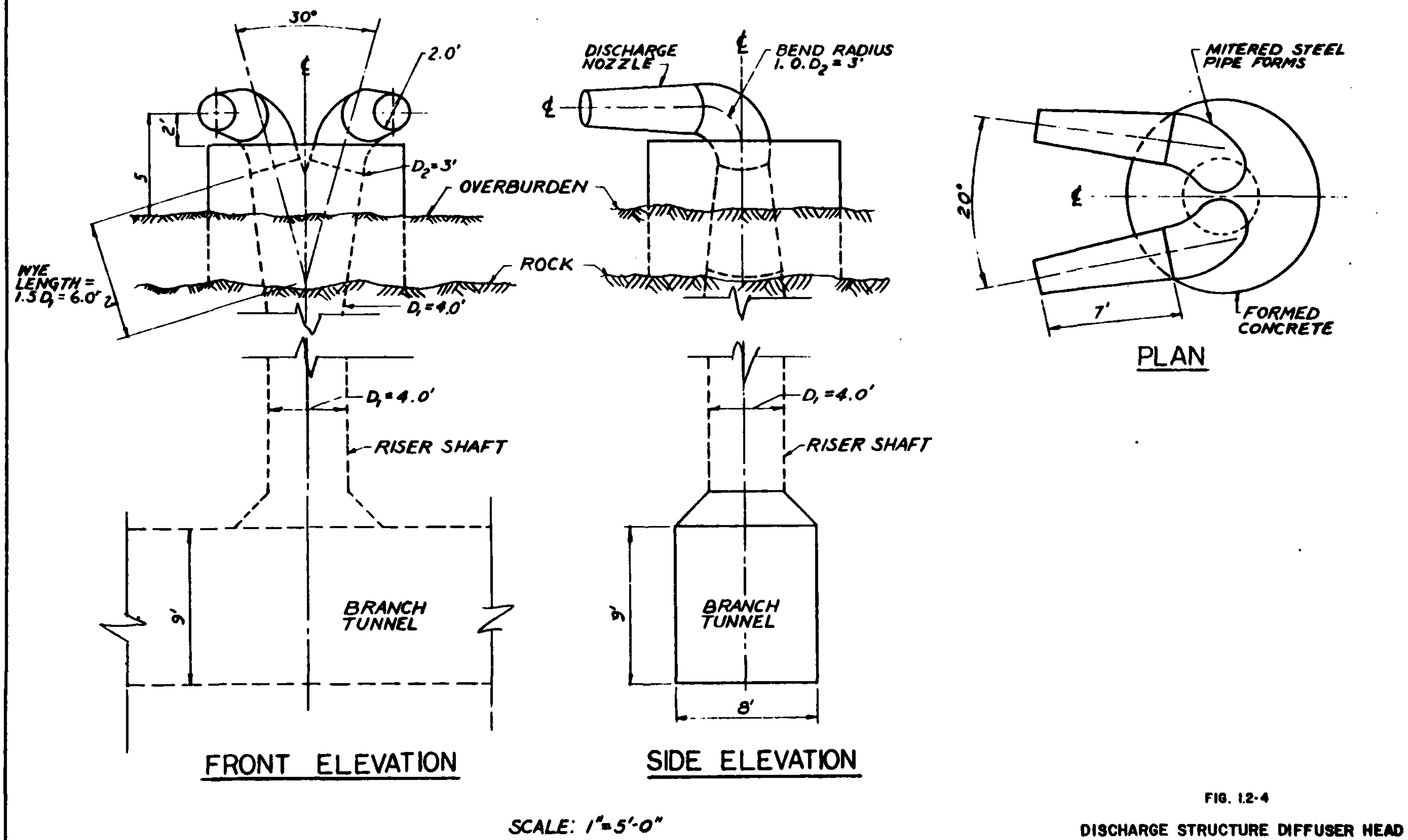


FIG. 1.2-4

DISCHARGE STRUCTURE DIFFUSER HEAD

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION

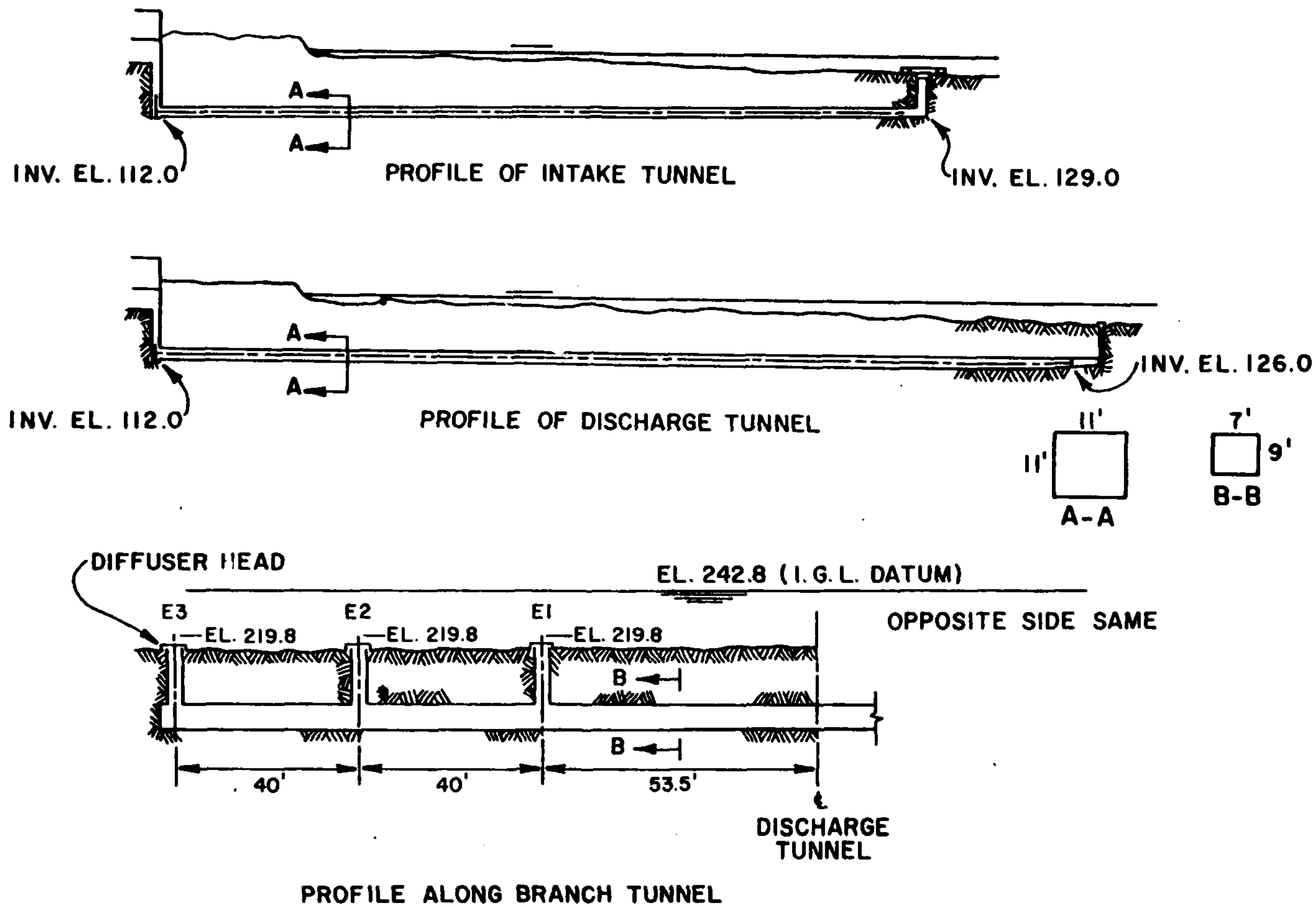


FIG. 1.2-5
TUNNEL PROFILES
NIAGARA MOHAWK POWER CORPORATION

output. The temperature of the condenser cooling flow of 546 cfs will be raised 32.42 F, while the temperature of the service water flow of 89 cfs will be raised 5 F. Thus, 635 cfs will be discharged from the unit at a maximum temperature rise above lake ambient of 28.6 F. Total heat emission to the lake will be 4.09 billion Btu per hr.

STACK AND FLUE GAS SYSTEM

A schematic of the flue gas system is shown in Fig. 1.2-6. Combustion air will pass through two vertical shaft regenerative air preheaters. The preheaters will be fitted with steam cleaning and water washing devices and Cor-Ten steel cold end baskets. Flues immediately downstream from the air preheater will be provided with fixed water sprays for cleaning.

Flue gases will pass from the air preheaters through two high efficiency electrostatic precipitators, each capable of handling 1,070,000 cubic feet per minute (cfm) at 284 F. An ash handling system will be installed to convey ash from the precipitator and economizer hoppers.

Two motor-driven, half-capacity, inlet vane controlled, induced draft fans will take flue gases from the precipitator and discharge to the stack. Each fan will be capable of handling 1,510,000 cfm at 32.9 in. water pressure (in. H_2O) with an 8,000 hp motor. The fans will be enclosed and suitably sound attenuated.

A 700 ft high, reinforced concrete chimney will discharge the flue gas from all units including the proposed Unit 5 and existing Units 1 through 4. The chimney will be supported on a heavy reinforced concrete mat, bearing on rock. The chimney shell will be approximately 65 ft diam and will contain a single insulated steel liner. The total gas flow through the stack will be 3,400,000 cfm from the total of five generating units.

Sampling ports for particulate measurement and for sulfur dioxide and nitrogen oxides concentration monitoring will be provided at the stack breeching. The chimney will be equipped with approved aircraft warning systems and a lightning protection system.

FUEL OIL STORAGE AND TRANSFER SYSTEM

Two hydraulically operated marine unloading arms will be located at the existing dock to receive oil pumped from barges delivered to the dock by tugboat. The arrangement of unloading facilities is shown in Fig. 1.2-7. The oil will be transferred from the unloading arms to any one of four 240 ft diam by 48 ft high fuel oil storage tanks via a 16 in. fuel oil fill line.

The four storage tanks will be surrounded by 12 ft high earthen dikes with a 15 ft wide access road on top. The tanks will be

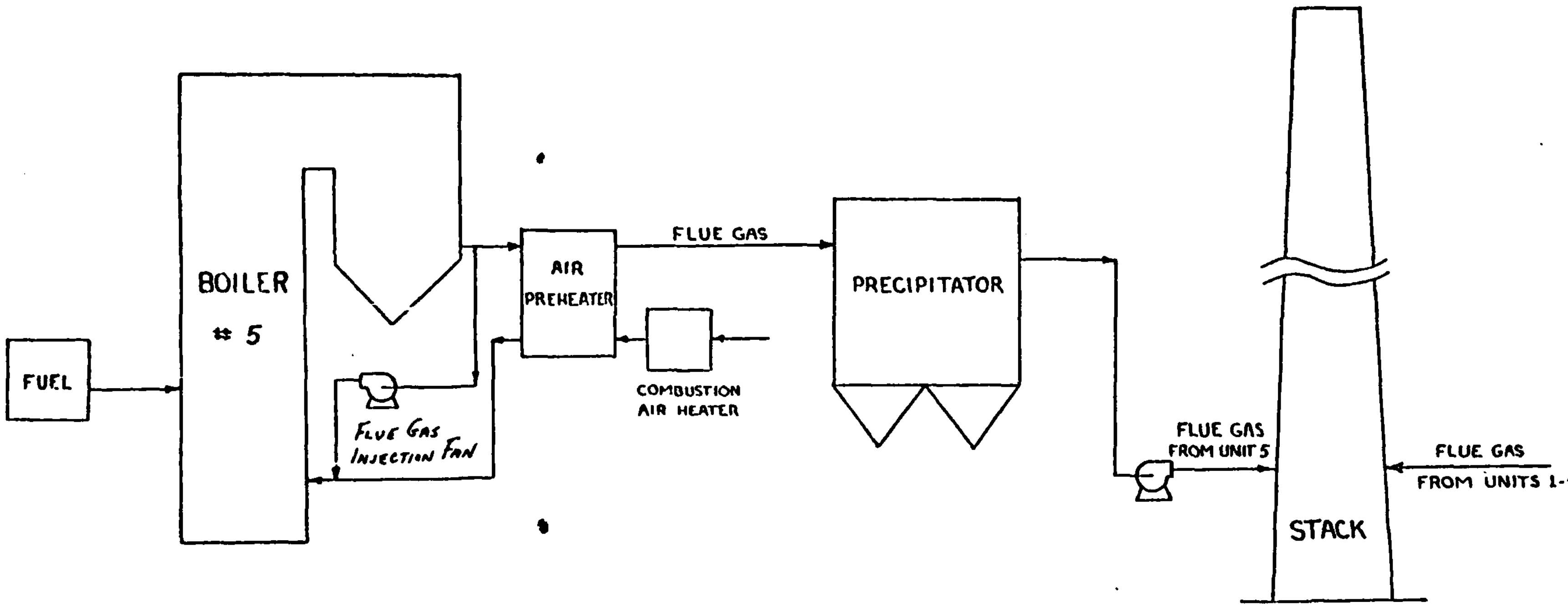
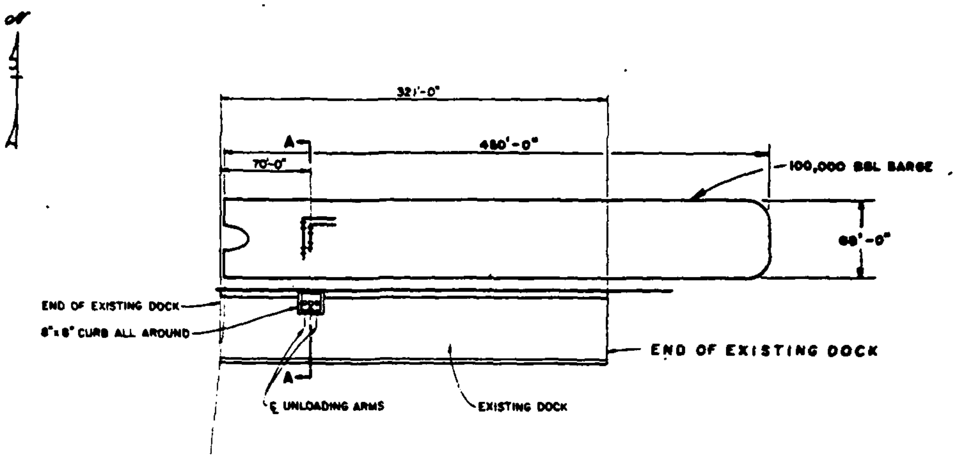


FIG. 1.2-6

FLUE GAS SYSTEM

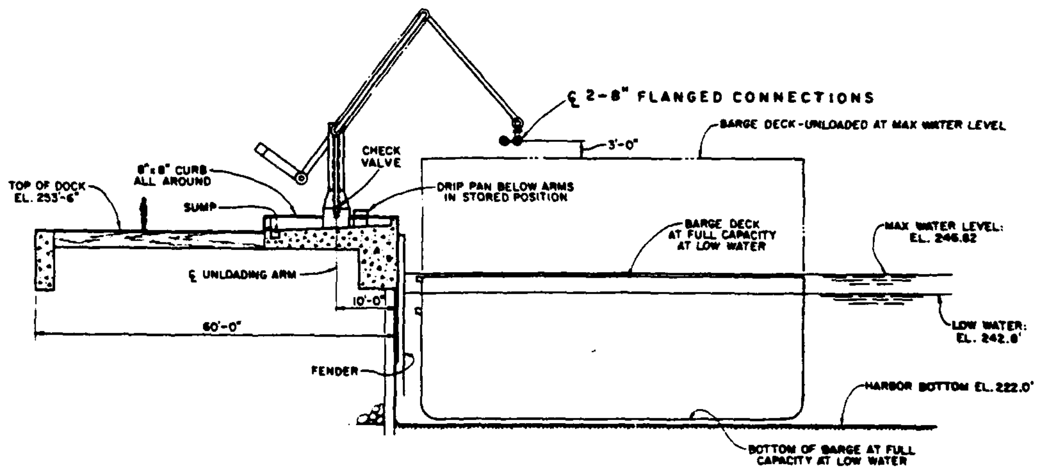
OSWEGO STEAM STATION - UNIT 5

NIAGARA MOHAWK POWER CORPORATION



PLAN

0 20 40 60 80 100
SCALE - FEET



SECTION A-A

0 5 10 15 20
SCALE - FEET

FIG. 1.2-7
FUEL OIL UNLOADING STATION
OSWEGO STEAM STATION UNITS 1, 2, 3, 4 & 5
NIAGARA MOHAWK POWER CORPORATION

diked in groups of two. All diked areas are sized in accordance with Bulletin NFPA-30 of the National Fire Protection Association which states that dikes be able to contain the contents of the largest tank enclosed within them. The arrangement of dikes and drainage at the tank area is shown in Fig. 1.2-8.

A fuel oil transfer pumphouse will be located outside the diked area. The pumphouse will contain three 3,000 gpm transfer pumps for transferring oil from the storage tanks via 24 in. suction lines from the tanks to the pumps and a 14 in. fuel oil transfer line from the pumps to the day tanks.

A 50 ft diam by 48 ft high fuel oil day tank inside a 100 ft diam by 12 ft high steel dike will be located between the north wall of Units 1 through 4 and the shoreline to provide one day's storage for these units.

A pumphouse will be located between the day tank and the north wall of Units 1 through 4 and will contain the burner supply pumps and heaters for Units 1 through 4.

A 67 ft diam by 48 ft high day tank inside a 135 ft diam by 12 ft high steel dike will be located adjacent to Unit 5 to provide one day's storage for this unit.

Ignition oil for Units 1 through 4 will be stored in existing ignition oil storage tanks. Ignition oil for Unit 5 will be stored in a 21 ft high tank inside the 135 ft diam by 12 ft high steel dike provided for the Unit 5 day tank.

Oil spill control equipment will consist of approximately 800 ft of rubberized fabric, foam filled oil boom with flexible skirt, floating oil skimmers, slop water receivers and approved commercial oil absorbents or straw. This equipment will be stored at the Oswego Steam Station for use in the event of an oil spill. The location where the boom would be deployed is shown in Fig. 1.2-9. A 14 ft boat with a 75 hp extended shaft motor will be on hand for deployment of oil spill control equipment.

An additional 800 ft of oil boom is stored at the Oswego Port Authority by the Oswego-Fulton Oil Pollution Project Committee. A contingency action plan for containment and removal of oil spills in Oswego Harbor is being developed.

CHEMICAL WASTE TREATMENT

All continuous and intermittent chemical waste discharges from the Oswego Steam Station power plant will be collected, treated and monitored prior to discharge to the City of Oswego sewage treatment plant. Wastes will be pumped to an onsite treatment building where the pH levels will be adjusted to a range of 6.5 to 7.5. The waste will then flow through an oil flotation unit, where oil will be removed, drummed and returned to the fuel oil tanks. The wastes will then flow to two large settling basins

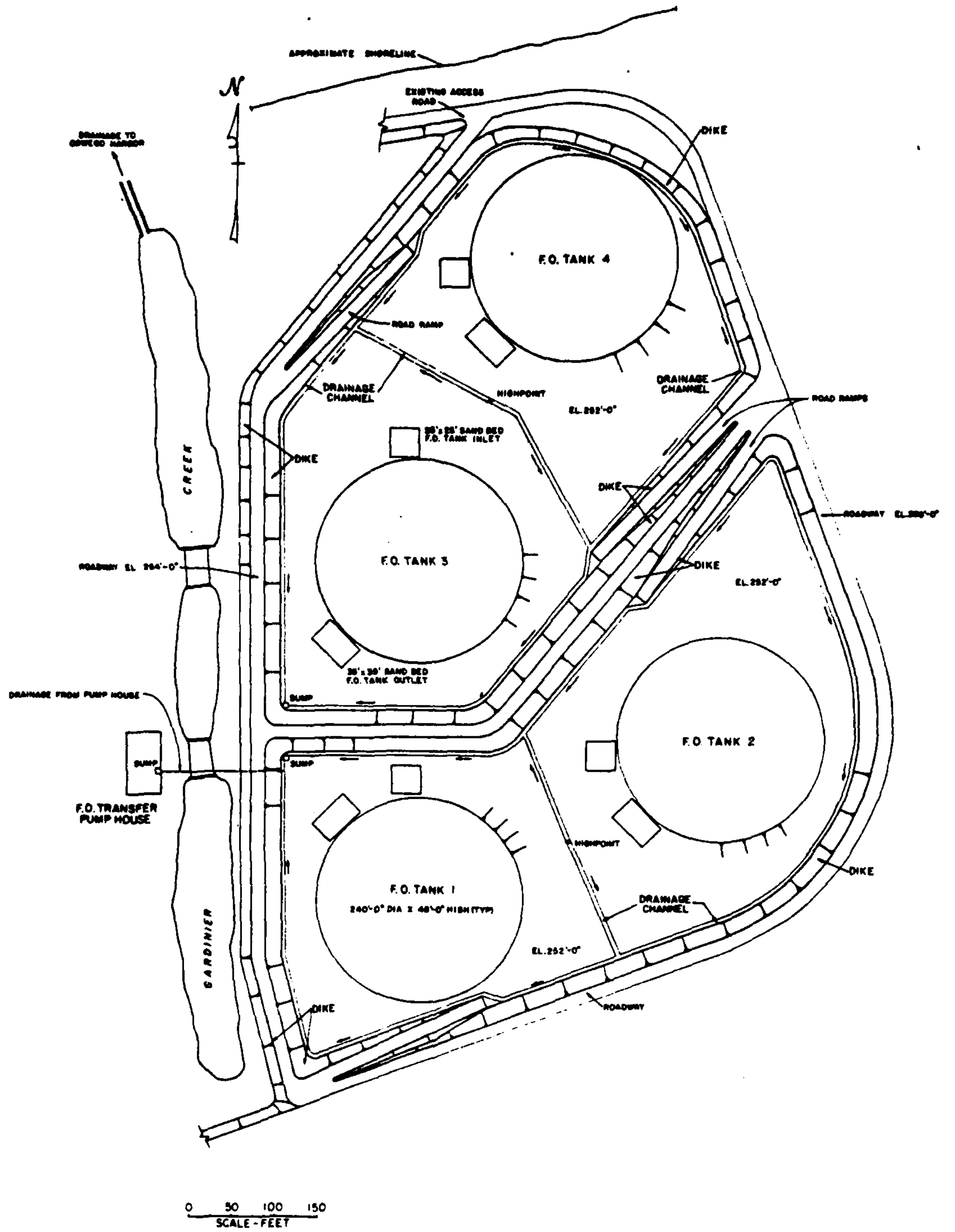


FIG. 1.2-8

DRAINAGE ARRANGEMENT FOR DIKED AREA AT FUEL OIL STORAGE TANK FARM

OSWEGO STEAM STATION UNITS 1, 2, 3, 4 & 5

NIAGARA MOHAWK POWER CORPORATION

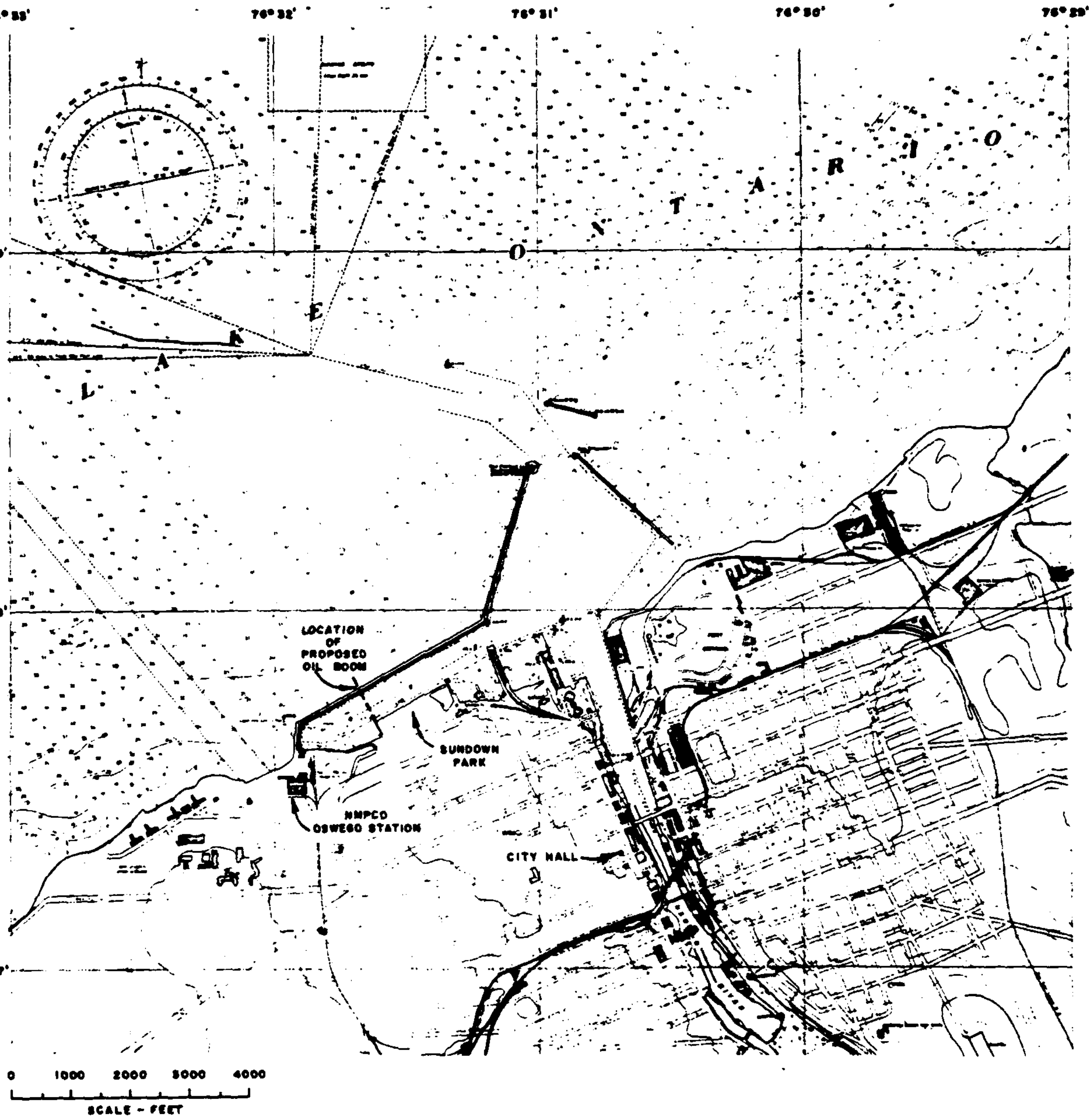


FIG. 1.2-9
OIL BOOM LOCATION MAP
OSWEGO HARBOR AT CITY OF OSWEGO
OSWEGO COUNTY, NEW YORK
NIAGARA MOHAWK POWER CORPORATION

FROM CORPS OF ENGINEERS U.S.L.S. CHART NO. 225 where solid materials will settle out. Large intermittent flows resulting from infrequent equipment cleaning operations will be retained and equalized in the large basins and discharged gradually to the city treatment plant. A maximum discharge rate of 100 gpm will be closely controlled to prevent upsets in the city's system. The remaining portion of the effluent from these basins will be returned to the plant for use in the precipitator ash sluicing system. The proposed system is shown in the flow diagram Fig. 1.2-10, together with estimated flows and frequencies of equipment cleaning.

Accumulated solids in the settling basin will be composed mainly of inert ash compounds and unburned carbon particles. This material will be periodically removed from the basin and trucked offsite to an existing land-fill operation, or sold for recovery of metals.

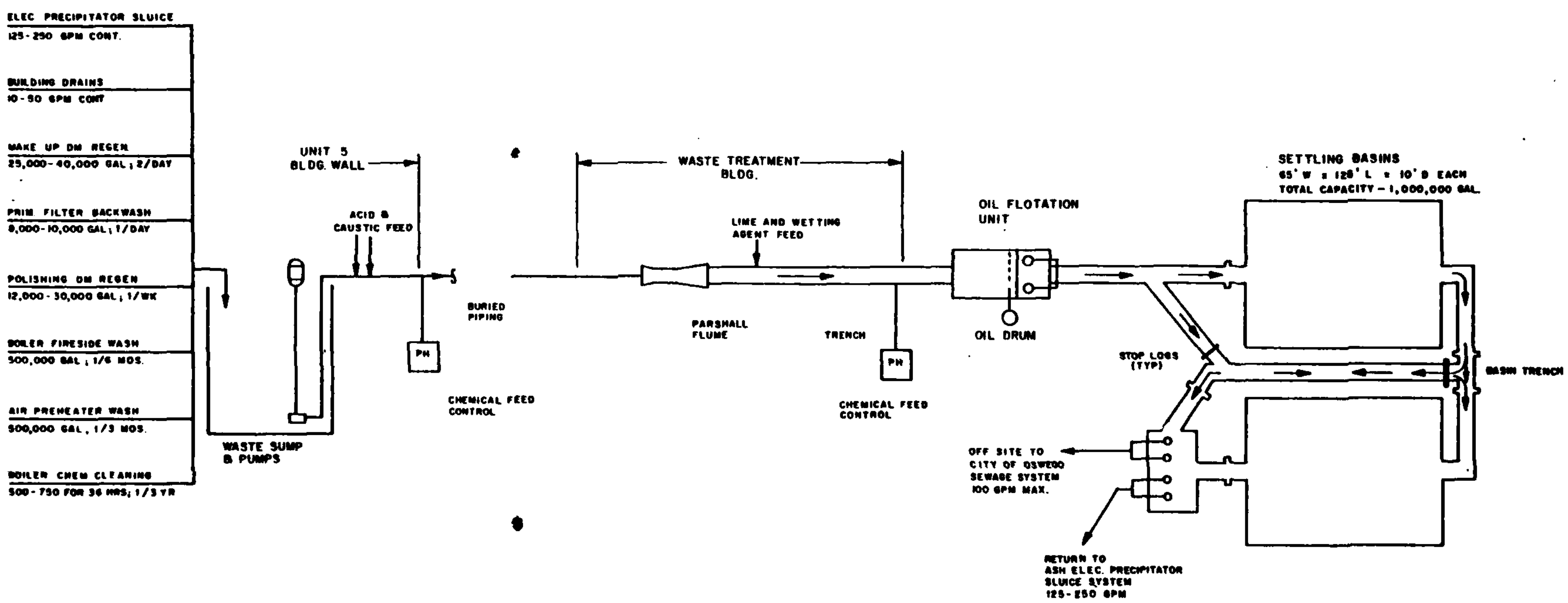


FIG. 1.2-10

WASTE HANDLING FLOW DIAGRAM
OSWEGO STEAM STATION UNIT 6
NIAGARA MOHAWK POWER CORPORATION

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.1 TOPOGRAPHY AND GEOLOGY

The Oswego Steam Station project area lies in the Erie, Ontario lowland physiographic province shown in Fig. 2.1-1. This province is bounded by upland on the south and east and by the Canadian shield to the north.

Within the lowland province, the terrain is generally flat and gently rolling and is controlled by an irregular bedrock surface of low relief. Thin glacial deposits cover most of the area. Post-glacial weathering and stream erosion have not significantly modified the terrain. The land surface rises gradually to the south and southeast away from Lake Ontario. The lowland extends 30 to 40 miles in the southerly direction to the Portage Escarpment (an erosional feature) which forms the boundary with the Appalachian uplands.

Regional geologic features are shown in Fig. 2.1-2. At the site, approximately 1,700 ft of Cambrian or Ordovician strata overlie Pre-Cambrian basement rocks.

Bedrock of the Oswego formation lies at a depth of 20 ft or less over much of the site. It consists of greenish-grey to light grey hard to moderately hard, medium bedded, medium grain sandstone. Shale interbeds occasionally occur, increasing in thickness and frequency with depths. No major faults are known in the Oswego area, although minor small displacement faulting has been encountered in excavations near the plant. Joint systems in the area strike north 55 to 70 deg east and north 30 to 50 deg west with near vertical dip angles. Joints are of limited vertical extent and show no evidence of movement. Natural fractures are few and the shale units are more susceptible to fracturing than the sandstone. The shales may also be susceptible to some slaking action when exposed to the air.

The project site is located in an area of historically very low seismic activity. Table 2.1-A shows the history of earthquakes in an area within 100 miles of the site. The closest area of major seismic activity is in the St. Lawrence Valley, approximately 350 miles to the northeast. Modest seismic activity has been noted at Massena, New York and Attica, New York, respectively, 120 and 100 miles distant. Earthquakes of epicentral intensity VIII on the modified Mercalli scale occurred in 1944 at Massena and 1929 in Attica. The nearest location at which even minor earthquake damage was recorded is Lowville, 50 miles away, in 1853. Based on these observations, the historic maximum earthquake intensity at the site is estimated to be a low V on the modified Mercalli scale. This is a level which may be clearly felt but does not result in damage to even poorly built structures.

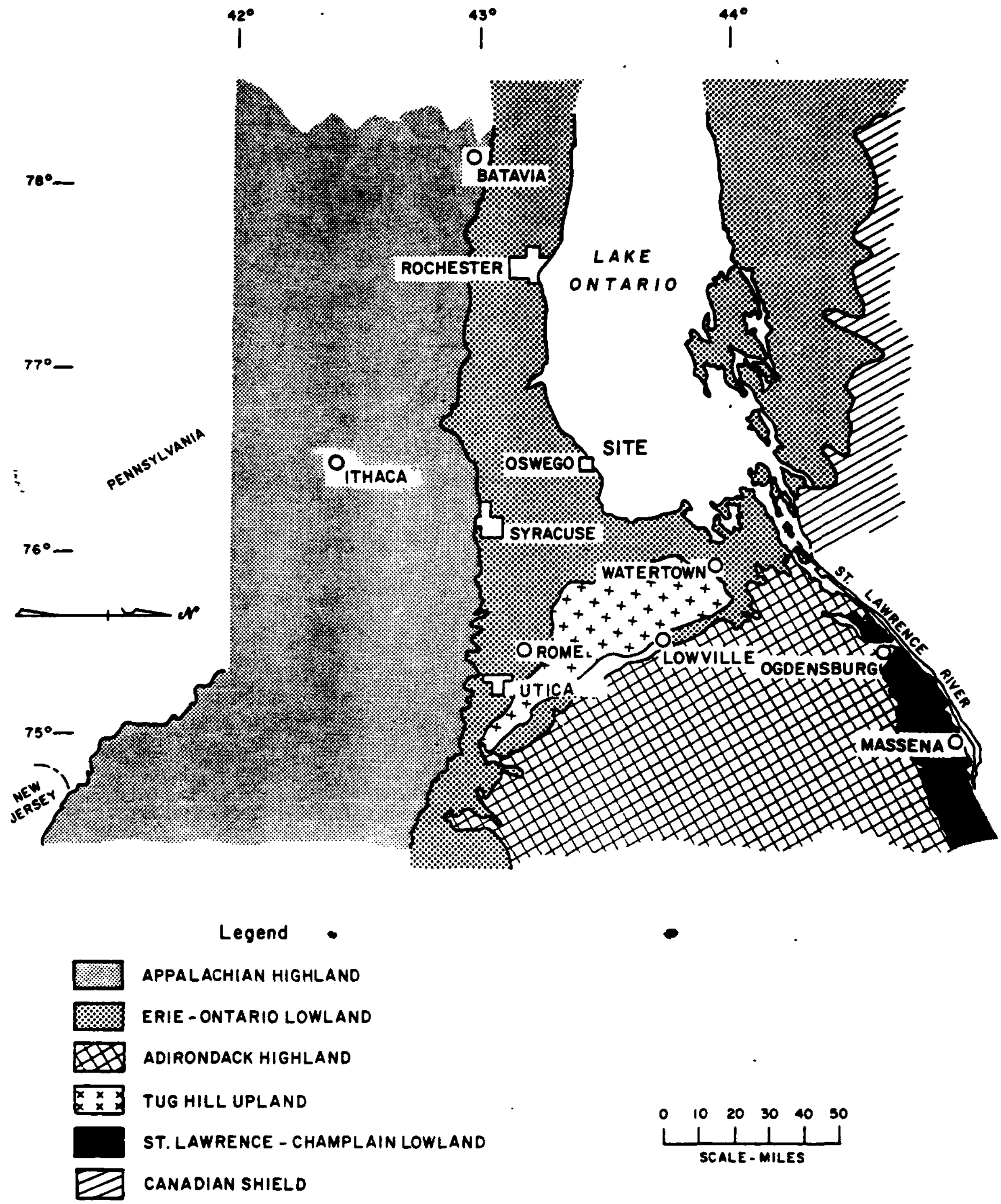


FIG. 2.1-1
REGIONAL PHYSIOGRAPHIC MAP
PORTION OF NEW YORK STATE
NIAGARA MOHAWK POWER CORPORATION

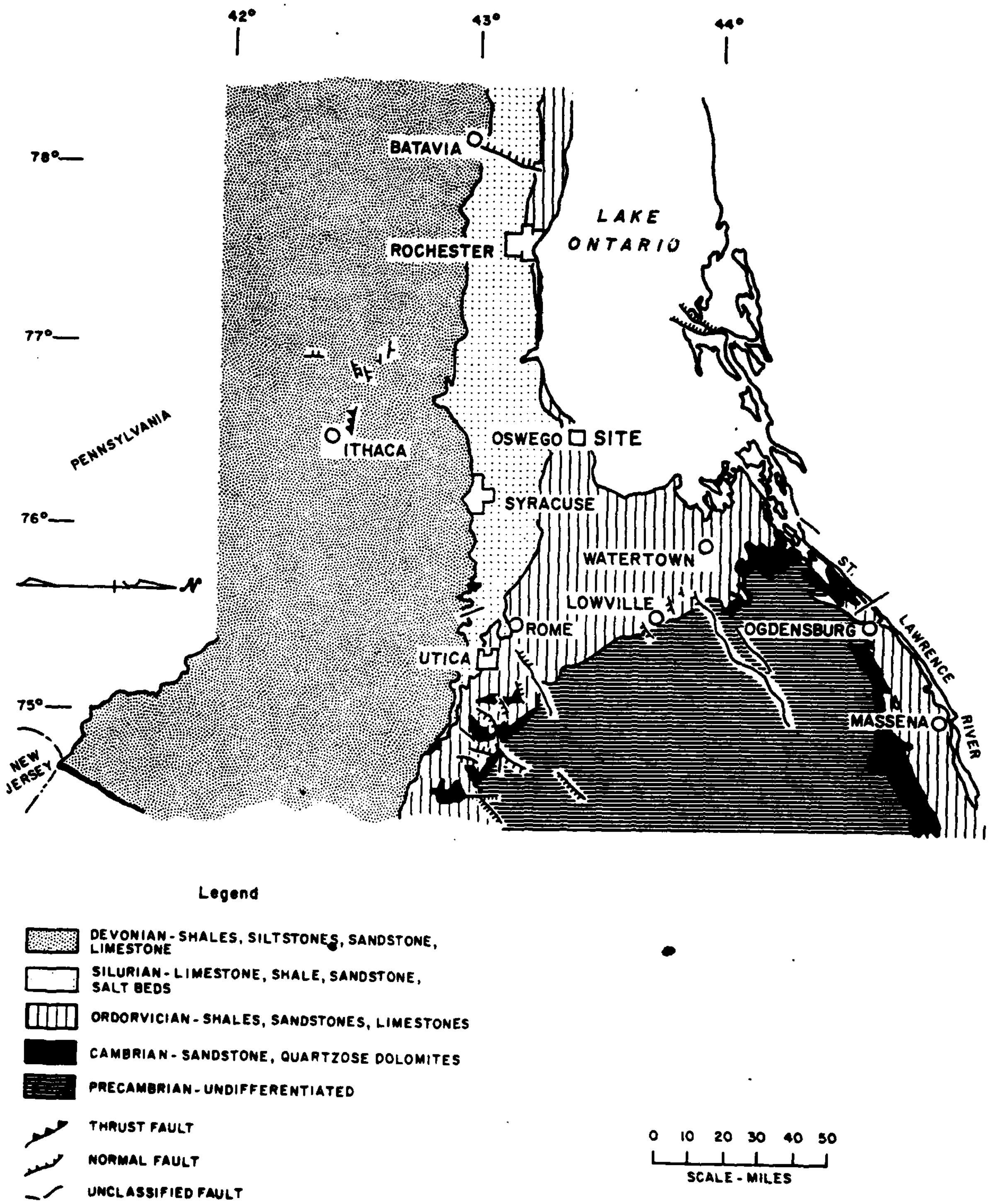


FIG. 2.1-2

REGIONAL GEOLOGIC MAP
PORTION OF NEW YORK STATE
NIAGARA MOHAWK POWER CORPORATION

YEAR	DATE	TIME	EPICENTRAL INTENSITY	APPROXIMATE LOCATION	N. LAT.	W. LONG.	APPROXIMATE PERCEPTIBLE AREA (square miles)	DISTANCE FROM SITE (miles)
1663	Feb. 5	1730	IX - X	St. Lawrence River Valley near Quebec, Canada	47.6	70.1	750,000	350
1853	March 12	0200-0300	VI	Near Lowville, New York	43.7	75.5	Local	50
1857	Oct. 23	1515	VI	Near Buffalo, New York	43.2	78.6	18,000	100
1903	Dec. 25	0730	V	Near Ogdensburg, New York	44.7	75.5	1,500	100
1922	Dec. 8	1624	V	Near Canton, New York	44.6	75.5	Local	100
1925	Feb. 28	2119	IX - X	St. Lawrence River Valley near Quebec, Canada	47.6	70.1	2,000,000	350
1925	April 7	1518	I - III	Near South Syracuse, New York	43.0	76.2	Local	35
1925	May 23	-	I - III	Near Sodus Point, New York (in Lake Ontario)	43.4	77.1	Local	30
1927	March 29	1530	I - III	Near South Syracuse, New York	43.0	76.2	Local	35
1927	March 21	1600 1630	I - III	Near Syracuse, New York	43.0	76.2	Local	35
1929	Aug. 12	0625	VIII	Near Attica, New York	42.9	78.3	100,000	100

SIGNIFICANT EARTHQUAKES WITHIN 100 MILES OF SITE

TABLE 2.1-A

YEAR	DATE	TIME	EPICENTRAL INTENSITY	APPROXIMATE LOCATION	N. LAT.	W. LONG.	APPROXIMATE PERCEPTIBLE AREA (square miles)	DISTANCE FROM SITE (miles)
1941	Oct. 9	2207	I - III	Near Watertown, New York	44.0	76.0	Local	45
1941	Oct. 20	2129	I - III	Near Watertown, New York	44.0	76.0	Local	45
1944	Sept. 5	2339	VIII	Cornwall, Ontario-Massena, New York	44.9	74.9	175,000	120
1945	April 15	1315 1420 1530	I - III	Near Auburn, New York	43.0	76.4	Local	30
1952	Nov. 20	-	I - III	Near Auburn, New York	42.9	76.6	Local	35
1954	Feb. 1	0037	I - III	Near Montezuma, New York	43.0	76.7	Local	35
1954	Sept. 29	2250	I - III	Near Watertown, New York	44.0	75.9	Local	45
1966	Jan. 1	0823	VI	Near Attica, New York	42.8	78.2	3,500	100

TABLE 2.1-A

The immediate site is located in the City of Oswego on the shore of Lake Ontario. The surface grade in the project area is at an average elevation of 254 ft, approximately 8 ft above lake level.

Locally, the area has been artificially graded for the Oswego Steam Station and adjacent facilities, resulting in a leveling of the terrain which, in its natural state, is a very low undulating relief. The site is surrounded on three sides by developed portions of the City of Oswego and on the fourth side by Lake Ontario. Natural drainage at this site is very good with a large drainage channel (Gardinier Creek) crossing the plant property. Rain water flows either to the creek and then to Oswego Harbor or to Lake Ontario.

The project site is overlaid by artificial fills which include waste ash from the existing units of the Oswego Steam Station and sands and gravels. Some natural alluvial sands and silts are present in the area. Commonly, the fill materials and the alluvial materials overlie dense glacial tills which in turn overlie the Oswego sandstone. The bedrock surface beneath Lake Ontario is typically covered by a layer of till which is overlaid by a thin shifting layer of recent lacustrine sand.

2.2 HYDROLOGY

Ground Water

The ground water in the vicinity of the Oswego Steam Station is at approximately El. 250 and appears to stay within 4 to 6 ft of the ground surface across the entire site. The upper layers of soil are relatively heavy and percolation rates are expected to be slow. The interaction of on-site activities with surrounding water tables will be minimal.

The City of Oswego makes use of Lake Ontario for its public water supply. Few private wells for potable water are found within the city, and none is situated near the power plant site. Municipal water supply wells for towns near Oswego are shown in Fig. 2.2-1.

Surface Water

Lake Ontario, the easternmost of the Great Lakes, is an international body of water forming part of the border between the United States and Canada. The lake is 193 miles long and 53 miles wide at its widest point, and has a surface area of 7,340 sq miles (4.7 million acres). It has a maximum depth of 802 ft, an average depth of approximately 283 ft, and a volume of 393 cubic miles or 1.34 billion acre-feet.

Inflow into the western end of Lake Ontario averages about 205,000 cubic feet per second (cfs). Runoff directly into Lake Ontario from 27,300 sq miles of watershed in New York State and the Province of Ontario amounts to an additional 36,000 cfs. The combined outflow from the lake averages about 241,000 cfs.

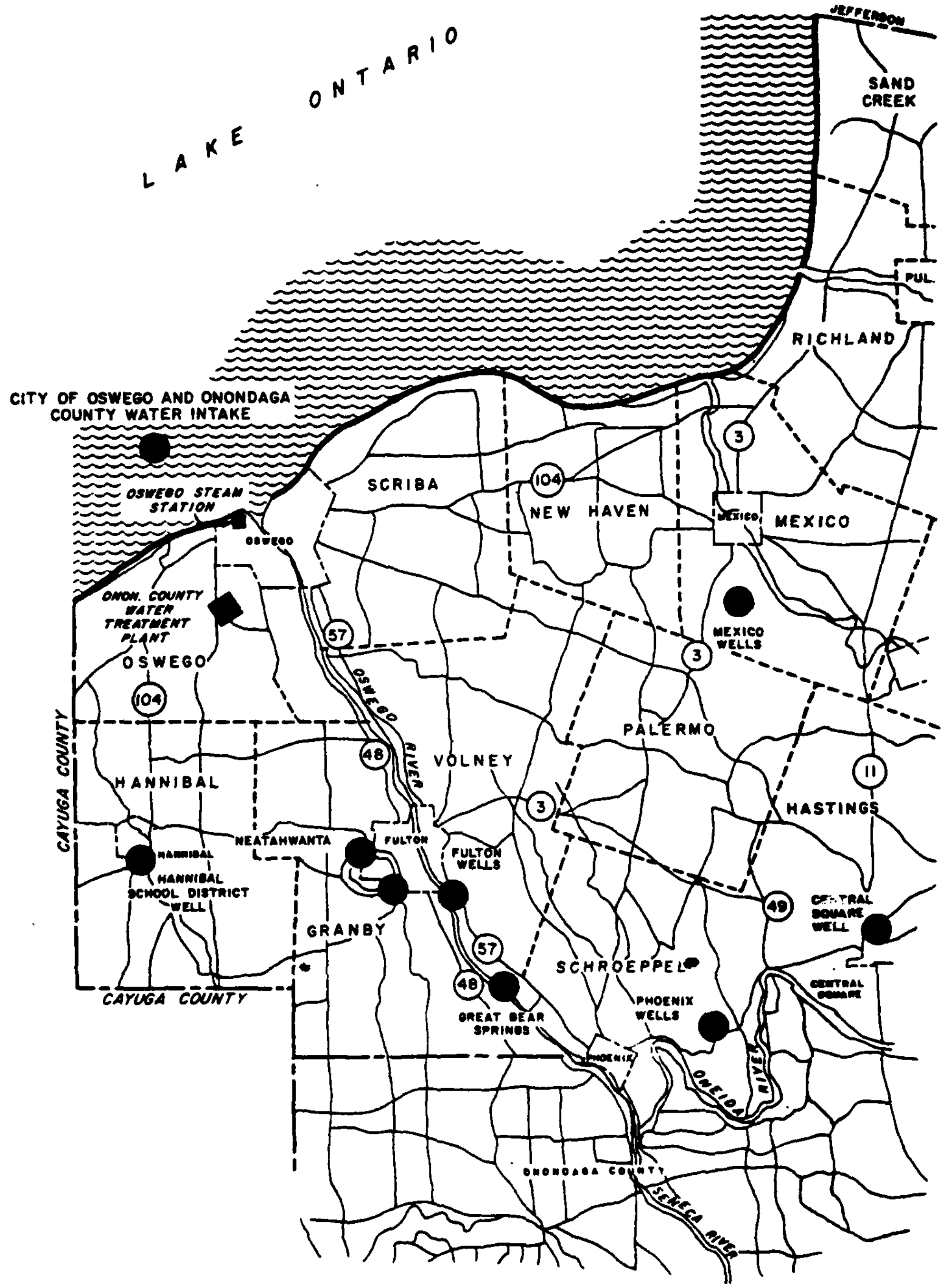


FIG. 2.2-1

MUNICIPAL WATER SUPPLY
VICINITY OF OSWEGO, NEW YORK
NIAGARA MOHAWK POWER CORPORATION

Annual rainfall into the lake, averaging 34 in. per year, is almost balanced by annual evaporation of about 30 in. per year.

Prior to the beginning of flow regulation, the elevation of the lake surface was controlled by a natural rock weir located about 4 miles downstream from Ogdensburg, New York in the Galop Rapids reach of the St. Lawrence River. The 111 year record of the U.S. Lake Survey, from 1860 to 1970 indicates a mean lake surface elevation of 246.00 (Ref. 2) above mean tide at New York, 1935 datum.* Over this period, the maximum monthly lake surface elevation was 249.29 ft, and the minimum was 242.68 ft, a range of 6.61 ft. The annual range of elevations varies between 3.58 and 0.69 ft.

Dams on the St. Lawrence River, under the supervisory authority of the International St. Lawrence River Board of Control, are now used to regulate the lake level. The lower limit is set for El. 244 on April 1 and is maintained at or above El. 244 for the navigation season (April 1 to November 30). The upper limit of the lake level is El. 248.

Investigators (Ref. 3) have agreed that tidal elevations of the surface of Lake Ontario are of negligible importance amounting to 1/10 of an inch or less. Changes in lake levels of greater magnitude result from seiche activity. Typically, a seiche develops when the wind, having piled up water on the lee shore, falls off rapidly so that the unbalanced water wedge sets up an oscillation. In the region of Oswego, 1.7 ft variations of lake level caused by a seiche have been noted with a recurrence interval of 10 years. (Ref. 4).

Currents within Lake Ontario are produced by the interaction of Coriolis forces operating on the liquid mass in the lake, the topography of the lake bottom and shoreline, density gradients due to temperature variation or to dissolved or suspended materials and the direction, force, and duration of the wind blowing over the lake. Drift bottle studies by Harrington (Ref. 5) in 1895, and a drift card survey by Storr (Ref. 4) in 1963 indicate that the general direction of the surface circulation, under conditions of summer stratification is easterly and northeasterly along the New York shore with a small counterclockwise return flow along the Canadian shore. These observations have been extensively confirmed by measurements at temporary and permanent current metering stations operated cooperatively by the New York State Department of Health (now New York State Department of Environmental Conservation) and the Federal Water Quality Administration (1968) (now Office of Water Quality of Environmental Protection Agency).

*International Great Lakes Datum = Lake Survey 1935 Datum minus 1.23 ft. (at Oswego)

The general pattern is extensively modified at specific spots by local conditions. Thus, studies of lake currents of the shore area out to the 40 ft depth contour were conducted in October and November 1970 (Ref. 1). Current profiles with depth were made under two conditions: when the sampling area was thermally stratified, and when the water in the sampling area was essentially isothermal. These studies showed that the wind is the predominant factor in determining the speed and direction of lake currents in the region of Oswego. Cumulative wind rose data show that these winds have a westerly component a high percentage of the time. Moreover, while light winds of 0 to 12 mph are most prevalent, when the winds reach the 12 to 25 mph range, they almost invariably flow from the northwest, west, or southwest.

From theoretical studies of Lake Ontario conditions, a graphic relationship between wind speed and current velocity was developed. This relationship proved to be conservative when the predicted current velocities, based on 6 hour average wind speed, were compared with measured lake currents.

In the Northern Hemisphere, lake currents set up by these winds normally move 45 deg to the right of wind direction. In the Oswego region, the direction of the shoreline and the shallow average slope of the lake bottom modify this predicted direction and lake currents are often deflected no more than 10 deg to the right.

The following general comments describe the wind-current combinations found in the lake area studies. During periods of southeast winds the water on the surface moved out in a north-northeast direction. This eventually caused counter movement below the surface. Usually light southerly winds will cause a general upwelling along the shore (Fig. 2.2-2a).

With westerly winds, the surface water piled up against the shoreline. Eventual sinking of water occurred along the shore and a north flowing current became evident on the bottom. After a period of time, the surface currents set up in the direction of the wind (Fig. 2.2-2b).

Winds from the east caused a surface water movement away from shore, setting up a countercurrent with resultant upwelling near shore (Fig. 2.2-2c).

North or northeast winds resulted in complex current patterns in the Oswego area, with surface water being driven against the shore and westward.

Temperature-depth profiles in the lake were recorded for a 12 month period (1970-1971). The instability of successive weekly profiles demonstrated the effectiveness of the wind, wind-induced currents and upwelling of shoreward waters in preventing the development of a thermocline.

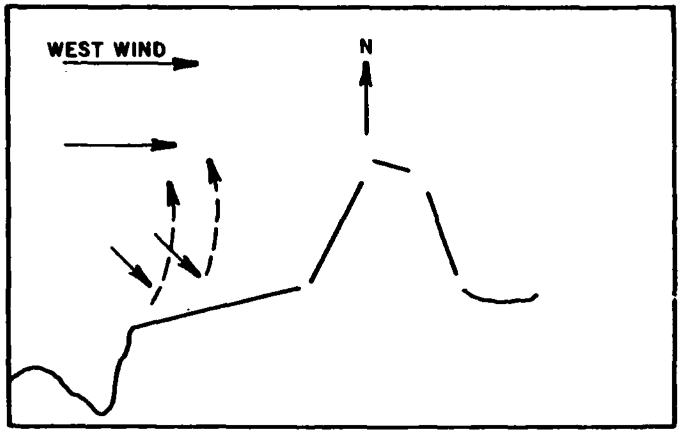


FIG. 2.2-2b

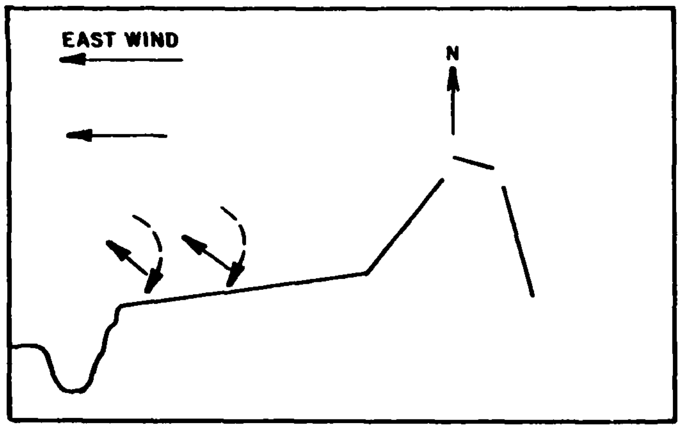


FIG. 2.2-2c

NOTE:
SOLID ARROWS = SURFACE CURRENTS
DASHED ARROWS = SUBSURFACE CURRENTS

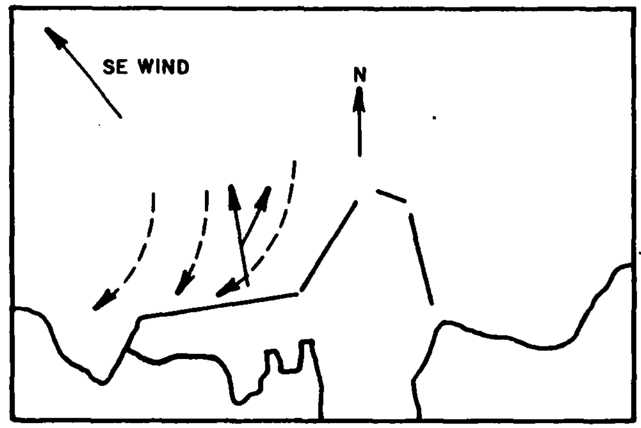


FIG. 2.2-2a

FIG. 2.2-2
WIND INDUCED CURRENTS
LAKE ONTARIO
NIAGARA MOHAWK POWER CORPORATION

After a period of calm days, a thermocline would appear to be forming at the 7-9-foot depth. Within a week, wind-induced mixing would have destroyed this apparent stratification and the temperature would be uniform to a depth of 40 ft.

Thus, it was demonstrated that thermocline formation within the 40 ft depth contour of the Oswego section of the Lake Ontario shoreline is a transitory phenomenon and that the characteristic condition in this zone is one of wind-stirred uniform temperature. The maximum surface temperature recorded was 77.9 F.

The ecology of the southern and eastern shorewaters of Lake Ontario is determined in large measure by the water quality of the rivers discharging into the lake from New York State. The principal rivers are the Genesee River at Rochester, the Oswego River at Oswego, and the Black River at Watertown (Fig. 2.2-3). The combined drainage area of these three rivers (9,431 sq mi.) constitutes 34.5 percent of the area tributary directly to Lake Ontario.

The combined average flow of the three rivers (12,624 cfs) represents 35.1 percent of the additional 36,000 cfs that Lake Ontario contributes to the flow from the Great Lakes system to the St. Lawrence River.

The Oswego River is formed by the confluence of the Oneida and Seneca Rivers, the latter being the drainage outlet of the Finger Lakes region of New York State. The United States Geological Survey (USGS) records note that "a large amount of natural storage and some artificial regulation (of the Oswego River) is afforded by the many large lakes and the Erie (Barge) and Oswego (Barge) canal system in the river basin." The 211 miles of barge canals represent a considerable portion of the flow channels of the basin.

The average flow of the Oswego River during the 33 year period from 1933 to 1967 amounted to 6,137 cfs. The maximum flow of record was 37,500 cfs on March 28, 1936.

The minimum daily flow of 353 cfs was recorded on August 14, 1949, but the minimum average seven-consecutive-day flow, having a once-in-10-year frequency (MA7CD/10) is 720 cfs. (Ref. 6).

Surface runoff from the western portion of the City of Oswego and the eastern slope of Gardinier Hill flows into Gardinier Creek and passes through Niagara Mohawk property at the Oswego Steam Station. The creek flows into Lake Ontario about 500 ft west of Units 1 to 4.

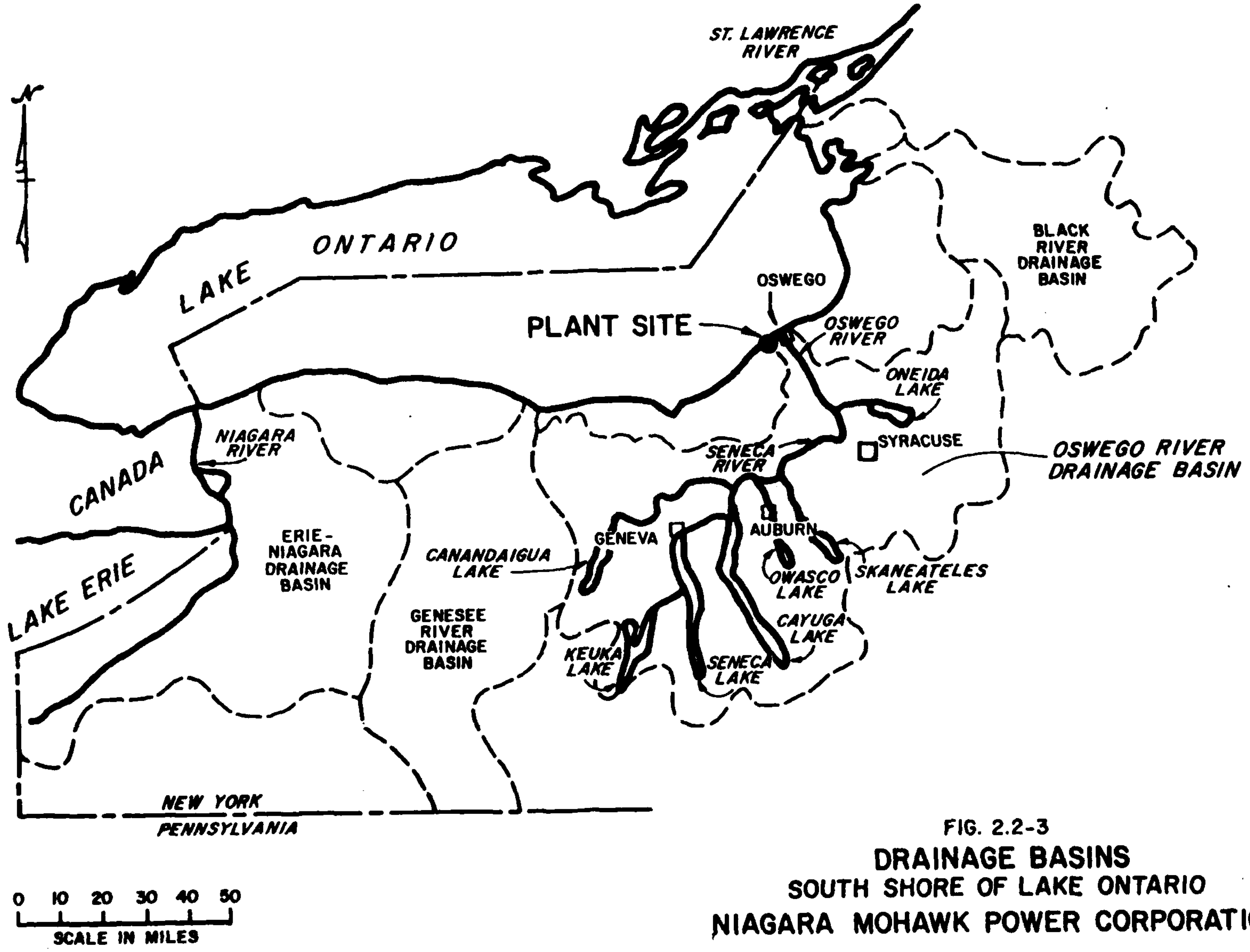


FIG. 2.2-3
DRAINAGE BASINS
SOUTH SHORE OF LAKE ONTARIO
NIAGARA MOHAWK POWER CORPORATION

2.3 CLIMATOLOGY

Data Sources

Average and extreme values of standard meteorological parameters were obtained from the U.S. Weather Bureau Station in Oswego, which ceased operations in 1950, and from the U.S. Coast Guard Station at Oswego (wind observations 1936 to 1945). Knowledge of the micrometeorology of the site was obtained from an instrumented tower which was operative during 1963-1964 at Nine Mile Point, eight miles east of the Oswego Steam Station. The instruments measured temperature at 30 ft, 64.5 ft, 196.5 ft and 202 ft above grade, wind speed and direction at 31 ft and 203 ft and wind fluctuation at 31 ft.

Ten years of wind, temperature, and humidity observations taken at Rochester (1955-64) 55 miles to the west-southwest of Oswego were used to estimate an hour-by-hour climatologic record at Oswego. Rochester is considered more representative of Oswego climatology than Syracuse because Rochester is located near the shore of Lake Ontario which has a profound influence on the climate.

Relative humidity observations were taken at three hourly intervals during the months of December 1967 through February 1968 at the residence of Professor R. B. Sykes, located 3.15 miles west-southwest of the site.

Both the Nine Mile Point and R. B. Sykes residence locations are near enough so that the data collected can be considered representative of the site.

Wind and temperature recorded at Nine Mile Point and humidity recorded at the R. B. Sykes residence were compared statistically with equivalent data taken at Rochester. Only minor variations were found between temperature and wind data at the two locations. At Oswego, humidity was found to be slightly higher than at Rochester.

General Climatology

Oswego is in a zone frequented by cyclones from several sources. These cyclones result in frequent air mass changes, stronger than average winds, a relatively uniform distribution of precipitation throughout the year and generally favorable diffusion conditions.

Summer weather is generally pleasant, with daytime temperatures averaging about 80 F. Only a few days of 90 plus temperature with high humidity occur each year. Thunderstorms, which occur on the average of one day in five, constitute the major portion of summer rainfall of approximately 3 in. per month.

Winters are frequently severe. Temperatures average below freezing from the first of December to mid-March. Winds are relatively high due to the exposure of the site to Lake Ontario.

The most outstanding characteristic of the Oswego climate is the heavy snowfall during the winter which averages 1 to 2 ft per month during December through March. The prevailing wind over Lake Ontario, convergence of air near the shoreline and topographical factors combine to produce the heavy snow. Lake Ontario affects temperatures by delaying the onset of cold weather in late fall and winter and the onset of warm weather in late spring and summer.

Average and Extreme Weather Conditions

Average monthly values of temperature, precipitation and snowfall are shown in Table 2.3-A. (Ref. 7). Extreme temperatures during the 90 yr period ending in 1960 were -23 F and 100 F. The maximum three-day snowfall, 75 to 90 in., was recorded in 1966. High winds in the Lake Ontario area result from intense winter storms, remnants of tropical storms and severe thunderstorms. A review of wind data recorded at official stations around the lake indicates that the following wind climatology is representative of the site. (All wind speeds are in miles per hour, measured 30 ft above the ground.)

Estimated Maximum Winds at Site

Return Period (Yr)	5 Min Average	Fastest Mile	Peak Gust
10	60	62	81
50	70	75	95
100	76	82	102

Observed Maximum Winds

Location	5 Min Average	Fastest Mile	Peak Gust
Rochester	60 in 1946	-	-
Buffalo	78 in 1900	-	-
Toronto	-	58 in 1954	78 in 1954
Site	-	-	73 in 1963

TABLE 2.3-A

METEOROLOGICAL AVERAGES*

Month	Temperature (F)	Precipitation (In.)	Snowfall (In.)
January	25.1	2.70	23.6
February	25.4	2.62	21.4
March	32.6	2.80	12.7
April	44.0	2.72	2.3
May	54.6	2.97	-
June	64.5	2.28	-
July	70.5	2.74	-
August	69.4	2.51	-
September	62.3	2.78	-
October	52.2	3.26	0.4
November	40.8	3.01	7.3
December	29.0	3.17	20.4
Annual	47.5	33.56	88.1

*Based on Oswego data. Temperature and Precipitation 1930-1960. Snowfall-76 years ending 1960.

Tornado Occurrence

Significant tornadoes in upper and central New York State have been rare. Consequently, it is impossible to define a meaningful probability for such an occurrence at the site. All investigators treat the area as substantially devoid of these storms, although a single occurrence is shown on a tornado summary map of the area. (Ref. 8). The nearest tornadoes listed as significant occurred in Jamestown (1945) and Allegany County (1920), both approximately 150 miles to the southwest.

Turbulence Classes

The classification system used to differentiate stack effluent dispersion regimes was based on the directional fluctuations of an aerovane wind instrument (Brookhaven type) mounted at the 203 ft level on the Nine Mile Point meteorological tower. The four turbulence classifications are related to other descriptions of turbulence in the following way:

Niagara Mohawk Class	Pasquill Type	Brookhaven Type	Qualitative Description
I	B	B2	Very Unstable
II	C	B1	Unstable
III	D	C	Neutral
IV	F	D	Stable

The Brookhaven classification is based on turbulence measurements from strip charts of the wind speed and direction. In the absence of onsite wind measurement, the Pasquill classification is widely used as an approximation of turbulent conditions. The Pasquill classification is based on wind speed and cloud cover parameters that are routinely measured at most airports. Of the seven Pasquill classifications (A through G) the four listed above most closely correspond to the four Brookhaven types, except that Brookhaven Class B2 and B1, actually correspond to Pasquill Classes A and B. The modification to B and C is reasonable because: (1) turbulence is typically less at the elevation of stack effluent release (approximately 700 ft) than at the 200 ft elevation where measurements were made and (2) the convective turbulence caused during fall and winter by the relative warmth of unfrozen Lake Ontario is suppressed as the air moves over the cold, often snow-covered land.

The Niagara Mohawk classifications are defined to be the same as the corresponding Pasquill and Brookhaven classes as listed in the above table. Stability frequency as a function of wind direction is shown in Table 2.3-B.

TABLE 2.3-B

ANNUAL STABILITY FREQUENCY OF OCCURRENCE
WITH RESPECT TO WIND DIRECTION

Wind Direction	Frequency of Occurrence of Stability - Percent B	C	D	F	Total
N	.14	2.62	.07	.75	3.58
NNE	.09	3.64	.32	.71	4.76
NE	.12	2.66	.23	.67	3.68
ENE	.11	1.11	.03	.61	1.86
E	.08	1.35	.16	.67	2.26
ESE	.12	2.72	.96	.74	4.54
SE	.47	4.58	3.65	2.02	10.72
SSE	.75	3.19	1.75	1.08	6.77
S	.96	3.33	1.79	.65	6.73
SSW	.44	4.07	1.97	.42	6.90
SW	.25	4.51	2.83	.38	7.97
WSW	.25	7.47	6.17	.52	14.41
W	.17	8.21	1.83	1.89	12.10
WNW	.05	5.15	.34	.71	6.25
NW	.07	3.84	.22	.53	4.66
NNW	.11	2.80	.06	.52	3.49
Total	4.18	61.25	22.38	12.87	

Lapse Rates

Another measure of stability is the lapse rate measurements taken between the 30 and 203 ft levels on the tower. These are summarized as mean diurnal lapse rates for each month in Appendix B at the end of this Report.

These figures reflect the importance of the lake-land relationship. In the winter months (December, January and February) the mean diurnal lapse rate never passes into the inversion regime. However, in May and June the mean diurnal lapse rate lies in the inversion regime close to 75 percent of the day.

Wind Direction and Speed Distributions

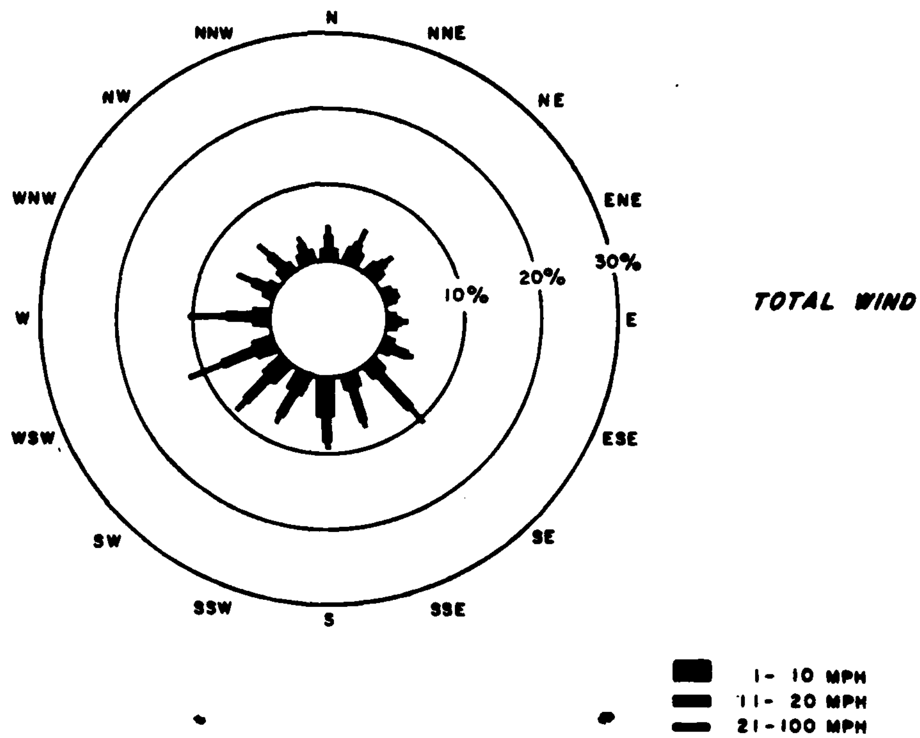
The wind direction and speed distributions are shown in Fig. 2.3-1 (based on observations taken on the meteorological tower) and Fig. 2.3-2 (based on Coast Guard data). (Ref. 7) Monthly wind roses based on observations from the meteorological tower are shown in Appendix B at the end of this Report.

The overall wind roses, both annual and for individual months, show a decided preference for directions ranging from west through southeast in the southerly sector. No northerly compass point has a frequency as high as 10 percent, except for northwest during December. The most prominent peak in the distribution is west-southwest, which becomes especially marked in May and June when the overall frequency reaches more than 20 percent from this direction.

2.4 HISTORY, HISTORICAL AND SCENIC SITES

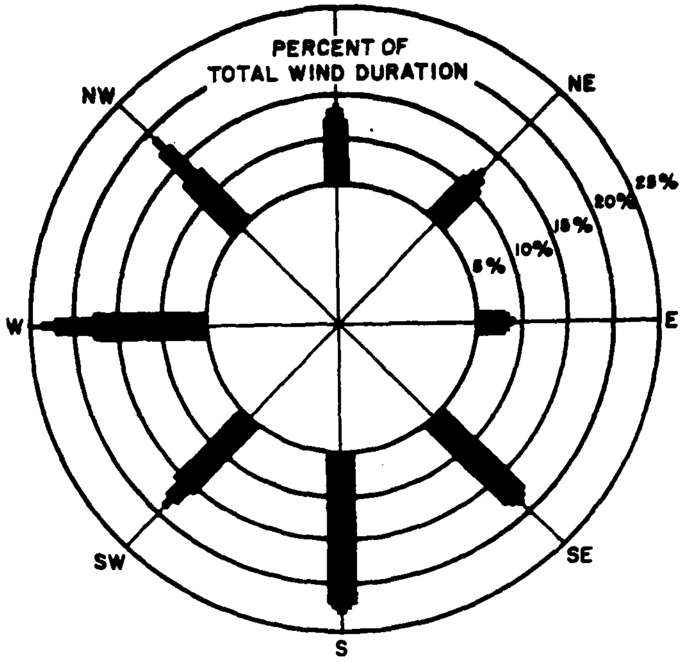
The location of the mouth of the Oswego River on Lake Ontario has made the site significant for commerce ever since the immigration of Europeans into the New World. The site was visited about 1616 by Samuel deChamplain, and later it served as a station for Jesuit missionaries. The British established a trading post in 1722 and fortified it five years later. In 1755 they built Fort Ontario on the lake shore to the east of the river mouth and the following year the French under General Montcalm captured and destroyed both fortresses. Fort Ontario was restored by the British in 1759. This fort, together with Fort George, which was located on the opposite side of the harbor but no longer exists, dominated the river mouth. Fort Ontario was ceded to the United States in 1796 when the first civilian settlement was founded, and continued in service as an important U.S. Army post until 1946. The New York State Historic Trust is currently in the process of restorating Fort Ontario.

In 1799 the Port of Oswego was established. The settlement was incorporated as a village in 1828 and became a city twenty years later. It thrived as the Lake Ontario port of the Erie Canal until the growth of railroads reduced canal and lake traffic in the last quarter of the nineteenth century. The completion of the New York State Barge Canal System in 1917 revived the port



NOTE:
NINE MILE POINT WEATHER DATA

FIG. 2.3-1
AVERAGE WIND ROSES
1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



LEGEND

- 0-12 M.P.H.
- GREATER THAN 12 M.P.H. AND LESS THAN 25 M.P.H.
- 25 M.P.H. OR GREATER

WIND DATA BASED ON RECORDS OF THE U.S. COAST GUARD AT OSWEGO, NEW YORK, FOR THE PERIOD JANUARY 1935 TO DECEMBER 1945.

FIG. 2.3-2

WIND ROSE FOR 1936-1945

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION

activities and with the opening of the St. Lawrence Seaway in 1959, Oswego became a world port. Oswego is now the steam electric power center of central New York with excellent water supplies for industrial and other uses.

No known archeological excavations exist near Oswego, nor are there any sites in Oswego County or the northern part of neighboring Cayuga County that have been designated as national historical sites as of July 1971. A list of historic and scenic sites within ten miles of Oswego follows, based on information from the New York State Historic Trust and the Oswego County Planning Board.

Site Name	Distance from the Plant (Approximately)	Description
Fort Ontario	One mile east	On a hill overlooking the City and lake. It was first built in 1755. Reconstructed in 1905. It is the oldest fort in the U.S. Just to the east is Old Military Cemetery dating from the French and Indian War.
Fort Oswego (Fort George)	One mile east	Built by the British in 1727. Destroyed in 1756 by French. Site marked with stone marker.
Oswego Harbor	One mile east	Most important port on U.S. side of Lake Ontario. In latter half of Nineteenth Century, water commerce and milling industry thrived here.
Fruit Valley Community	Five miles west on U.S. Highway 104	Community contains graveyard and burial place of Sister Mary Walker, noted feminist and winner of Congressional Medal of Honor for serving as war nurse, and also a house reputed to have been a station for the Underground Railroad aiding in the escape of fugitive slaves.
The Oswego County Historical House and Museum	One mile east	Collection of local historical military relics, Victorian furnishings and Civil War period gowns.

Site Name	Distance from the Plant (Approximately)	Description
Battle Island State Park	Ten miles south on Route 48	Site of skirmish between British supply force and a French and Indian scouting force attempting to cut off the forts at Oswego in 1756. Now a State Park with an 18-hole golf course.
The John VanBuren House and VanBuren Tavern	Ten miles south off Route 57	John VanBuren, a cousin of Martin VanBuren, built a tavern and a brick structure in 1796.
State University College	Adjacent to western part of site	Founded in 1861.

2.5 TRANSPORTATION

Transportation facilities at Oswego, New York are shown in Fig. 2.5-1. Docking facilities on Lake Ontario afford easy access to the St. Lawrence Seaway and to the New York State Barge Canal System.

Light planes may land at Fulton Municipal Airport in the Town of Volney, about 10 miles southeast of the plant. The nearest commercial airport, Hancock Field near Syracuse, is approximately 35 miles southeast of the plant.

U.S. Route 104 passes through Oswego several hundred yards south of the plant, proceeds eastward to Interstate Highway 81, and westward to Rochester and Niagara Falls. Interstate Route 90 (the New York State Thruway) passes 30 miles south of Oswego, and Interstate Highway 81 passes 20 miles east. Both routes are accessible to Oswego by hard surface roads. Future highway plans for the area include an expressway connection to the Utica-Rome district and to Syracuse. Both roads are in the long-range planning stage, and no specific routes have been selected.

Penn Central routes from Syracuse and Rochester and an Erie-Lackawana route from Syracuse provide rail service to Oswego. On the site of the Oswego Steam Station, a spur of the Penn Central Railroad provides rail access.

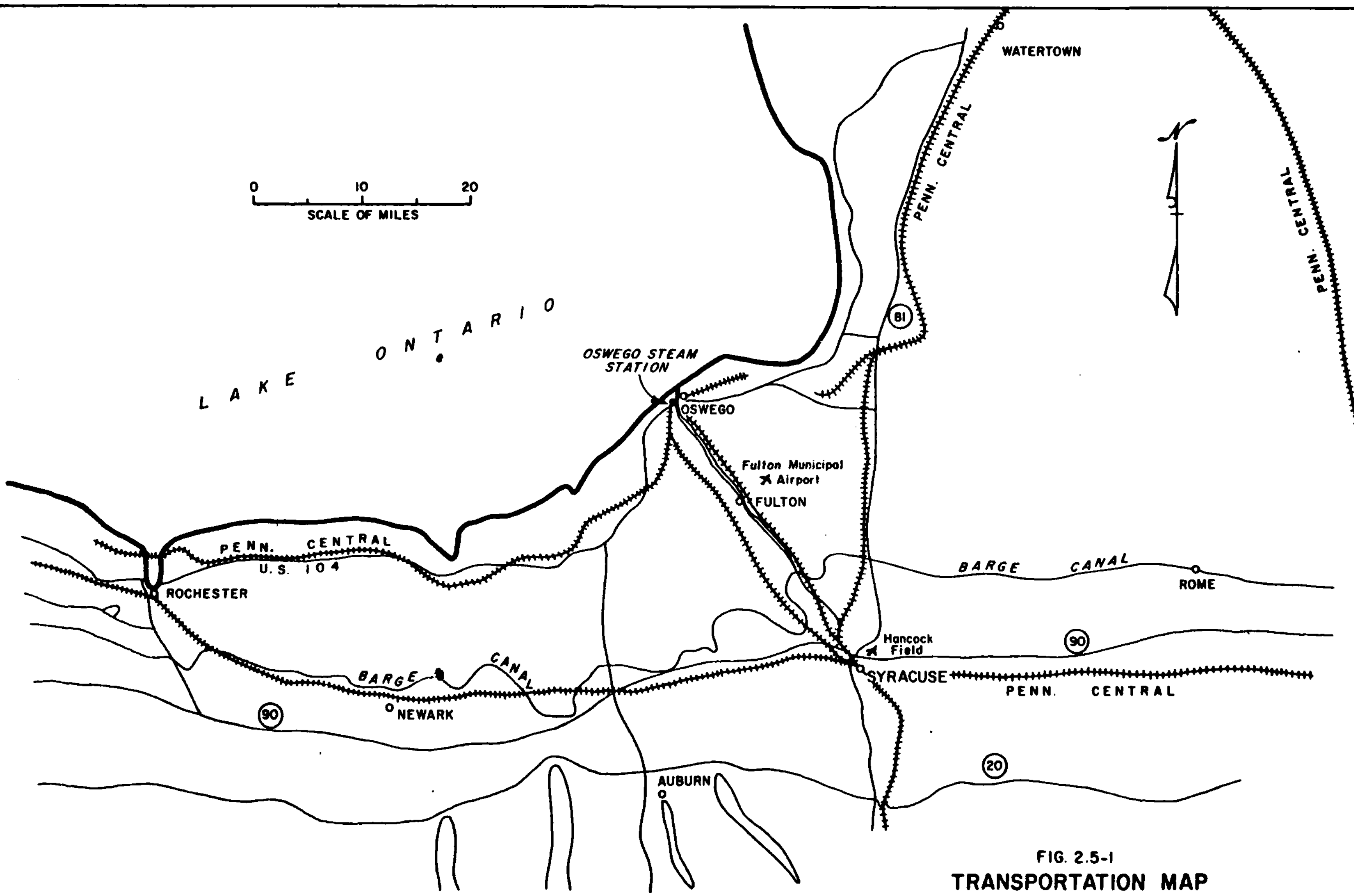


FIG. 2.5-1

TRANSPORTATION MAP
OSWEGO, NEW YORK
NIAGARA MOHAWK POWER CORPORATION

2.6 POPULATION AND LAND USES

Population

The area surrounding the Oswego Steam Station is neither densely populated nor rapidly increasing in population. All towns within ten miles of the plant lie within Oswego County with the exception of Sterling, which is located to the west in Cayuga County. The 1970 populations of these towns and their locations are indicated in Fig. 2.6-1. (Ref. 9)

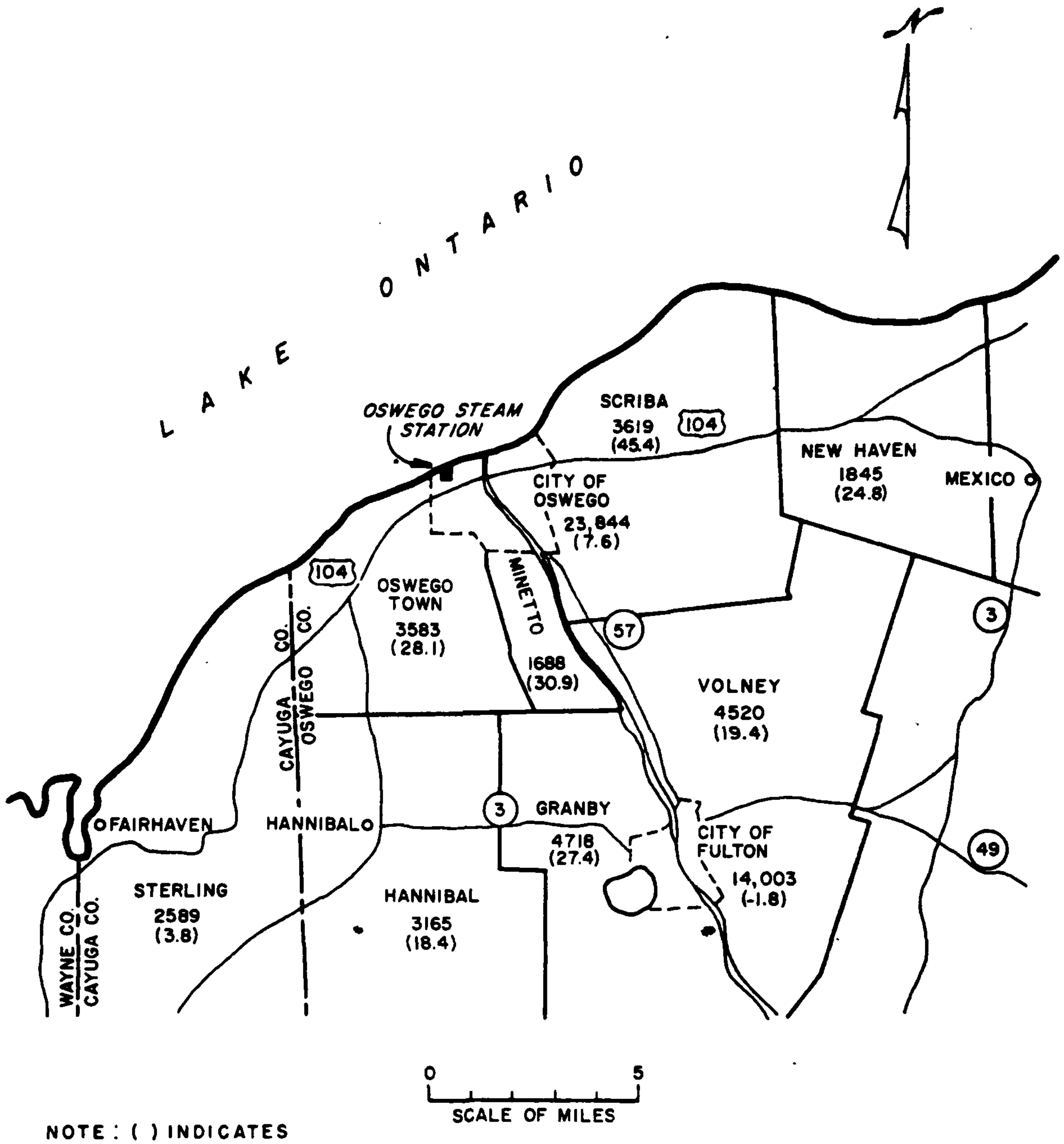
The populations of nearby communities in Oswego County compiled from Bureau Census reports for the last three decades are given below. The area surrounding the City of Oswego is growing somewhat more rapidly than Oswego County as a whole, although the population of the city itself is almost constant. The City of Fulton has decreased in population in the last ten years.

OSWEGO COUNTY POPULATION CHANGES BY COMMUNITY

	1950	1960	1970
Oswego County	77,181	86,118	100,897
City of Fulton	13,922	14,261	14,003
Granby	2,775	3,704	4,718
Hannibal	2,230	2,673	3,165
Minetto	1,025	1,290	1,688
New Haven	1,259	1,478	1,845
City of Oswego	22,647	22,155	23,844
Town of Oswego	2,106	2,796	3,585
Scriba	2,248	2,489	3,619
Volney	3,106	3,785	4,520

In 1968, the New York State Office of Planning Coordination projected the populations of Oswego and Cayuga Counties (Ref. 10) as follows:

Year	Oswego	Cayuga
1970	99,000	78,000
1980	118,000	82,000
1990	141,000	87,000
2000	164,000	90,000



NOTE: ( ) INDICATES PERCENTAGE INCREASE FROM 1960 to 1970

FIG. 2.6-1

POPULATIONS OF TOWNS AND CITIES WITHIN 10 MILES OF PLANT SITE

1970 FINAL CENSUS COUNTS

NIAGARA MOHAWK POWER CORPORATION

The 1970 populations were, in fact, 100,897 and 77,439 for Oswego and Cayuga Counties, respectively. New projections based on the 1970 census data are not yet available.

Present and Future Development

The Syracuse Metropolitan area consisting of Madison, Onondaga and Oswego Counties is one of the fastest growing areas in upstate New York. The New York State Department of Commerce index of business activity for the area has been rising at an annual average rate of 3.7 percent since 1957 and reached an all time high of 155 in the third quarter of 1969.

In addition to continuing increases in manufacturing activity, the retail and wholesale trade and services and the transportation, communication and public utility sectors moved upward to meet the needs of increasing population. Fig. 2.6-3 depicts historical and projected employment trends for Oswego County. (Ref. 11).

Fig. 2.6-2 depicts the growth in the Syracuse Metropolitan Area index as compared with statewide increases and upstate areas generally.

The City of Oswego lies on the south shore of Lake Ontario in Oswego County about 35 miles north of Syracuse. The 1970 population was 23,844 and the land area is approximately 8 sq miles. Frontage along Lake Ontario is about 2 1/2 miles. The Oswego River, which provides a navigable link between Lake Ontario and the Erie Barge Canal across central New York State, divides the city approximately in half.

Land use within city limits is generally mixed, with retail and commercial use concentrated along West First and Second Streets and East First and Second Streets on either side of the river and along Bridge Street (U.S. Route 104) which passes east and west through the central city approximately 1/2 mile south of the plant.

The outer portions of the city and the surrounding county land are predominantly rural in character with flat to moderately rolling terrain and scattered villages and townships. A generalized land use map for the City of Oswego is shown in Fig. 2.6-4.

Industrial

With the exception of a relatively small area in the southwest section of the city, most of the industrial activity in Oswego is concentrated along or adjacent to the Lake Ontario waterfront and at the mouth of the Oswego River. Types of industry vary, with metal processing and power production predominating.

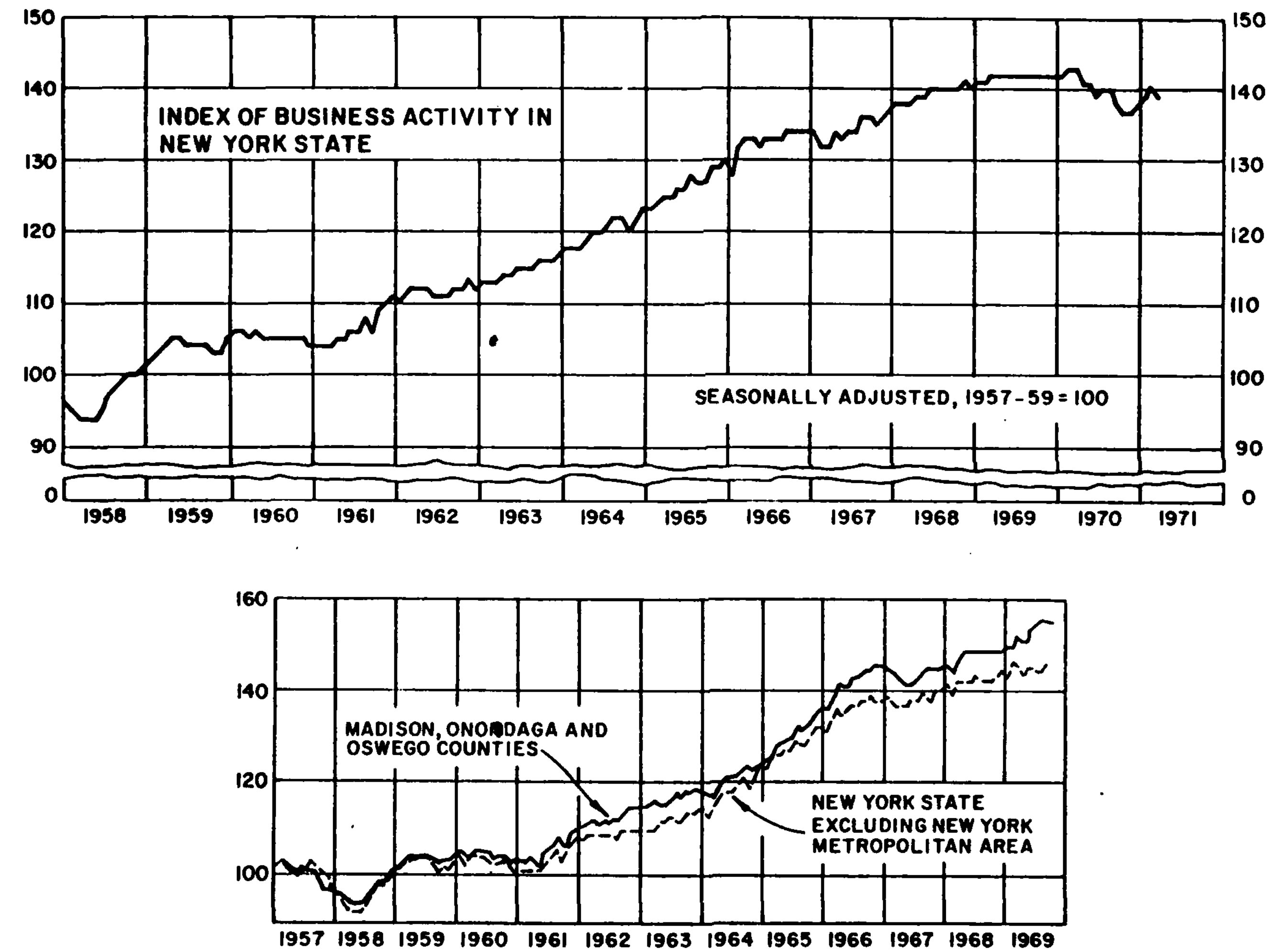


FIG. 2.6-2

INDEXES OF BUSINESS ACTIVITIES
NEW YORK STATE

NIAGARA MOHAWK POWER CORPORATION

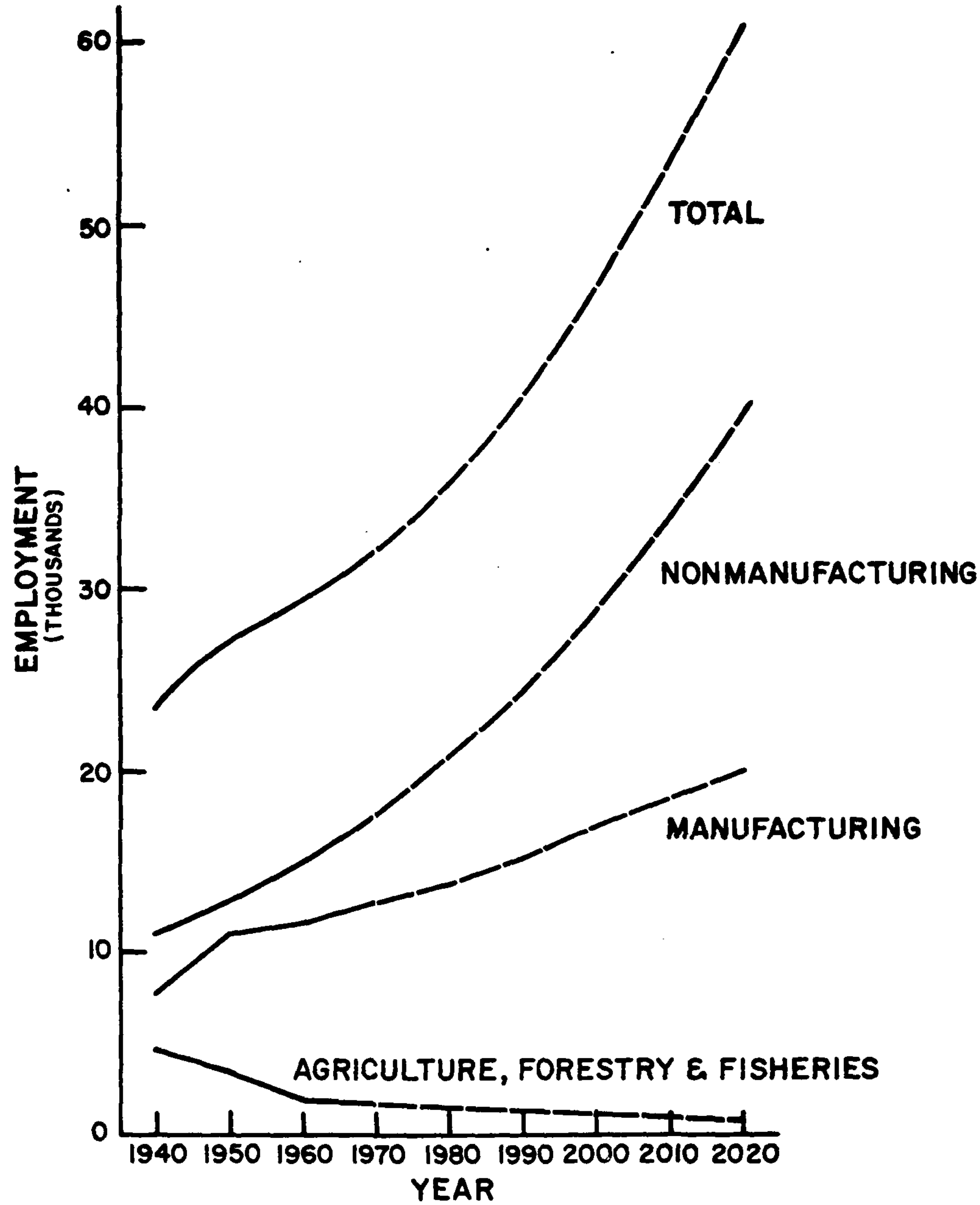


FIG. 2.6-3
HISTORICAL & PROJECTED EMPLOYMENT
OSWEGO COUNTY
NIAGARA MOHAWK POWER CORPORATION

Industrial use in the city totaled 7.4 percent of the land area in 1957. (Ref. 12)

The Bureau of the Census lists 103 industrial establishments in Oswego County in 1967 with a payrcll of 48.5 million.

Residential

The heaviest concentrations of population in the city are adjacent to and east and west of the central business district as shown in Fig. 2.6-5. (Ref. 12). Residential properties of the lowest values generally are adjacent to land in industrial use. About 31 percent of Oswego's area is in residential use. The only apartment type facility is a State Housing Authority low rent project, Hamilton Homes, which houses 766 persons in 186 units in 28 two story buildings located southeast of the central business district. Oswego's first high rise apartment, a 10-story, 100 unit facility for senior citizens to be located within the Central Business District urban renewal project, is in the preliminary planning stages.

Of 6,879 housing units in the city in 1970, 4,348 were owner occupied and 4,614 were single unit structures. Median value of owner occupied units was $11,800.

Commercial

Retail sales in the City and County of Oswego in recent years have increased as shown in the following tabulation:

	1963 (Ref. 13)		1967 (Ref. 13)		1969 (Ref. 14)	
	City	County	City	County	City	County
Number of Establishments	267	948	252	975	N.A.	N.A.
Sales (Millions of Dollars)	29.6	99.4	38.6	124.7	40.0	127.9

Buying income per household in the city in 1969 was $9,128. (Ref.14).

In addition, wholesale sales in the city and county amounted to $22 million and $45 million, respectively, in 1967, according to the Bureau of the Census.

Agriculture

Although a small portion of the city remains in agricultural use, the county area surrounding the city contains the primary agricultural activity in the region.

In the last 90 years, land use for farms and employment in agriculture have steadily decreased. A 1964 census of

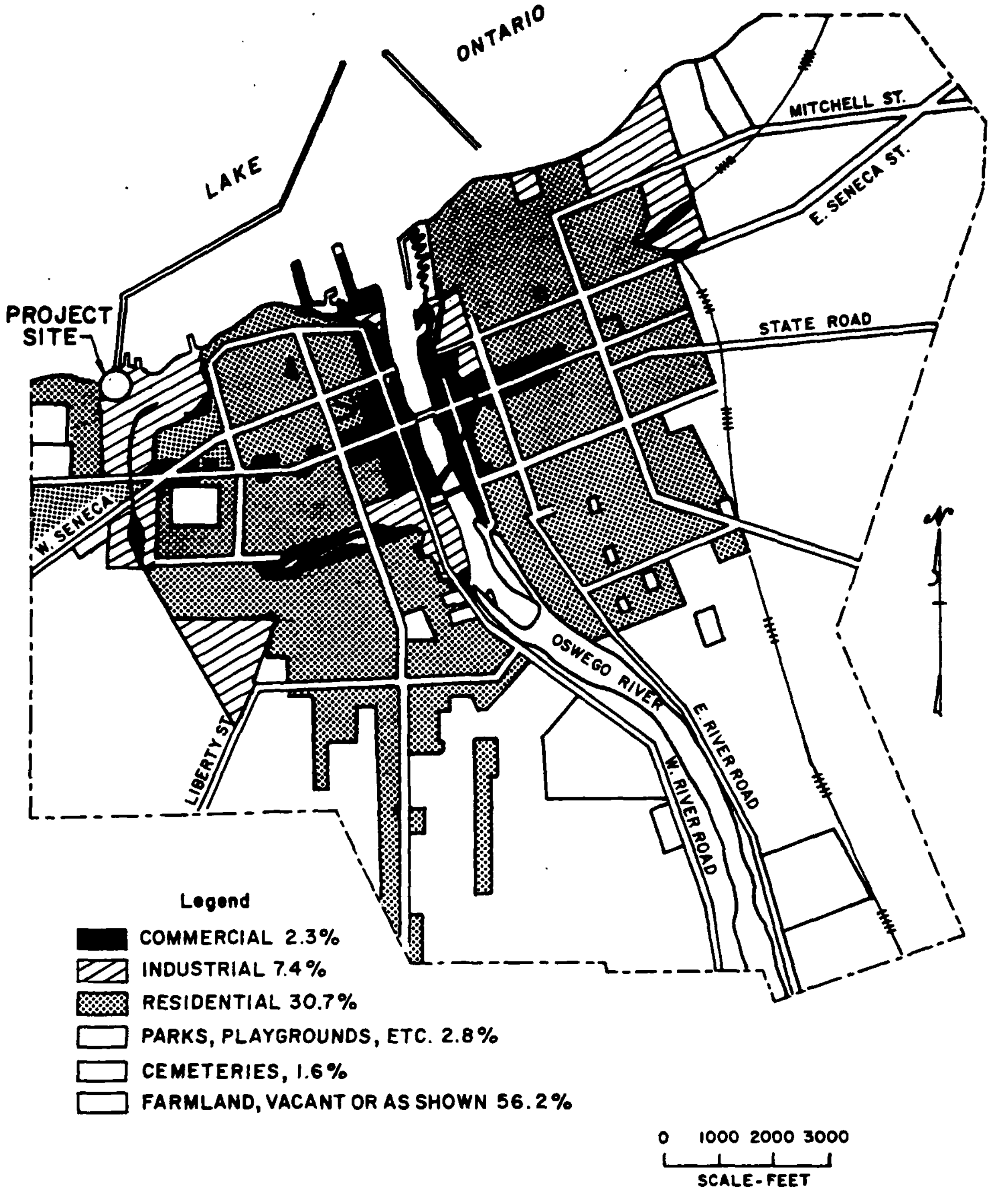


FIG. 2.6-4

GENERALIZED EXISTING LAND USE
CITY OF OSWEGO, NEW YORK
NIAGARA MOHAWK POWER CORPORATION

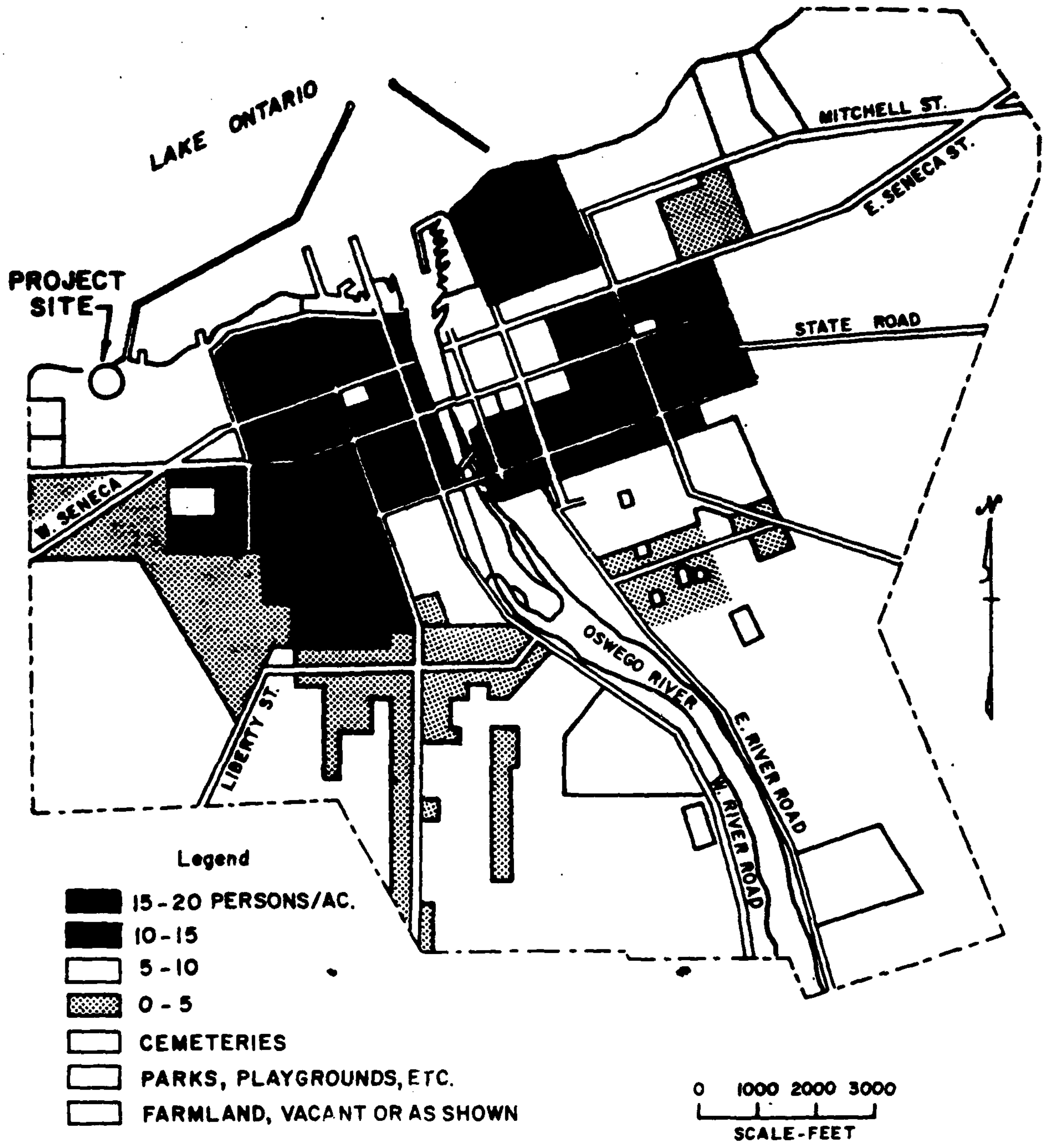


FIG. 2.6-5

POPULATION DENSITY

CITY OF OSWEGO, NEW YORK

NIAGARA MOHAWK POWER CORPORATION

agriculture shows 1,592 farms covering 210,555 acres, 34 percent of the county area. In 1960, 8.4 percent of the total county employment was on farms.

Land use for agriculture is expected to decline further in the future because of poor soil conditions and increasing urbanization. A study of the economic viability of farm areas published by the New York State Office of Planning Coordination indicates that only limited portions of the county, most of which surround the City of Fulton, nine miles south of Oswego, have high or medium viability. With the exception of a small area southeast of the city boundary, the land surrounding Oswego has either low viability or is not commercially farmed.

A similiar condition exists in the Lake Ontario waterfront areas west of the city in Cayuga County. Except for orchards, the land is ill-suited for agriculture, and a large percentage of land previously farmed has reverted to a natural state. In the bordering township of Sterling, cropland area is below 23 percent, the lowest in Cayuga County.

Recreation

The Oswego County Planning Commission lists 10 public parks, playgrounds and recreational areas in the city, as shown in Table 2.6-A.

TABLE 2.6-A

PRINCIPAL EXISTING RECREATIONAL FACILITIES

CITY OF OSWEGO

Facility	Approximate Acreage	Activities
Fort Ontario	15	Baseball, playground, track, swimming pool, tennis
Leighton School	7	Baseball, football, playground
Fitzhugh Park	3	Baseball, tennis, playground, ice skating
Riley School (Peglow Park)	2	Ballfield, playground, ice skating
East Park	7	Playground
Kingsford Park	5	Ballfield, playground, ice skating rink and pavilion
South Park	4	Baseball, playground
West Park	7	Ballfield, playground
Charles C. Crisafulli Park	3	Ballfield, playground
Veterans Park	3	Passive
Municipal Beach	N.A.	Swimming

Facilities for boating are provided at the privately owned and operated Oswego Marina which has 68 berths and can handle boats up to 100 ft in length. During the peak pleasure boating season, from July 15 to August 15, approximately 30 boats stop for overnight berthing. For the remainder of the boating season, average overnight stops vary from 10 to 20 boats.

One campsite is in operation immediately beyond the west boundary of the city on County Route 89.

The nearest State parks to Oswego are all at distances greater than five miles. They are:

Park	Location	Acreage	Activities
Battle Island	7.5 miles south	240	Golf
Fair Haven Beach	13 miles southwest	861	Beach Picnicking Play fields Camping Boating Fishing Hiking
Selkirk Shores	18 miles northeast	980	Beach Hiking Picnicking Play fields Camping Fishing

There are no Federal or County parks or recreational areas within the vicinity of Oswego and none is planned for the future. However, the Cayuga County Planning Board, in a recent report (Ref. 15), recommends that a conservation strip be established along the Lake Ontario waterfront from Fair Haven to the Oswego County line 6 miles west of the project site.

Fig. 2.6-6 shows principal recreational areas and other points of interest in the city.

Institutional and Cultural

At the western extremity of the city situated partially within the city and partially within the Town of Oswego, the State University of New York has established the State University College at Oswego. Prior to 1948, the University was known as Oswego State Teachers College.

During the past decade, the institution has expanded its programs to function as a general purpose college of Arts and Science. The campus now consists of a complex of 32 buildings and related

Principal Industries

A ALCAN ALUMINUM CORP.
B OSWEGO PLASTICS, INC.
C. BRENEMAN HARTSHORN
D. CYCLOTHERM
E FLEXO-WIRE
F HAMMERMILL PAPER CO.
G. PAPERTRONICS
H. NIAGARA MOHAWK POWER CORP.
I NORTHERN STEEL CORP.
J OSWEGO CANDY COMPANY, INC.
K. OSWEGO CASTINGS CORP.
L. HURON - PORTLAND CEMENT CO.
M ERIE - LACKAWANNA R.R. COAL DOCK
N ACME PLATE CO.
O. CONN KNITTING MILLS
P LAGOE OSWEGO CORP.
Q. INDUSTRIAL PRECISION PRODUCTS
R OSTED MFG. CO.

Points of Interest and Public Buildings

1 PORT OF OSWEGO AUTHORITY
2 S U N Y ATHLETIC FIELD
3 U S COAST GUARD STATION
4 CITY RECREATION AREA
5. OLD FORT ONTARIO
6 CITY HALL
7 COUNTY BUILDINGS
8 LOCK 8 N Y S BARGE CANAL
9 COUNTRY CLUB
10 CITY PUMPING STATION
11 HIGHEST ELEVATION IN CITY 434 FT ABOVE SEA LEVEL
12 HAMILTON HOMES
13 OSWEGO SPEEDWAY
14 MUNICIPAL BEACH*
15 POST OFFICE
16 OSWEGO HOSPITAL
17 CITY LIBRARY
18 OSWEGO HISTORICAL SOCIETY
19 WRIGHT'S "SMALL BOAT" LANDING
20 N Y S ARMORY
21 NAVAL RESERVE TRAINING STATION
22 PONTIAC HOTEL
23 THOMAS MOTOR COURTS (West) THOMAS MOTOR LODGE (East)
24 STATE UNIVERSITY COLLEGE at OSWEGO
25 OSWEGO SHOPPING PLAZA
26 MIDTOWN SHOPPING CENTER
27 MUNICIPAL POOL

☐ Churches — Schools

1 ASSEMBLY OF GOD
2 WEST BAPTIST CHURCH
3 FIRST CHURCH OF CHRIST SCIENTIST
4 CHRIST EPISCOPAL CHURCH
5 CHURCH OF THE EVANGELISTS
6 JEHOVAH'S WITNESSES
7 CONGREGATION ADATH ISRAEL SYNAGOGUE
8 GRACE EVANGELICAL LUTHERAN CHURCH
9 FIRST METHODIST CHURCH
10 TRINITY METHODIST CHURCH
11 CHURCH OF THE NAZARENE
12. PRESBYTERIAN CHURCH
13. UNITED CHURCH OF CHRIST
14 ELIM PENTACOSTAL TABERNACLE
15. SALVATION ARMY CITADEL
16. ST JOHN'S CHURCH (R.C.)
17. ST JOSEPH'S CHURCH (R.C.)
18 ST MARY'S CHURCH (R.C.)
19. ST. PAUL'S CHURCH (R.C.)
20 ST PETER'S CHURCH (R.C.)
21. ST. STEPHEN'S CHURCH (R.C.)
22. OSWEGO HIGH SCHOOL
23. CATHOLIC HIGH SCHOOL
24. STATE UNIVERSITY COLLEGE AT COLLEGE
25. FITZHUGH PARK*
26. KINGSFORD PARK*
27. No 2*
28 CHARLES E RILEY*
29 FREDERICK LEIGHTON*
30. ST JOHN'S PAROCHIAL
31. ST MARY'S PAROCHIAL
32 ST. PAUL'S PAROCHIAL
33. CAMPUS SCHOOL

* RECREATIONAL FACILITIES

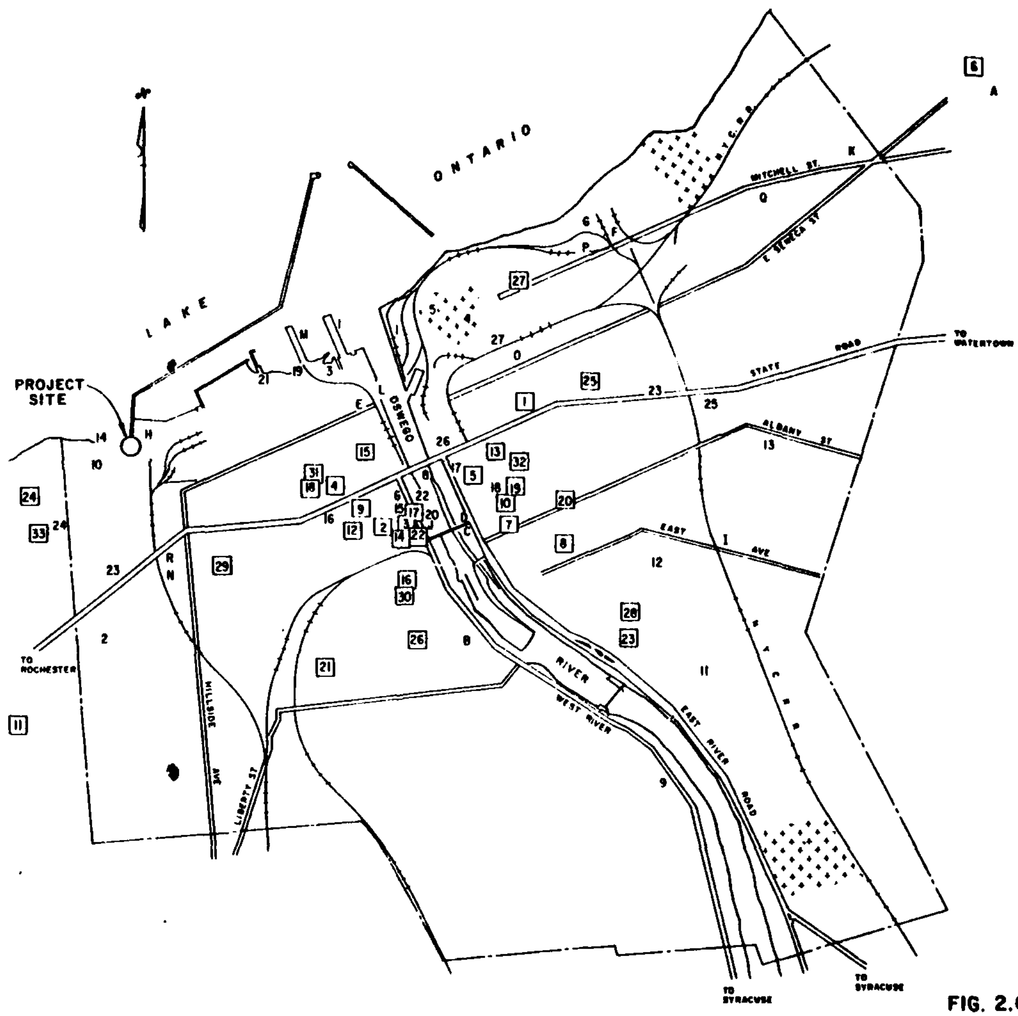


FIG. 2.6-6
COMMUNITY FACILITIES, POINTS OF INTEREST AND INDUSTRIAL ACTIVITIES
OSWEGO, NEW YORK
NIAGARA MOHAWK POWER CORPORATION

facilities with a total enrollment of approximately 7,000 undergraduate and graduate students.

Three additional residence halls and two dining halls are scheduled for future construction and it is anticipated that enrollment will continue to increase to a projected 11,000 by 1974.

To serve its approximately 23,000 population, there are ten public and parochial schools in the city, two of which are high schools. Twenty churches and one synagogue are located in or adjacent to the central business district and, in addition to the 260,000-volume library at the College at Oswego, the city maintains a centrally located, 51,000-volume public library.

Two hospitals with 236 beds are located within the city.

Cultural activities in the City of Oswego include the Oswego Historical Society and the Oswego Arts Center located in the former Quartermaster's Building at Fort Ontario. The Oswego Art Guild, which was formed to further art appreciation in the City, sponsors several art shows during the year.

Other Community Facilities

The Federal Government maintains a Coast Guard Station in Oswego Harbor and there is also a Naval Reserve Training Station on the Lake Ontario waterfront. A New York State Armory is located in the Central Business District and the Oswego County Office Building and County Courthouse are also in the city.

At the river mouth, the Port of Oswego Authority provides facilities for the docking of ocean vessels and the transfer of cargo for highway and rail shipment. Annual net tonnage handled by the facility for the past three years during the shipping season is as follows:

	General Cargo	Bulk Cargo
1970	10,734	56,967
1969	9,421	38,208
1968	18,548	67,846

The recently constructed docks are capable of servicing vessels which can navigate the St. Lawrence Seaway.

2.7 TERRESTRIAL ECOLOGY

PLANT SITE

The Oswego Steam Station site is located in an industrially zoned area of the city adjacent to Oswego Harbor. Most of the adjacent land has been developed. There is an open field on the site south of the main powerhouse buildings of approximately 20 acres which is covered with low grassy and herbaceous vegetation. Bordering the west side of the field is a small stand of red pine (Pinus resinosa). The dominant vegetation in the field includes orchard grass (Dactylis glomerata), timothy (Phelum pratens), white clover (Trifolium repens), red clover (T. pratens), dandelions (Taraxacum officinale), mullen (Verbascum thapsus), goldenrod (Solidago sp.), ragweed (Ambrosia artemisifolia) and Queen Anne's lace (Daucus carota). The lack of woody vegetation indicates that the field is mowed periodically.

ENVIRONS SURROUNDING THE CITY OF OSWEGO

The plant site is located in a portion of Oswego County referred to as the Oneida Plain which is characterized by low undulating land comprised of heavy soils. Much of the land has been cleared in the past for farming but over half of the farm land in the county has been abandoned. The vegetation of the region provides an ideal habitat for woodcock (Philohela minor), cottontail rabbits (Sylvilagus floridanus), ruffed grouse (Bonasa umbellus) and gray squirrel (Sciurus carolinensis). There are a few white-tail deer (Odocoileus virginianus) and ring-neck pheasant (Phasianus colchicus). Furbearers, including raccoon (Procyon lotor), muskrat (Ondatra zibeticus), mink (Mustela vison), red fox (Vulpes fulva) and skunk (Mephitis mephitis) are also found in the area.

The area up to a few miles from the plant site was examined to determine qualitative descriptions of the dominant habitat types in the vicinity of Oswego. Three principal stages of secondary land succession could be identified in the area. These, in sequential order are: abandoned pasture in the early stages of succession, abandoned pasture or field in later stages of succession and mature forested areas. In addition to these broad land groupings, three areas of special interest were identified; marshland, the campus of the New York State University at Oswego and muck farms.

Abandoned Pasture and Field

In past years dairy farming was a primary industry on the uplands, but due to the relatively poor soil conditions, the farms did not prosper and the pastures were abandoned. Many of the pastures, instead of supporting growths of edible grasses, are being invaded by various undesirable species such as thistle (Cirsium), blackberry (Rubus allegheniensis) and hawthorn (Crataegus). The pasture edges support varied trees and shrubs which invade the open areas in the absence of domestic animals. Poplar (Populus), black cherry (Prunus serotina), American elm (Ulmus americana) and staghorn sumac (Rhus typhina) are typical of the woody species encountered in hedgerows surrounding the fields.

Much of the land surrounding Oswego is in this early stage of succession. When open land is abandoned, a great variety of herbaceous plants invade the area. The exact species composition will vary slightly from field to field but some dominant species can be identified at most sites. Chicory (Cichorium intybus), goldenrod (Solidago), asters (Aster) and Queen Anne's lace (Daucus carota) are some of the dominant plants. In fields that have been abandoned for a longer period of time, some low woody species can be seen along with the herbaceous growth: blackberry, raspberry (Rubus), wild grape (Vitis) and purple nightshade (Solanum dulcumara). This stage of vegetation is low and dense and is used extensively by insects. Some of the plant species are in flower during most of the summer and fall, providing pollen and nectar for food as well as protection for insects.

Overgrown Pastures and Fields

There is no distinct separation between abandoned and overgrown pastures and fields in this stage of succession but rather a gradual transition from one to the other. Woody vegetation becomes dominant, shading the herbs and grasses causing many to die out due to lack of sunlight. Some of the small transition trees that invade the open areas are hawthorn, poplar, staghorn sumac and alder (alnus). Young trees of the species that will comprise the mature forest in the area are also evident at this stage. They are black cherry, red maple (Acer rubrum), sugar maple (Acer saccharum), white ash (Fraxinus americana), American elm and basswood (Tilia americana).

Mature Forest

A field survey within two miles of the plant site indicated very few mature forested areas. Two distinct forested areas were examined and probably represent the mature seral stage of succession for this region. The more upland, drier sites were dominated by species of red oak (Quercus rubra), American beech (Fagus grandifolia), white ash, basswood and black cherry. Ground cover in this forest was moderate, consisting primarily of bracken fern (Pteridium aquilinum), false Solomon's seal (Smilacina racemosa)and greenbriar (Smilax rotundifolia).

The more poorly drained wetter areas are dominated by red maple forest, a tree that is able to tolerate flooding for part of the year. White ash, sugar maple, cherry, basswood and elm are also represented in these areas. The groundcover consists of sasparilla (Aralia nudicaulis), sensitive fern (Onoclea sensibilis)and partridge berry (Mitchella repens).

Marsh Areas

There are many marshy areas in the region which support distinct species of vegetation adapted to living in shallow water. A vegetation check was made on the lower end of Rice Creek 2 miles west of the site and on the marshy site between the New York Central and the Erie-Lackawanna railroad tracks, 1 1/2 mile south-southeast of the site.

The two areas had many plant species in common. The major difference between the two areas was that the Rice Creek area was dominated by buttonbush (Cephalanthus accidnetalis) while the marsh between the railroad tracks was dominated by cattails (Typha latifolia).

Other important species found in the marsh areas were rushes (Cyperaceae) and sedges (Juncareae), sensitive fern, purple loostrife (Lythrum salicaria), red osier dogwood (Cornus stolonifera), pickerelweed (Pontederia cordata), arrowhead (Sagittaria) and the tiny floating aquatic duckweed (Lemna minor).

College Campus

The college campus borders the west side of the plant site and is of particular interest due to the altered condition of the landscape. The campus is a man made setting of spacious mowed lawns which are interspersed with a great variety of native and exotic trees and shrubs. The most abundant trees planted on the campus are the Norway maple (Acer platanoides) and the Lombardy poplar (Populus nigra). The Lombardy poplar is represented by mature trees and extensive plantings of young trees. No doubt these trees are being planted because of their wind break quality. Sugar maple, white oak (Quercus alba), red pine (Pinus resinosa) and Scot's pine (Pinus sylvestris) are also growing on the campus.

Muck Farms

Muck soils are derived from accumulated decomposing marsh vegetation. Muck soils are extremely fertile, which permits their use for high cash crops. In the Oswego area, onions are the primary crop grown on these soils. Muck farms are constructed by draining and ditching a marsh so that the land can be cultivated by machinery. Several small muck farming operations are found to the west and south of Oswego.

In summary, the area surrounding the City of Oswego supports a diverse array of vegetative species and associated animal species.

2.8 WATER USES

City of Oswego

The major user of Lake Ontario water in the vicinity of Oswego, other than the Oswego Steam Station, is the City of Oswego. Its water supply intake is located about a mile from the proposed water intake and some 6,200 ft out in the lake at a depth of 54 ft. Average 1970 water withdrawal from the lake for city use was 17 million gallons per day (Mgd). The City of Oswego plans to continue to use water drawn through this intake to supply the Oswego area through the year 2020. Approximately 6,300 of the population of the City of Oswego and a 4,000 college population are now served by the City's 1.6 mgd West Side Sewage Treatment Plant which discharges directly into the harbor area after primary treatment of the effluent. (Ref. 16). The remainder of the effluent from the City's combined storm and sanitary system is discharged directly into the Oswego River and Lake Ontario. However, complete renovation and expansion to a plant capacity of 4 mgd is now under construction. Secondary treatment, as well as phosphate removal, will be provided when this work is completed.

Metropolitan Water Board

The Metropolitan Water Board of Onondaga County is permitted, by agreement, to draw up to 62.5 mgd through the city intake for its own purposes. By about 1980 the Onondaga County Water District (OCWD), administered by the Metropolitan Water Board, is expected to exceed its agreed-upon maximum supply through the Oswego intake. At this time, the Onondaga County Water Report recommends that a second intake be constructed off Burt Point west of the existing intake.

Furthermore, the construction of a third intake to meet Onondaga County demands by the year 2020 is recommended to be located at West Nine Mile Point in Cayuga County, approximately 7 1/2 miles northeast of the Oswego Steam Station. No schedule for construction of this intake is given, but presumably it would begin about 1990, at which time the capacity of the second intake off Burt Point will have been reached.

Present and projected peak public water demands to be supplied through these intakes by both Onondaga County (Ref. 17) and the City of Oswego (Ref. 18) are as follows:

User	Peak Water Demand (mgd)		
	1970	1990	2020
City of Oswego	17	27	43
Metropolitan Water Board	36[1]	164[2]	416[3]

1 Present capacity of transmission system

2 62.5 mgd from Oswego intake, remainder from Burt Point

3 62.5 mgd from Oswego intake, remainder from Burt Point and West Nine Mile Point

Existing Power Generation

The four existing generating units at the Oswego Power Station draw a total of 492 mgd of Lake Ontario water for cooling and other needs. A flat, octagonal intake structure is located approximately 550 ft offshore at a depth of about 13 ft, with an intake tunnel running underneath the harbor breakwater to the station.

The heated water from the condensers is discharged into the harbor at low velocity from a sluice gate located at the shoreline. Various benefits accrue to the environment as a result of this discharge because of the circulation and flushing induced in the harbor waters. Substantial dilution is provided to the Oswego West Side Sewage Treatment Plant primary effluent which is discharged to the west basin. Furthermore, the discharge velocity is sufficient to scour light organics contained occasionally in the effluent. The buildup of inorganic silt in the harbor area is also limited as a result of scouring from the station discharge jet, thus reducing the amount of periodic dredging required to maintain navigable channel depths.

In addition to the Oswego Station, NMPC has a nuclear power station at Nine Mile Point, approximately 7-1/2 miles northeast of the Oswego River, which requires a maximum of 356 mgd withdrawal and return to Lake Ontario. Average depths to centerlines of the intake and discharge ports are 20.8 ft and 14.3 ft and distances from shore are 915 ft and 405 ft, respectively.

Industrial

Of the 42 industrial establishments in the City of Oswego, only the Alcan Aluminum Corporation draws any significant amount of water directly from the lake. The plant is located about 4 miles east of the Oswego River, and normal use is 8.5 mgd. Alcan provides secondary sewage treatment through a 10,000 gpd plant prior to discharge to Lake Ontario for removal of chemical wastes and a secondary treatment of plant sanitary wastes. The remainder is discharged to the lake without treatment at a mean temperature rise above ambient of 5 F.

2.9 AQUATIC ECOLOGY

The geology and topography of the shore of Lake Ontario have a marked bearing on the ecology of the lake in the Oswego area. Borings, fathometric surveys, and direct observation by divers were made at seven transects perpendicular to the shore from a point 6,000 ft west of the existing steam station to the outer end of the turning basin breakwater, 6,000 ft east of the station. These transects were extended a distance of 2,000 ft offshore where the lake depth is about 40 ft and are shown in Fig. 2.9-1.

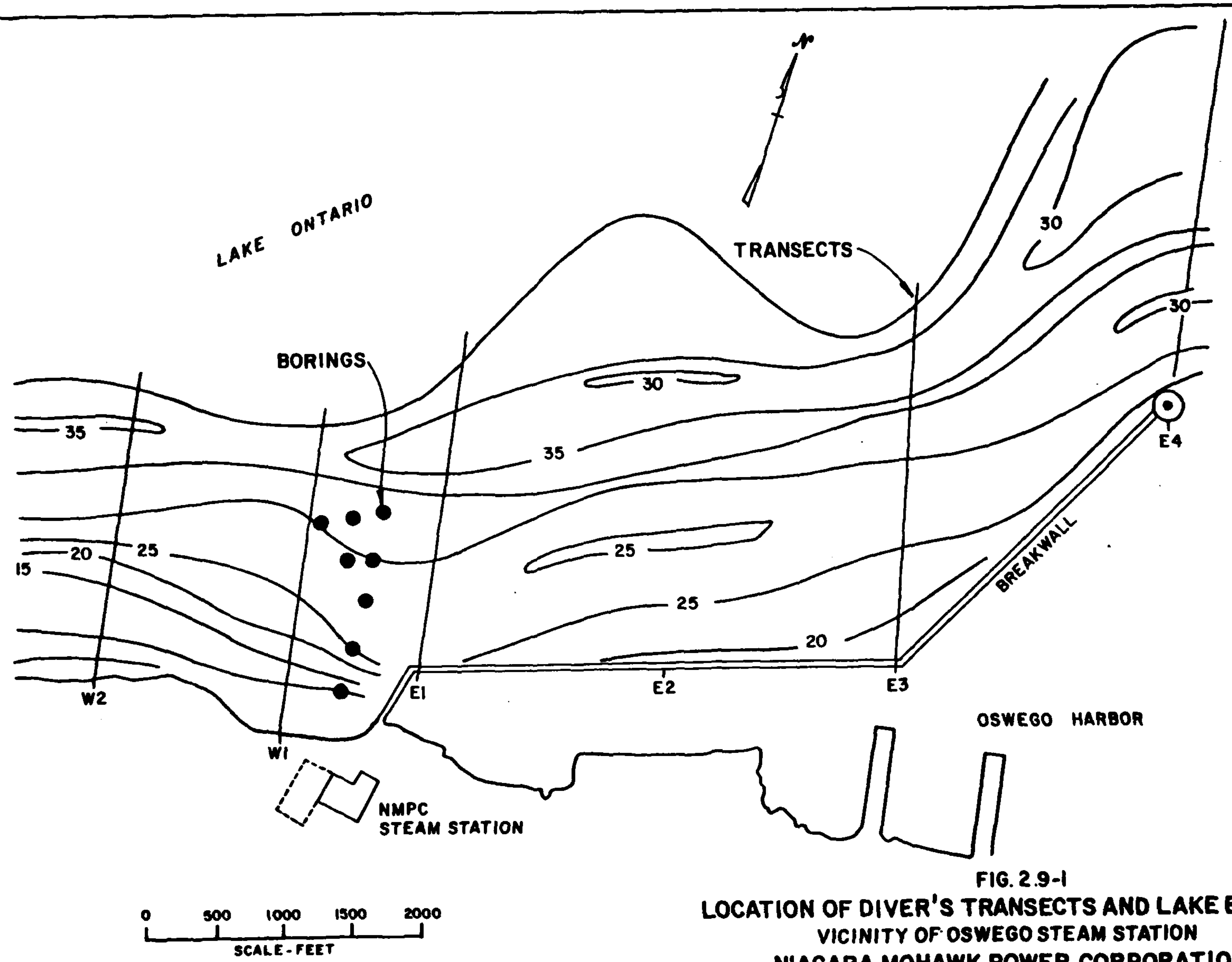


FIG. 2.9-1
LOCATION OF DIVER'S TRANSECTS AND LAKE BORINGS
VICINITY OF OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION

Bedrock in this area is Oswego sandstone which is covered in some places with an overburden of glacial till which is a preconsolidated heterogeneous mixture of gray brown silt, sand, gravel and boulders. In some places, the exposed bedrock has weathered to broken rhomboidal slabs, roughly 4 ft by 5 ft.

In the bay area, immediately to the west of Oswego Steam Station, the bottom is composed of rounded glacial boulders up to 12 in. in diameter. In some places, notably near the eastern end of the breakwater, the combination of river and lake currents has deposited considerable amounts of sand.

From the standpoint of the ecology of the lake, the area is unproductive of rooted vegetation. As will be detailed in a subsequent section, the rock surfaces provide attachment for some filamentous photosynthetic organisms down to depths at which reduced light penetration limits growth.

The west basin and harbor area act as a mixing basin for Oswego River inflow and for lake water passed through the condensers of Units 1 to 4 and discharged into the west basin. The ecology of Oswego Harbor and the west basin is determined in large measure by the water quality of the Oswego River discharge.

Stream pollution surveys, conducted during 1954-57 by the New York State Department of Health on the various streams and lakes in the Oswego Basin indicated widespread discharges of sanitary sewage, industrial wastes, and partially treated sewage and industrial waste effluents. (Ref. 19). In some of the smaller streams, the development of septic conditions indicated that the waste assimilative capacity of the stream had been exceeded.

The Water Quality Surveillance Unit of the New York State Department of Environmental Conservation (DEC) monitors the water quality of the Oswego River at Hinmansville, midway between Baldwinsville and Fulton. The cumulative record of the principal parameters determined by this monitor for the period January 1, 1964 to August 1, 1970 is summarized in Table 2.9-A. The tabulated values are the median and decentile observations. In the following paragraphs the interdecile range (10% - 90% values) has been used to characterize the variability of certain constituents. Certain parameters, like total alkalinity, that are characteristic of the natural surface water runoff show a narrow spread (103 to 134 milligrams per liter [mg/l]). Other parameters show a marked variation and can probably be related to flow. The suspended solids that are erosional products, including scoured sludge banks of polluting material, vary by more than a factor of 4, from 10 to 46 mg/l. Dissolved solids do not respond as widely to flow variation and vary by a factor of 2, from 489 to 1,067 mg/l.

The upstream contamination of the river with sewage discharges is evidenced by total coliform bacteria counts, ranging from a most probable number (MPN) of 930 to 4,600 organisms per 100 ml. The concomitant chemical parameters of previous pollution, notably nitrates (0.15 to 0.69 mg/l) and phosphates (0.08 to 0.21 mg/l) vary by about a factor of four. These constituents represent the principal nutrients upon which the productivity of the harbor and west basin depend. A survey of the river, conducted between July and November 1970, indicated that the daily weight of nitrates discharged to the harbor varied from a low of 35 to a high of 244 tons per day.

The New York State Department of Environmental Conservation monitors the water quality of the lake as drawn into the Oswego City water supply intake 6,500 ft offshore at a depth of 40 ft. The 6 year cumulative record of this monitor is shown in Table 2.9-B. The same water quality parameters and the same median and percentile concentrations are tabulated as in Table 2.9-A.

Lake Ontario supports commercial and sport fisheries of considerable magnitude. Whitefish, carp, bullhead, yellow perch, rainbow smelt, American eel, sunfish, and walleye dominate the commercial landings. Smallmouth bass, yellow perch, walleye, bullhead, northern pike, and coho salmon are the principal sport fishes, although other species are present in the lake. No rare and endangered species are found in these environs.

TABLE 2.9-A

OSWEGO RIVER WATER QUALITY AT HINMANSVILLE, MIDWAY BETWEEN BALDWINSVILLE AND FULTON

Cumulative Record: 1964 to 1970

Parameter	Percentage Frequency of Observations 10%	Median 50%	90%
Color	11	25	35
Turbidity	6.4	15.0	21.6
Water Temperature, F	33.8	59.5	75.8
DO, mg/l	7.5	9.7	11.8
DO, % saturation	79.0	90.0	105.5
BOD (5 Day)	1.5	2.5	4.0
Total Hardness, mg/l	221	320	394
Total Alkalinity, mg/l	103	114	134
Ammonia Nitrogen (N), mg/l	0.108	0.600	1.108
Organic Nitrogen (N), mg/l	0.32	0.56	1.01
Nitrite Nitrogen (N), mg/l	0.012	0.021	0.044
Nitrate Nitrogen (N), mg/l	0.15	0.32	0.69
Phosphates (PO_4), mg/l	0.08	0.16	0.21
Sulfates (SO_4), mg/l	57.8	78.0	110.2
Total Solids, mg/l	509	750	1,081
Suspended Solids, mg/l	10	24	46
Dissolved Solids, mg/l	489	738	1,067
Coliforms, MPN	930	2,400	4,600

TABLE 2.9-B

LAKE ONTARIO WATER QUALITY:
OSWEGO CITY WATER INTAKE

Cumulative Record: 1964 to 1970

Parameter	Percentage Frequency of Observations 10%	Median 50%	90%
Color	5	7	15
Turbidity	5.0	8.0	15.0
Water Temperature, F	35.6	48.2	67.3
DO, mg/l	8.0	11.2	13.6
DO, % saturation	81.5	92.3	103.9
BOD (5 Day)	0.5	1.2	2.3
Total Hardness, mg/l	128	138	162
Total Alkalinity, mg/l	86	95	104
Ammonia Nitrogen (N), mg/l	0.002	0.185	0.659
Organic Nitrogen (N), mg/l	0.00	0.23	0.53
Nitrite Nitrogen (N), mg/l	0.000	0.003	0.009
Nitrate Nitrogen (N), mg/l	0.02	0.13	0.24
Phosphates (PO_4), mg/l	0.06	0.14	0.27
Sulfates (SO_4), mg/l	24.0	29.0	41.0
Total Solids, mg/l	185	248	287
Suspended Solids, mg/l	2	8	22
Dissolved Solids, mg/l	171	236	283
Coliforms, MPN	3	23	93

In all essential characteristics, the lake water has lower concentrations and the range of concentration is generally smaller than that in the Oswego River. This signifies that, in terms of ecology, the lake is less fertile and will support a less abundant biota than the harbor area. It is worth noting that bacterial die-away of coliform organisms in the lake reduces the median bacterial density by two orders of magnitude.

Ecological investigations in the harbor area included sampling for benthic organisms with a 2 in. diameter corer as well as with a 6" by 6" by 9" Eckman dredge. Species of oligochaetes identified from these samples included Ilyodrilus templetoni, Limnodrilus hoffmeisteri and Limnodrilus cervix variant. Each of these organisms is characteristic of organically enriched waters. The amphipods, Gammarus lacustris limnaeus and Hyalella azteca, were found to be abundant on rooted vascular plants in shallow water areas of the turning basin. Gammarus was subsequently identified, in the stomach contents of fish taken from the harbor, as the preferred food of 17.8 percent of the fish.

Diptera identified in benthic samples included species of Chironomus and Procladius. Tubellarians of the genus Dugesia and Hydrolimax grisea were found in the river channel and near the Oswego Station discharge.

Snails and organisms inhabiting the shells of dead snails were recovered in the November Eckman haul on the edge of the channel of the Oswego River. Snails were also observed visually by a diver at several places in the harbor where the bottom is rocky or crevices exist in solid rock substrate. Bithinia tentaculata make up 95 percent of the gastropods at the river channel station. Other gastropod species collected included Valvata sincera, V. tricarinata and a species of Amnicola. Sphaerids were the only pelecypods found, of which nine species have been recorded in the ecological literature on Lake Ontario. (Ref. 20).

Collections of the fish population in the west basin were made by gill nets set at distances of 100 and 700 ft from the Oswego Steam Station discharge during the months of August through December 1970. It should be noted that the 700 ft sampling section was near the point of discharge of the Oswego Sewage Treatment Plant. Gill net sets were made for a 12 hr overnight period and the fish were removed onshore, identified, measured and weighed as quickly as possible.

In terms of total numbers of fish caught, there was no significant difference in the catches at 100 ft and 700 ft from the Oswego Steam Station outfall, as summarized in the following tabulation:

Month	Avg. Temp. F	Top-to-Bottom Gradient, F	Fish in Overnight Gill Net Set 100 ft.	
			100 ft.	700 ft.
August	25.4	2.6	272	291
September - October	21.1	0.6	142	147
November	10.8	2.3	226	213
December	9.0	2.3	78	212

Except for the near-uniform top-to-bottom temperature gradient in the September-October sample, the bottom temperature averaged about 2.4 F cooler than the surface temperature. Although the overall collections indicate little about temperature preferences and acclimation of the species collected, more fish were caught near the bottom than near the top of the nets.

A total of 17 genera of fish as listed below in Table 2.9-C was collected in the eight gill net samples but only white perch (Morone americana) and gizzard shad (Dorosoma cepedianum) were present in all eight samples. The alewife (Alosa pseudoharengus) was represented in seven of the eight collections. White perch constituted 61 percent of the total collection, gizzard shad, 10 percent and alewife, 20 percent, for a total of 91 percent of the total catch. The remaining 9 percent were made up of species of the other 13 genera.

TABLE 2.9-C

FISH SPECIES FROM WEST BASIN
GILL NET SAMPLES

	Scientific Name	Common Name
1.	Alosa pseudoharengus	Alewife
2.	Ambloplites rupestris	Rockbass
3.	Amia calva	Bowfin
4.	Catostomus commersoni	Sucker
5.	Coregonus sp.	Whitefish
6.	Cyprinus carpio	Carp
7.	Dorosoma cepedianum	Gizzard Shad
8.	Esox lucius	Northern Pike
9.	Ictalurus catus	White catfish
10.	Ictalurus nebulosus	Brown Bullhead
11.	Lepomis sp.	Sunfish
12.	Notropis hudsonius	Shiner
13.	Osmerus mordax	Smelt
14.	Perca flavescens	Yellow Perch
15.	Pomoxis nigromaculatus	Strawberry Bass
16.	Morone americana	White Perch
17.	Stizostedian vitreum	Walleye

Stomach contents of 53 fish from the August sample were examined as a means of relating food preference to the available biota production in the west basin. The stomachs of white perch contained mainly amphipods and oligochaetes, with some specimens containing in addition diptera larvae, cladocerans and algae. Unidentifiable fish remains were found in two stomachs. Stomachs of 14 brown bullheads (Ictalurus nebulosus) were shown to contain amphipods, oligochaetes, and algae. Stomachs of other species examined yielded no identifiable material.

It is not clear whether fish stay in the west basin for extended periods, but it appears that many of them are feeding on the abundant benthos and on the organisms associated with rooted aquatic plants in shallow water margins of the west basin. Condition of the fish caught was good. Lamprey scars were observed on a few fish but other wounds were not seen nor was there evidence of bacterial or fungal infection.

The biological productivity of Lake Ontario outside of Oswego Harbor was studied extensively. Attached filamentaneous algae were found to grow in diminished amounts on hard surface down to 15 ft. Measured in terms of organic weight, a 10 ft deep sample was only 36 percent as abundant as a sample taken at 5 ft; a 15 ft sample was only 14 percent as abundant as the 5 ft sample.

Similarly, the numbers of amphipods (Gammarus) at the 10 and 15 ft depth were only 23 percent and 3 percent as abundant, respectively, as at the 5 ft depth. Larva of the midge fly declined in numbers even more markedly with depth, being only 5 percent and 7 percent as prevalent, respectively, as at the 5 ft depth. Snail populations based on the small number collected, were as numerous at 10 ft depth as at the 5 ft but were reduced by about 50 percent at the 15 ft depth.

The benthic survey along the transects illustrated in Fig. 2.9-1 has shown that the lake bottom in the vicinity of the intake and discharge structures is generally composed of dense glacial till almost completely free of sediment. Rooted aquatic plants are absent owing to storm action and lack of suitable substrate. Most of the benthic organisms are found as residents of the algae Cladophora which, in the intake area, fringes the lake to a water depth of only 15 ft. This faunal association with Cladophora represents a transient food supply for fish because the algal growth periodically breaks away from the lake bottom during storms. These morphological lake characteristics do not combine to provide an environment capable of supporting dense polulations of fish. This is borne out by results from gill netting and echo sounding (fathometric) studies conducted in Lake Ontario from June 1970 through June 1971. These investigations showed that the numbers of fish in this area were low and that there is no pronounced pattern to their distribution.

The lake fish populations were sampled with gill nets placed along a line perpendicular to the breakwater at the Oswego Steam Station. One net was set close to the breakwater in 15 ft of water; two nets were set offshore in 20 ft of water, one near the surface and one near the bottom; and another pair, near surface and bottom, in 35 ft deep water. A total of 12 species of fish was collected from the lake as tabulated below in Table 2.9-D.

TABLE 2.9-D

FISH SPECIES FROM LAKE ONTARIO
GILL NET SAMPLES

	Scientific Name	Common Name
1.	Alosa pseudoharengus	Alewife
2.	Ambloplites rupestris	Rockbass
3.	Catostomus commersoni	Sucker
4.	Esox lucius	Northern Pike
5.	Ictalurus sp.	Bullhead
6.	Lepomis sp.	Sunfish
7.	Micropterus dolomieui	Smallmouth Bass
8.	Notropis sp.	Minnow
9.	Osmerus mordax	Smelt
10.	Perca flavescens	Yellow Perch
11.	Morone americana	White Perch
12.	Stizostedian vitreum	Walleye

The August net setting over a period of four days was collected daily. A total of 10 species was captured with alewife and rock bass accounting for 69 percent of the numbers caught. In terms of absolute numbers, the catch per day was very low and this apparent low density was confirmed by fathometric traces made in the area.

The same placement of gill nets in September caught only nine species of fish. Alewife (35 percent), yellow perch (16 percent) and rock bass (10 percent) accounted for 61 percent of the total catch. The total number of fish taken was nearly six times as great as in the August sampling.

For the October-November sample, the first pair of nets was set in 30 ft of water and the second pair was moved offshore into 40 ft of water. Again, nine species were taken but the numbers were markedly lower than the previous month.

The surface nets caught practically no fish. It was concluded that fish had left the area and the fathometric traces confirmed that there were few fish above the bottom of the lake.

The food preference of the fish taken in the September sample was determined by examination of stomach contents. Of the 135 fish examined, 46 percent of the stomachs were empty, 17.8 percent had been feeding strictly on gammarus, 15.5 percent on crayfish and 12.6 percent showed only fish remains. The remaining 8.1 percent had either a mixture of foods or unidentifiable material in the stomach.

Few fish were collected in the October-November sample. Examination of stomach contents indicates that the declining fall temperatures had reduced the numbers of gammarus available and that small fish became the predominant food available in the area.

The ecology of the area covered varies markedly. To the west of the station, the lake bottom slopes unevenly downward to the 40 ft contour. To the east, the base of the breakwater is in 15 to 20 feet of water. The 40 deg slope of the large rocks of which it is comprised, with the interstices between them, afford hiding and resting places for fish and other organisms. These unique features make the nearshore area of the lake, east of the station, ecologically different from the area to the west.

Fathometric surveys were conducted on July 10, September 3, September 21-27 and October 28-29 in 1970 along seven transects offshore from the Oswego Steam Station (bearing 340 deg.). The number of fish in the area was low and their distribution over the area was patternless. In 24-hour studies, with fathometric traverses made at 4 hr intervals, it was apparent that a good deal of gathering, movement en masse and dispersal of fish was taking place within a 24 hr period, but no consistent repetition of a diurnal pattern was discernible.

2.10 AMBIENT AIR QUALITY

The City of Oswego is located in an air quality area designated as Level III by the New York State Department of Environmental Conservation. This signifies that the air quality levels in the city should be consistent with those of a small metropolitan area comprised primarily of commercial office buildings, department stores and light industries.

Sampling of the ambient air for sulfur dioxide was conducted by Niagara Mohawk in Oswego during one summer month in 1970 and during a six-week winter period in 1970-71. During the summer sampling period, one sulfur dioxide sampler was used in the following manner: the analyzer was situated at a fixed location and operated continually for two days and nights. For the next five days, the analyzer was used for a mobile survey during daytime hours and returned to the fixed site during the night. During the winter sampling period, a sampler was fixed at a location approximately one-half mile east-northeast of the power station and was operated continually. The locations of the sampling stations are shown in Fig. 2.10-1. The sulfur dioxide samplers used were the electro-conductivity type which operate on the action of the contaminant impinging onto the surface of a conductivity cell containing acidified hydrogen peroxide solution. From the data collected, the following background sulfur dioxide concentrations were determined:

SO_2 Concentration, Average	Ambient Value (ppm)	Comparative State Standard for Level III (ppm)
Annual	0.02 (estimated*)	0.03
Maximum 1 hr	0.12 (measured)	0.50
Maximum 24 hr	0.075 (measured)	0.14
One month summer	0.01 (measured)	
Six-week winter	0.035 (measured)	

Ambient sampling for suspended particulates was conducted in the City of Oswego from May 1970 through April 1971 by the New York State Department of Environmental Conservation. Fifty-one 24 hr high volume samples were taken at two locations and results indicate that the ambient particulate level is within the limits set by the state. The location of the particulate samplers are shown in Fig. 2.10-1.

*From Limited Sampling Data

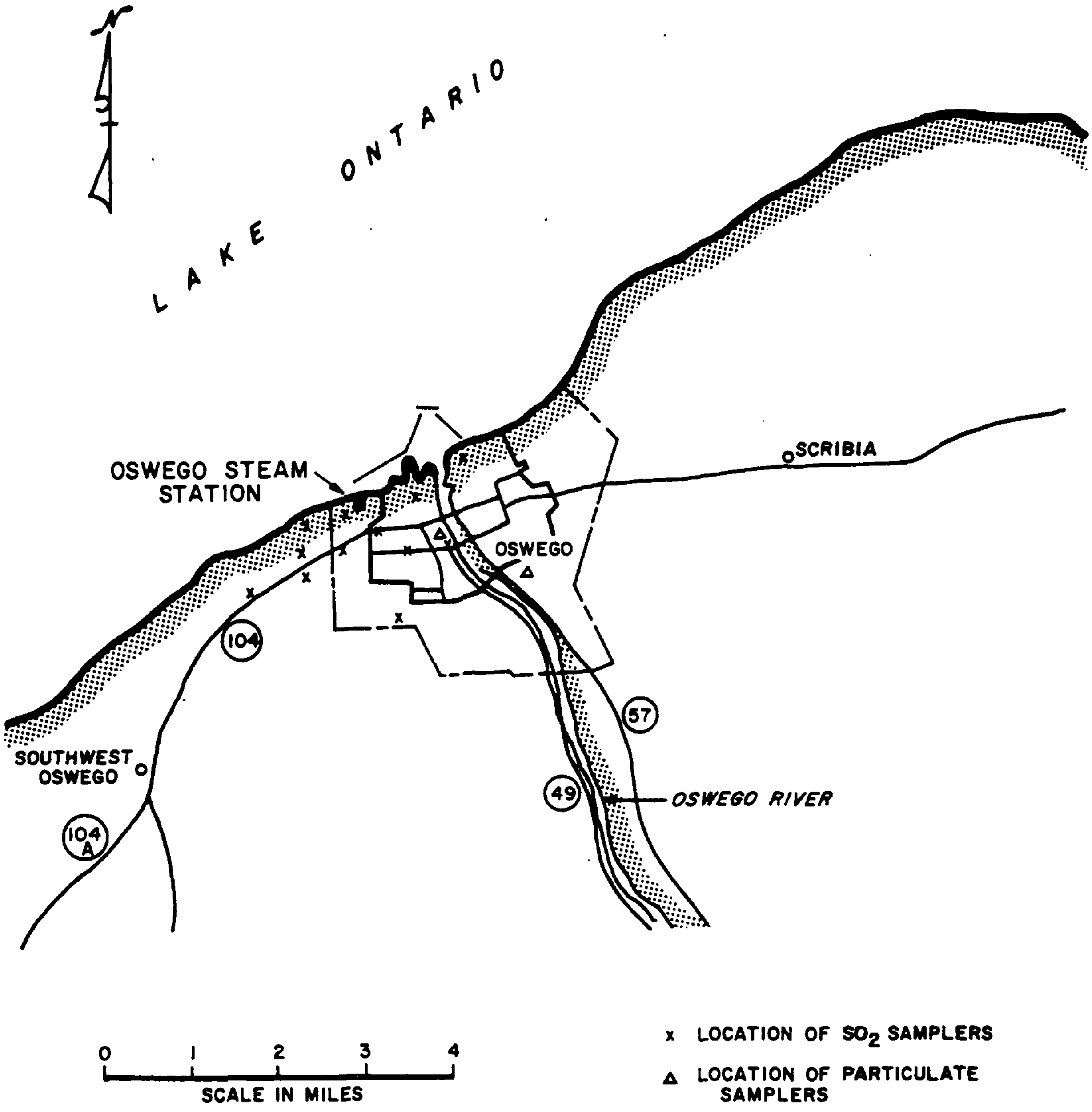


FIG. 2.10-1

LOCATION OF
AMBIENT AIR MONITORS

NIAGARA MOHAWK POWER CORPORATION

The following particulate concentrations were derived from the study:

At the Oswego Post Office	Measured ($\mu g/m^3$)	State Standard for Level III ($\mu g/m^3$)
Arithmetic mean	52	65
Geometric mean	47	-
84 percent of the values were less than	75	100
Maximum 24 hr average	142	200

At the Riley School	Measured ($\mu g/m^3$)	Comparative State Standard for Level II ($\mu g/m^3$)
Arithmetic mean	36	55
Geometric mean	32	-
84 percent of the values less than	51	85
Maximum 24 hr average	97	200

3. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

3.1 CIRCULATING WATER

The narrative which follows simultaneously interrelates the selection of a specific design with the environmental impact in terms of the objective of minimizing adverse effects.

Intake and Screenwell

As described in Section 2 under "Water Uses," the intake aperture is designed so that water velocities at maximum station output will be 1.0 feet per second (fps) and the flow into the intake structure will be in the horizontal plane. This latter point is significant because investigations have shown that fish can better avoid horizontal inflows than vertical ones (Ref. 21, 22). In addition to controlling the approach velocity to the intake and the flow patterns into the structure, other precautions were taken in the design and location of the intake structure in order to ensure adequate fish protection.

Location of the intake structure relative to the diffuser has a direct effect on plant efficiency. If heated discharge water recirculates to the intake structure and the intake water is significantly warmed, the result could be a decrease in plant efficiency as well as attraction of fish to the intake area. It is consequently necessary to locate the intake and discharge structures relative to each other to minimize recirculation. A series of hydraulic model investigations were conducted to determine the optimal locations for the structures in Lake Ontario (Ref. 23). The hydraulic model results showed that, with the intake located in relation to the discharge as shown in Fig. 1.2-2, recirculation of heated water from Unit 5's discharge did not occur for any of the tested conditions. The conditions simulated in the model included lake currents from the west and northeast, zero lake current, high and low Oswego River flows and winter and summer lake ambient temperature conditions.

It was recognized in the design of the circulating water system that, even though the intake structure is designed and located to minimize the possibility of fish entering it, fish may still enter and become trapped in the forebay of the screenwell structure. These fish could be injured on the traveling screens if a refuge area were not provided. This problem would tend to be most critical during the winter months when fish that gain entry to the screenwell may reduce their activity and, due to their winter semi-dormant physical state, would be less likely to resist water movement toward the traveling screens.

The intake system for the existing four units at Oswego is used to withdraw as much as 762 cubic feet per second (cfs) from Lake Ontario and is located in the vicinity of the proposed location for the Unit 5 intake. In addition, since the flows through existing and proposed intakes is comparable, conditions at the existing intake are indicative of conditions that will be found at Unit 5 intake. Consequently, the intake system for the existing plant was studied to determine whether significant numbers of fish could gain entrance to this structure.

The maximum approach velocity to the existing intake ranges between 1.30 and 1.75 fps with a maximum velocity through the intake bars of 3.2 fps. Since investigations of the existing intake revealed that these velocities do not result in significant numbers of fish entering the structure, a maximum approach velocity to the Unit 5 intake of 1 fps and a maximum velocity through the intake bars of 1.2 fps appear reasonably conservative.

Biologists, using scuba techniques, observed the screenwell forebay area of the existing intake during the winter of 1970-71. These investigations indicated that few fish entered the intake during the winter. Furthermore, the fish population in the screenwell remained concentrated in a still, dark section. Few fish were found in front of, or forced against, the traveling screens. These observations indicate that the approach velocity to the traveling screen is low enough to permit fish to escape this area and find refuge in the quiescent area of the screenwell. The maximum approach velocity to the traveling screens for the existing intake is 0.94 fps.

The screenwell of the Unit 5 intake is designed so that the maximum approach velocity to the traveling screens is 0.97 fps. In addition, a refuge area for fish, comparable in size to the area where fish are found concentrated in the existing screenwell, will be provided. The layout of this refuge area is shown in Fig. 3.1-1.

Although relatively few fish should find entrance to the intake structure, the screenwell is designed to allow for the installation of fish transfer pumps in the future to remove fish from the refuge area and the area in front of the traveling screens. This will be monitored by Niagara Mohawk and the Division of Fish and Wildlife of the New York State Department of Environmental Conservation. If it becomes necessary to install the pumps, the fish would be removed on an intermittent basis and returned to Lake Ontario.

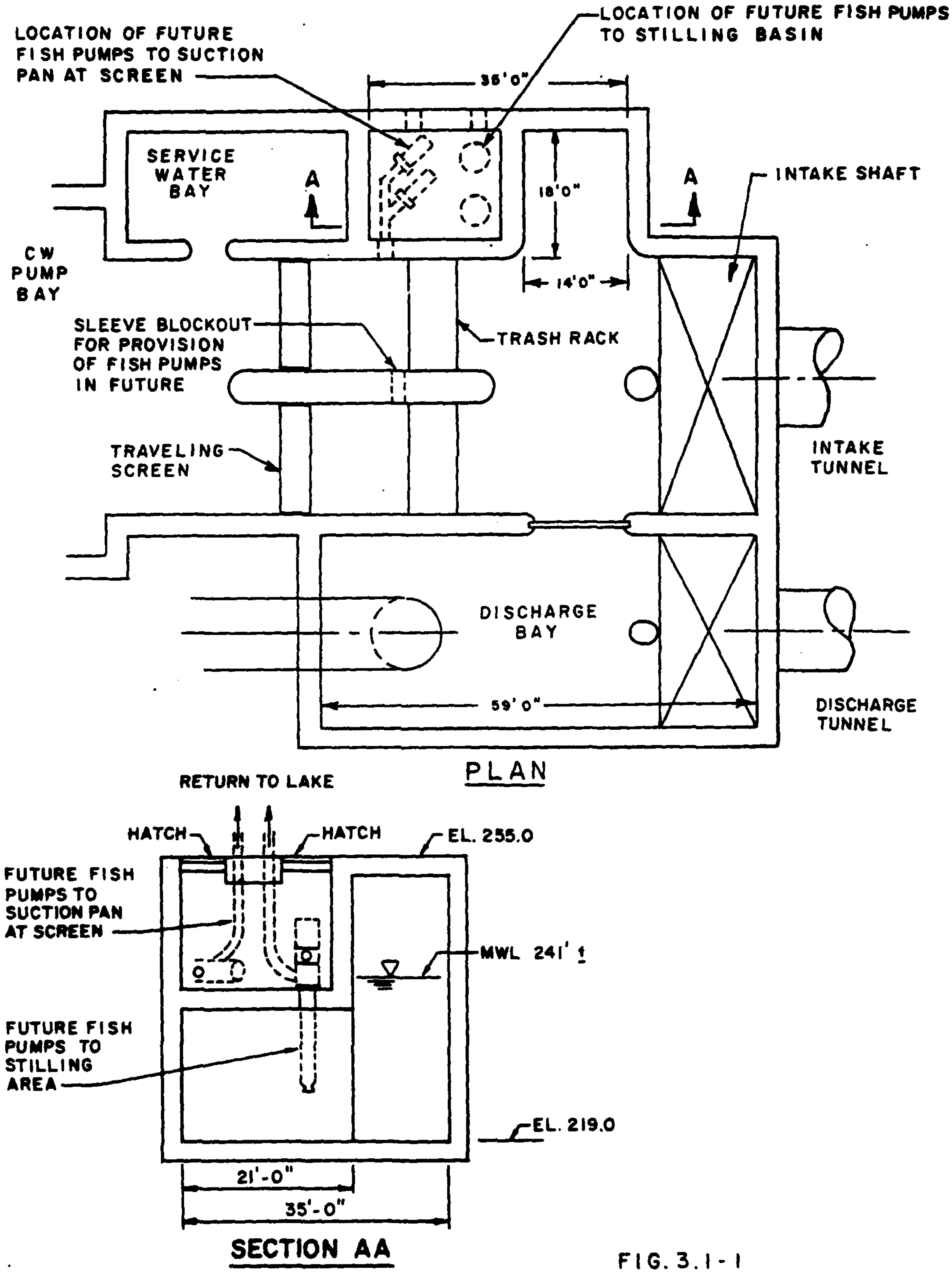


FIG. 3.1-1
FISH PROTECTION FACILITIES
OSWEGO STEAM STATION UNIT 5
NIAGARA MOHAWK POWER CORPORATION

Discharge

Heat Dissipation and Criteria

The outfall facility is designed to meet the New York State standards and criteria applicable to the discharge of heated liquids to Lake Ontario. Lake Ontario, in the vicinity of Oswego, is designated water quality Class "A." Section 701.3, 6NYCRR defines the best usage for this class as a source of water for drinking, culinary or food processing purposes. The quality standards for Class "A" waters include the following specifications regarding heated liquid discharges:

> "None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to fish life, make the waters unsafe or unsuitable as a source of water supply for drinking, culinary or food processing purposes or impair the waters for any other best usage as determined for the specific waters which are assigned to this class."

Application of this standard is interpreted in a quantitative manner in thermal discharge criteria adopted by the New York State Water Resources Commission in July 1969. For lakes, the applicable criteria are as follows:

> "The water temperature at the surface of a lake shall not be raised more than 3 F over the temperature that existed before the addition of heat of artificial origin, except that within a radius of 300 ft or equivalent area from the point of discharge, this temperature may be exceeded. In lakes subject to stratification, the thermal discharges shall be confined to the epilimnetic area."

In compliance with these rules and regulations, extensive engineering investigations were conducted to establish that the design of the circulating water system for the new unit would conform with the aforementioned criteria. Moreover, ecological investigations were carried out in Lake Ontario in the vicinity of the proposed discharge in order to delineate the biota of the area and to determine the probable effects of the discharge from Unit 5 on these biota. These latter investigations were performed in recognition of the fact that, in addition to adhering to the appropriate specific numerical criteria, the intake-discharge system must be designed and located to protect the standard, i.e., no adverse ecological effects result from the discharge of the condenser cooling water.

The results of these investigations were included in a report (Ref. 1) supporting Niagara Mohawk's application to The New York

State Department of Environmental Conservation (NYSDEC) for permits to construct facilities to discharge heated water to Lake Ontario. Construction permits were issued on July 16, 1971 by the Division of Pure Waters (NYSDEC) and on September 21, 1971 by the Division of Resource Management Services, Bureau of Water Regulation (NYSDEC). Copies of these permits are included in Appendix C to this report.

The effects of the plant discharge on the temperature distribution in Lake Ontario are minimized by the use of the submerged multiport outfall described previously. The following discussion is a synopsis of the basic concepts of this design.

When a jet of heated effluent is discharged into a receiving water body at some depth below its surface, it rises, as a plume, to the surface, and then spreads laterally and longitudinally at the free surface. This rising behavior is caused by both initial momentum flux and the net buoyant force due to the lower density of jet. The initial momentum flux is due to the fact that the jet has a higher velocity than the surrounding ambient water. The buoyant force is caused by the difference in density between the heated effluent and the surrounding ambient water.

Reduction in temperature occurs by entrainment of ambient water into the jet as it approaches the surface. This dilution proceeds until the relative velocity between the jet and surrounding water is reduced to zero. This phenomenon is called jet dilution and occurs by turbulent transport mechanisms.

The relative motion between the plume and the ambient water develops shear stresses. Turbulence is generated and mixing takes place first around the periphery of the column and finally throughout the whole column. This results in a continual growth in jet size, a decrease in jet temperature, and an increase in density of the heated jet as it nears the surface.

Entrainment of ambient water which possesses horizontal momentum causes the plume to move in the direction of the predominant current. The introduced heat is then ultimately lost to the atmosphere through the water surface.

The design of the intake and discharge structures as shown in Section 1, Fig. 1.2-3 and 1.2-4, was determined by analytic and hydraulic model investigations based on field data collected offshore of the site during 1970.

The mathematical model was used to establish preliminary designs of the circulating water system for Unit 5. These preliminary designs were then tested in the hydraulic model and a final design for the Unit 5 circulating water system was selected based on hydraulic model results.

In addition to establishing test conditions for the hydraulic model, the mathematical model established the feasibility, in terms of meeting applicable thermal discharge criteria, of the preliminary design values. The mathematical model results were used to determine water depth, port size and port velocity required to meet the thermal criteria.

The submerged jet analysis is intentionally set up so that maximum boundary interference is assumed. The computed results are, therefore, conservative when compared to the results of the hydraulic model, i.e., the required dilution would occur sooner along the jet trajectory in the hydraulic model than the mathematical model would predict.

The mathematical model results showed that a submerged jet outfall located in 25 to 30 ft of water will provide at least an 11-fold dilution of the thermal discharge prior to its reaching the surface. Since the maximum temperature rise at full plant capacity is 28.6 F, such a dilution means that the maximum surface temperature rise will be less than 2.7 F.

Substantiation of these predictions was obtained by the use of detailed hydraulic models. These models were built by Acres American Incorporated and were located in Niagara Falls, Ontario, Canada.

An undistorted model, built with both vertical and horizontal dimensions reduced to 1/20th of the dimensions of the prototype, was used to determine the optimum diffuser configuration and the temperature distribution up to 250 ft from the point of discharge. This was accomplished by conducting 53 tests in which port diameters, spacings, orientation with the horizontal, elevation above lake bed and the angle between double ports were varied. The optimum combination of these parameters was then determined in terms of sufficient dilution, minimum surface temperature rise and construction costs.

Based on results from the undistorted model testing program, it was determined that a diffuser consisting of six double 2 ft diam ports on 40 ft centers, elevated 5 ft above the lake bed and located in 25 to 30 ft of water would provide sufficient dilution. For this diffuser configuration, the maximum surface temperature rise for summer or winter ambient conditions would be 2.8 F and 2.5 F with the outfall located in 25 and 30 ft of water, respectively. These two temperatures represent the points of maximum rise observed in the model. For the same outfall locations, the corresponding dilutions were 14 and 15 at 250 ft from the points of discharge. At this distance the temperature rise above ambient conditions would be approximately 2 F.

In addition to the large scale (undistorted) model, a smaller scale (distorted) model, with area sufficiently large to describe the overall temperature distribution and heat dissipation resulting from the Unit 5 discharge was constructed. The prototype of this model extends 15,000 ft along the shoreline and 10,000 ft out into the lake (see Fig. 3.1-2).

As shown in Fig. 3.1-2, this model was sufficiently large to include the mouth of the Oswego River, Oswego Harbor, the intake and discharge for the existing power station at Oswego and the City of Oswego's water supply intake. Various lake drift currents, Oswego River flows and locations for Unit 5's intake/discharge system were simulated in the model to assess the effects of these variables on temperature patterns in the lake. These tests were also used to locate the intake structure to minimize recirculation of the thermal discharge.

The hydraulic model test results for the final design are summarized below:

	Test Conditions		
	No Current	West-East Current (0.46 fps)	Northeast Current (0.46 fps)
Maximum Surface Temperature Rise, F	2.2	2.2	2.5
Surface Isotherms, F	Area Enclosed by Isotherm (Acres)		
2.0	3	1	5
1.5	8	4	14
1.0	55	18	70

As shown above, temperature rise above lake ambient will reach a maximum of 2.5 F. The isotherm plot for northeast current conditions appears in Fig. 3.1-3. The average temperature rise in the plume area bounded by the 1 F isotherm will be approximately 1.4 F and will cover a maximum of 70 acres of the lake surface. Surface temperatures in excess of 1.5 F above lake ambient will be confined to an area of less than 14 acres and at no point will the surface temperature rise be greater than 2.5 F. Also, surface temperature rises due to the cooling water discharge into Lake Ontario will be 1 F or less within approximately 0.6 mile from the discharge structure, and less than 0.5 F within slightly less than 0.9 mile from the point of discharge.

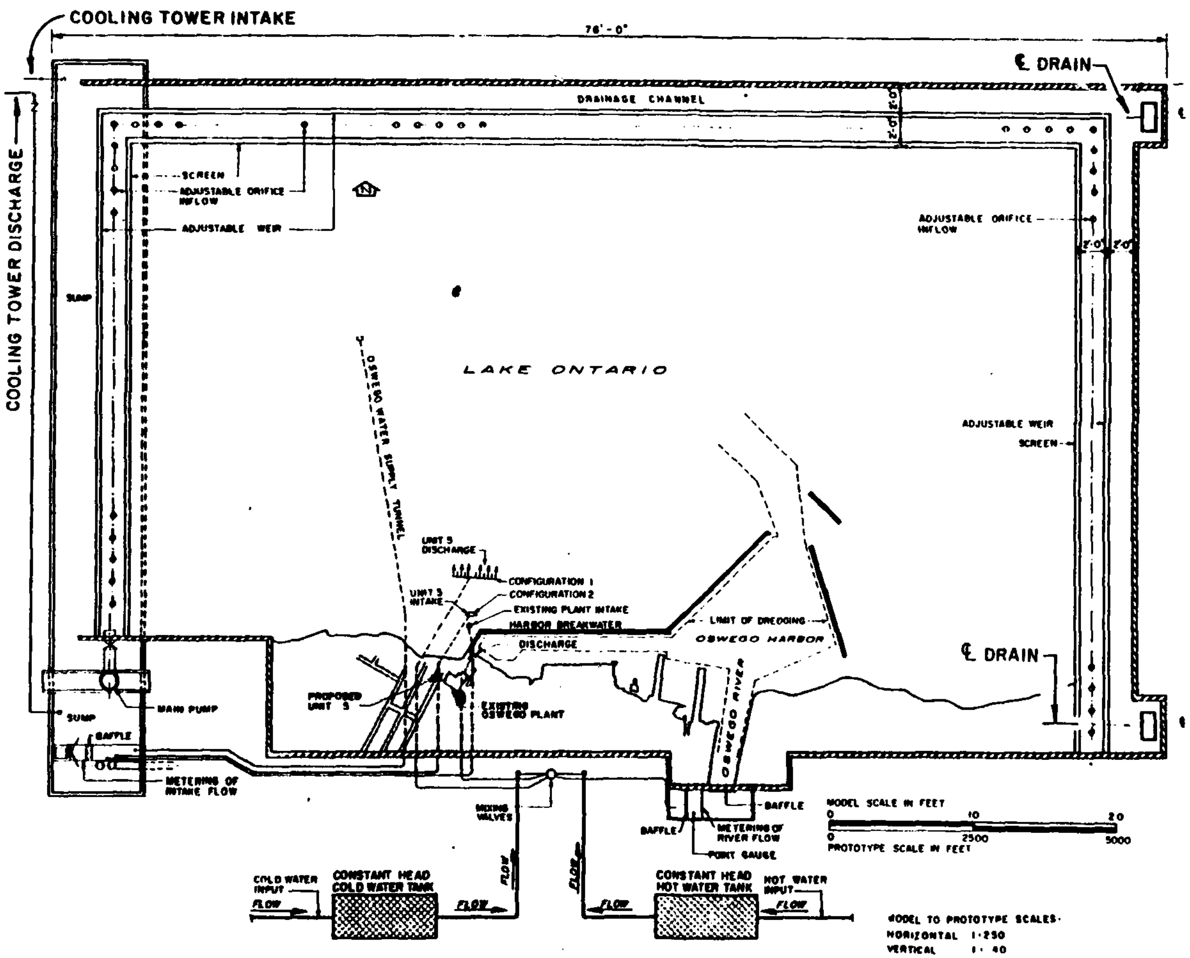


FIG. 3.1-2

DISTORTED MODEL - GENERAL LAYOUT

OSWEGO STEAM STATION UNIT 5

NIAGARA MOHAWK POWER CORPORATION

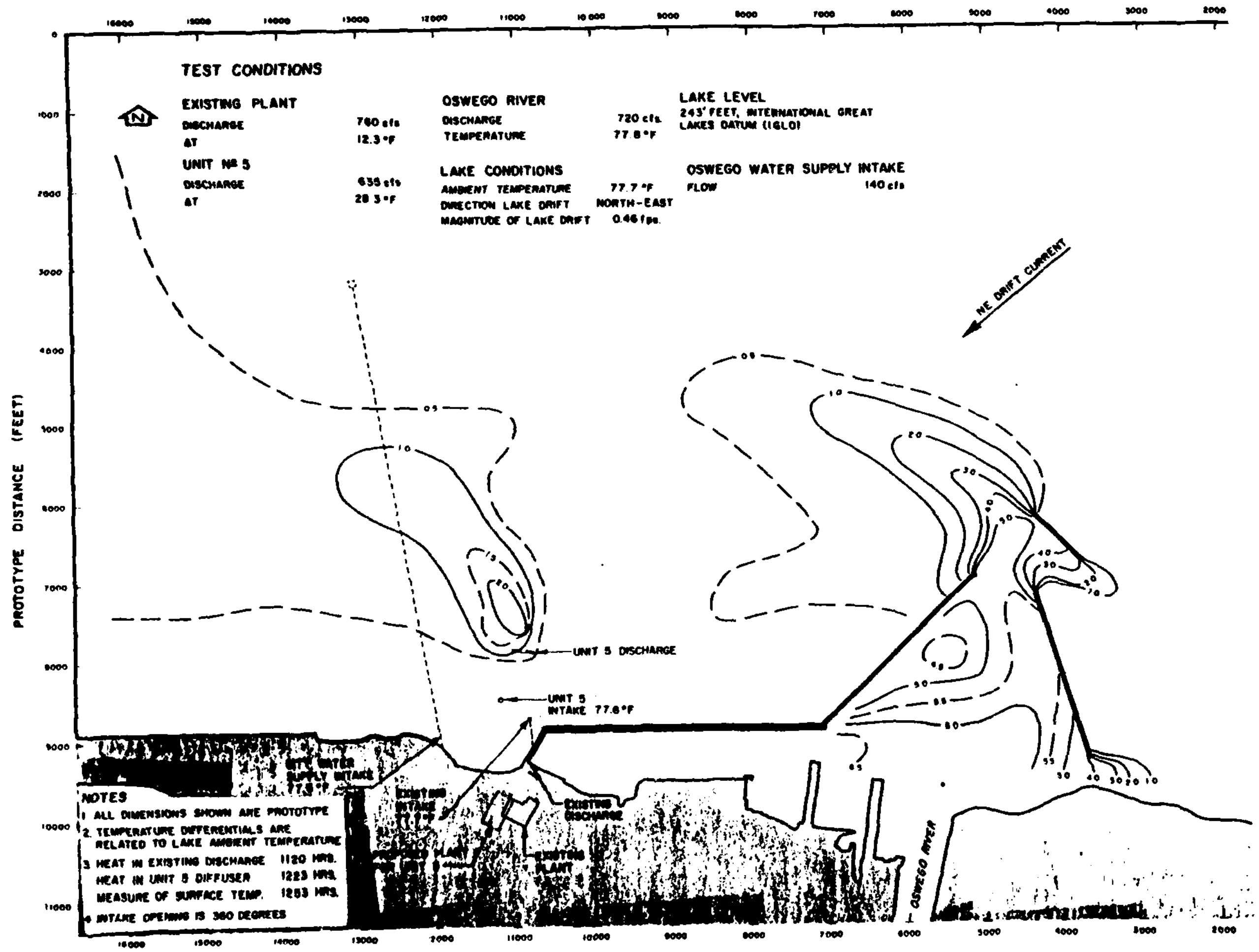


FIG. 3.1-3

DISTORTED MODEL-SURFACE TEMPERATURE ISOTHERM PLOT

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION

Due to the lakeward orientation of the discharge nozzles and the high initial jet velocity, the heated discharge will not affect the shorewaters off Oswego. This was confirmed by hydraulic model tests.

As described in Section 1, the discharge nozzles for Unit 5 are to be located so that their centerlines are 5 ft above lake bottom. Experience with the undistorted hydraulic model showed that the plume touched bottom at about 30 ft from the ports and removed 1 to 2 ft of lake bottom material. These results are conservative on two counts. First, the model lake bottom was horizontal, whereas under actual conditions, the bottom slopes downward away from the discharge. Secondly, the model used fine, noncohesive sand, whereas the lake bed is dense glacial till. Little, if any, bottom scour is to be expected.

In accordance with New York State thermal discharge criteria, both the intake and discharge structures are located in the epilimnion of the lake. A comparison of water quality data collected at the surface and at 40 ft depth shows that the water quality at the site is fairly uniform with depth. Consequently, flow patterns induced by the circulating water system for Unit 5 will have little effect on the redistribution of nutrients in this area.

Measurements of dissolved oxygen offshore of the site revealed that the water is at or near saturation throughout the year. The 6 yr record of the New York State Department of Environmental Conservation water quality monitor on the Oswego City water intake (6,500 ft offshore, 40 ft deep) shows that dissolved oxygen exceeds 8.0 milligrams per liter (mg/l) (81.5 percent average saturation) 90 percent of the time; that the median dissolved oxygen is 11.2 mg/l (92.3 percent average saturation); and that, as a result of algal oxygen production, exceeds 13.6 mg/l (103.9 percent average saturation) 10 percent of the time (See Section 2). Since the discharge is designed to achieve rapid dilution of the heated effluent and is located in 26 ft of water, little if any oxygen loss is expected.

The hydraulic model tests were conducted under the most critical conditions from the viewpoint of extent of temperature rise effect. These conditions included capacity operation of both Unit 5 and the existing four units at Oswego, maximum observed lake ambient temperature, maximum currents or no currents, and high or low Oswego River flow. A more complete description of the test conditions and procedures may be found in the report by Quirk Lawler & Matusky (Ref. 1). Even under the severest of these conditions, it has been demonstrated by both analytic and hydraulic model techniques that the circulating water system design for Unit 5 will ensure that all applicable New York State thermal criteria will be met.

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A solution to waste heat disposal from power stations is to use the rejected heat for beneficial purposes. Thermal discharges from power stations are being used in agricultural pilot projects throughout the U.S. Agricultural uses of this heat source include such possibilities as frost protection, extension of the growing season, irrigation and cultivation of high-quality fruits and vegetables within controlled environments.

Other proposed beneficial uses of thermal discharges are for aquiculture (the farming of plants or animals in fresh or salt water), desalinization, space heating and water and waste water treatment. The latter two uses appear to afford the greatest potential with regard to beneficial utilization of waste heat from the proposed unit at Oswego.

The efficiency of most water and waste treatment processes is improved with increased temperatures. Heating sewage can increase the capacity of municipal sewage treatment plants or, conversely, a smaller (less expensive) plant may be utilized to achieve a given degree of treatment. Similarly, for water treatment processes, chemical savings may accrue as a result of increased water temperatures.

The new City of Oswego West Side secondary treatment plant will be constructed on the site of the existing West Side primary sewage treatment plant. Since this site is located approximately 0.5 mile from the Oswego Steam Station, it is possible to transport some of the heated discharge from the new unit to the treatment plant, and use this flow to increase the temperature of the sewage entering the treatment plant.

In recognition of this potential beneficial use of Unit 5 heated discharge, NMPC will provide a takeoff connection from the circulating water discharge line so that the city can use a portion of the condenser discharge water if it so desires. This connection will be designed to provide a flow of approximately 63 cfs, representing approximately 10 percent of the total unit flow. This water could be drawn continuously or intermittently, in accordance with needs.

The takeoff connection will be 36 in. in diam and will terminate, temporarily, in a blind flange immediately outside the station. NMPC does not intend to provide the pumping capacity that might be required nor to extend a line to the sewage treatment plant. The proposed takeoff connection, however, will be provided at no cost to the City of Oswego. In addition, NMPC will grant easements for a connecting line to the sewage treatment plant.

The foregoing discussion shows the consideration that has been given to environmental effects, and both the intake, screenwell and discharge structures have been designed to protect against, or minimize adverse environmental effects. Low intake velocity, the fish refuge area with provision for possible future installation of fish removal pumps and the multiport discharge have all been specifically selected to provide a high degree of protection to the aquatic environment.

Effects on Aquatic Biology

Potential objectionable effects on the lake biology are considered in two categories: (1) those that occur between the intake and discharge of the circulating water system and (2) those that take place in the lake in the region of the plant.

The evaluation of Category (1) is based on a field search for demonstrable biological changes at Units 1 to 4, between intake and discharge. The maximum temperature rise across the condensers of the existing station is 12 F, whereas that of the proposed Unit 5 is 32 F. The time of cooling water passage is short, only 4 minutes being required for the existing units and 8 minutes for Unit 5. Many aquatic organisms appear to be able to survive higher temperature rises for short exposure intervals (10 minutes or less) better than lower temperature rises for extended exposure times (Ref. 24).

Ecologists have generally agreed that evaluation of Category 1 effects must take into consideration: (a) mechanical impairment or destruction of biological organisms by shear forces in the region of circulating water pump impellers, (b) tissue rupture of organisms in sections of the circulating water system where negative pressures prevail and (c) thermal shock.

The seriousness of deleterious effects by any of these mechanisms is variable with the generation time of the species under consideration. Bacterial species that multiply by cell division will double their numbers in an hour or less at optimum temperature. Zooplankton that produce two or three generations in 24 hr will take several days to re-establish their normal population density in any volume of water in which their numbers have been markedly depleted. If fish eggs or larval fish are adversely affected in the circulating water system, their numbers will not be replaced until the next spawning season.

Clearly, the impact of entraining suspended organisms, i.e., larval fish, in the cooling water flow (assuming some damage is incurred thereby) will depend upon the proportion of total volume of receiving waters that is diverted through the condensers (Ref. 25).

No evidence of spawning was observed in the lake in the vicinity of the intake and discharge of the plant during April, May and June 1971, as evidenced by repeated plankton tows, sampling about

1,000 cubic meters of water. In July, the first fish larvae captured in a plankton tow proved to be alewives (Alosa pseudoharengus). Repeated tows during July in the area of the existing intake indicated a larval density of 2.3 per cubic meter at the lake surface. Similar tows in the intake channel averaged only 0.7 larvae per cubic meter, which appears to indicate that the larvae are less concentrated in the lower layers of the water column where the intake draws water.

An evaluation of the Category 1 effects between the existing intake and discharge provided the basis for a projection of the environmental impact of the proposed new circulating water system on plankton.

It is recognized that some fish eggs and larvae may be entrained in the circulating water system, although the intake location has been chosen in an area generally considered to be relatively devoid of these stages of the fish life cycle. Indications are that most of the spawning occurs at the eastern end of the lake in enclosed bays and other sheltered areas.

University, government and consulting biologists were contacted to ascertain what is known about the distribution and concentration of larval forms in Lake Ontario. Little quantitative data were available, but there is general agreement that significant concentrations of fish eggs and larvae might be expected to be found as far as ten miles from the shore due to the upwellings in this area. The effect of entrainment on fish population at the Oswego Station was evaluated, based on limited available data. The results of this analysis are summarized in Table 3.1-A.

TABLE 3.1-A

Effect of Entrainment

on

Fish Larvae Population

Case		Reduction of Population (%) 1 100% mortality	2 30% mortality	3 30% mortality with selective withdrawal
Direct Discharge				
1	Entire Lake	.008	.002	.0007
2	Ten Mile Inner Lake	.014	.004	.0013
3	One Mile Inner Lake	.160	.048	.0144

The effect of entrainment and passage through the Unit 5 circulating water system using three different models for a once-through cooling system is presented in this table. The assumptions of the various models are as follows:

1. Model of Entire Lake:

   Fish eggs and larvae are equally distributed throughout the entire lake.

   Water containing these stages of fish life will pass through the condenser system during the approximately 90 day spawning season.

2. Ten Mile Inner Lake

   Fish eggs and larvae are found equally distributed in the water within a ten mile limit from the shore all around the lake, and none are found in the rest of the lake. All water passing through the plant is withdrawn from this ten mile inner lake.

   Passage of biota same as previous model.

3. One Mile Inner Lake

Similar to second model, except the larval forms are found only within a one mile inner lake.

For each of the models, three cases were investigated, as recorded in the columns labled "100 percent mortality," "30 percent mortality" and "30 percent mortality with selective withdrawal." The results in the first column are for the case where it is assumed that all forms of fish life passing through the cooling water system will be destroyed. Preliminary data indicate that approximately 30 percent mortality of larval forms occurs as a result of passage through the cooling water systems for the existing units. This mortality rate may be high since it was not possible to determine the mortality which occurred as a direct result of the sampling technique. These results are not directly applicable to Unit 5, but they do provide a basis for a lower limit on the mortality rate.

Similarly, preliminary data indicate that surface water contains higher concentrations of fish eggs and larvae than at lower depths. The intake for Unit 5 is designed to draw water selectively from the deeper water and the results listed in column (3) of Table 3.1-A reflect this factor.

Despite many detailed model studies of mortality to fish eggs and larvae by passage through condenser cooling water systems, no long term studies have been accomplished at operating power plants; thus the extent of mortality cannot be predicted at this time, although it is expected to be low.

A careful study was made of the zooplanktons over a five month period. Samples were returned to the laboratory, kept in 225 milliliter (ml) widemouth jars at room temperature, and examined at 24, 48 and 72 hr intervals. No detrimental effects on organisms that passed through the cooling water system of the power plant were observed.

The production of phytoplankton was somewhat higher inside the west basin than in the lake. This appears to be a manifestation of the organic enrichment of the harbor and west basin rather than a temperature effect.

The evaluation of the second category of effects is based on ecological studies of the Oswego shore of Lake Ontario out to the 40 ft depth contour. The design, orientation and placement of the discharge diffuser jets has been such that no deleterious effects are expected to result. The jet nozzles are placed in 26 ft of water and raised above the lake bottom so that no scour or heating effects will alter its continued functioning as an integral part of the lake ecology. By placing the jets far enough off-shore to prevent warmer water from being carried on shore by currents, no alteration of the present littoral productivity or the spawning potential of the shore areas will occur.

Aerial observation flights along the southern shore of Lake Ontario, from eastern Mexico Bay to the Oswego-Cayuga County line showed that the filamentous alga, Cladophora, grows in shallow water along this stretch of shoreline. Most satisfactory growth occurs in alkaline waters at a temperature of about 65 F. The phosphate concentration in Lake Ontario appears to be the limiting nutrient. The growth season begins in late April or early May, continues through the summer months, and ceases about the end of October. Cladophora grows best in waters with a current that continually transports a nutrient supply to this attached photosynthetic organism. The limiting depth to which growth is achieved is determined by light penetration of the lake water. Within the project area, the intensity of production decreased rapidly with depth, with little occurring at depths greater than 12 ft. Placing the centerline of the discharge diffuser nozzles an average of 21 ft below the lake surface at a distance of 1,360 ft from shore and directing the discharge plumes away from shore ensures that the condenser discharge will have no effect upon production of this alga.

Gammarus, which were observed to be the preferred food of a sizeable fraction of the fish in the shallower waters of the study area, were found to grow most abundantly on the attached biota of the shallow water margins. Fish netted at depths down to 40 ft were found to have fed on crayfish and small fish. The depth, orientation and off-shore direction of the discharge diffusers will have no effect on these sources of fish food.

Samples of the benthos at various depths out from the lake shore showed that the algae, amphipods, fly larvae and snails that make up this community decreased markedly with depth and reached very low densities at depths greater than 15 ft. Therefore, this portion of the lake biota will not be affected by the cooling water discharge located at the 26 ft depth, 1,360 ft off-shore.

Fish density surveys in the areas of the proposed Unit 5 intake and discharge locations were made by both gill netting and electronic fathometric studies. Gill netting was conducted during a five-day period each month from June through November 1970 and in May and June of 1971. Fathometric studies extending over 24 hr periods were conducted from July through October 1970 and coincided with gill netting operations. Analyses of data from these surveys showed that the character of this area of the lake bottom is not productive enough to support a large fish population. By comparison, the west basin supported a fish population six times as dense as the lake during the period sampled.

The existing heated water discharge to the west basin is not the sole physical difference between it and the lake. Other factors that produce a different ecology in the west basin are bottom topography, bottom sediments, shelter from storms behind the breakwater and soluble nutrients, particularly nitrates and phosphates. In order to compare the physical condition of the fish populations living in these two ecosystems, condition factors were used.

The condition factor, ratio of weight-to-length, is a quantitative parameter of the plumpness or well-being of the fish (Ref. 26). This factor was used as a basis for comparison of two species, white perch (Morone americana) and gizzard shad (Dorosoma cepedianum), that were found to spend more time in the west basin than any other species collected there. Mean condition factors for these two species and for yellow perch (Perca flavescens), together with the number of specimens available, are shown below:

	Lake Ontario		West Basin	
Species	Mean Condition Factor	No.	Mean Condition Factor	No.
White Perch	1.71	29	1.71	212
Gizzard Shad	-	None	1.28	81
Yellow Perch	1.45	97	1.37	55

The observations indicate that the condition of these species varied little between the lake and the west basin.

The comparison of the condition of the fish populations of the west basin and Lake Ontario showed no discernible effects from the thermal discharge into the west basin. Numerous ecological factors relevant to fish population dynamics have been taken into consideration in the positioning of the proposed discharge diffuser, and little effect from this thermal discharge on the number and density of the native fish species or on their mean condition factor is expected to result.

At Units 1 to 4, the use of algicides has not proven necessary, a fact variously attributable to the low level of nutrients in the lake intake water and to the abrasive effect on the condenser tubes of fine suspended particles of glacial till in the cooling water. In any event, it is concluded that no algicides will be required at Unit 5 and no environmental impact from the use of such agents will arise at this station.

Effects on Other Water Uses

The detailed studies on Lake Ontario hydrodynamics carried out by means of mathematical and hydraulic models are discussed in this section under "Discharge". The results indicate that cooling water intake and discharge for the proposed Unit 5 will have negligible effects on any other water user in the area.

Results of the hydraulic model shown in Fig. 3.1-2 show that the heated discharge from Unit 5 will not have any effect on the temperature of the water entering the City of Oswego's intake. In addition, these tests indicated that the temperature rises in the intake for the existing four units and the intake for Unit 5 averaged 0.3 and 0.2 F, respectively.

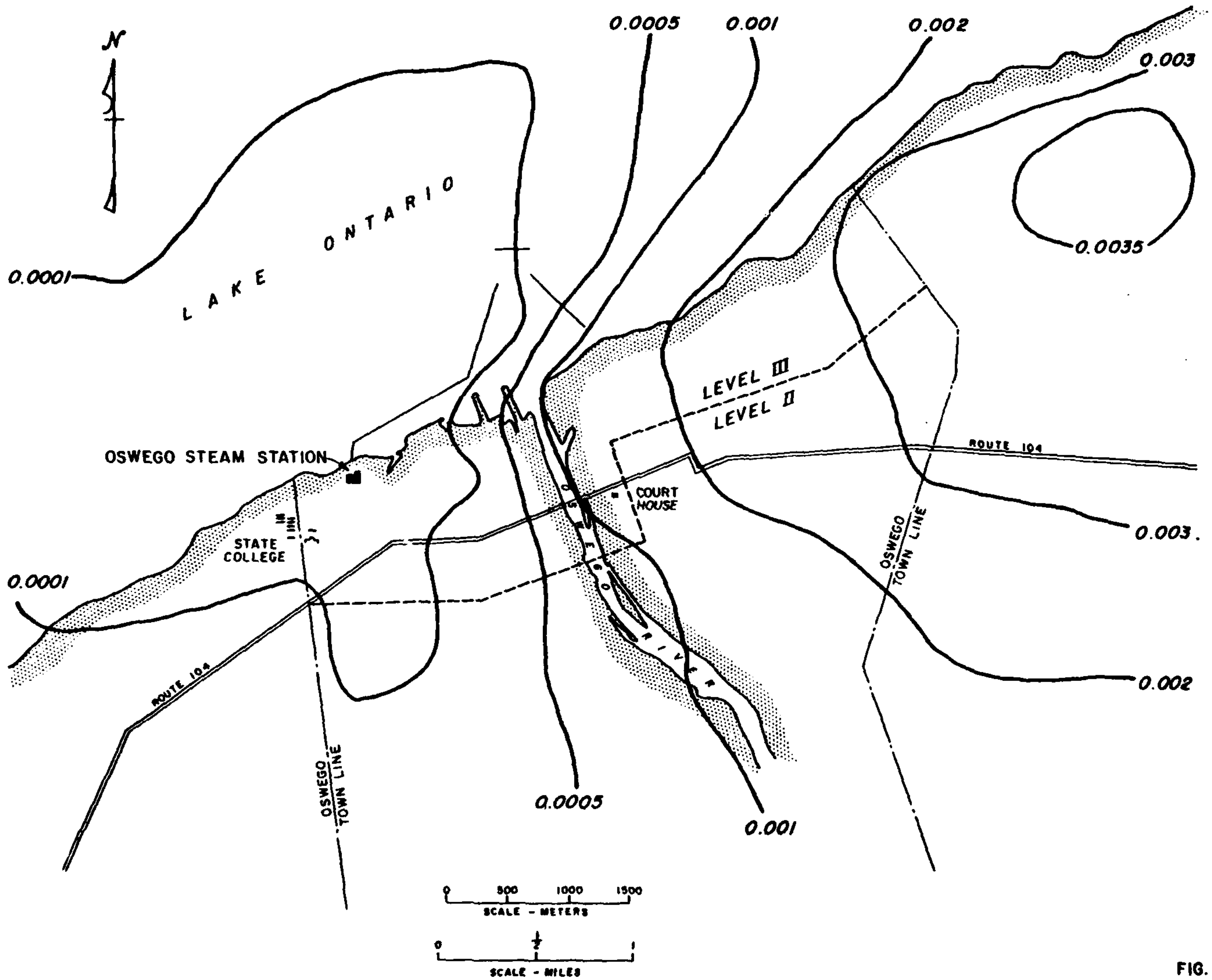
Other water users in the area are Alcan Aluminum Corporation, about 4 miles to the east, and Nine Mile Point Nuclear Power Station about 7 1/2 miles to the northeast. Based on model studies described above they will experience no change in water temperature as a result of the Unit 5 discharge.

The proposed cooling water intake structure is designed to conform to the U.S. Coast Guard's requirements of a minimum 12 ft depth above any submerged construction outside shipping lanes. The discharge diffuser will be located farther offshore, in deeper water. Neither structure is located in shipping lanes, nor will these structures constitute a hazard to navigation of pleasure craft. Marker buoys, similar to those in use at the existing offshore structures, will be used to mark the location of the diffuser for ease of inspection and maintenance.

3.2 ATMOSPHERIC DISCHARGES

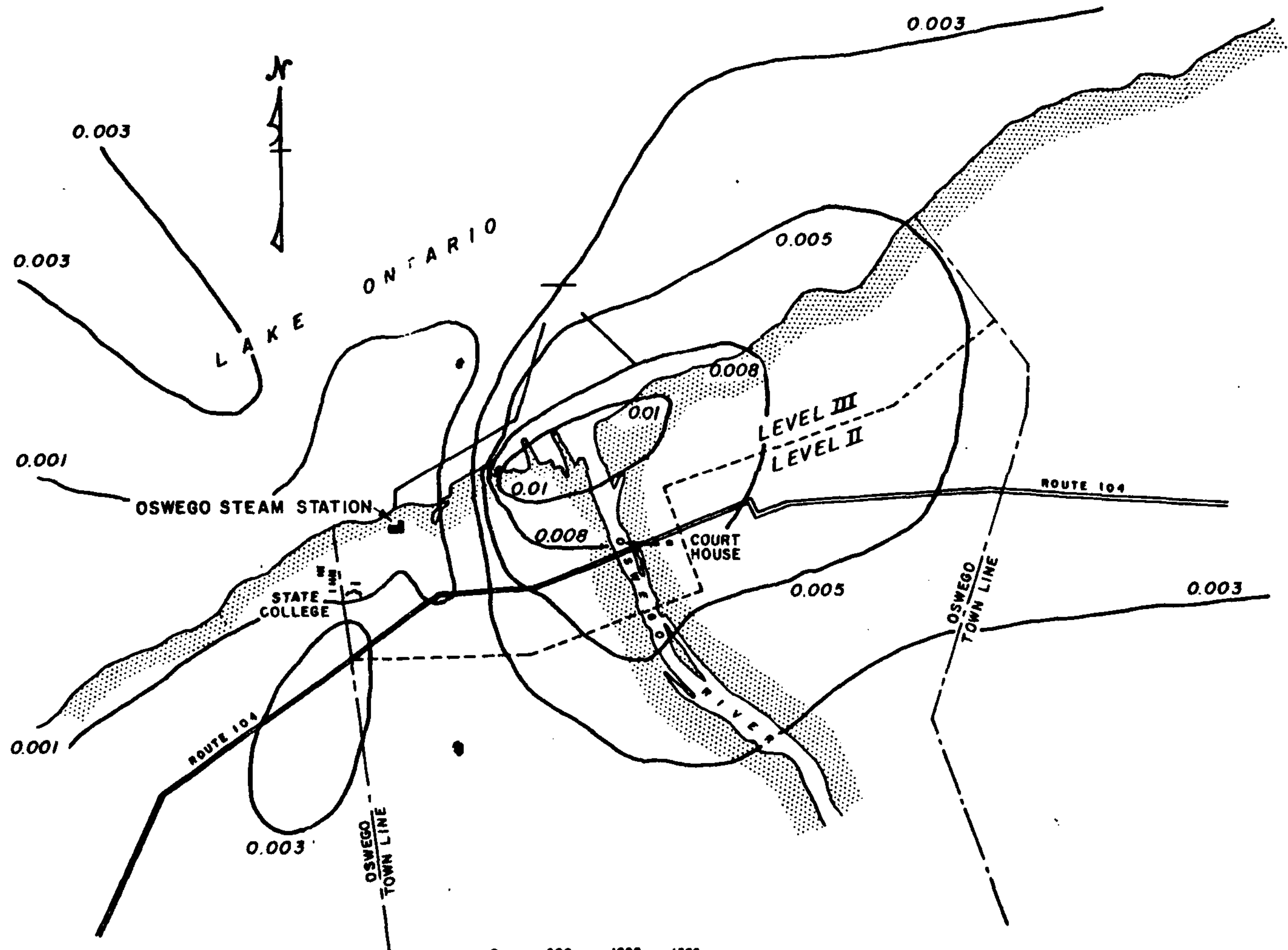
After Unit 5 begins operating in 1974, ground level concentrations of air contaminants emitted by the Oswego Steam Station are expected to be lower than will result from the existing four units firing oil. This can best be seen by comparing predicted annual average sulfur dioxide concentration contours produced by the two power plant configurations. Fig. 3.2-1 depicts the predicted annual average concentrations expected to be produced by Units 1 through 5 and Fig. 3.2-2, the predicted concentrations expected to be produced by Units 1 through 4 with the existing stacks while firing oil. The technical approach to estimating these concentrations and summaries of meteorological data are given in Appendixes A and B, at the end of this report.

When Unit 5 is operating, it is expected that neither the New York State nor the national primary ambient air quality standards will be exceeded. Furthermore, the concentrations of air contaminants are expected to be lower than the national secondary



NOTES:
CONCENTRATIONS ARE IN PPM
LEVELS II AND III INDICATE NEW YORK AIR QUALITY LEVELS

FIG. 3.2-1
CONTOURS OF AVERAGE ANNUAL SO_2 CONCENTRATIONS FROM UNITS 1-5
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



NOTES:
CONCENTRATIONS ARE IN PPM
LEVELS II AND III INDICATE NEW YORK AIR QUALITY LEVELS

FIG. 3.2-2
CONTOURS OF AVERAGE ANNUAL SO_2 CONCENTRATIONS FROM UNITS 1-4
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION

ambient air quality standards which were promulgated "to protect the public welfare from any known or anticipated effects of a pollutant."

A list of predicted maximum ground level concentrations of sulfur dioxide, nitrogen oxide and particulate matter from the plant is presented in Table 3.2-A. These concentrations were calculated under the assumption that no capping inversion is present to limit plume dispersion. The impact of inversions is discussed on page 3-19 of this report. The applicable New York State and national primary and secondary ambient air quality standards are also listed in this table for comparison. The percent of the national secondary ambient air quality standards contributed by the operation of the expanded power station is listed in Table 3.2-B.

Appearance of the power station plume will be enhanced with the addition of Unit 5. The flue gas from Unit 5 will combine with the flue gas from Units 1-4 to produce a gas stream with lower average dust loading than the gas stream from Units 1-4 alone and a resulting clearer plume.

Emissions from the auxiliary generator and the fire pump diesel will be minor and will have negligible effect on the environment.

Vapors from the storage and handling of the fuel oil will be effectively treated to eliminate odors that are objectionable beyond the property lines. The plant contribution to concentrations of hydrocarbons is expected to be well within air quality standards.

Stack Emissions

Expected contaminant quantities produced during full load operation of the expanded power station are listed in Table 3.2-C. The total emission of particulates, sulfur dioxide, sulfur trioxide, and nitrogen oxides are also presented in this table.

Acidic matter is produced when sulfur trioxide condenses on particulates. The sulfur trioxide and particulate emission controls that will be used when the expanded plant is placed in operation should effectively prohibit the emission of acidic material.

Controls over both the formation, emission, and distribution of air contaminants have been incorporated into the proposed unit. Descriptions of these controls are given below.

Sulfur Dioxide	Units 1-5	Est. Concurrent Background Level	Maximum State Standard	Federal Standard Primary	Federal Standard Secondary
Maximum annual average SO2 concentration, ppm	.004	.02 (within the city)	0.03 (within the city) 0.02 (outside the city)	.03	0.02
Maximum one hour concentration, ppm	0.27	.12	0.50	-	-
Percent of a year 0.25 ppm is not exceeded	99.9+	-	99	-	-
Hourly concentration exceeded 1% of the time, ppm	0.09	.03	0.25	-	-
Maximum 24 hr concentration, ppm	.05	.03	0.140	0.14	0.10
Daily concentration exceeded 1% of the time, ppm	.03	-	0.100	-	-
Particulate Matter					
Maximum 24 hr value, ug/m³	3.0	70	200	260	150
50% of values on an annual basis are less than, ug/m³ (24 hr averaging period)	0.04	-	45		
84% of values on an annual basis are less than, ug/m³ (24 hr averaging period)	0.3	-	70	-	-
Nitrogen oxides annual average, ppm	.001	-	-	.05	.05

Note: Each concentration produced from the power station is estimated at the position where it will be a maximum value.

TABLE 3.2-A

COMPARISON OF AIR QUALITY STANDARDS AND PREDICTED GROUND LEVEL CONCENTRATIONS

Sulfur Dioxide	Concentrations From Units 1-5	Percent of the Secondary Federal Air Quality Standard Contributed by the Power Plant
Maximum annual average concentration, ppm	0.004	20
Maximum 24 hr concentration, ppm	0.05	50
Particulate Matter		
Maximum 24 hr value, ug/m³	3.0	2
Annual average, ug/m³	0.04	0.07
Nitrogen Oxides		
Max. annual average conc. Ppm	.001	1.9

TABLE 3.2-B

CONTRIBUTION OF UNITS 1-5 AS A PERCENTAGE OF SECONDARY FEDERAL AIR QUALITY STANDARD

	Units 1 Through 4			Unit 5		Units 1 Through 5*
	Coal	Oil				
Fuel rate, lb/hr	279,600		204,000		430,000	634,000
Flue gas rate, lb/hr	3,850,000		4,044,000		7,000,000	11,044,000
Flue gas temperature, F	340		300		280	287
Gas flow rate, acfm	1,310,000		1,260,000		2,140,000	3,400,000
Particulates Produced						
Ash, lb/hr	23,200		305		650	955
Carbon, lb/hr	-		305		650	955
Additive rate, lb MgO/hr	-	200		1,500		-
Conversion of MgO, lb/hr	-	100		210		-
Weight of magnesium sulfate	-		300		630	930
Unconverted MgO, lb/hr	-	100	100	1,290	1,290	1,390
Total particulates produced, lb/hr	23,200		1,010		3,220	4,230
Particulate grain loading to the collector's inlet, gr/acf	2.0		0.09		0.18	-
Collector efficiency, %	80		15		95	-
Weight emitted, lb/hr	4,640		860		180	1,040
Outlet grain loading, gr/acf	0.4		0.08		0.01	.036
Gaseous Contaminants Produced						
Nitrogen oxides, ppm	500		500		250	340
Sulfur dioxide, ppm	1,500		1,250		1,550	1,450
Sulfur trioxide, ppm	0		0		0	0

*These emissions were used to predict the ambient concentrations produced by the steam station.

TABLE 3.2-C

CONTAMINANTS PRODUCED AT FULL LOAD BY UNITS 1-5

Stack

The expanded Oswego Power Station will discharge exhaust gases through a single flue, 700 ft smokestack serving both Unit 5 and the four existing units. The height of the stack and the additional rise of the plume are significant factors in the dispersion of contaminants.

The single flue produces a high flue gas exit velocity even when Units 1 through 4 are not operating at full load. This is important since it has been observed that when the exit velocity is less than 1.5 times the wind speed, the plume does not rise and ground level concentrations increase. High exit velocities will minimize the occurrence of nc plume rise.

Fuel Oil Additive System

A commercially available magnesium based additive will be added to the fuel of each boiler in sufficient quantities to reduce emissions of sulfur trioxide. This additive inhibits the catalytic formation of sulfur trioxide and neutralizes sulfur trioxide that is produced.

Electrostatic Precipitator

To provide for maximum removal of particulate matter, an electrostatic precipitator will be installed on Unit 5. The outlet grain loading will be guaranteed not to exceed 0.01 grains (gr) per actual cubic foot (acf) during all normal operating conditions. The average particulate concentration for all five units will be approximately 0.036 gr per acf. These emissions would meet regulations for liquid fuels now in effect in other states and New York State regulations for solid fuel boilers.

Flame Temperature Control and Low Excess Air Operation

Temperatures in the flame zone in the boiler of Unit 5 will be controlled by the injection of up to 15 percent of the flue gas into the combustion air. Fans, ductwork and a specially designed compartmentalized wind box will be furnished with the boiler to permit this injection of flue gas. The combustion controls on the boiler of Unit 5 will enable an excess air rate of 5 percent to be maintained during operation above 67 percent of full load. These control measures will inhibit formation of both nitrogen oxides and sulfur trioxide.

Flue Gas Temperature Control

Heating coils will be added to the forced draft air ducts of Unit 5 to prevent overcooling of the flue gases in the air heater with a resulting loss of gas buoyancy. The coils on Unit 5 will be sized to maintain a 280 F gas temperature at design load. The coils will be used during startups and low capacity operation to maintain flue gas temperature. On Units 1 through 4, heat exchange surface will be removed from the air preheaters during conversion to oil firing to ensure a flue gas temperature of 300 F.

The single flue stack will also aid in maintaining flue gas temperature. Since the stack will be in continuous use, there will be no periods when the stack is permitted to cool and subsequently cool the flue gases.

Storage for One Percent Sulfur Oil

A minimum four-day supply of 1 percent sulfur oil will be stored on the site and burned when necessary to meet the requirements of the New York State Department of Environmental Conservation for emergency air pollution episode procedures. All fuel-handling equipment has been designed to accommodate this fuel.

Light Oil Storage

Light fuel oil, Grade 2, will be stored on the site and used for boiler startups to reduce the excessive smoke usually present during boiler ignition.

Emissions From Other Sources

A 225 hp diesel engine will be used to operate the fire pumps. Small engine size and infrequent use will result in insignificant atmospheric discharges.

An auxiliary internal combustion generator rated at 750 kw is now located at the plant site. This generator will be used to provide power to the pumps and fans during shutdown operations. The expected continuous operation of the generator is less than five hours annually. A brief generator test will be conducted once a week. Emissions from this source will be minor.

The storage and handling of No. 6 fuel oil is not expected to produce odors which are objectionable beyond the plant property. Experience gained during oil fired operation of Units 1 through 4 will indicate whether odor masking agents should be used.

Steam from the active units will be used to heat the station and no additional combustion equipment will be required.

Inversions

An analysis of inversion frequency and the resulting surface sulfur dioxide concentrations was performed for the Oswego stack discharges. Vertical sounding data measured at Buffalo, New York were used for these calculations. Plant load at 100 percent and fuel containing 2.8 percent sulfur was assumed. The strength of inversion necessary to prevent penetration by the plume was calculated by a procedure proposed by Briggs (Ref. 43). Ground level concentrations were calculated by a method described by Turner (Ref. 30).

The analysis revealed that low level inversions based from 0 to 300 meters above the ground which occur frequently throughout the year during the morning hours would be penetrated by emissions from the 700 ft stack. The resulting calculated ground level concentrations of sulfur dioxide are very low, less than those calculated when the inversion is neglected.

Inversions based above 550 meters are expected to trap the plume. However, the plume rises sufficiently high that calculated ground level concentrations are less than 0.3 ppm and approximate the values calculated when the inversion is neglected.

A critical range of inversion base heights occurs between 300 and 550 meters above the ground. Inversion bases in this range can result in calculated concentrations above 0.3 ppm during a few hours each year. The critical meteorological conditions are presented in Table 3.2-D, together with the average historical frequency of occurrence.

The table indicates that the expected frequency of concentrations above 0.3 ppm would be 9.4 hr per yr and the frequency above 0.5 ppm would be 2.4 hrs per yr. As described above these calculations are based on use of a fuel containing 2.8 percent sulfur.

Critical inversions based between 300 and 550 meters above the ground are commonly of the type which cover large geographical areas and persist one to five days. New York State has proposed a system of air pollution warnings whereby contaminant sources would use emergency procedures for reducing emissions during persistent stagnation conditions. The Oswego Steam Station will have a four day supply of 1 percent sulfur oil available for use during these periods.

Calculated concentrations of sulfur dioxide during the critical inversion conditions will be significantly reduced by burning the lower sulfur fuel. The resulting number of hours when calculated concentrations would exceed 0.3 ppm falls to 1.4 per year and none would exceed 0.5 ppm. The maximum concentration expected under these conditions is 0.34 ppm.

TABLE 3.2-D

Critical Inversion Conditions and Resulting Sulfur Dioxide Concentrations

Surface SO Concentration ppm	Average Annual Number of Hours	Inversion Height (meters)	Inversion Intensity (deg C/100 meters)	Atmospheric Stability (Class)	Wind Speed (meters/sec)
0.96	0.9	385	5 plus	C	2
0.86	0.5	400	4-5	C	2
0.74	0.1	435	3-4	C	2
0.62	0.9	495	2-3	C	2
0.46	0.8	550	1-2	C	2
0.46	0.2	345	5 plus	C	5
0.43	0.4	365	4-5	C	5
0.39	0.4	385	3-4	C	5
0.39	0.1	315	5 plus	C	8
0.36	2.6	385	5 plus	D	2
0.32	2.0	400	4-5	D	2
0.32	0.2	330	4-5	C	8
0.32	0.3	415	2-3	C	5

3.3 NOISE

Unit 5 will contain a number of noise sources, but the plant is designed to reduce noise levels within the building and to minimize noise impact on the surrounding area.

Design sound levels for Unit 5 were set at approximately 10 db beneath the sound levels for Units 1 through 4 to prevent an increase of plant noise. Because of the barrier effect of Unit 5, the sound level at Site 1 (see below) and much of the adjacent campus should decrease with the addition of Unit 5.

Noise Surveys

Two noise surveys were conducted for Niagara Mohawk on August 17 (Ref. 27) and September 9, 1970 (Ref. 28) in the neighborhood of the present power station. The measurements were taken by the Noise Services Group of Bolt, Beranek and Newman, Inc. Each survey consisted of a series of octave band, sound pressure level measurements, taken during the afternoon and early the next morning. The early morning sound pressure levels (SPL) are representative of minimum ambient sound levels when plant noise will have its greatest effect. They will be used exclusively in this discussion to determine plant noise impact. During the first survey, noise measurements were made at each of the locations shown in Fig. 3.3-1. The second survey included only the property line locations of Sites 1, 4 and 10, but these measurements were very similar on both surveys. The values presented in Fig. 3.3-1 are calculated sound levels given in decibels measured on the "A" scale (dBA). The underscored values indicate sites where the plant noise predominates. Peripheral measurements generally typify background levels unaffected by the plant. The sound level at Site 7 is controlled by a nearby university power plant.

It is most convenient to define the plant noise level in terms of the level at property line locations 1, 4 and 10. The range of octave band SPL for these locations appears in Fig. 3.3-2.

Noise Control Techniques

The noise levels for Unit 5 will be controlled through the use of a number of techniques. The forced draft, induced draft and flue gas injection fans will all be housed in separate acoustically treated rooms for noise attenuation. Heavy duct lining will be applied downstream of the fans to reduce duct noise radiation. Silencers will be used at the forced draft fan air intake.

The boilerhouse and the turbine hall will be totally enclosed with double walls to restrict internal noise. All windows will be fixed and the building will be ventilated by the use of fans with silenced intakes and exhausts as necessary. The boiler safety valves will also be silenced. The plant main transformer will be housed in a totally enclosed sound attenuating vault.

These noise control techniques should reduce noise from Unit 5 sufficiently that it will be inaudible at all points on the property line when the present units are operating. After the plant is in operation, a post-operational survey will be conducted at the three locations indicated above to verify that the plant meets the specified noise criteria. If necessary, adjustments or modifications will be made.

3.4 SANITARY WASTE

Sanitary waste from proposed Unit 5 results from conventional water closet and washing facilities. The sanitary waste system is isolated from the process and storm drainage systems. A maximum flow of approximately 3,000 gal per day will discharge to the sanitary sewer system in the present powerhouse, and then to the Oswego municipal sewage system. During periodic plant maintenance activities, short periods of greater flow may occur due to the increase of personnel.

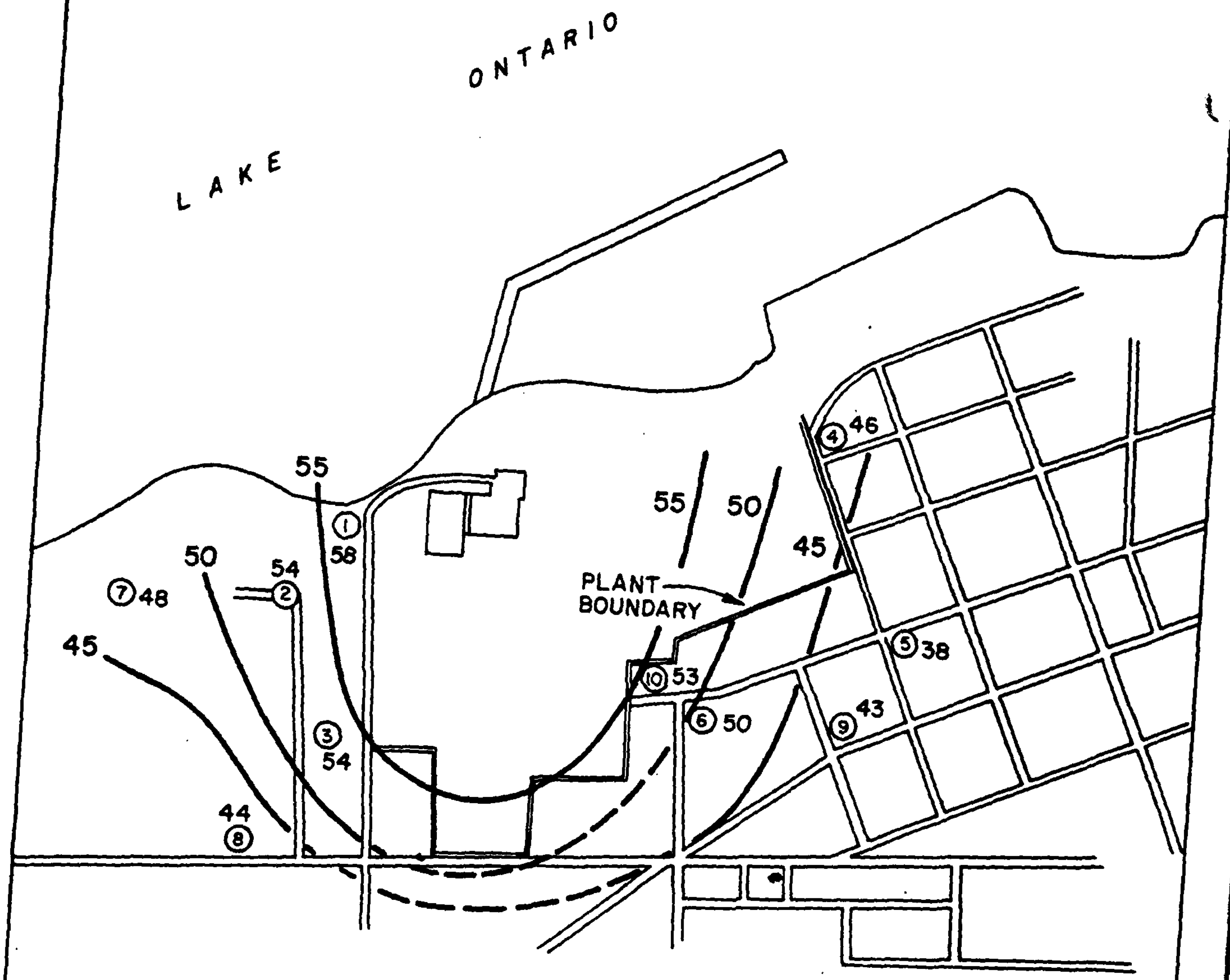
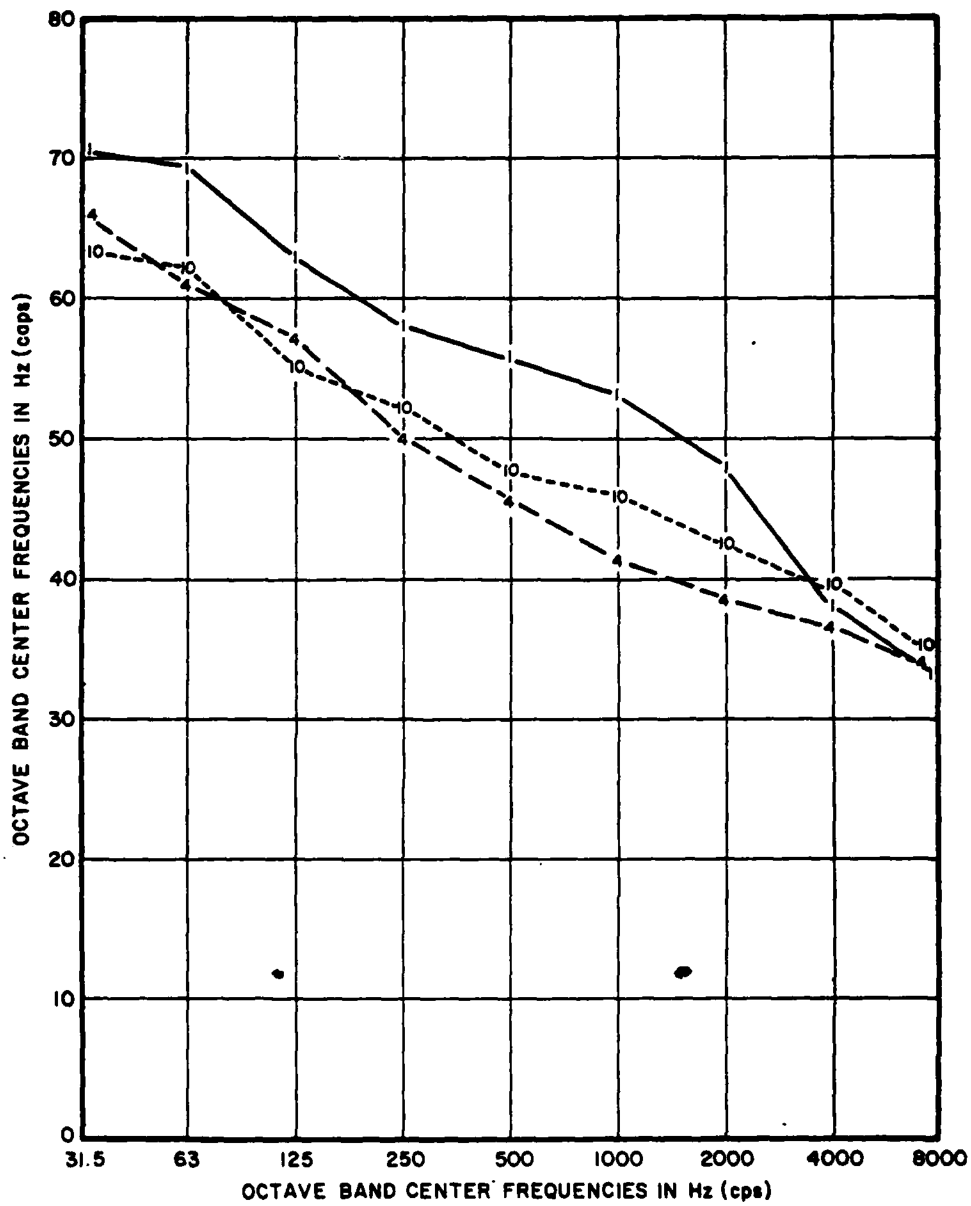


FIG. 3.3-1
SOUND LEVEL - DECIBELS, A SCALE
NIAGARA MOHAWK POWER CORPORATION



NOTE:
NUMBERS 1, 4, 10
INDICATE MEASUREMENT SITE

FIG. 3.3-2
OSWEGO SOUND LEVELS
NIGHTTIME AVERAGES
NIAGARA MOHAWK POWER CORPORATION

This quantity of sewage will negligibly affect the municipal system which by 1974 will terminate in a plant providing primary and secondary treatment prior to final discharge into Lake Ontario. The average design flow rate of the Oswego City treatment plant will be approximately 4 million gallons per day (mgd).

3.5 CHEMICAL WASTES

The environmental impact of plant wastes will be controlled by the proposed system of collecting, recycling, where possible, and treatment prior to disposal. Liquid waste discharge to the city treatment plant will contain neutralized dissolved solids which are composed almost entirely of sodium chloride. The effect of this waste discharge is expected to raise the dissolved solid concentration at the inlet to the city treatment plant by a maximum of 100 parts per million (ppm). This waste discharge will not adversely affect the operation of the treatment plant.

The remaining chemical wastes from plant operations will be recycled, sold for metals recovery, or properly disposed of at an existing sanitary landfill site on Niagara Mohawk property 2.5 miles east of the plant. Oil collected from the gravity separator will be returned to the fuel oil tanks. Solid wastes recovered from the settling basins will be trucked to the sanitary landfill operation on Niagara Mohawk property for disposal.

3.6 FUEL OIL HANDLING

All oil unloading procedures will be under the constant supervision of trained personnel. In the event of an oil spill into Oswego Harbor, the U.S. Coast Guard, Captain of the Port will be informed and the floating oil boom stored at the Oswego Steam Station will be deployed using station personnel, from the northwest corner of Sundown Park to the existing breakwater, to contain the spill. (See Fig. 1.2-9 in Section 1). Since harbor currents are slow and wave action from Lake Ontario is blocked by the breakwater, this oil boom will prevent any oil from entering Lake Ontario by isolating the west basin of Oswego Harbor. Deployment of the boom comprises the initiation of Niagara Mohawk's contingency action plan to contain the oil spill. When the oil spill has been contained, means of removing the oil spilled into the harbor can proceed.

Floating head skimmers and slop water receivers will be provided for this purpose. The slop water will be trucked out for disposal at the sanitary landfill site or other acceptable location. An approved oil absorbent material will be kept on hand in the vicinity of the unloading dock to help remove minor oil spills.

If an oil spill extends beyond the plant boom, the station shift superintendent in charge will inform the U.S. Coast Guard, Captain of the Port, and the Oswego Port Authority and the Port Authority contingency action plan will be carried out. This contingency action plan consists of placing the booms now at the Oswego Port Authority Terminal at the harbor entrance and from the shoreline to the breakwater opening at the northeast end of the harbor for containment, and subsequent removal with floating skimmers and absorbents.

Excess rain water that may accumulate around the oil storage tanks will be pumped from the diked areas to Gardinier Creek with portable pumps provided the water is not contaminated with oil. If it is determined by visual inspection that the water is contaminated, it will be pumped from the diked areas to tank trucks for disposal as described above. Portable heaters and pumps will be used to remove major oil spills contained within the diked area. The oil would be transferred from the diked area to one of the storage tanks via connections provided on the fuel oil fill lines located outside the diked area. Areas within the dike that have been contaminated by a major spill will be replaced with clean soil.

If minor oil leaks or accidental spills occur at the inlet or outlet connections, sand beds will absorb the oil and eliminate the possibility of contaminating runoff water. Contaminated beds will be replaced with clean sand. Oil-contaminated sand will be trucked out for disposal at the sanitary landfill site.

3.7 CONSTRUCTION

Impact On Land

Construction of Unit 5 will take place during the period 1971 through 1974. All feasible measures for limiting the environmental impact of construction activities will be taken.

A considerable amount of rock and earth excavation will be required. When possible, excavated material will be disposed of onsite. Shoreline protection work adjacent to the powerhouse will utilize approximately 30,000 yd of rock fill obtained during underground blasting. Approximately 22,500 yd of excavated material will be used for construction of dikes at the fuel oil storage area.

Excavation will be with conventional earth-moving equipment and rock blasting where necessary. Dust and flying debris from blasting will be controlled by the generally damp condition of the underground surfaces and by protective mats over the blasting zone. As of August 1, 1971, a large part of the near surface blasting has been completed. Some additional surface blasting and subterranean blasting for cooling water tunnels will occur throughout the foundation construction period ending about November 1973.

During plant construction, heavy equipment and trucking noises will be experienced. Material deliveries to the site will be via an existing rail spur or by truck. Unloading will be performed west or south of the present building. Primary road access will be via Lake Street at the east side of the property. All unstabilized access roads will be treated with water to minimize dust formation. Secondary access to the construction site will be via Sixth Avenue at the west of the site.

The plant property is essentially devoid of woods or marshlands. No trees or significant vegetation must be removed to provide access or for site preparation. Due to the industrialized character of the plant site, minimal ecological impact is expected during construction. No permanent alteration to the environmental setting, other than the existence of the new facilities, will result.

During construction public access to the existing breakwater will be blocked for safety reasons. The area which is now used for fishing and recreation will again be accessible after completion of construction.

Impact On Water

Water oriented construction to be undertaken relative to Unit 5 consists of the following items:

Circulating water intake structure
Discharge diffuser for circulating water
Tunnels to intake and discharge structures
Shoreline protection seawall

The intake and discharge structures will be outside the west basin bounded by the harbor breakwater. Design details of the structures are shown in Fig. 1.2-2 through 1.2-5 in Section 1.

The intake structure will cover a lake bottom area of less than 2,000 sq ft and disturbance of the very firm glacial till overburden on sandstone bedrock will be minimal. No disturbance of beaches along Lake Ontario is expected during offshore construction.

Similarly, the drilling of the rock tunnels including the branch tunnels which will be up to 100 ft below lake bottom will result only in very minor disturbance of the lake water at the points of entry of the intake and diffusers.

Excavated material resulting from the construction of the tunnels will be disposed of either in the proposed shoreline protection seawall or at the offsite location owned by Niagara Mohawk.

No water construction is proposed as part of the oil handling facilities to be provided. An existing dock will be used for the berthing of oil barges and the only new facilities will be the equipment to be installed on this dock.

Socio-Economic Impact

Construction of Unit 5 will result in total expenditures estimated at $200,000,000. Approximately $45,000,000 will be spent locally. The remaining amount will cover material costs and miscellaneous indirect expenses which will have no impact on the local economy.

Local labor expenditures will be distributed over the period 1971 through 1974. Peak employment amounting to approximately 1,000 jobs will occur during 1973. For comparison, the largest employer in the City of Oswego (The State University College) employs about 1,300. The largest industrial employer, "Alcan" has about 750 employees. Based on anticipated average wage rates, the maximum weekly payroll will exceed $250,000. In 1969, prior to start of construction at this plant, retail sales in the City of Oswego were approximately $40,000,000 and in Oswego County were approximately $125,000,000. The corresponding figures for total spendable income were approximately $67,000,000 and $250,000,000. It is expected that a significant increase in each of these figures will result from the construction payroll.

Other construction projects in the Oswego area have resulted in relatively high employment for the heavy construction trades. For this reason, some influx of transient labor is expected. Based on labor patterns at similar project sites, most of these workers will maintain permanent residences elsewhere. Some will obtain temporary quarters for themselves, but will not relocate their families. A small percentage are expected to relocate their families to permanent residences in the Oswego vicinity.

3.8 SCENIC AND AESTHETIC IMPACT

The proposed Unit 5 of the Oswego Steam Station will be constructed on a site presently containing four coal fired generating units. The appearance is consistent with the industrial zone in which it is located, and will be enhanced by the architectural treatment of the buildings and the landscaping of the site.

The four existing steel stacks will be replaced by a single concrete chimney. The stack will be visible from a greater distance due to its greater height but will present a more pleasant appearance than the present stacks.

3.9 MONITORING PROGRAMS AND FUTURE STUDIES

A number of aquatic studies to characterize the ecology and water quality of the area were performed in the vicinity of the Oswego Steam Station during 1970 and 1971. Results and evaluations of these studies have been reported by Quirk Lawler & Matusky, Engineers (Ref. 1). This document and its associated appendixes were submitted to the New York State Department of Environmental Conservation in support of (a) Niagara Mohawk Power Corporation's application for a permit to discharge heated waters to Lake Ontario from Unit 5, (b) Niagara Mohawk Power Corporation's request for a certificate of reasonable assurance that the thermal discharge would not be detrimental to the water quality.

The report also incorporates results of hydraulic modeling tests conducted to predict expected dissipation of the cooling water discharged from the unit. The various lake studies conducted are described in Section 2.9 and in Section 3.1.

Applicable portions of the aquatic ecological studies to measure and evaluate effects of plant operation on the aquatic environment will continue after Unit 5 is in operation. The characteristics of the cooling water discharge plume will be measured and evaluated and compared to the predicted (model) values to verify that the discharge complies with thermal standards and criteria it was designed to meet.

Several air monitoring efforts were conducted during 1970 and 1971 to evaluate and characterize the stack effluent of the existing four coal-fired units and measure ambient air quality in the area. Data acquired from these programs were employed to support predictions for dispersion of stack emissions under oil-fired conditions for a five-unit station. These dispersion calculations are described in Section 3.2.

Emission data indicate that the entire oil-fired station with nameplate capacity totaling 1,136 Mw will contribute less particulate matter to the atmosphere than the existing 320 Mw of coal-fired capacity. In addition, burning of 2.8 percent sulfur oil combined with increased stack height will provide greater dilution of sulfur dioxide concentrations and result in ground level concentrations lower than those for the existing station. A program of stack emission and ambient air monitoring will be conducted after the oil fired units are operational to verify these predicted values.

4. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

Two general criteria have been employed in the determination of what ought to be defined as adverse effects. The first criterion is the application of existing local, state and federal numerical or otherwsie well defined standards. The second guideline involves the recognition that all environmental effects are not always included in regulatory standards and therefore, consideration must also be given to qualitative, less well defined notions of effects than can be environmentally damaging.

4.1 AQUATIC BIOTA

The anticipated impact on aquatic organisms from the proposed discharge in Lake Ontario is described in Section 3.1.

Preliminary data taken from water samples indicate that a small percentage of fish larva will be destroyed as a result of passage through the circulating water system. Because of the paucity of fish in the vicinity of the proposed intake structure, and the precautions taken in the design of the lake structures, no significant loss of more mature fish is anticipated in proportion to the fish population as a whole.

4.2 AIR QUALITY

The impact of air discharges is described in Section 3.2.

The Oswego Steam Station will add relatively small concentrations of air contaminants to the ambient air. The resulting ambient levels of contaminants are expected to be well below those levels considered by the Federal Government to be harmful.

4.3 FUTURE ADJACENT LAND USES

Land uses immediately adjacent to the plant site include institutional and public to the west, residential, commercial and light industry to the south, and residential and heavy industry to the east. The Comprehensive Zoning Map of the City of Oswego, adopted in July 1959 indicates that these uses conform to the zoning now in effect. Furthermore, the most recent Master Plan for the city, dated July 1958, proposes continued use as described above for the areas adjacent to the Oswego Steam Station.

Adverse environmental effects on adjacent properties will be considerably alleviated by the use of oil rather than coal as fuel in the new unit as well as from the conversion from coal to oil in the existing four units. Although the use of oil will require the construction of oil storage tanks at the eastern portion of the site partially adjacent to general residential land use, the unsightly coal piles now in existence will be eliminated. Particulate matter associated with coal storage will no longer exist.

Construction of a shoreline protection seawall and shore-front improvements in Lake Ontario will result in the loss of approximately 1.5 acres of lake bottom. However, as pointed out in Section 3, the bottom is not a highly productive area at present, and the proposed rock fill is not expected to alter the ecology and may even provide a more suitable habitat than now exists.

5. ALTERNATIVES TO THE PROPOSED ACTION

5.1 NOT PROVIDING THE POWER

The Public Service Law of New York State, under which the applicant operates as a public utility, requires that the applicant must adequately supply electricity to its customers, the bulk of upstate New York's residential, commercial and industrial population. Applicant has discontinued the advertising of electricity, except that used for safety reasons such as street lighting and highway lighting.

Because of the long lead times necessary for sitings and construction of major power facilities, electric utilities must project their plant expansion programs on demand forecasts based on historical growth trends adjusted for expected changes in consumer requirements. Many areas, including upstate New York, have exceeded previous forecast figures. The applicant's most recent prediction of demand on its system indicates that its load will reach 5,620 megawatts (Mw) by the winter of 1974, and 5,855 Mw by the winter of 1975–76.

Without the addition of the power producible by Oswego Unit No. 5, the applicant's generating resources in 1975 (including firm purchased power) will amount to 6,587 Mw. A peak demand of 5,855 Mw will leave a reserve of 732 Mw, or approximately 12 1/2 percent. Experience shows that this margin is insufficient to ensure continuous adequate service when necessary scheduled maintenance and forced outages are taken into account.

The applicant is a participating member of the New York Power Pool, an association of the electric utility companies of New York State, one of the principal functions of which is to conduct studies to optimize system design and operation of the interconnected facilities of the member companies.

To meet the reliability objectives of the pool, the applicant intends to provide capacity in excess of peak load. To meet the projected 1974 winter peak load and maintain the desired reserve margin, the applicant must have 6,630 Mw of generating capacity in service or available for service by November of that year. The applicant presently has 5,665 Mw in existing generating resources. The applicant's own installed capacity is 4,023 Mw. The remaining 1,642 Mw are purchased from others. An additional 480 Mw are under construction, and purchases will increase by 481 Mw, making available a total of 6,626 Mw of generating resources by the winter of 1974.

Without taking into consideration the expected loss of additional capacity caused by scheduled maintenance and forced outages, this total of 6,626 Mw will be reduced by a minimum of 659 Mw due to day-to-day short-time unavailability of generating capacity. The resulting 5,967 Mw falls short of the projected peak load and indicates that additional generating capacity must be added.

5.2 PURCHASED POWER

The New York Power Pool and its members have found that realistic possibilities for additional power purchases in the mid-1970's do not exist. Both the Pennsylvania-Jersey-Maryland Interconnection (PJM) and the New England Power Pool (NEPOOL) are experiencing capacity shortages similar to those of the New York Power Pool.

In order to maintain reliability in the New York Power Pool each member is expected to maintain capacity at least 18 percent in excess of anticipated peak load. The lack of adequate reserve capacities currently has made it impossible for some members to undertake usual yearly maintenance. A continuation of this situation would result in an increased number of forced outages and lowered reliability. To allow all pool members opportunity for required maintenance, and to enable the pool to have sufficient capacity to meet load requirements, each member must meet his capacity obligation to the pool. During and subsequent to the winter of 1974, there will be insufficient excess capacity within the pool to allow Niagara Mohawk to meet the reserve obligation without Oswego Unit 5.

5.3 ALTERNATE MEANS OF GENERATION

Coal-fueled unit

A number of valid arguments and situations must be considered regarding expansion of the Oswego Station with additional coal-fired capacity. These include:

(a) Increased solid waste associated with the higher percentage of ash in coal fuel.

(b) Onsite railroad delivery for the existing coal-fired units which now results in disruption of residential highway traffic in the Oswego area and which would be grossly magnified if coal trains were employed as a supply for Unit 5.

(c) Niagara Mohawk has attempted to establish a balance of fuels throughout its system which would provide quality power if severe shortages occur from one source or another. In keeping with this philosophy, the following quote from testimony by F.S. Brown of the Federal Power Commission at hearings by the Joint Committee on Atomic Energy held in November 1969 is appropriate to the coal versus oil situation: "with the exception of Central and Western Pennsylvania, where low-cost coal is abundantly available, the New England and Middle Atlantic States do not have access to low-priced coal. The competitive fuels are the imported low-sulfur-residual oils in locations with deepwater port facilities, and nuclear fuels."

Natural gas fueled unit

The quantity of natural gas necessary to generate the required amount of electricity from this site is not available in the Niagara Mohawk system and it cannot presently be obtained and delivered to the site.

Nuclear fueled unit

A minimum period of six years is necessary to license and construct a nuclear plant on an approved site.

Since a nuclear unit could not be sited at this location in accord with Atomic Energy Commission (AEC) siting criteria, a fossil fueled unit at the Oswego Steam Station was the only viable alternative.

Gas turbines

Gas turbines are generally unsuited for the continuous operation required of base loaded units. They are known to have a relatively low availability due to maintenance requirements and to have a high fuel cost. Significant environmental impact would be experienced due to sound levels emitted by the large number of units (16 to 40) required to generate the required amount of electric power.

Hydroelectric facility

Niagara Mohawk's system and franchise territory does not include sites which possess the hydroelectric potential which could supply the electrical output necessary to meet 1974 load demands. Niagara Mohawk has 81 hydroelectric plants throughout its system which presently account for approximately 20 percent of the installed system capacity. Most of these are comprised of small supervisory load controlled units with the largest being 50 Mw. A large pumped storage project would be unsuitable because of the base load capacity required to meet Niagara Mohawk's power needs.

5.4 ALTERNATE SITES

Projected power demands indicate that the Niagara Mohawk system would be required to supply additional power to the eastern load center in 1974. The areas of site exploration were consequently limited to the company's central and eastern divisions. Major site selection efforts were concentrated on several areas within the franchised territory which provide adequate supplies of cooling water and sufficient acreage for the location of a generating station of the size required.

A number of factors were evaluated before final selection of the Oswego Steam Station site. The most important was the time which could be saved by locating the unit on an available existing site, and the joint use or sharing of existing facilities rather than building new ones. Construction of an additional large fossil fueled generating unit at this site has been found to be compatible with environmental considerations. Air quality, water quality, noise, and waste disposal criteria can be met through application of conventional technology.

Obtaining a land option, physical site field studies, environmental investigations and final land acquisition of a new, undeveloped site would necessarily entail delays of up to two years.

5.5 ALTERNATE COOLING METHODS

The decision to expand the Oswego Steam Station was influenced by the availability of a body of cooling water large enough to make it possible to meet New York State regulations regarding thermal discharge, which prohibit a temperature rise of more than 3 F outside a 300 ft radius mixing zone. The once-through system as described previously will meet this requirement by returning cooling water to the lake through a multiport diffuser which permits rapid dilution by entrainment of large quantities of cooler lake water.

Other methods investigated for providing cooling water included cooling ponds, lake surface discharge, harbor discharge and cooling towers. After a detailed comparison of these alternatives, the direct cooling method with a multiport diffuser was chosen, based on the following considerations:

1. Limited available land space

2. Capability to meet New York State criteria for thermal discharges

3. Greater reliability than cooling systems with more mechanical equipment

Cooling Ponds

A cooling pond was not considered to be a feasible alternate because the pond area required for a station this size is approximately 800 acres. The present site is approximately 91.5 acres and no undeveloped land is available in the area. Furthermore, such ponds would result in environmentally objectionable ground level fog.

Surface Discharge

Alternatives to the proposed circulating water system include a surface rather than a submerged discharge configuration. Such a surface discharge would provide the most suitable method of handling the thermal effluent from the standpoint of heat transfer to the atmosphere.

However, if the discharge enters the lake surface at a low velocity, the heated discharge may encroach on the shoreline under certain current conditions. Furthermore, this type of discharge, although satisfactory for rapid heat transfer to the atmosphere, would not provide sufficient mixing water to maintain New York State thermal discharge numerical criteria limitations. Increasing the velocity of the discharge would alleviate the former objection but not the latter.

The maximum allowable surface temperature rise of 3 F above ambient lake water temperature over an area not to exceed 300 ft in radius would be contravened by use of either a high or low velocity surface discharge for the proposed Unit 5.

Harbor Discharge

The alternative of a harbor thermal discharge from Unit 5 has also been eliminated because temperature measurements in the harbor area indicate that the New York State numerical thermal citeria would similarly be contravened as a result of the additional effluent.

Cooling Towers

Investigations have shown that wet mechanical draft cooling towers with a fog abating system or a wet natural draft cooling tower are feasible cooling system alternatives. A wet mechanical draft tower arrangement without fog abating equipment was dismissed as an alternate due to its greater potential for creating ground level fog than the towers discussed in detail below. Ground level fog is objectionable at this site because of its close proximity to the City of Oswego.

Dry cooling towers were not considered to be a practical alternate at this time because the state of the art is not sufficiently advanced for a tower of the size required for this station. The largest station utilizing this type of tower has a capacity of approximately 200 Mw. The turbines used in these installations must of necessity operate with back pressures of 15± inches of mercury absolute pressure (" Hg. abs). Turbines manufactured at the present time for units the size of Oswego Unit 5 will not operate at back pressures higher than ±6 in. Hg abs. It is not anticipated that units operating at higher back pressures will be available in the near future.

The installation of an induced draft or natural draft cooling tower would alter the sound in the residential areas surrounding the plant. For the natural draft tower, the predominant noise is in the mid-to-high frequencies, resulting from falling water within the tower. This would cause an increase in the present sound level at the 2,000 cycles per second (Hz) frequency at the residences on the east side of the plant. The mechanical draft tower has the sound of falling water, plus a low and mid-frequency noise from the fans and motors. The sound level increase would be somewhat greater than the increase expected with the natural draft system.

The Sections below describe the possible mechanical arrangements of both the natural draft cooling tower, and the wet mechanical draft cooling tower with fog abating apparatus. Predicted effects on the environment due to discharge of large amounts of moisture to the atmosphere are also discussed.

5.5.1 NATURAL DRAFT TOWER SYSTEM

The circulating water system would consist of a natural draft cooling tower, a screenwell structure housing circulating water pumps and related equipment, piping to and from the condenser, and makeup and blowdown systems. Circulating water, cooled in the tower and collected in the tower basin, would flow into a screenwell, pass through panel screens, and be pumped through a piping system to the condenser and back to the tower.

The natural draft hyperbolic cooling tower would be either of the cross-flow or counter-flow type. Based on tower optimization studies and turbine back pressure considerations, the tower would have an 18 F approach at a design wet bulb temperature of 74 F and relative humidity of 60 percent. The tower would be designed for a total circulating water system flow of 285,700 gallons per minute (gpm) and a temperature range of 28.6 F. The size of the cooling tower required to meet these criteria would be approximately 400 ft diameter and 370 ft high for the cross-flow type. The counter-flow type tower would be somewhat smaller in diameter and greater in height.

In order to maintain circulating water quality at a specified level, a blowdown pipeline would discharge a regulated quantity of circulating water from the system into Lake Ontario through the discharge line of the existing circulating water system for Units 1 through 4. This water would be treated as required to meet the appropriate water quality standards in order to prevent any significant environmental impact. A separate pipeline would obtain tower makeup water from Lake Ontario to augment circulating water lost by blowdown, tower evaporation and drift. This water would be pumped from the existing screenwell at Units 1 through 4.

Environmental Effects of the Cooling Tower Plume

Studies were conducted to determine the extent of fogging that could be created by the natural draft tower plume and to evaluate the frequency of ground level fog which might be expected as a result of the operation of a natural draft tower at the Oswego Steam Station. For this study the station was taken to be operating at the anticipated full load heat rejection of 4.08 billion British Thermal Units (Btu) per hr. The following preliminary performance data for a cross-flow type tower were obtained from a manufacturer for use as input data for tower plume analysis:

a. Top Diameter = 160 ft

b. Height = 370 ft

c. Tower exit air temperature versus ambient air wet bulb temperature curves for different ambient air relative humidities

d. Tower exit air velocity versus ambient air wet bulb temperature curves for different ambient air relative humidities

Ten years of hourly weather observations from Rochester, New York, from January 1, 1949 through December 31, 1958 were used in the analysis. Meteorological parameters used as input for the analysis were ambient dry bulb temperature, relative humidity and wind speed. The most important parameter in the analysis is ambient wet bulb temperature, which was computed based on a psychrometric chart in the computer program. Wind direction was not considered in the mathematical analysis. The meterological parameters were grouped into the following classes:

Air Temperature, F	Relative Humidity, Percent	Wind Speed, Knots
-5 (0 to -9)	20 (0-39)	1 (0 to 2)
+5 (1 to 10)	50 (40-59)	4 (3 to 5)
+15 (etc.)	65 (etc.)	8 (etc.)
25	75	13
35	82.5	18
45	87.5	21 (21)
55	91.5	
65	95	
75	98 (97-99)	
85		

One hundred percent relative humidity was not considered, because it was assumed that natural fog would be present at this condition.

A mathematical model which takes into account the entrainment of ambient air, momentum of the balanced system, buoyancy force and heat content was used to describe the characteristics of a cooling tower plume. Equations of continuity, mass conservation, momentum conservation along the axis of the plume and in the transverse direction, conservation of heat flux, and geometrical relationships are expressed in seven ordinary differential equations. The differential equations are transformed into a series of finite difference equations for seven unknown variables: density, mean radius, moisture content, mean velocity, angle of the center line with respect to the horizontal, and horizontal distance and vertical distance with respect to the source. For given cooling tower operating conditions and specified meteorological conditions, the mathematical model determines the size and configuration of the visible plume. The plume is visible as fog when the air in the plume is at or below its saturation temperature.

The visible plume size and configuration described by the total length, trajectory and radius were determined for all combinations of the above parameters. A separate computer program determined the number of hours of simultaneous occurrences of each possible combination of air temperature, relative humidity and wind speed class. The results of the above analyses were combined, and the number of occurrences of each characteristic plume over the 10-yr period was then determined.

Typical plume configurations for three different wind speeds at 15 F ambient air dry bulb temperature are shown in Fig. 5.5-1. The effect of varying relative humidity and values of pertinent parameters are also indicated in this figure. Fig. 5.5-2 is included to show the plume characteristics at 55 F ambient air dry bulb temperature. Fig. 5.5-3 shows the frequency and limits of fogging patterns which could result from the natural draft hyperbolic cooling tower.

A natural draft tower would not cause any fogging problems at the ground level. However, a certain amount of cooling tower drift would probably occur. This drift (water entrained in the air flowing through the tower) would fall to the ground within a few hundred feet of the tower during calm wind periods. During high winds, the drift would tend to disperse and would not be expected to create significant problems.

5.5.2 MECHANICAL DRAFT TOWER ARRANGEMENT WITH FOG ABATING SYSTEM

The circulating water system would consist of two mechanical draft cross-flow towers, each with a fog abating system, a screenwell structure housing circulating water pumps and related equipment, piping to and from the condenser, and makeup and blowdown systems. Circulating water, cooled in the towers and collected in the tower basins, would flow into an open channel interconnecting the basins, and then into a screenwell. The water would pass through panel screens and be pumped through a piping system to the condenser and back to the towers.

The towers would be designed for a total circulating water system flow of 285,700 gpm and a temperature range of 28.6 F and for operation with a 14 F approach at a 74 F wet bulb temperature. Each tower would consist of 11 cells 36 ft long, and would have a 30 ft high wet fill section and a 21 ft high fin tube dry heat exchanger section in parallel for the purpose of fog abatement. The towers would be equipped with dampers which may be placed against the dry section of the tower to improve tower performance when the probability of fog is slight.

Each reinforced concrete tower basin would be approximately 400 ft long, 55 ft wide and 4 ft deep. The basins would be interconnected by an open channel which would carry cooled circulating water to the screenwell. Makeup and blowdown systems would be the same as described above for the natural draft tower.

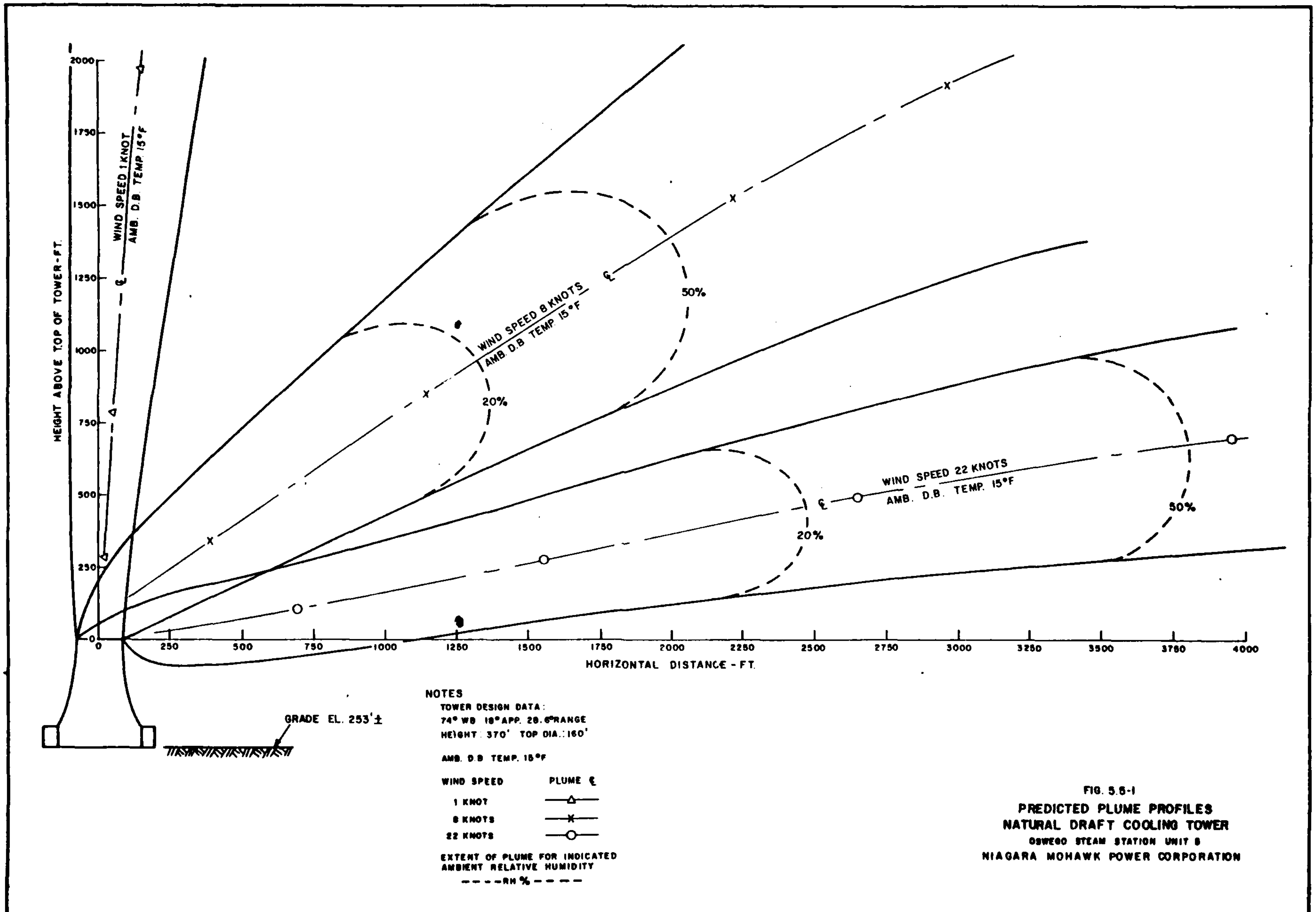


FIG. 5.6-1
PREDICTED PLUME PROFILES
NATURAL DRAFT COOLING TOWER
OSWEGO STEAM STATION UNIT 6
NIAGARA MOHAWK POWER CORPORATION

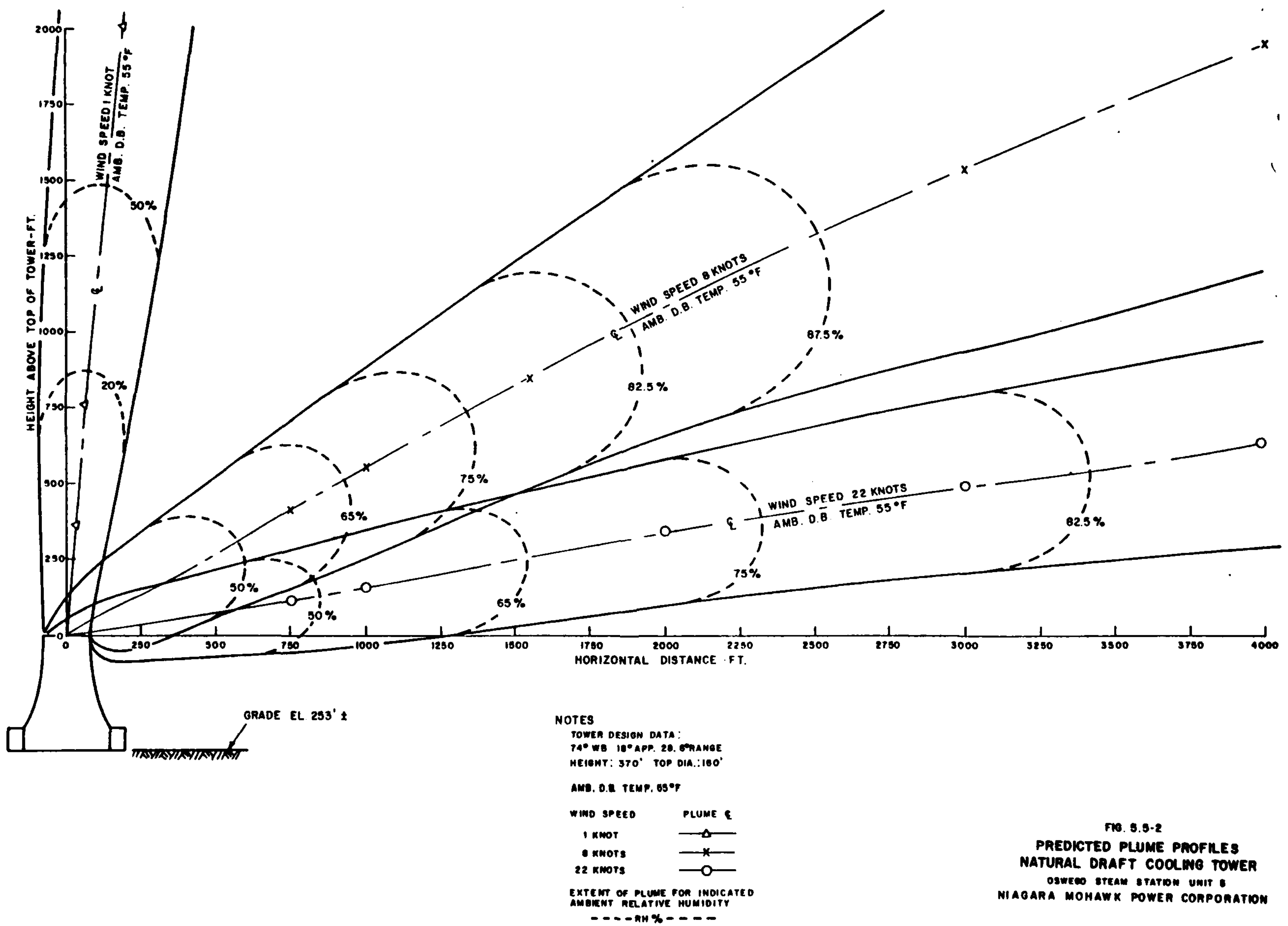


FIG. 5.5-2
PREDICTED PLUME PROFILES
NATURAL DRAFT COOLING TOWER
OSWEGO STEAM STATION UNIT 6
NIAGARA MOHAWK POWER CORPORATION

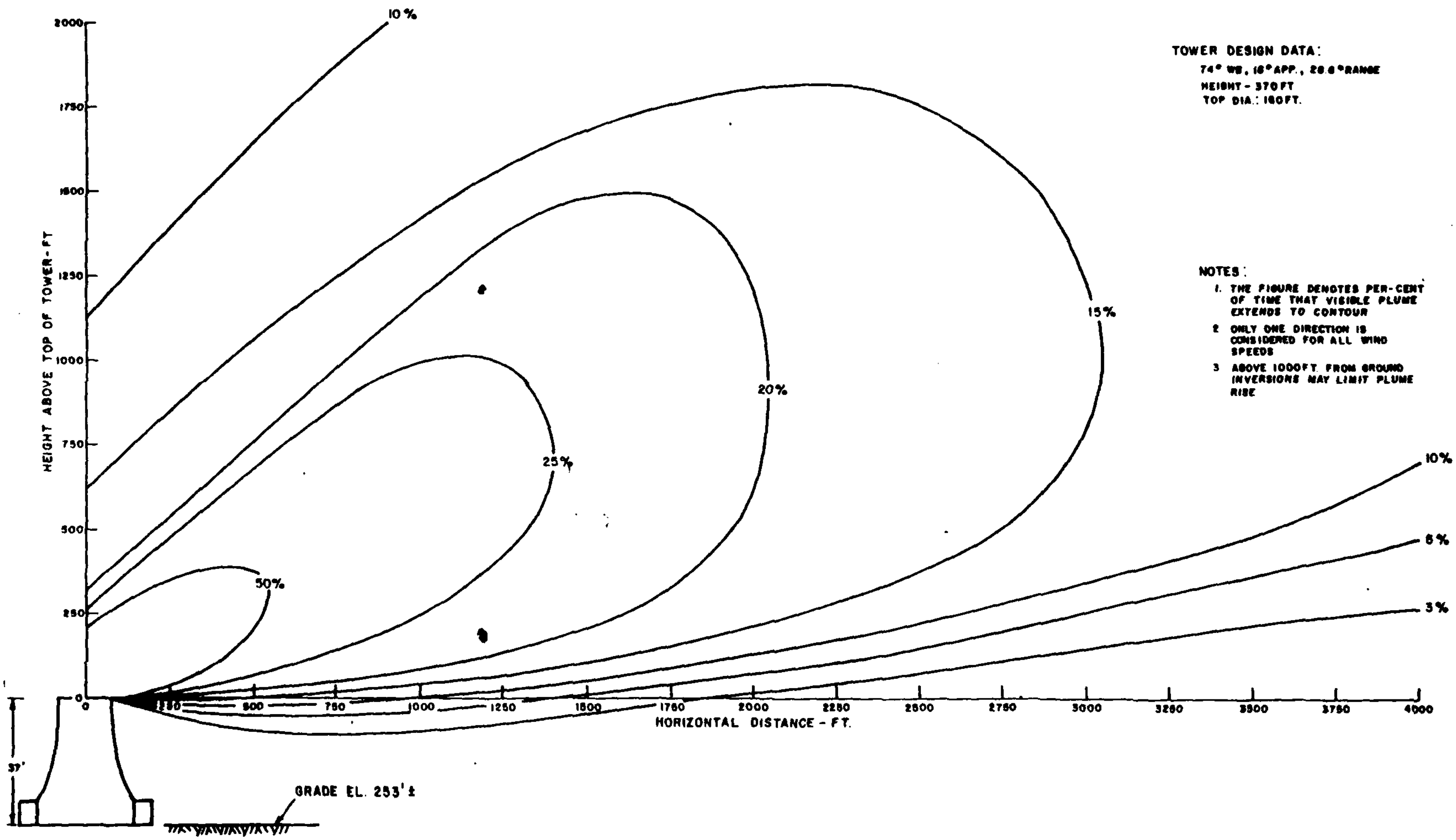


FIG. 5.5-3

PREDICTED OCCURENCES OF FOG GENERATED FROM NATURAL TOWER

OSWEGO STEAM STATION UNIT 6

NIAGARA MOHAWK POWER CORPORATION

Environmental Effects of The Cooling Tower Plume

Studies were conducted to determine the extent of fogging which might be created by the operation of a mechanical draft tower with a fog abater system. As in the natural draft tower study, the station was taken to be operating at the anticipated full load heat rejection of 4.08 billion Btu per hr. The following preliminary data were obtained from the manufacturer for use in the tower plume analysis:

a. Cell stack exhaust area = 22 cells at 32 ft diameter

b. Tower height = 66 ft

c. Tower exit air wet bulb temperature versus ambient air wet bulb temperature curves for different ambient air relative humidities

d. Tower exit air dry bulb temperature versus ambient air wet bulb temperature curves for different ambient air relative humidities

e. Tower exit air flow rates during winter and summer operations

From c and d above, tower exit air relative humidity versus ambient air wet bulb temperature curves for different ambient air relative humidities were constructed. The same weather data and grouping of meteorological parameters as described for the natural draft tower were used in this analysis. One important input parameter for this tower system is the exit air relative humidity, as the air leaving the stacks of this tower is partially saturated.

The mathematical model described for the natural draft cooling tower plume was modified to incorporate the characteristics of this tower. The 11-cell tower system was converted into a single source of equivalent diameter. It was assumed that the other equivalent tower would have an identical plume behavior. The interaction of the plumes from the two rows was not considered in the analysis.

Typical plume configurations for three different wind speeds at 15 F ambient air dry bulb temperature are shown in Fig. 5.5-4. The effect of varying relative humidity is also indicated in the figure. Values of pertinent parameters are listed in the figure. Fig. 5.5-5 is included to show the plume characteristics at 55 F ambient air dry bulb temperature. Fig. 5.5-6 shows the frequency and limits of fogging patterns which could result from the mechanical draft tower with fog abating equipment. As can be seen from this figure, ground level fog can be produced infrequently by each of the two mechanical draft towers.

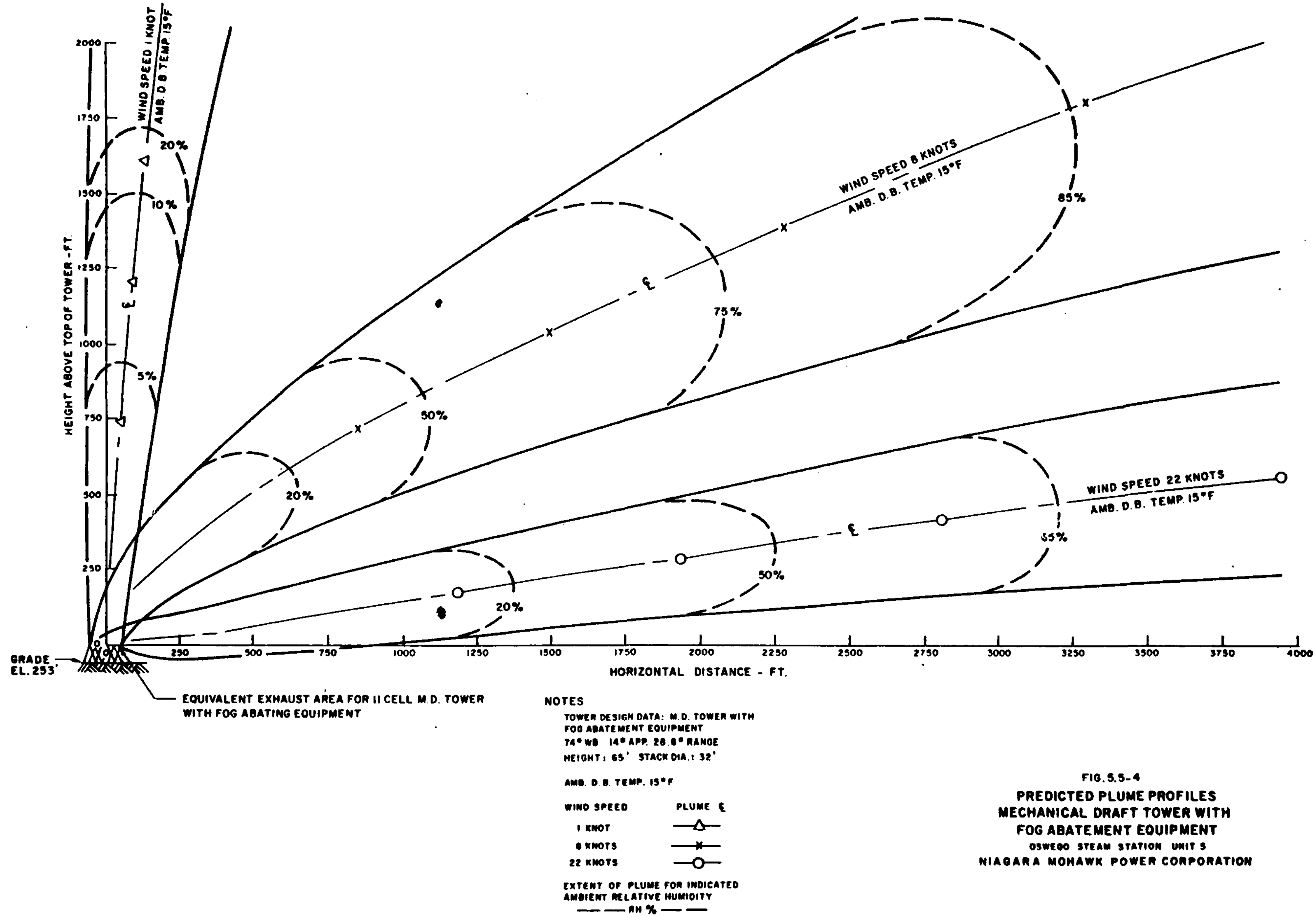
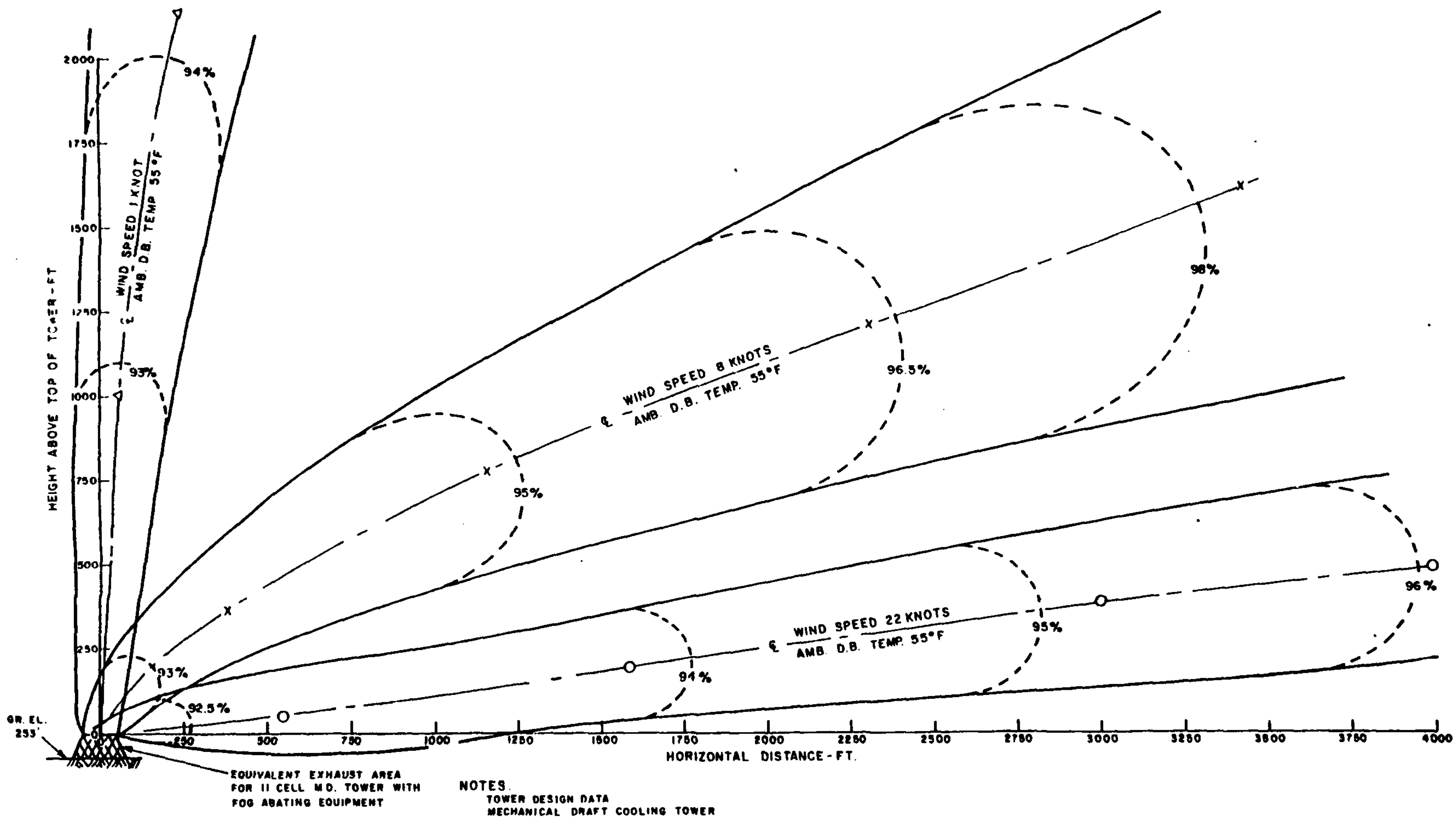


FIG. 5.5-4
PREDICTED PLUME PROFILES
MECHANICAL DRAFT TOWER WITH
FOG ABATEMENT EQUIPMENT
OSWEGO STEAM STATION UNIT 5
NIAGARA MOHAWK POWER CORPORATION



NOTES.

TOWER DESIGN DATA
MECHANICAL DRAFT COOLING TOWER
WITH FOG ABATING EQUIPMENT.
74° W.B. 14° APP. 28.6° RANGE
HEIGHT 65' STACK DIA. 32'

AMB. D.B. TEMP. 55°F

WIND SPEED	PLUME ℄
1 KNOT	—△—
8 KNOTS	—×—
22 KNOTS	—○—

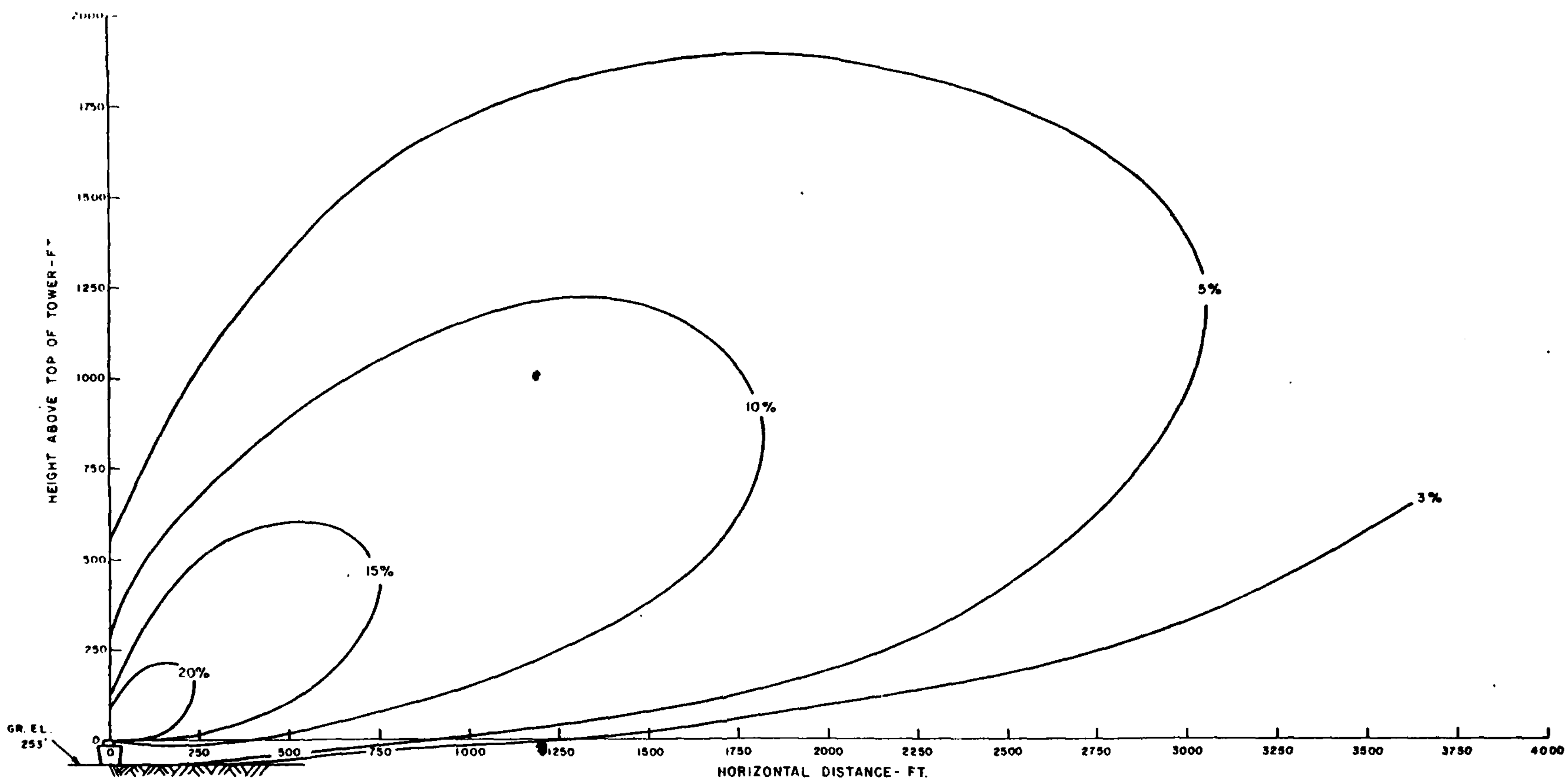
EXTENT OF PLUME FOR INDICATED AMBIENT RELATIVE HUMIDITY
- - - -RH%- - - -

FIG. 5.5-5

PREDICTED PLUME PROFILES MECHANICAL DRAFT TOWER WITH FOG ABATEMENT EQUIPMENT

OSWEGO STEAM STATION UNIT 6

NIAGARA MOHAWK POWER CORPORATION



NOTES:

1. THE FIGURE DENOTES PER-CENT OF TIME THAT VISIBLE PLUME EXTENDS TO CONTOUR
2. ONLY ONE DIRECTION IS CONSIDERED FOR ALL WIND SPEEDS
3. ABOVE 1000FT. FROM GROUND INVERSIONS MAY LIMIT PLUME RISE

TOWER DESIGN DATA:

M.D. TOWER WITH FOG ABATING EQUIPMENT
74°WB 14°APP. 28.6° RANGE
HEIGHT 65' STACK DIA. 32'

FIG. 5.5-6

PREDICTED OCCURRENCES OF FOG GENERATED FROM M.D. TOWER WITH FOG ABATING EQUIPMENT

OSWEGO STEAM STATION UNIT 6

NIAGARA MOHAWK POWER CORPORATION

5.6 ALTERNATE AIR QUALITY CONTROLS

Unit 5 of the Oswego Steam Station will be equipped with a high efficiency electrostatic precipitator to reduce the emission of particulate matter and thereby enable the plant to meet particulate emission requirements and produce a plume opacity equivalent to number 1 or less on the Ringleman Smoke Density Chart.

Three other major types of particulate control devices are commercially available; cyclones, baghouses and scrubbers. However, each of these methods has limitations that preclude its use on this power station.

Cyclones are less efficient in collecting small particulates. The submicron oil ash particles which contribute to plume opacity would not be sufficiently removed to produce a satisfactory plume appearance.

Baghouses have not yet been applied successfully to oil-fired power plants. The oil ash, which has a sticky characteristic, tends to blind the fabric bags and increased air resistance causes the bags to rupture frequently.

The major drawbacks of a scrubber system are costly waste water treatment, visible steam plume, and reduced plume rise.

6. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The local "short-term" use of the overall project involves the production of electric power for the next 35 yr. Niagara Mohawk is of the opinion that there will be no negative, cumulative, long-term effects from the proposed action.

The safeguards incorporated in the plant design preclude any significant changes in aquatic species distribution and bottom productivity as a result of the proposed project.

The heat in the discharge water decays continuously to the atmosphere and will not result in cumulative effects. In considering thermal discharge effects, the question of long-term influence on the fish and other aquatic life is often raised. It is not expected that changes in fish population or condition will accrue from the thermal discharge since the temperature increases are small, and the zones within which these small changes occur are minimal.

The use of the land on which the proposed Oswego Unit 5 is to be located may be considered a short-term use for the normal 35 yr life expectancy of an oil-fired generating station. Lake Ontario water is returned to the lake in essentially the same condition as that in which it is withdrawn.

Concerning the maintenance and enhancement of long-term productivity of the land and water, the presently proposed occupation of the site for purposes of power generation does not preclude its use for other productive short or long-term purposes in the future. Among these are the possibilities of development for recreational or residential use, both of which are impractical or unsuitable at present.

The resources of water and land remain without destruction regardless of the short-term use as a power generating station.

Short-term effects of discharges into the atmosphere can become less significant as feasible technological advances permit a reduction in objectionable stack emissions. Beneficial uses of the area for industrial purposes will be reduced only to the extent that the assimilative capacity of the environment is reduced.

Niagara Mohawk does not believe that the range of beneficial uses of the surrounding environment is narrowed by the project. Little change, if any, is anticipated with respect to wildlife in the vicinity, boating on the lake, or the general ecosystem.

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IF THE PROPOSED ACTION SHOULD BE IMPLEMENTED

With Lake Ontario as the source, approximately 635 cfs of water will be circulated through the condenser cooling system of proposed Unit 5 at the Oswego Steam Station. The use of this water resource is not an irreversible procedure because plant shutdown immediately results in a return of the lake to the natural state. Discharge water from the plant operation is essentially the same in quantity and quality as that withdrawn. No chemical will be added to the system. Observations of the distribution of heat from the existing discharges of Units 1 to 4 indicate that with proper design of the proposed intake and discharge facilities for the new unit, deleterious effects will be negligible.

Furthermore, although approximately 2 percent of the ciculating water flow is evaporated into the atmosphere, even this small quantity is not irreversibly lost, but returns to the ecosystem in the form of rainfall.

In considering the use of the atmosphere for the dispersion of stack gases and other emissions, again proper design will reduce any deleterious effects and will not result in any irretrievable commitment of air resources.

The only irretrievable and irreversible commitment from a practical standpoint of land resources will be the new 850 ft long breakwater which, with the backfill to be placed behind it, will result in a loss of about 1 1/2 acres of lake bottom. This is not a significant loss from the standpoint of the minute proportion of this area to the area of the lake as a whole and also because of the relative lack of biological productivity of lake bottom at this location.

Fuel oil requirements for the operation of Units 1 to 5 of the Oswego Station are estimated to be 30,000 barrels per day. Based on the present consumption of 14.7 million barrels of oil per day in the United States, the Oswego Station will use about 0.20 percent of this supply. The commitment of this energy resource is irreversible and irretrievable.

In summary, the applicant believes unalterable disruptions to the ecosystem in the Oswego Station environment are not of a seriousness to warrant action beyond the thorough and careful measures which have been planned. Standards and criteria limitations will be met.

8. COORDINATION WITH OTHERS

Niagara Mohawk Power Corporation, in addition to its meetings with appropriate permit issuing agencies, participated in numerous meetings, seminars, briefings, and lectures with members of the public, governmental agencies, and citizens' groups.

8.1 PUBLIC PARTICIPATION

Meetings were held with members of the public and citizens' groups as listed below. These meetings were basically informational in nature, the function of same being to answer questions and disseminate information regarding construction, operation, and environmental safeguards in connection with the proposed Oswego Unit 5. Those in attendance appeared to be satisfied with the information supplied to the end that no comments have been received subsequent to the meeting.

Environmental Committee of Lake Ontario

Oswego Lions Club

Oswego Kiwanis

Officials of the State University College at Oswego

Copies of the draft statement, dated 8 October 1971 were sent to the following parties, but no comments were received:

Dr. Purdue, President, State University College at Oswego, Oswego, New York

Vice President, Consolidation Coal Company, Pittsburgh, Pennsylvania

Mexico Independent (newspaper) Mexico, New York

Shapiro Paper Company, Mexico, New York

Watertown Daily Times, Watertown, New York

A summary of the Draft Environmental Statement was sent to 275 environmentally oriented groups and individuals with a notice that the full statement was available on request without cost. The last three parties listed above requested the full statement.

8.2 GOVERNMENT AGENCIES

Copies of the draft statement, dated 8 October 1971, were sent to the following agencies for comment:

	Date of Transmittal	Date of Comments
Environmental Protection Agency, New York, New York	14 Oct	10 Dec
State of New York, Department of Environmental Conservation, Albany, New York	14 Oct	10 Dec
Department of Commerce, Buffalo, New York	14 Oct	No Comments Received
Federal Power Commission, New York, New York	14 Oct	No Comments Received
Environmental Protection Agency, Chicago, Illinois	19 Oct	No Comments Received
Chairman, Port of Oswego Authority, Oswego, New York	21 Oct	No Comments Received
New York State Office of Planning Coordination, Albany, New York	21 Oct	No Comments Received
Regional Federal Highway Administrator, Delmar, New York (U.S. Department of Transportation) (Federal Highway Administration)	14 Oct	27 Oct
Regional Director, Bureau of Outdoor Recreation, Philadelphia, Pennsylvania	14 Oct	1 Nov
National Marine Fisheries Service, Gloucester, Massachusetts	14 Oct	29 Oct
Ninth Coast Guard District, Cleveland, Ohio	14 Oct	26 Oct
Bureau of Sport Fisheries & Wildlife, Boston, Massachusetts	14 Oct	24 Nov
National Park Service, Philadelphia, Pennsylvania	14 Oct	19 Nov
Federal Aviation Administration, Jamaica, New York	14 Oct	7 Dec

	Date of Transmittal	Date of Comments
Great Lakes Basin Commission, Ann Arbor, Michigan	14 Oct	No Comments Received
Genesee/Finger Lakes Regional Planning Board, Rochester, New York	14 Oct	9 Nov
Central New York Regional Planning Board, Syracuse, New York	14 Oct	24 Nov
Chairman, Board of Supervisors, Oswego, New York	21 Oct	No Comments Received
Charles Sauers, Esq., Oswego County Attorney, Oswego, New York	21 Oct	No Comments Received
Senator Douglas Barclay, Albany, New York	21 Oct	No Comments Received
Town of Mexico Supervisor, Mexico, New York	21 Oct	No Comments Received
Town of Scriba Supervisor, Scriba, New York	21 Oct	No Comments Received
Department of Agriculture, Economic Research Service, Upper Darby, Pennsylvania	14 Oct	No Comments Received
Great Lakes Laboratory, State University College, Buffalo, New York (Consultant to U.S. Army Corps of Engineers)	14 Oct	No Comments Received
New York State Historic Trust, Albany, New York	23 Nov	2 Dec

Summaries of the comments received are as follows:

Department of Transportation, United States Coast Guard, Cleveland, Ohio

Comments:

1. The type of oil spill control boom mentioned in the report is a temporary type for use after a spill has occurred. The Coast Guard proposes a permanent type boom arrangement which runs on a track.

2. Since the fuel oil pump houses are to be outside the diked area, there has to be adequate facilities to handle any spill which may occur at the pump house. The

Coast Guard concern is if the sumps in the pump house are large enough to handle a spill at this location.

3. Regarding the offshore intake and discharge structures, it is important that these obstructions be marked as proposed in the draft statement.

4. With respect to disposal of chemical wastes, the Coast Guard is concerned if the city sewer system will be able to handle the increased burden of these chemical wastes.

Responses:

1. Niagara Mohawk's consultant, Stone & Webster, contacted Commander Mason of the Coast Guard to determine specifically the type of boom proposed. They were informed that Commander Mason had obtained this information solely from technical publications and did not know if or where this type of boom was currently in use. Commander Mason suggested that Mr. Paul Preus of Clean Water, Inc., a New Jersey oil spill control contractor, be contacted. Mr. Preus was contacted and stated that he did not believe the permanent boom arrangement proposed by Commander Mason to be practical for this installation.

   At this moment, consequently, Niagara Mohawk and Stone & Webster believe the recommended boom arrangement to be the best method available for handling oil spills in the Oswego harbor. They will, however, continue to evaluate new techniques for preventing and containing oil spills and will make necessary changes in their present spill prevention program to improve same as techniques are developed.

2. The sump in the pump house is furnished with a 100 gpm pump capable of handling oil contaminated water. A high level alarm is provided in the sump to warn the operator in the control room of a major oil leak in the pump house. It will be the operator's responsibility to isolate the leak in the pump house when it occurs. No oil contaminated water will be pumped into Gardinier Creek nor will it be allowed to run into the Creek.

3. Niagara Mohawk Power Corporation agrees to mark those underwater obstructions pursuant to the applicable rules and regulations of the Coast Guard.

4. Niagara Mohawk Power Corporation has contacted the City of Oswego and its consultant, Charles R. Velzy Associates, with reference to this inquiry. Based on investigations made by this firm, the waste will have no deleterious effects on the city sewage disposal system.

Genesee/Finger Lakes Regional Planning Board, Rochester, New York

Comment:

The Regional Planning Board expressed concern over the expansion of power generating capacity along Lake Ontario by several organizations and the resulting discharge of "vast" quantities of heated water into the lake. Further concern was described regarding the "crisis" atmosphere of the Niagara Mohawk proposal and the need for increased coordination with regard to environmental factors in plant siting. The Board expressed their willingness to discuss these concerns further.

Response:

On December 6, 1971, a meeting was held with the Genesee/Finger Lakes Regional Planning Board by representatives of Niagara Mohawk Power Corporation; their consultants, Quirk, Lawler and Matusky; and Rochester Gas and Electric Company to discuss the future siting of power plants along the Lake Ontario shoreline.

As a result of the meeting, Niagara Mohawk was authorized to notify the Corps of Engineers that the Board was satisfied with the proposed construction of Unit 5 at the Oswego Steam Station as described in the draft environmental statement. In addition to a full discussion of the plans for construction of Unit 5 at Oswego, Niagara Mohawk also informed the Regional Planning Board that they would discuss sitings of future generating stations with them at appropriate times in the future.

United States Department of the Interior, National Park Service, Philadelphia, Pennsylvania

Comment:

The National Park Service stated that the project will not directly affect any existing or proposed National Park Service Area or any registered or national historic landmark. However, it was suggested that contact be made with the State Liaison Officer for Historic Preservation.

Response:

Mr. Lewis C. Rubenstein of the New York State Historic Trust was contacted by letter by the District Engineer regarding the proposed Unit 5 at Oswego. Comments from the New York State Historic Trust and the response are summarized below.

Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Boston, Massachusetts

Comments:

1 The Bureau suggested that Section 1.1 - Power Demands and Projects - be deleted as it does not contribute to an understanding of the physical description of the project.

2. The Bureau requested that a paragraph be added to Section 2.9 - Aquatic Ecology, describing the commercial and sport fisheries of Lake Ontario including a statement on rare and endangered species.

3. The Bureau requested that a paragraph on Page 3-12 of the draft describing expected damage to fish eggs and larvae by passing same through the circulating water system be deleted. The paragraph would be replaced by a paragraph stating that long-term studies at operating power plants have not been conducted, but mortality of fish eggs and larvae is expected to be low.

Responses:

1. Section 1.1 - Power Demands and Projections - has not been deleted because this information has been requested by another governmental agency.

2. The revised paragraph suggested by the Bureau of Sport Fisheries and Wildlife has been added to page 2-29 of the statement including a comment that no rare and endangered species are found in these environs.

3. The revised paragraph suggested by the Bureau of Sport Fisheries and Wildlife has replaced the previous paragraph found on page 3-12 of the statement.

Central New York Regional Planning and Development Board, Syracuse, New York

Comment:

The Board stated that the typical sanitary landfill site is not satisfactory for disposal of slop water and contaminated sand resulting from the oil spill control procedures. It was suggested that Niagara Mohawk develop a different method of treating these wastes. The Board indicated this was not sufficient grounds to hold up the proposed construction but that an acceptable plan should be prepared prior to the first barge delivery of oil to the station.

Response:

Niagara Mohawk Power Corporation, as mentioned in the letter of the Central New York Regional Planning and Development Board, met with the Board and outlined its proposals. It was not the intention of the Niagara Mohawk representative to indicate that the existing plan for oil unloading was inadequate, but to assure the Board that Niagara Mohawk will constantly search for new means and methods of improving its unloading procedures to obtain the best results. Niagara Mohawk will meet with the Board prior to any oil deliveries to discuss progress in this area.

Niagara Mohawk offered the following further clarification of the proposed disposal method for oil contaminated sand and oil contaminated water. The oil contaminated sand will be disposed of in a dump area south of the City of Oswego. This area has previously been approved by the New York State Department of Environmental Conservation in accordance with permit No. 4-97-7-OS for disposal of dredged material from the west basin of the harbor. The Corps of Engineers has also approved of this area in its permit 070-0X2-1-050016 for disposal of this dredged material.

The dike, as described in the permit, encloses a fill area of approximately 100,000 cu yd capacity. The dike is about 20 ft high with 1 1/2 - 1 side slope and 10 to 15 ft wide at the top. It is constructed of silty clay material to minimize permeability and is coated on the inside face with 100/120 oil penetrant carried down below the bottom of the dike. This area has been prepared in this manner to eliminate leaching to adjoining lands.

The oil sand will be covered with clean fill material after placement in the disposal area. The pour point of the fuel oil which will be used at this site is 65-105 F, and since subsurface temperatures will be lower than these temperatures, the oil will not flow and will be permanently contained in the area. Should a feasible scheme be developed for recovery of oil from sand in the future, this scheme may be adopted.

Oil contaminated water will be pumped from slop barges to the fuel oil storage tanks. Connections will be furnished on the fuel oil fill line in the vicinity of the unloading facility for this purpose. The water will eventually settle to the bottom of the storage tank and then be removed through the water draw-off connection furnished on the tanks. This water will be drained to the sand beds furnished within the diked areas. The water will be visually inspected, and if it is free from oil, it may be pumped to Gardinier Creek or left to evaporate if the volume is small.

New York State Historic Trust, Albany, New York

Comment:

The New York State Historic Trust believe the proposed Unit 5 at Oswego will not directly damage any places of historic significance. They are concerned, however, that if there are valid possibilities of problems resulting from thermal impact on Lake Ontario or accidental oil spills then the plant could constitute a potential danger to Fort Ontario, a major state historic site.

Response:

The thermal discharge from the proposed Oswego Unit 5 will be in compliance with New York State thermal discharge regulations and criteria. Oil spill prevention procedures and cleanup procedures (if a spill should occur) will comply with all requirements of the U.S. Coast Guard.

State of New York, Department of Environmental Conservation, Albany, New York

Comments:

1. The Department believes that there should be no inference that there will be no impact on the fish and wildlife resources, although the potential effect could be either beneficial or detrimental. They have therefore suggested that the last two sentences of the last paragraph on page 3-13 of the draft statement be deleted.

2. The Department noted that approximately 1 1/2 acres of Lake Ontario would be lost and requested that the need for this preemption should be better explained.

3. The Department indicated that the lower Oswego River estuary is a wintering ground for a fair number of waterfowl. They requested that concern be mentioned regarding the danger of even minor oil spills to waterfowl population in the winter months.

4. The Department pointed out that one of the most important considerations in this report is the long-term and cumulative effects of thermal discharges on the lake. They requested that any concern given these matters should be noted.

Response:

1. The two sentences described by the Department of Environmental Conservation have been deleted from the final statement.

2. The shore protection sea wall is required to prevent continuing erosion of the shoreline and provide sufficient distance between the lake shore and building to prevent ice and wave damage to the structures and also provide suitable access at the lake side of the plant in wintertime.

   The proposed sea wall will be about 850 ft long, located at varying distances out from the existing shoreline, with a maximum distance of 100 ft. The sequence of construction will consist of building a dike along the outboard side, using rock spoil from the tunnel excavation, to approximately El. 251.8 ft. The lakeside slope will be protected with a 3 ft depth of well graded riprap, extending above the slope to El. 256.8 ft, with a 6 ft wide berm at the top. Riprap will be 24 in. average size, with a maximum of 36 in., sized to one inch spalls, to minimize leaching and possible turbulence. Tunnel spoil will then be placed behind the dike to the existing shoreline.

3. It is recognized that oil spills could adversely affect the aquatic biota including waterfowl. In recognition of this, the fuel oil unloading procedure and contingency plans described in the Environmental Statement were developed.

4. The cumulative effect of the proposed unit on Lake Ontario was considered in the design of the station. The thermal studies indicate that this unit's discharge will not have any significant net thermal effect on the lake.

Federal Aviation Administration, Jamaica, New York

Comment:

The Administration found no environmental impact from an aeronautical point of view, but indicated they will conduct a study of the notice of the proposed construction of the 700 foot stack to determine its effect on aeronautical operation.

Responses:

Niagara Mohawk Power Corporation recognizes the requirement of forwarding to the FAA a notice of proposed construction of the stack associated with Unit 5 of the Oswego Steam Station. They will cooperate with the FAA in its study to determine the effect of the stack on aeronautical operations and will comply with all legal requirements associated with the construction of the stack and the obstruction marking and lighting thereof.

Environmental Protection Agency, New York, New York

Comment:

The Agency emphasized that air and water quality standards were in a state of evaluation toward more stringent standards and suggested that the applicant be urged to design not to just meet existing standards, but to employ the best available technology in an effort to minimize the potential impact of the proposed project on the environment.

Response:

Niagara Mohawk Power Corporation recognizes the existence of a state of evolution with respect to air and water quality standards and will construct and operate this plant in accordance with applicable legal requirements.

8.3 CITIZEN GROUPS

Reference is hereby made to Section 8.1, above, wherein citizens' groups contacted are listed.

8.4 CORRESPONDENCE

Copies of all correspondence received in regard to the draft Environmental Statement are included following Item 8.5.

8.5 UNRECONCILED CONFLICTS

There are no unreconciled comments.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (oil)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199

5922
Ser.(oil) 126-71
26 October 1971

Department of the Army
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Gentlemen:

In reference to your Environmental Statement on the Oswego Steam Station--Unit 5 of the Niagara Mohawk Power Corporation, I have reviewed the draft and have found four areas of concern to the Coast Guard.

The first area of concern to me is the use of a foam filled Slick-Bar type boom to contain the oil in the event of an oil spill. The type of boom mentioned in your report is a temporary type boom for use after a spill has occurred. I would propose a permanent type boom arrangement which runs on a track. This type of arrangement is being used at many of the newer off-loading terminals. The boom could be lowered to allow barges to enter and leave the dock area. When off-loading operations were commenced, the permanent boom could be raised to contain any spill which might occur. If the boom was installed in the proposed location, the containment of oil spills would be very effective.

Another area of concern to me is the location of the pump houses. Since the pump houses have to be outside the diked areas, because of the chance of explosion, there has to be adequate facilities to handle any spill which may occur at the pump house. Fig. 1.2-8 shows that the pump houses are equipped with sumps. My only concern is if the sumps are large enough to handle a spill at this location. This is of concern to me because the pump house is located at the edge of Gardiner Creek. If the sumps are not large enough to pump the oil into the diked areas, a spill into the creek could occur.

The third area concerns the intake and discharge structures. As stated in your report, these structures will be able to meet our requirements for underwater obstructions. It is important that these obstructions be marked, as you propose in your draft.

The last area of concern is the use of the city sewer system for disposal of your chemical wastes. My only concern here is if the city sewer system will be able to handle the increased burden of these chemical wastes.

In closing, except for the potential oil spill hazard, which is always present in off-loading and handling of oil and fuel, I see no other areas of concern to the Coast Guard. The fact that a Contingency Plan for oil spills is being prepared, indicates that the company is well aware of the potential hazard present.

Sincerely,

W.E. MASON
Commander, U.S. Coast Guard
Chief, Intelligence and Law
Enforcement Branch
By direction of Commander,
Ninth Coast Guard District

Encl: (1) Environmental Impact Statement for the Niagara Mohawk Power Corporation

FORM FHWA-121A (REV. 4-70)

UNITED STATES GOVERNMENT

Memorandum

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

TO : Mr. Joseph G. Weinrub, Acting Chief
Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

DATE: October 27, 1971

In reply refer to:
01-30.4C

FROM : Robert E. Kirby
Division Engineer
Albany, New York

SUBJECT: New York - Environmental Impact Statement Review
Oswego Steam Generating Station Unit 5
Oswego Harbor
(RE: Your letter dated October 14)

We have reviewed your October 14 draft environmental impact statement prepared for the proposed Oswego Steam Generating Station Unit 5, Oswego Harbor, New York. We have no comments on your submission.

For The

FILE COPY
Checked by
Filed by

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
FEDERAL BUILDING
14 ELM STREET
GLOUCESTER, MASSACHUSETTS 01930

October 29, 1971

Mr. Joseph G. Weinrub
Acting Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Weinrub:

We have reviewed the draft environmental statement relative to the application by Niagara Mohawk Power Corporation for permit to construct intake and discharge facilities for Oswego Steam Generating Station Unit 5, Oswego Harbor, New York.

We do not at this time have any comments to offer relative to the environmental statement or other aspects of the subject application.

Sincerely yours,

Russell T. Norris
Regional Director

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
FEDERAL BUILDING
1421 CHERRY STREET
PHILADELPHIA, PENNSYLVANIA 19102

IN REPLY REFER TO:

River Basin Studies
Reg. Supvr.
Asso. Reg. Supvr.
Clerk-Steno (1) (2)
Files

NOV 1 1971

Memorandum

To: Regional Director, Bureau of Sport Fisheries and Wildlife, Boston, Massachusetts

From: Regional Director, Bureau of Outdoor Recreation

Subject: Draft Environmental Impact Statement - Niagara Mohawk Power Corporation - Construct Intake and Discharge Facilities for Oswego Steam Generating Station Unit 5, Oswego Harbor, New York

This memorandum is in response to a request made on October 14, 1971 by the Buffalo District Corps of Engineers for our review and comment on the subject material.

A review of the draft environmental statement was conducted and found to be in accord with the requirements set forth in the Environmental Policy Act of 1969. Therefore, we have no additional comments to make and recommend that the statement be accepted.

Rolland B. Handley

By: George W. Davis

RECEIVED
NOV 4 1971
R. B. S.

GENESEE/FINGER LAKES REGIONAL PLANNING BOARD
Suite 500, Ebenezer Watts Building, 47 Fitzhugh Street South, Rochester, New York 14
716-232-1060

November 9, 1971

Mr. Joseph G. Weinrub
Acting Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Re: Environmental Statement
Oswego Steam Station - Unit 5

Dear Mr. Weinrub:

The Genesee/Finger Lakes Regional Planning Board has completed its review of the draft environmental impact statement prepared by the U. S. Army Corps of Engineers relative to the proposal to construct intake and discharge facilities for Oswego Steam Generating Station Unit 5, Oswego Harbor, New York. It is apparent from our review that a considerable amount of work has gone into the evaluation report and the Corps is to be commended for a very thorough and complete investigation and analysis.

I would like to take this opportunity to say that we appreciate the chance to review and comment upon this proposal. Although the proposed plant is thirteen miles east of the region's eastern border, the plant, its environmental impact and the "crisis" nature in which decisions are to be made have considerable relevance to the Genesee/Finger Lakes Region.

Within our region two power plants presently discharge heated effluent to Lake Ontario: Russell Station coal fired plant in Greece, and the Ginna Nuclear Power Plant in Ontario, Wayne County, both operated by Rochester Gas & Electric Corp. A test breeder reactor nuclear power plant is presently being considered for the lakeshore in Orleans County.

Outside, but close to the borders of this region on Lake Ontario are: two nuclear power plants at Nine-mile Point, east of Oswego; a proposal by Rochester Gas & Electric Corp., to build a plant in Sterling, Cayuga County, probably nuclear; and a proposal by New York State Electric & Gas Co., to build a nuclear power plant in Niagara County, immediately west of this region.

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All of these plants, existing and proposed, nuclear or conventional, are much bigger than existing coal fired plants and so use and discharge vast quantities of heated water into Lake Ontario. The power companies have coordinated their planning for future power generation in terms of demand for electricity as members of the State Power Pool.

New York State Atomic and Space Development Authority (NYSASDA) has undertaken a statewide survey to locate suitable sites for future power plants, nuclear in particular. Its survey committee has identified the New York shore of Lake Ontario - ninety miles of which is an integral part of this region - as a prime area for future consideration for power plants.

The "crisis" atmosphere in which this Niagara Mohawk Power Company Unit 5 proposal is being made indicates to us that there has been a lack of communication and coordination between the power companies and power pool planners on the one hand and the NYSASDA Power Plant siting committee on the other hand, which considers the environmental factors in plant siting in relation to the state's power needs. The work and conclusions of this siting committee, especially their concerns for the environmental impact of power plants, must be made known at the earliest possible opportunity to the power pool and power company technical planners. The Genesee/Finger Lakes Regional Planning Board as well as every other unit of government concerned with this question, cannot make rational long-term decisions when the power plant proposals are being presented, as this Niagara Mohawk Power Company proposal is, in a "crisis" atmosphere. Unit 5 is being presented as a single project and on the face of it, it appears a lot of hard work and thinking in terms of environmental impact has been done. The time has come, however, when the environmental impact of a plant cannot be evaluated singly, but must be considered within the total environmental context.

We need answers to one question in particular: How many power plants can be safely sited on the shores of Lake Ontario? This "crisis" decision-making without adequate knowledge of the total environmental picture for the lake basin is not the most appropriate manner in which society can make rational decisions.

November 9, 1971

Mr. Joseph A. Weinrub

continued

The Genesee/Finger Lakes Regional Planning Board is presently undertaking a study of the Lake Ontario Shoreline in this region, addressing itself particularly to the environmental opportunities and problems. As this stretch of shoreline has been picked as a prime site for future power plants, and in view of the above concerns for the way decisions on the siting of power plants in presently being made, the Regional Planning Board urges much closer coordination of thinking on the plant siting environment issue and a speedy end to the "crisis" approach to this vital regional, state and National issue.

We would welcome the opportunity to discuss our concerns relative to the siting of power plants along the Lake Ontario Shoreline with you at your convenience.

Very truly yours,

Stuart O. Denslow
Executive Director

SOD:SIB:de

United States Department of the Interior
NATIONAL PARK SERVICE
NORTHEAST REGION
143 SOUTH THIRD STREET
PHILADELPHIA, PA. 19106

IN REPLY REFER TO:

L7423
NER(CP)

November 19, 1971

Mr. Joseph G. Weinrub
Acting Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Weinrub:

The opportunity to review the draft Environmental Statement - Oswego Steam Station - Unit 5, Niagara Mohawk Power Corporation is sincerely appreciated.

I regret that the press of other business prevented a more prompt reply to your communication of October 14, 1971.

The project will not directly affect any existing or proposed National Park Service areas. It likewise does not impinge adversely or any Registered or National Historic Landmark.

However, I do note that the project is located in an area of considerable historic significance, and for this reason I suggest that your final Environmental Statement reflect evidence of consultation with the State Liaison Officer for Historic Preservation.

Sincerely yours,

Harold I. Lessem
Federal Liaison, Division of
Federal, State & Private Assistance

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

4

District Engineer
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

Reference is made to Mr. Weinrub's letter of October 14, 1971, requesting our comments on a draft of the Environmental Impact Statement prepared by the Niagara Mohawk Power Corporation, in support of its application to construct intake and discharge facilities for the Oswego Steam Station, Unit #5, Lake Ontario, Oswego Harbor, New York. We offer the following comments for your consideration:

1. Project Description

Delete Section 1.1 — Power Demands and Projections — as it does not contribute to an understanding of the physical description of the project. The information in Section 1.1 is covered later in the Statement under the heading "Alternatives to the Proposed Action".

2. Environmental Setting Without-the-Project

Section 2.9 — Aquatic Ecology — Add the following: "Lake Ontario supports commercial and sport fisheries of considerable magnitude. Whitefish, carp, bullhead, yellow perch, rainbow smelt, American eel, sunfish, and walleye dominate the commercial landings. Smallmouth bass, yellow perch, walleye, bullhead, northern pike, and coho salmon are the principal sport fishes, although other species are present in the Lake." A statement concerning the presence or absence of rare and endangered species should also be included in this section.

3a. Identify "The Environmental Impact of the Proposed Action"

Pages 3-12: Delete third paragraph commenting on damage to fish eggs and larvae by passage through the circulating water

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system. In its place, add: "Despite many detailed model studies of mortality to fish eggs and larvae by passage through condenser cooling-water systems, no long-term studies have been accomplished at operating power plants; thus, the extent of mortality cannot be predicted at this time, although it is expected to be low."

3b. Identify "Any Adverse Environmental Effects which cannot be Avoided Should the Proposal be Implemented"

No comment.

3c. Identify "Alternatives to the Proposed Action"

No comment.

3d. Discuss "The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity"

No comment.

3e. Identify "Any Irreversible or Irretrievable Commitments of Resources which would be Involved in the Proposed Action Should it be Implemented"

No comment.

We would appreciate receiving a copy of your statement in the form in which it is forwarded to higher authority.

Thank you for the opportunity to comment on the draft of the environmental statement.

Sincerely yours,

Richard E. Griffith

Regional Director

P.S. Attached is a review letter from the Bureau of Outdoor Recreation, which was inadvertently sent to this office.

CENTRAL NEW YORK REGIONAL PLANNING AND DEVELOPMENT BOARD
321 East Water Street Syracuse, New York 13202 315-422-8276 Robert C. Morris, Executive Director

24 November 1971

Mr. Joseph G. Weinrub
Acting Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Weinrub:

The Central New York Regional Planning and Development Board has completed its review of the draft Environmental Statement relating to Oswego Stream Station Unit 5, and prepared by the U.S. Army District Engineer, Buffalo, New York (NCBED-PB). In the course of our review, this Board arranged and conducted a meeting attended by representatives of the Oswego County Planning Board and Niagara-Mohawk Power Corporation.

Though no conflicts or unresolved issues emerged regarding the Lake Ontario water intake and discharge, there was agreement at the meeting that additional contingency measures will be necessary for possible oil spills and leaks, described in section 3.6 of the report. The report indicates that both slop water and oil-contaminated sand, by-products of controlling oil spills and leaks, would be disposed of "...at the sanitary landfill site or other acceptable location." The typical sanitary landfill lacks adequate leachate controls for oil-related wastes, and should not accept wastes of this nature. It will therefore be necessary to find or devise other methods for disposing of the contaminants in the slop water and sand.

This Board suggested that Niagara-Mohawk investigate this matter more thoroughly and develop a different method of treating the slop water and contaminated sand. Their representatives agreed that the solution presented in the draft report was inadequate and assured us that Niagara-Mohawk would develop and present an acceptable engineering solution.

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We do not think this matter is sufficient grounds for holding up the proposed construction and conversion of the Oswego Stream Station. However, we do think that Niagara Mohawk should prepare an oil spill and leak strategy acceptable to this Board and to the New York State Department of Environmental Conservation prior to the first barge delivery of oil to the station.

With this one condition we review the Environmental Statement favorably, and at this time have no other objections to the environmental aspects of the proposal.

Sincerely,

Robert C. Morris, AIP
Executive Director

RCM:rl

cc: Robert C. Hansen, Director, Office of Planning Services, District Office
Alman J. Hawkins, Director, Oswego County Planning Board
Richard Clancy, Niagara-Mohawk Power Co.

NEW YORK STATE HISTORIC TRUST
PARKS AND RECREATION • STATE OFFICE CAMPUS • ALBANY, NEW YORK 12226 • 518-457-4194

December 2, 1971

Major Richard J. Barrett
Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Major Barrett: NCBED-PB

In reply to your recent letter to Mr. Lewis C. Rubenstein about the Draft Environmental Statement Oswego Steam - Unit 5, I am pleased to respond in behalf of the State Liaison Officer for Historic Preservation, the Chairman of the New York State Historic Trust, Dr. Louis C. Jones.

According to information available at present, the New York State Historic Trust thinks this addition to the Power Plant at Oswego will not directly damage any places of historic significance. The question, however, has been raised about the possible harmful effects on Fort Ontario, a major State Historic Site under the jurisdiction of the New York State Historic Trust, of problems resulting from the operation of the plant -- such as its thermal impact on Lake Ontario and of the defilement of the lake by accidental oil spillage. If, indeed, these are valid possibilities, then the plant could constitute a potential danger to the historic site.

Sincerely,

Mark Lawton,
Director

ML:ve

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

EASTERN REGION
FEDERAL BUILDING
JOHN F. KENNEDY INTERNATIONAL AIRPORT
JAMAICA, NEW YORK 1143C

FEDERAL AVIATION ADMINISTRATION

DATE: 7 December 1971

IN REPLY REFER TO: EA-4

SUBJECT: Environmental Impact Statement - Niagara Mohawk Power Corp., Oswego Steam Generating Station Unit 5, Oswego Harbor, N.Y.; your letter NCBED-PB, dated 10/14/71, to EA-530

TO:

Mr. Joseph C. Weinrub
Acting Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

We have reviewed the environmental impact statement for the subject project and find no environmental impact from an aeronautical point of view.

It is our understanding that the company will be forwarding a notice of proposed construction for the 700 foot stack associated with the plant. Upon receipt of the notice we will conduct a study under Federal Aviation Regulations Part 77, to determine the effect of the stack on aeronautical operations. If the stack is constructed we expect it to be obstruction marked and lighted in accordance with applicable FAA standards.

Martin Gach

MARTIN GACH
Noise Abatement and
Environmental Liaison Officer

RONALD W. PEDERSEN
FIRST DEPUTY COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
ALBANY

December 10, 1971

Dear Mr. Weinrub:

We have been in contact with Mr. Skelly of Quirk, Lawler, and Matusky Engineers, regarding comments forwarded you on November 29, 1971 on the Summary Environmental Report for the Niagara Mohawk Power Corporation's proposed Oswego Steam Station Unit 5.

The additional time has enabled us to more completely review the Draft Environmental Statement itself, and conferring with the consulting engineers has made it possible to resolve most of the questions we had regarding the Summary Report. The attached comments, therefore, should be considered as representative of our areas of concern on the Draft Environmental Statement.

Sincerely,

Ronald W. Pedersen

Enclosure

Mr. Joseph G. Weinrub
Acting Chief, Engineering Division
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Comments by the N. Y. S. Department of Environmental Conservation on the Summary Environmental Report for the Niagara Mohawk Oswego Steam Station No. 5.

1. The Oswego River, and surrounding area is of major importance, at least seasonally, to many species including smelt, alewives, walleye, yellow perch, bass, and others.

The inference that there is not an obvious or subtle potential problem or asset to the fish and wildlife resources from additional thermal discharges to the lake should not be made. In this particular operation the benefits to the fishery may outweigh the detriments. Unit 5 may attract salmonids in the winter and spring and provide a new sport fishing area. There will most likely be an effect either beneficial or adverse to the salmonids. We, therefore, suggest that the last two sentences of the last paragraph on page 3-13 be deleted.

2. It is noted, that preemption of about 1 1/2 acres of the lake is contemplated. This is to be constructed of excavated rock and fill. The rocks may provide some hiding places for fish, probably at the expense of shallow water food production. The need for this preemption in preference to a seawall at the present shoreline should be better explained.

3. In the summary there is no mention of waterfowl. The lower Oswego River and estuary is a wintering ground for a fair number of waterfowl, primarily diving duck species such as scaup and whistlers. The addition of Unit 5 may change the value of the area as a waterfowl wintering ground. One concern should be mentioned - the danger of even minor oil spills to the waterfowl population in the winter months.

4. One of the most important considerations in this Report should have been the long term and cumulative effects of thermal discharges on the lake. It is difficult to dtermine the point at which the lake will suffer disasterous effects from the addition of "one more thermal discharge." While this particular project may have little or no adverse environmental effects, future plants and the environmental statements prepared for them should carefully assess the possibility that the tolerability of the lake to maintain its natural balance will be exceeded. Any concerns given these matters should be noted, preferably as an introduction. Other related studies might also be noted at that point.

ENVIRONMENTAL PROTECTION AGENCY
Region II
26 Federal Plaza
New York, New York 10007

December 10, 1971

Colonel Ray L. Hansen
District Engineer
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

ATTENTION: Mr. Eugene Richards

Dear Colonel Hansen:

Under cover of your letter of October 19, 1971, EPA received a draft Environmental Impact Statement (EIS) for the Niagara Mohawk Power Corporation's proposed Oswego Steam Station, Unit No. 5.

We have completed review of the subject EIS and associated correspondence received from the applicant in connection with the project. In particular our evaluations were directed toward potential impact of the project on air and water quality and the possibility of spillage of oil during transfer operations. Evaluation of the oil spill prevention features at the proposed project, together with the facilities for combating possible accidental oil spills showed them to be adequate. Calculations of the effects of Unit 5 on air quality indicated that the facility would meet National Primary and Secondary Air Quality Standards. Likewise, it was determined that water quality standards would not be contravened by the proposed method of discharging once through cooling water.

Our evaluation as to whether or not the thermal discharge would not violate presently approved thermal criteria was based upon the existing Federally-approved New York State criteria, as well as the more stringent revised New York State thermal criteria.

With regard to air and water quality in particular, I want to emphasize that we are in a state of evolution toward more stringent standards in both of these areas. This has been demonstrated by recent legislation which set forth National Primary and Secondary Air Quality Standards and New Source Performance Standards. Also, it should be recognized that in other areas of the Great Lakes restrictions have been placed on thermal discharges, with closed cycle cooling now a requirement.

Considering these changes, the applicant should be urged not to design toward just meeting the standards, but rather to employ the best available technology in an effort to minimize the potential impact of the proposed project on the environment, and also so that he will not be faced with modifying these facilities at some future date, given changes in air and water quality conditions and/or revisions in standards. Finally, the applicant should also be informed that project approval provided herein does not preclude the necessity of obtaining Corps of Engineers Section 13 permits for this facility.

Thank you for the opportunity to comment.

Sincerely,

Gerald M. Hansler, P.E.
Regional Administrator

APPENDIX A

TECHNICAL APPROACH TO AMBIENT AIR QUALITY ANALYSIS

DIFFUSION MODEL

To evaluate the air quality effects of sulfur dioxide, nitrogen oxides and particulates from the Oswego Steam Station, a Gaussian dispersion model was used. This model, based on Pasquill's dispersion theory is explained below.

A computer program used the Gaussian dispersion model to calculate ground level concentrations of a contaminant at points surrounding the source for various meteorological conditions. The statistical occurrence of these meteorological conditions was determined from historical weather data measured near the power plant site. The weather data and concentration information were combined and resulted in the frequency of occurrence of contaminant concentrations at many distances and directions surrounding the plant. These concentration occurrence data were grouped to give predictions of annual average concentrations, the number of hours a given concentration is expected to be exceeded in a year and the maximum expected hourly and daily concentrations of a contaminant.

When the concentrations from the power plant were calculated, the effect of plume rise was taken into account. In this analysis of the Oswego Steam Station, the CONCAWE plume rise equation was used. This equation and its application are explained further below.

The computer-calculated contaminant concentrations were multiplied by a sampling correction factor of 0.7. This allowed Pasquill's stability classes, which are based on ten minute sampling periods, to be used to estimate hourly concentrations. This correction factor is explained by D. B. Turner in "Workbook of Atmospheric Dispersion Estimates" (Ref. 30).

It is recognized that plant operations vary continually and that these variations cause changes in the quantity of materials emitted. To account for this, average load factors were estimated for weekday, weeknight and weekend operation. These load factors were based on the weighted expected average loadings of each power plant unit and are listed below.

AVERAGE LOAD FACTORS

Unit	Day, %	Night, %	Weekend, %
1	100	50	50
2	100	50	50
3	100	50	50
4	100	67	67
5	100	70	70

Weather data for the site of the Oswego Steam Station were obtained from an instrumented tower which was operative during 1963-1964 at Nine Mile Point, eight miles northeast of the plant. The weather tower recorded wind speeds, directions, and fluctuations. Stability classes, wind speeds and directions for each hour of the weather record were determined from these data. Two years of weather data were divided into weekday, weeknight and weekend periods to allow for consideration of changes in plant operation during these times.

The weather conditions at Nine Mile Point are considered representative of those at the Oswego Steam Station because these two locations are separated by only eight miles. The locations of the power plant and the meteorological tower are shown in Fig. A-1.

Even though instantaneous differences in meteorological parameters are probably common, the similar exposures of both locations to Lake Ontario make it likely that both the average conditions and the occurrence of all types of weather events will be the same at both locations.

CALCULATION OF GROUND LEVEL CONCENTRATION OF STACK EFFLUENTS

Gaussian diffusion equations have been widely used to estimate the spread of gas plumes from single stationary sources. These equations are based on the assumption that the gas concentration distribution within a plume is Gaussian or normal in both the vertical and horizontal directions at all distances downwind from a source. Ground level concentrations of a gas may then be calculated using the following general equation:

$$C = \frac{Q}{\pi u \sigma_z \sigma_y} \cdot \exp - \frac{1}{2} \frac{H^2}{\sigma_z^2} \cdot \exp - \frac{1}{2} \frac{Y^2}{\sigma_y^2}$$

where:

C is the concentration at ground level, assuming that the plume is completely reflected at the earth's surface

Q is the source strength

u is the mean wind speed which affects the plume

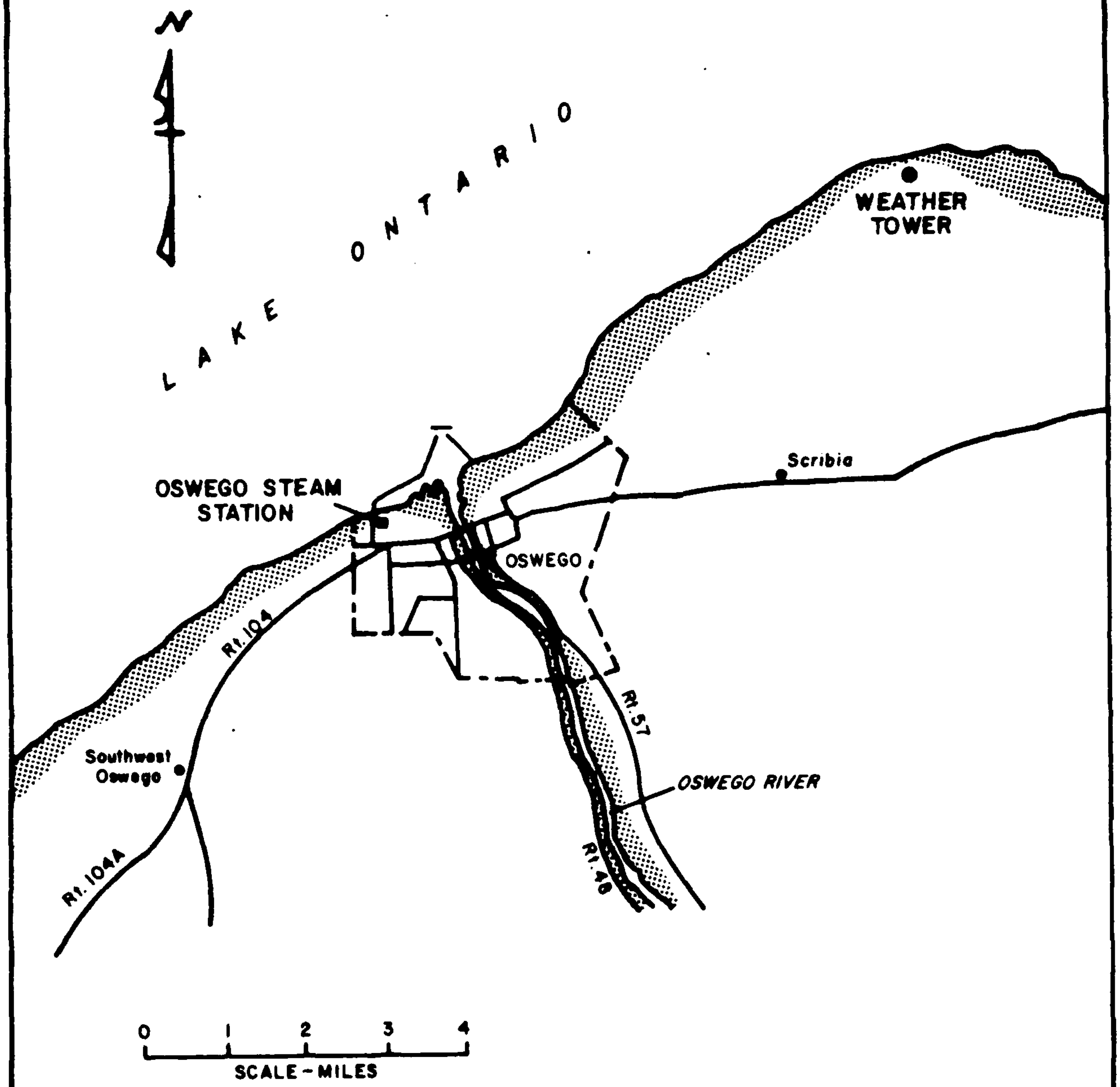

FIG. A-1

LOCATION OF THE INSTRUMENTED WEATHER TOWER

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION

H is the effective height of emission

Y is the crosswind distance from the plume centerline

Δz and Δy are the standard deviations of plume concentration distribution in the vertical and horizontal directions, respectively, and are functions of downwind distance from the source X.

Various methods for establishing values for Δz and Δy have been published. Of these the three most widely known are Bosanquet and Pearson (Ref. 31), Sutton (Ref. 32), and Hay and Pasquill (Ref. 33). Values for Δz and Δy, determined by Hay and Pasquill, are based on the statistical measurement of angular wind fluctuations and are readily related to atmospheric diffusion processes.

Pasquill (Ref. 34) introduced a simplifed method of determining angular wind fluctuations, hence plume dispersion, from weather parameters measured during Project Prairie Grass (Cramer et al, 1958) (Ref. 35). Gifford (Ref. 36, 37, 38) has transformed Pasquill's method of measuring angular parameters of wind fluctuation into vertical and horizontal standard deviations of plume gas concentration distribution.

The Gaussian diffusion equation, with values for Δz and Δy based on wind fluctuations, is the basis for the computer analysis of dispersion from the Oswego Steam Station.

ATMOSPHERIC STABILITY

Values of both Δz and Δy of the Gaussian dispersion equation depend on the turbulent structure of the atmosphere. These values can be determined from direct measurements using a bivane to record horizontal and vertical wind fluctuations. This method is explained by Davidson and Halitsky (Ref. 39).

If wind fluctuation measurements are not available, values for Δz and Δy may be estimated from predetermined curves relating Δz and Δy to downwind distance. These curves are given in D. B. Turner's "Workbook of Atmospheric Dispersion Estimates" (Ref. 30). Each of these curves is related to a weather stability class defined by Pasquill (Ref. 34) on the basis of insolation, cloud cover and wind speed measured at ten meters. In this way values of Δz and Δy can be estimated based on few observations.

The weather stability classes have also been related to atmospheric temperature gradients by Singer and Smith (Ref. 40).

PLUME RISE

Many procedures have been developed for estimating the rise of gas plumes. Some are entirely empirical in their development, while others are based on theoretical analyses with subsequent modification resulting from experimental information. Over the past 15 years, the improved capability for estimating plume rise has resulted in more accurate and confident assessments of diffusion problems. At present, all of the plume rise equations have been postulated for isolated stacks in an atmosphere with motion uncomplicated by obstructions, i.e., buildings or topographical features.

In 1963, the Tennessee Valley Authority, under the sponsorship of the Public Health Service, initiated a plume rise study at six of their electric generating stations. The purpose of this study was to determine and compile plume rise observations from these plants under a wide variety of operational and meteorological conditions. These observations were later correlated with postulated plume rise formulas to determine the most appropriate equation for a generalized dispersion study (Ref. 41).

From this study TVA concluded that several formulas can be used effectively to estimate the rise of gas plumes. These formulas were optimized by regression analysis to best fit TVA data. The CONCAWE and Csanady equations, along with the "2/3 Power Law" relation, were selected as the three best equations. The CONCAWE equation was considered preferable for most general investigations since it correlated well with both TVA and European data. The Holland equation, developed for small units (less than 200 Mw) at Oak Ridge and Watts Bar (two small TVA plants), was found to be in good agreement with observed data at other TVA plants, but tended to slightly underestimate the plume rise. The "2/3 Power Law" is currently being used by the TVA for estimating plume rise. This equation, along with the Csanady equation, requires a value for the temperature structure of the atmosphere. Since this information is not readily available from most of the sources of weather data, i.e., airports, the "2/3 Power Law" and the Csanady equation find limited use in a generalized dispersion study.

Stone & Webster Engineering Corporation has also conducted a study to determine the most realistic and conservative plume rise equation to be used for this analysis. It was concluded that several semi-empirical plume rise formulas were derived from observations of small sources and that these equations give erroneous results when extrapolated beyond this range. For example, the Holland equation tends to underestimate plume rise in some cases and overestimate in others when compared to the CONCAWE equation.

The selection of a plume rise equation for a dispersion study is dependent on many variables, e.g., unit size, exit velocity and meteorological parameters, and the CONCAWE equation, used for dispersion analysis for the Oswego Steam Station, has the widest application.

The CONCAWE equation, optimized to fit TVA data, is as follows:

$$h = 0.414 \frac{Q_h^{0.444}}{u^{0.694}}$$

where:

Q_h = (calories per second) heat emission from the stack
u = (meters per second) is the mean horizontal wind speed

DOWNWASH

When stack gas exit velocity is lower than 1.5 times the wind speed, whether due to low load or high winds, a condition of downwash exists. In such a case, stack gases do not rise (hence plume rise formulas are inapplicable); instead, they extend levelly from the stack top or flow partially down the sides of the stack. Once the stack exit velocity is less than 1.5 times the wind speed(Ref. 42), the probability of downwash occurrence is high. The analysis of stack dispersion from the Oswego Steam Station incorporated this cutoff number as the point beyond which plume rise is set equal to zero.

INVERSIONS

Low level inversions have often been associated with increased levels of air contamination. This problem results from the trapping of emissions from low level sources beneath the stable air layer. When a tall stack discharges gases at an elevated temperature, the plume rises above a majority of inversion lids, and ground level effects of these emissions do not increase. Infrequent high level inversions in Oswego are not expected to cause increased concentrations except under very unusual combinations of meteorological conditions. Emergency emission controls will be effective in minimizing ground level contaminant concentrations during these periods of high air pollution potential.

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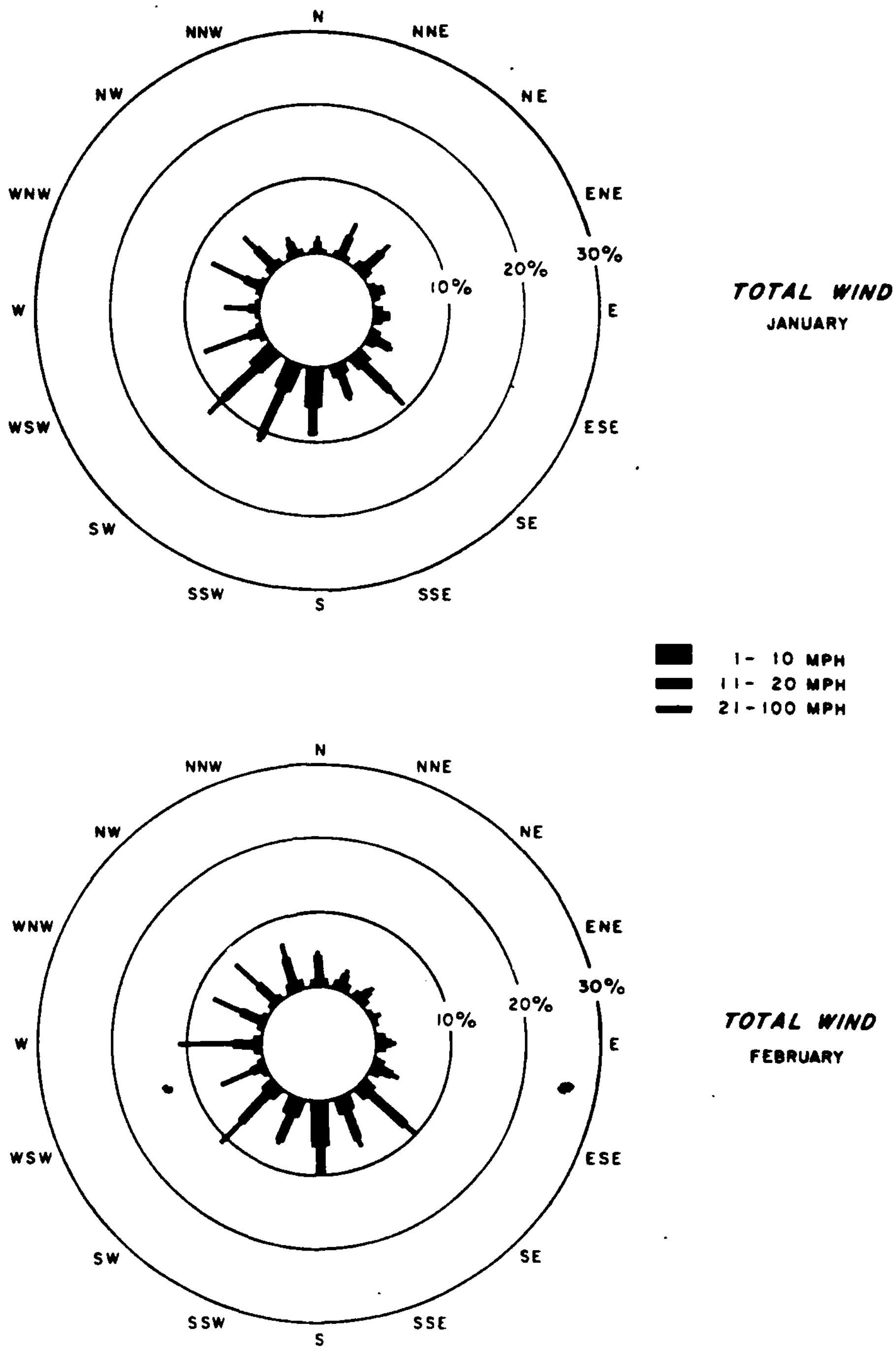
12000-312:1

APPENDIX B

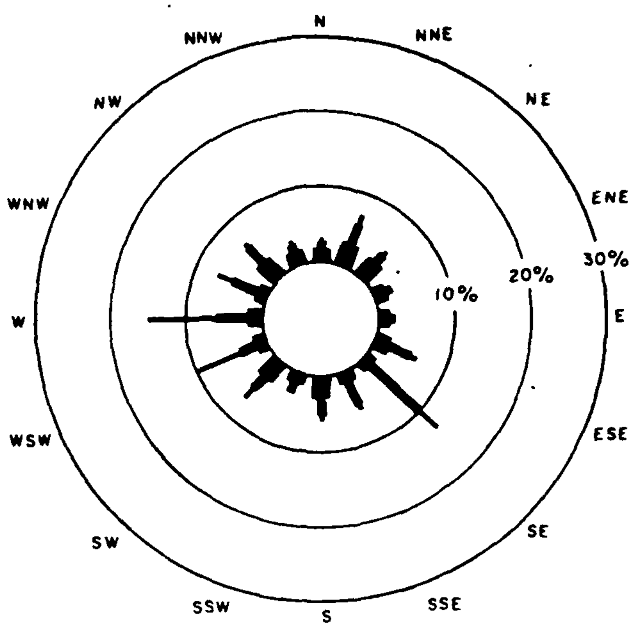
METEOROLOGICAL DATA SUMMARIES
NINE MILE POINT TOWER

AVERAGE WIND ROSES (6 Pages)
AVERAGE DIURNAL LAPSE RATES (6 Pages)



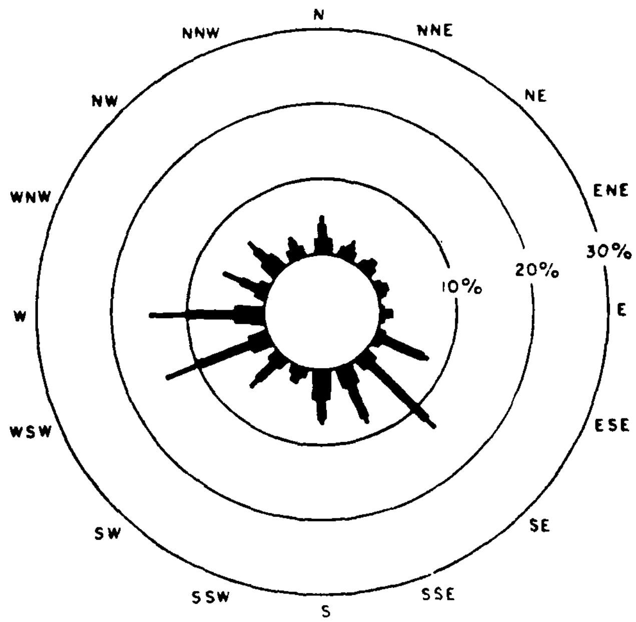
NOTE:
NINE MILE POINT WEATHER DATA

FIG. B-1
AVERAGE WIND ROSES
JANUARY & FEBRUARY 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



TOTAL WIND
MARCH

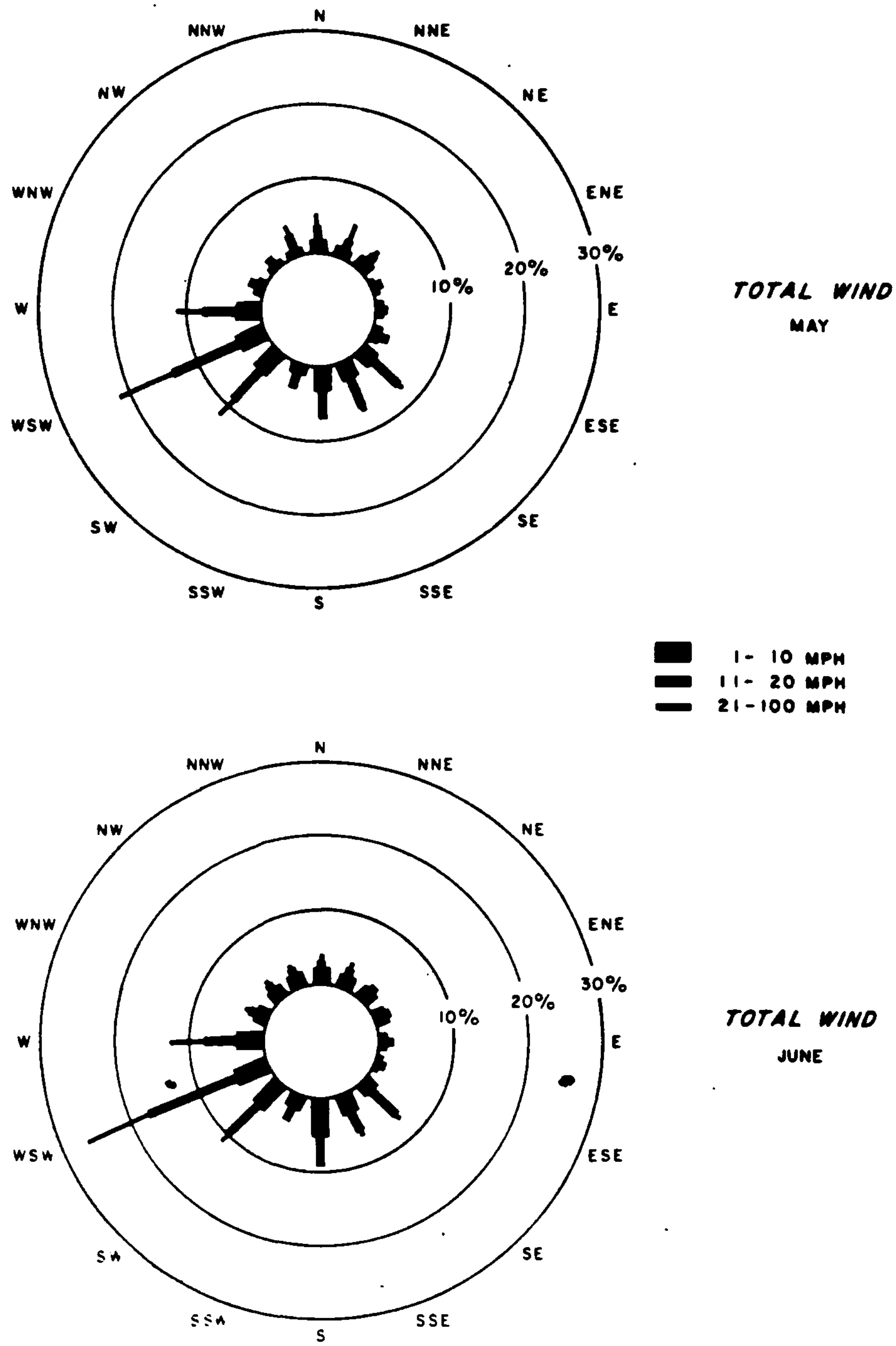
1- 10 MPH
11- 20 MPH
21-100 MPH



TOTAL WIND
APRIL

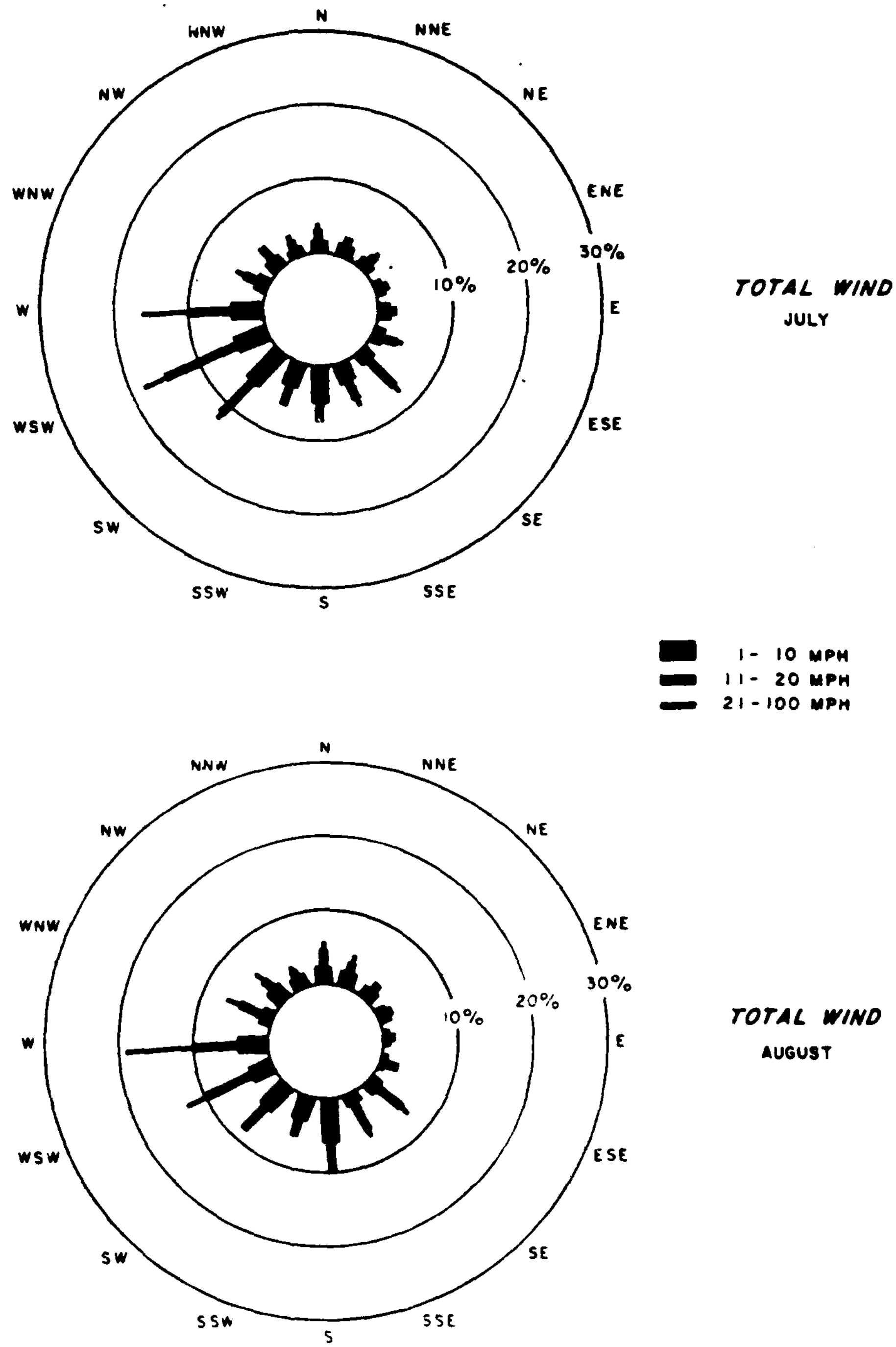
FIG B-2
AVERAGE WIND ROSES
MARCH & APRIL 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION

NOTE:
NINE MILE POINT WEATHER DATA



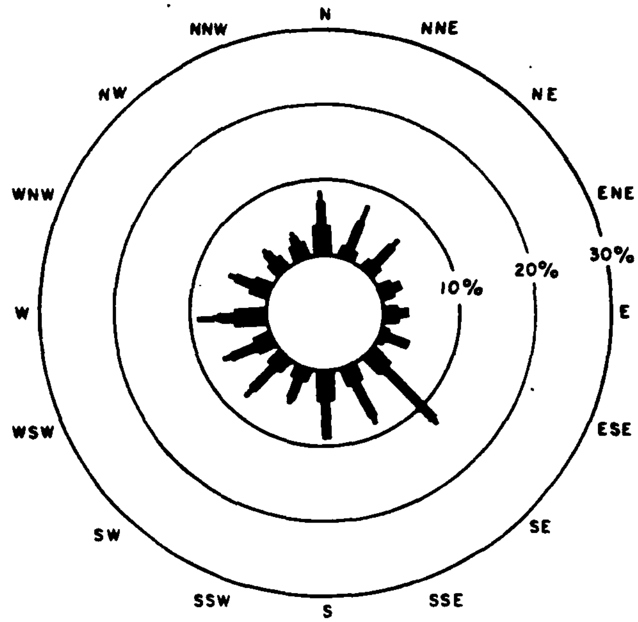
NOTE:
NINE MILE POINT WEATHER DATA

FIG. B-3
AVERAGE WIND ROSES
MAY & JUNE 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



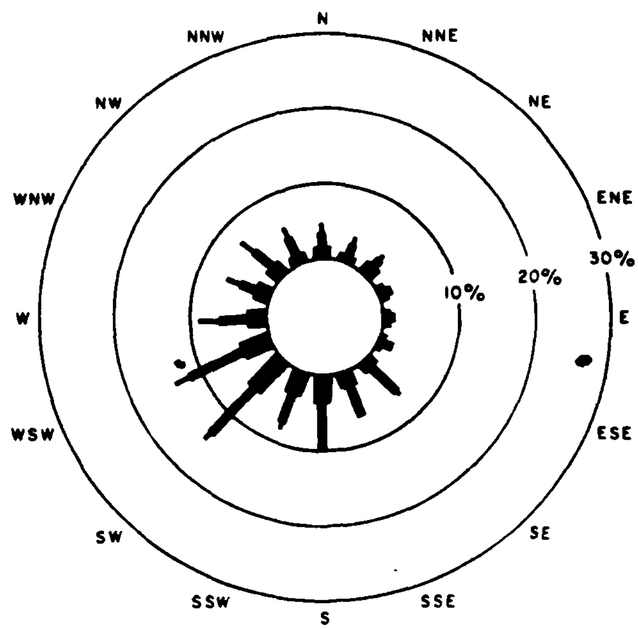
NOTE:
NINE MILE POINT WEATHER DATA

FIG. B-4
AVERAGE WIND ROSES
JULY & AUGUST 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



TOTAL WIND
SEPTEMBER

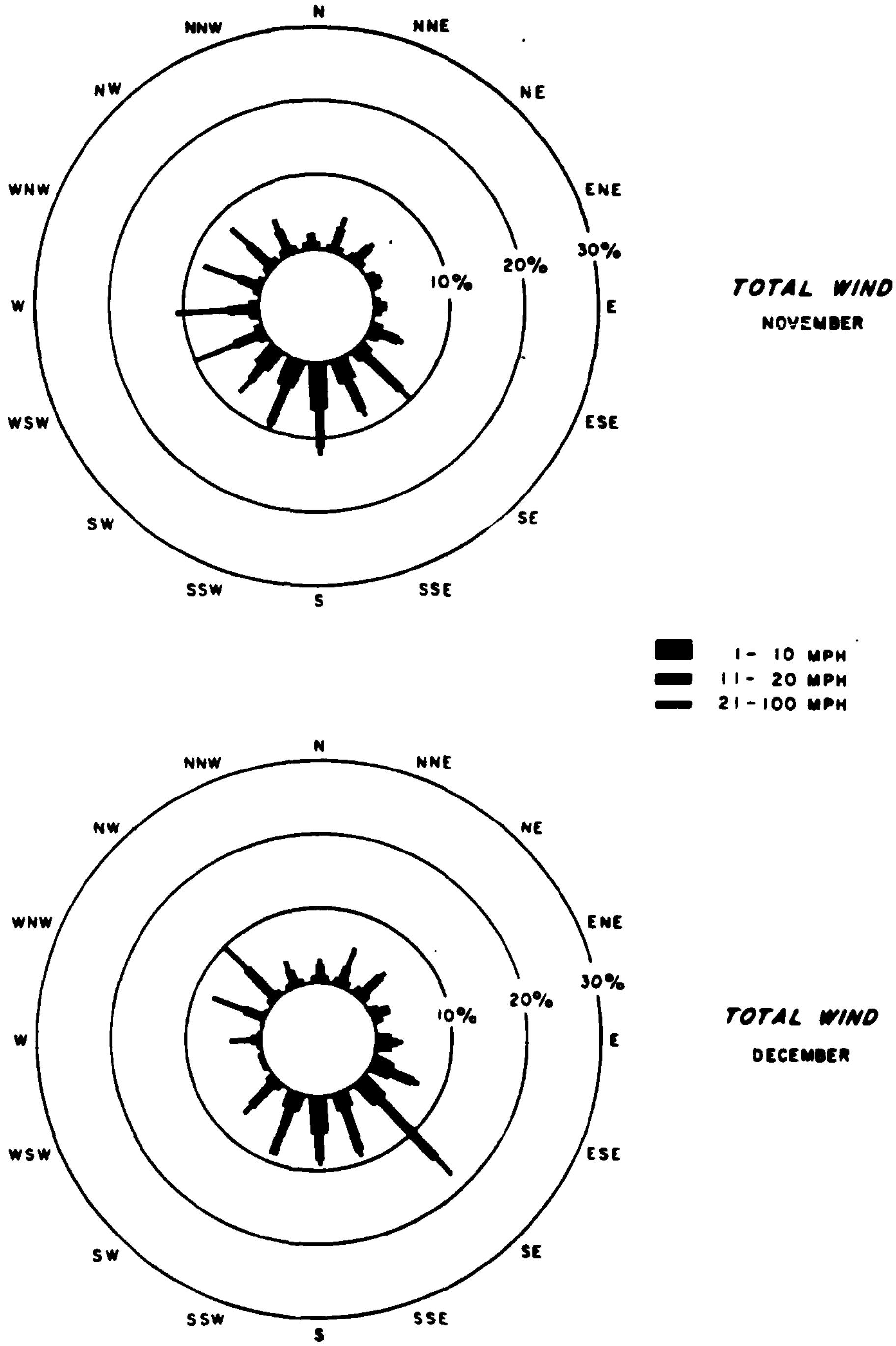
1- 10 MPH
11- 20 MPH
21-100 MPH



TOTAL WIND
OCTOBER

NOTE:
NINE MILE POINT WEATHER DATA

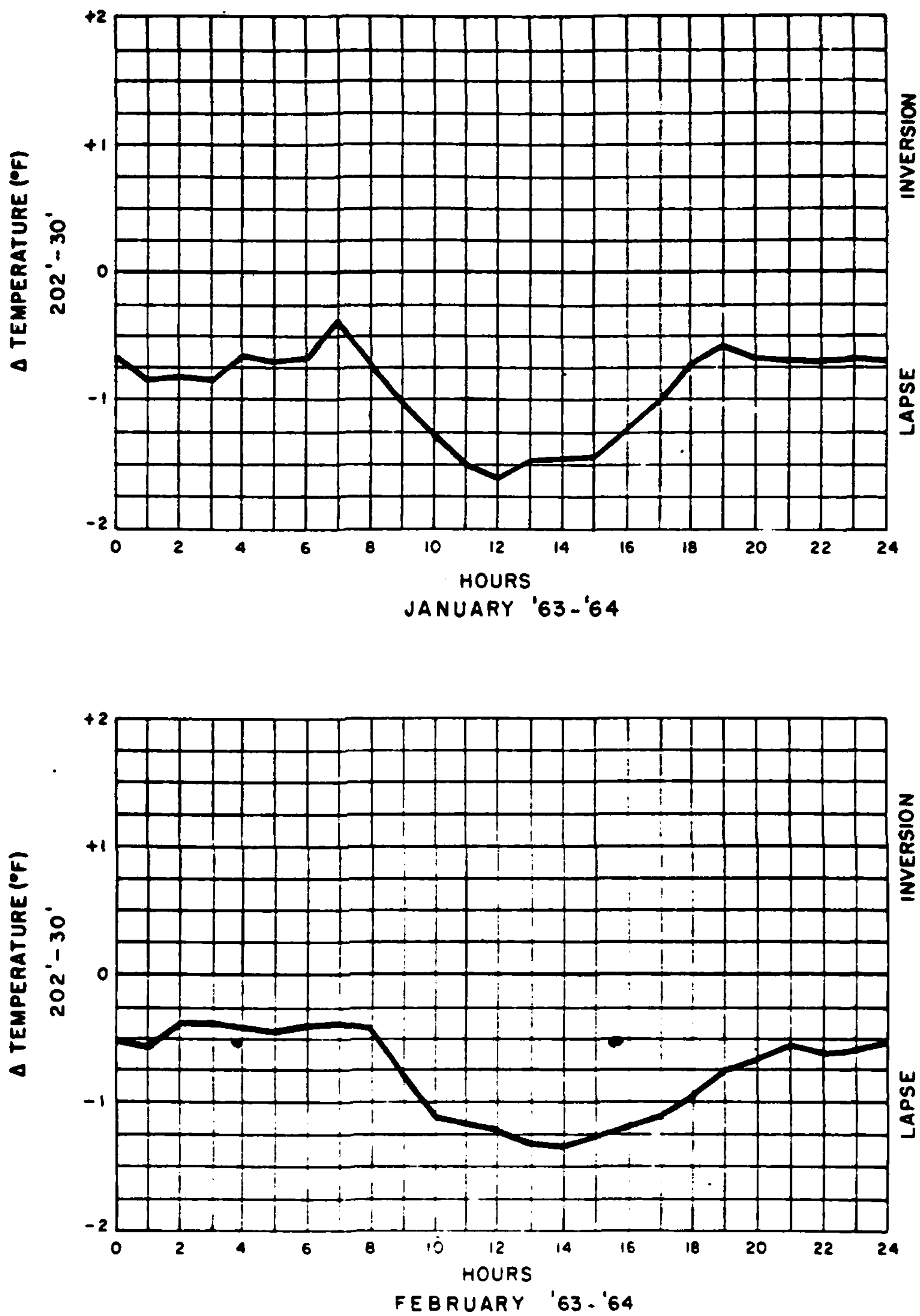
FIG. B-5
AVERAGE WIND ROSES
SEPTEMBER & OCTOBER 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



NOTE:
NINE MILE POINT WEATHER DATA.

FIG. B-6

AVERAGE WIND ROSES
NOVEMBER & DECEMBER 1963-1964
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



NOTE:

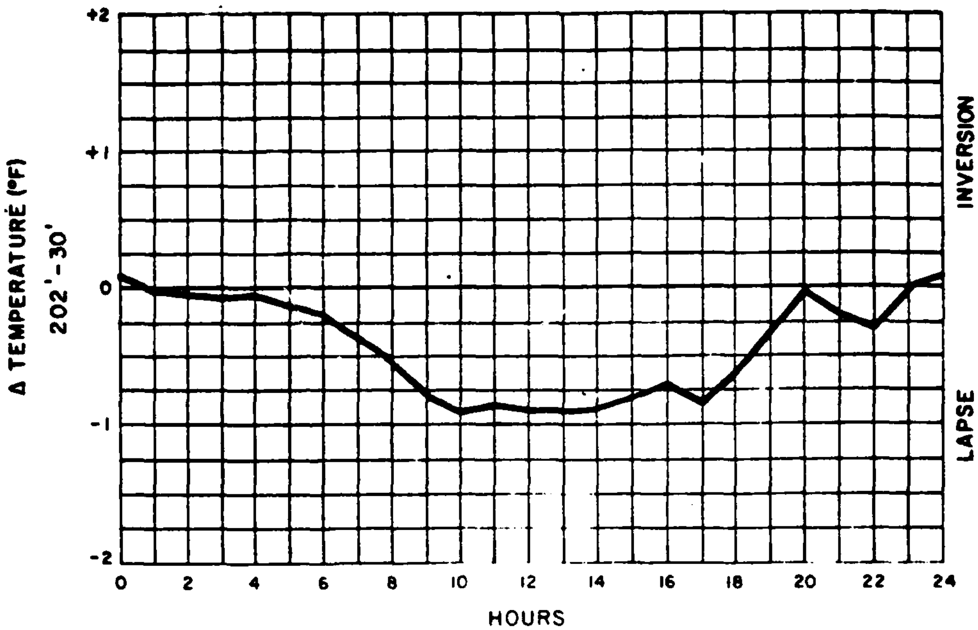
NINE MILE POINT WEATHER DATA

FIG. B-7

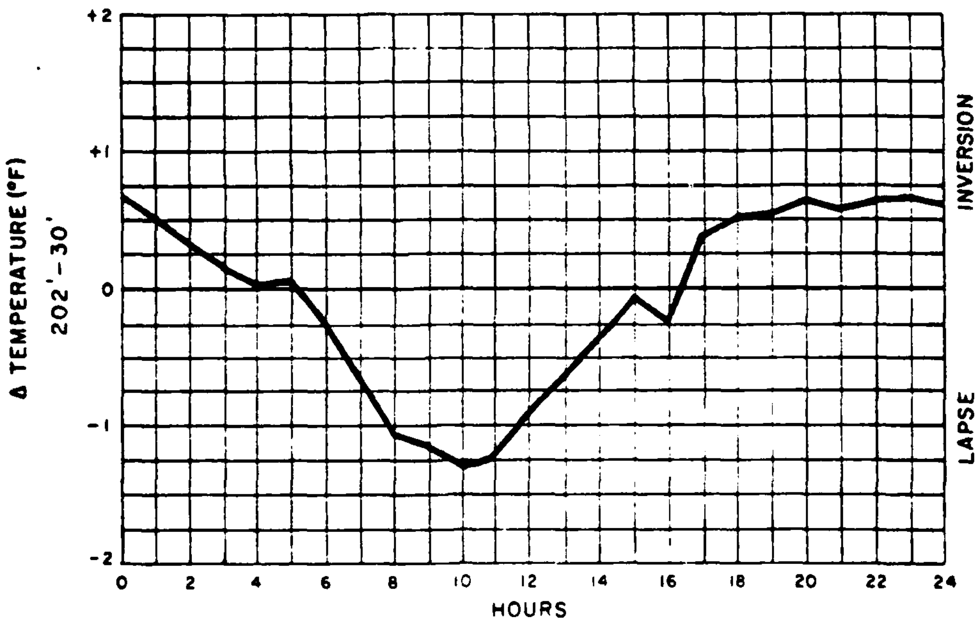
AVERAGE DIURNAL LAPSE RATES

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION



MARCH '63-'64



APRIL '63-'64

NOTE

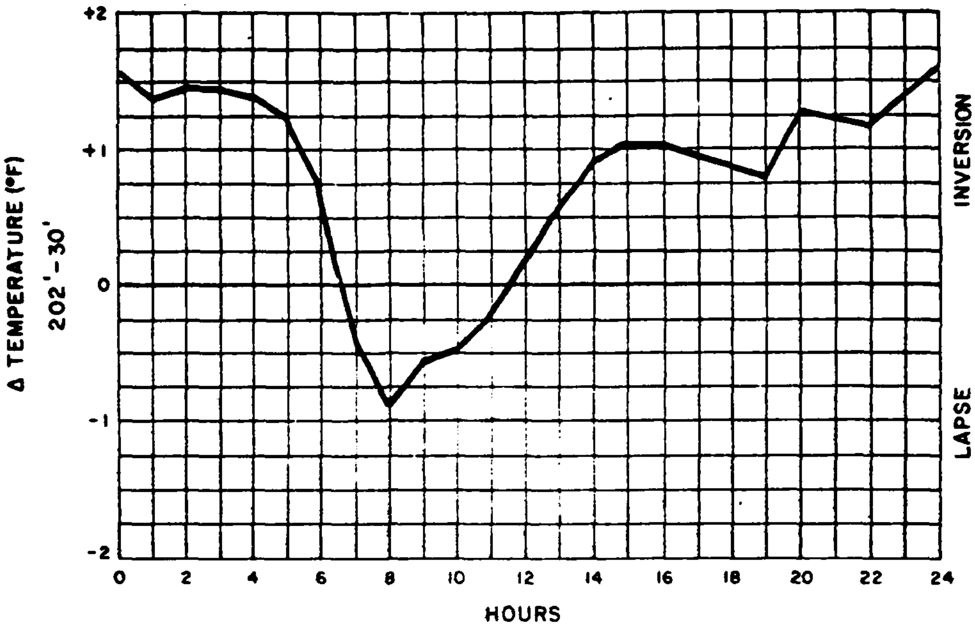
NINE MILE POINT WEATHER DATA

FIG. B-8

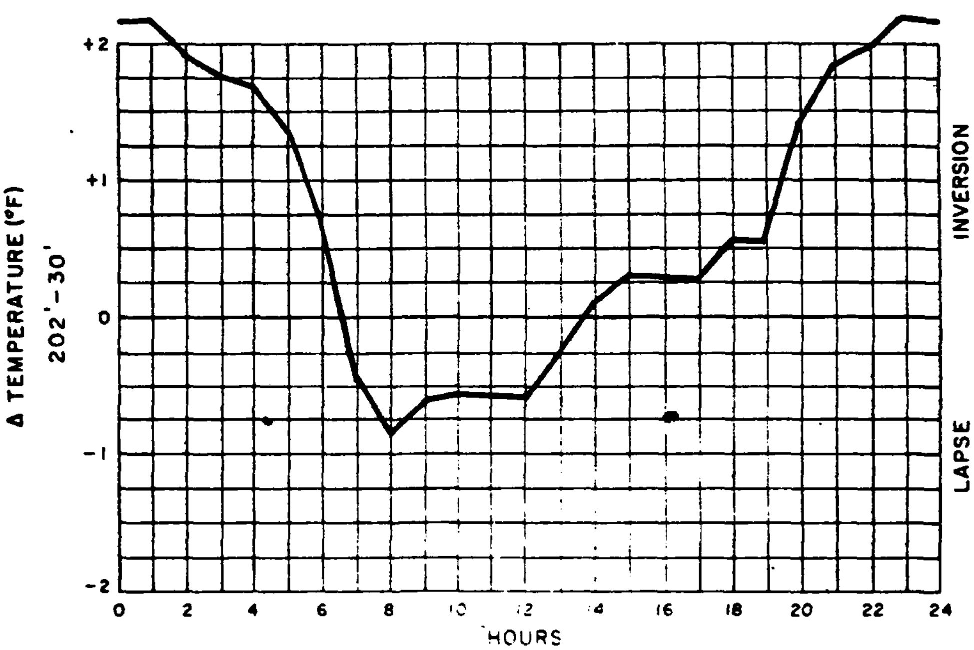
AVERAGE DIURNAL LAPSE RATES

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION



MAY '63-'64



JUNE '63-'64

NOTE:

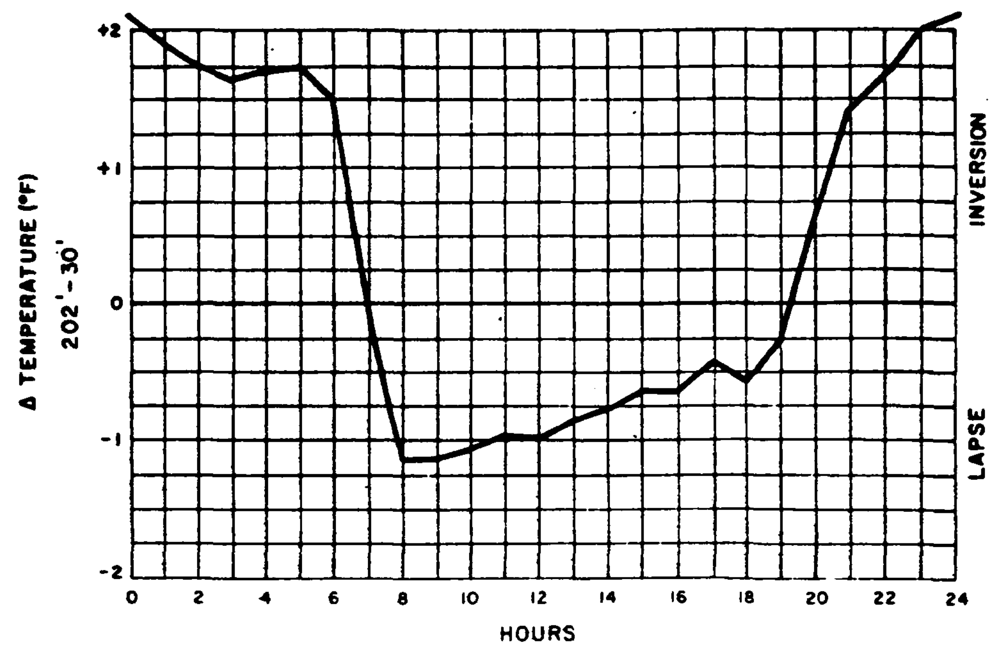
NINE MILE POINT WEATHER DATA

FIG. B-9

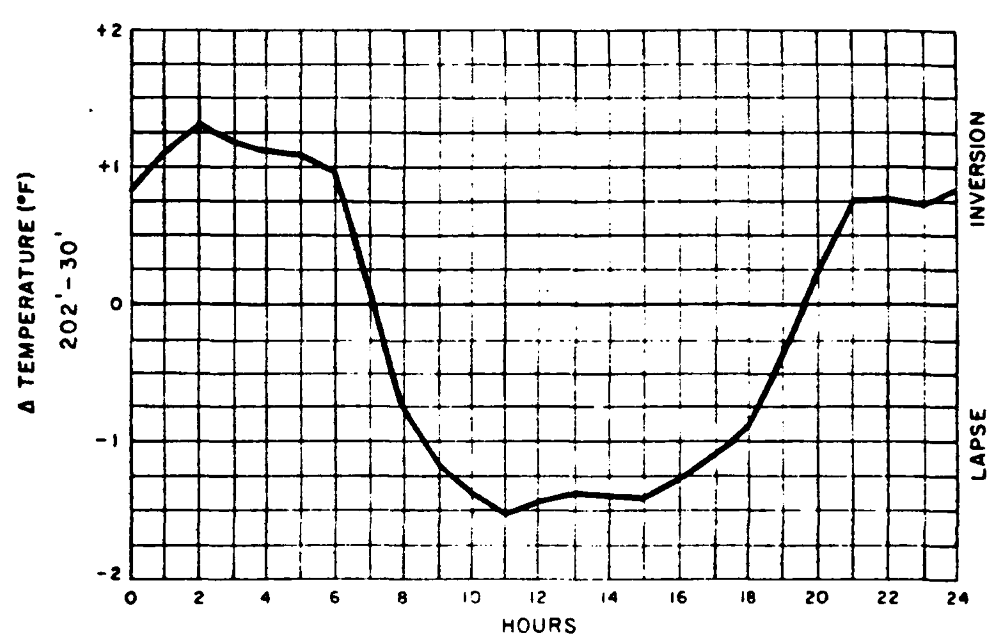
AVERAGE DIURNAL LAPSE RATES

OSWEGO STEAM STATION

NIAGARA MOHAWK POWER CORPORATION



JULY '63-'64

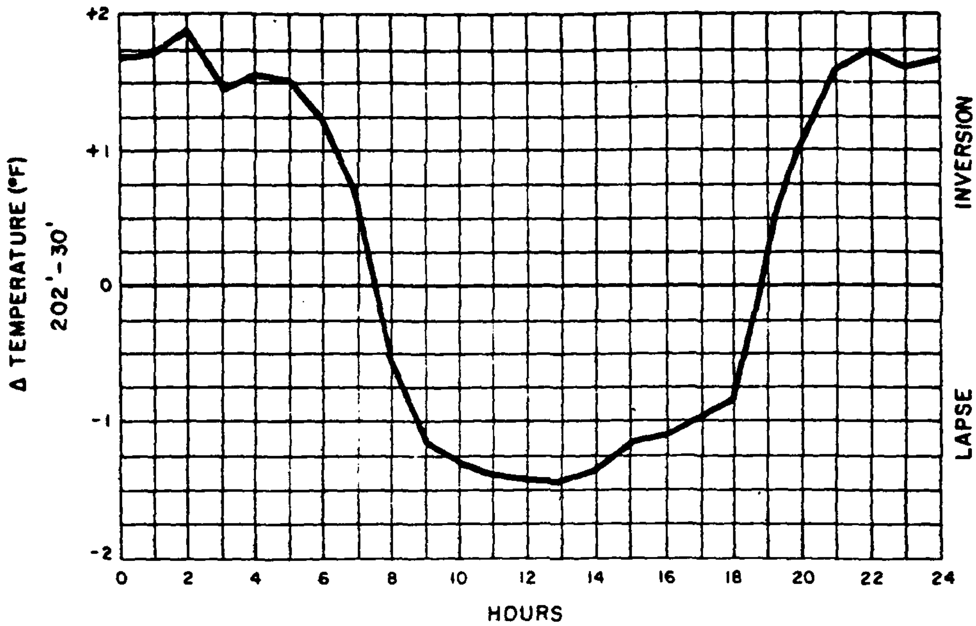


AUGUST '63-'64

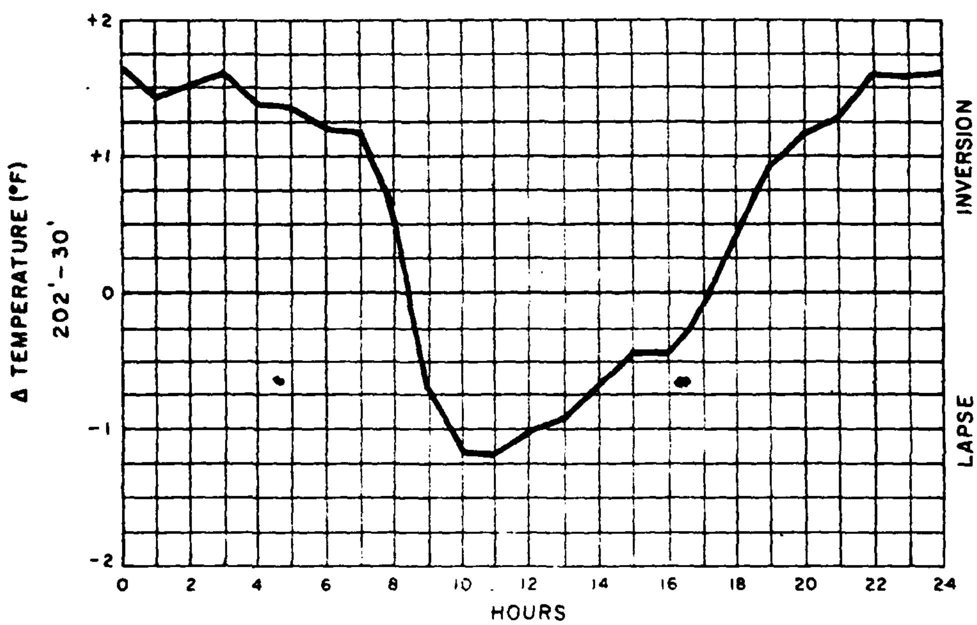
NOTE:
NINE MILE POINT WEATHER DATA

FIG. B-10

AVERAGE DIURNAL LAPSE RATES
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION



SEPTEMBER '63 - '64



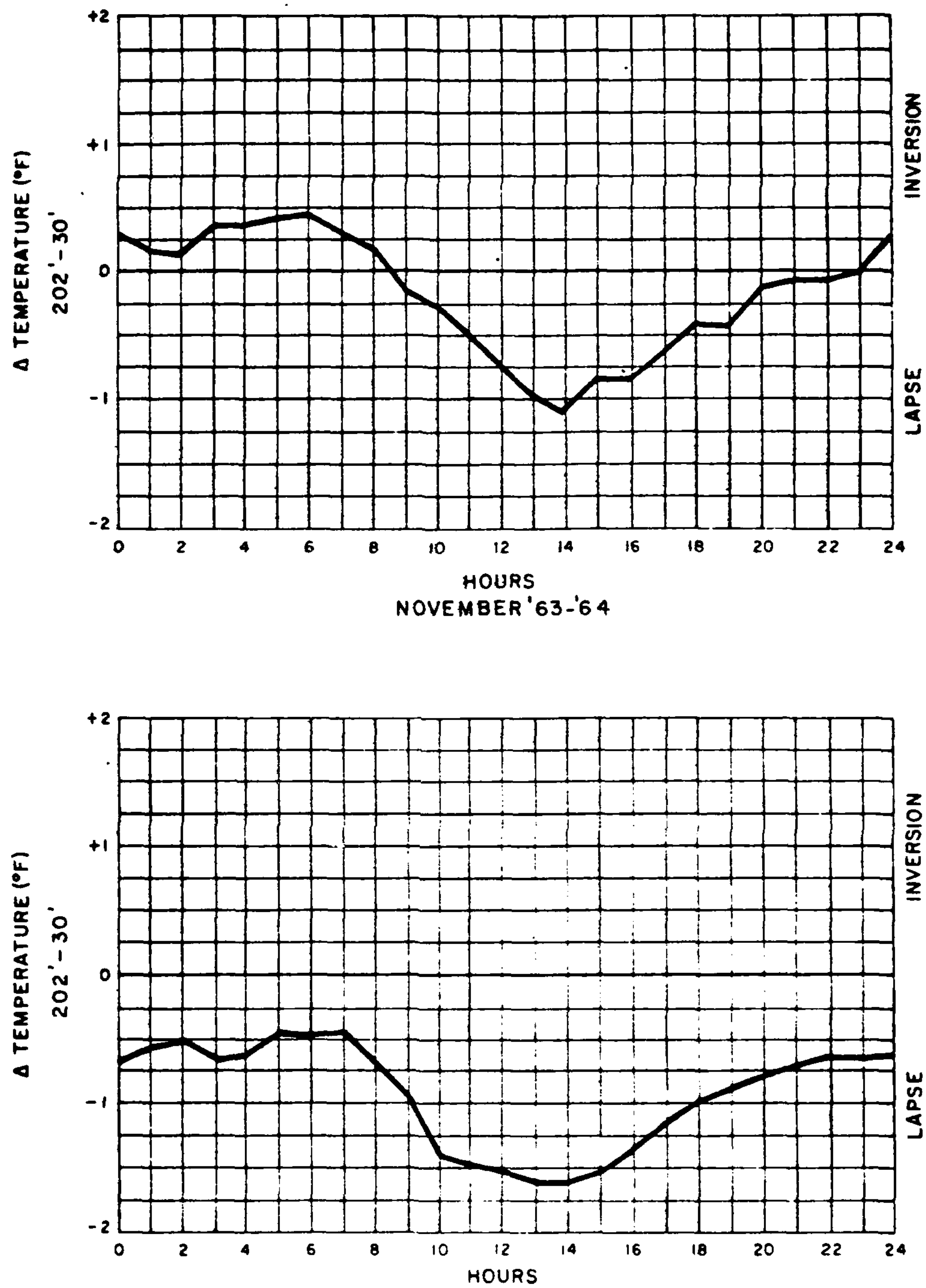
OCTOBER '63-'64

NOTE:
NINE MILE POINT WEATHER DATA

FIG. B-11

AVERAGE DIURNAL LAPSE RATES
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION

190



December data based on '62 plus '63 data
('64 data unavailable because of instrument malfunction)

NOTE·
NINE MILE POINT WEATHER DATA

FIG. B-12

AVERAGE DIURNAL LAPSE RATES
OSWEGO STEAM STATION
NIAGARA MOHAWK POWER CORPORATION

APPENDIX C

PERMITS AND CERTIFICATES

CONTENTS

1) Department of the Army, Corps of Engineers

   Description: Right of entry for construction (5 pages)

2) New York State Department of Environmental Conservation

   (a) Description: Permits to construct a waste disposal system-in compliance with Part 73 of Title 10, CRR of the State of New York (thermal discharges) (4 pages)

   (b) Description: Certificate of reasonable assurance that water quality will not be impaired - in compliance with Section 21(b) of the Federal Water Pollution Control Act as amended (U.S.C.A., Section 1171(b), 1970) (Seawall Construction) (1 page)

   (c) Description: Permit for Article 5 Part 3A of Conservation Law (Seawall construction) (6 pages)

   (d) Description: Certificate of reasonable assurance that water quality will not be impaired - in compliance with Section 21(b) of the Federal Water Pollution Control Act as amended (U.S.C.A., Section 1171(b), 1970) (Construction of submerged water intake and submerged discharge tunnels in Lake Ontario) (1 page)

   (e) Description: Permit for Article 5 Part 3A of Conservation Law (Construction of submerged water intake and submerged discharge tunnels in Lake Ontario) (4 pages)

3) City of Oswego

   Description: Building permits (Alteration of existing four units, new oil storage structures, new building addition - Unit 5, new 345 kv switchyard) (5 pages)

AD-A079 786 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/G 5/5
ENVIRONMENTAL STATEMENT. OSWEGO STEAM STATION, UNIT 5.(U)
DEC 71

UNCLASSIFIED NL

3 of 3
AD
A079786

END
DATE
FILMED
2 80
DDC

July 15, 1971

Mr. B. A. Fisher
Acting Chief, Real Estate Division
Department of the Army
North Central Division, Corps of Engineers
536 South Clark Street
Chicago, Illinois 60605

Dear Mr. Fisher:

Enclosed please find Right-of-Entry agreement executed by this Corporation. I agree with your suggestion regarding the exchange of easements proposal outlined in your letter of June 22, 1971, after construction has been completed and definite boundaries established.

In accordance with your instructions I am returning the original and all copies forwarded to me and shall expect to receive after signature by the government a fully executed copy returned for my file.

I wish to thank you most sincerely for your prompt cooperation in this matter.

Very truly yours,

John W. Keib
Attorney

JWK:rlp
Encs.

DEPARTMENT OF THE ARMY
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605

NCDRE-M 22 June 1971

Mr. John W. Keib
Attorney at Law
Niagara Mohawk Power Corporation
300 Erie Blvd., West
Syracuse, New York 13202

Dear Mr. Keib:

In accordance with your request contained in your letter, dated June 7, 1971, inclosed are 3 copies of a Right-of-Entry for the area described in your letter.

We have discussed the matter with our Buffalo District and we feel that to exchange easements would best be accomplished after your construction has been completed and definite boundaries have been established. In order to serve your purpose, the right-of-entry for construction has no expiration date.

Please have an officer of the Corporation sign the inclosed documents and return them to us. After signature by the Government, a fully executed copy will be mailed to you.

Sincerely yours,

B. A. Fisher

B. A. FISHER
Acting Chief, Real Estate Division

1 Incl (in trip)
as

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY FOR CONSTRUCTION

THE SECRETARY OF THE ARMY hereby grants to the NIAGARA MOHAWK POWER CORPORATION, 300 Erie Blvd. West, Syracuse, New York 13202, a right-of-entry for construction commencing on 15 June 1971 as shown in red on Exhibit "A" attached hereto and made a part hereof.

This right-of-entry is granted subject to the following conditions:

1. That the exercise of the privileges granted herein shall be without cost or expense to the United States.

2. That any property of the United States damaged or destroyed by the licensee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the licensee to the satisfaction of the United States; or in lieu of such repairs or replacement the licensee shall, if so required, pay to the United States money in an amount sufficient to compensate for the loss sustained by the United States by reason of damage to or destruction of Government property.

3. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of the licensee, or for injuries to the person of the licensee, or for damages to the property or injuries to the person of the licensee's officer, agents, servants, or employees or others who may be on said premises at their invitation or the invitation of any one of them, arising from governmental activities on the said premises, and the licensee shall hold the United States harmless from any and all such claims.

4. That the licensee shall pay the cost of producing and/or supplying any utilities and other services furnished by the Government or through Government-owned facilities for the use of the license, including the licensee's proportionate share of the cost of operation and maintenance of the Government-owned facilities by which such utilities or services are produced or supplied. The Government shall be under no obligation to furnish utilities or services. Payment shall be made in the manner prescribed by the said officer upon bills rendered monthly.

5. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the construction, maintenance, and use of the facilities constructed by the licensee on the said premises.

6. That this right-of-entry may be terminated by the licensee at any time by giving to the Secretary of the Army, through the said officer, at least ten (10) days' notice in writing.

7. That it is to be understood that this right-of-entry is effective only insofar as the rights of the United States in the property involved are concerned, and that the licensee shall obtain such permission as may be necessary on account of any other existing rights.

IN WITNESS WHEREOF, I have hereunto set my hand by authority of the Secretary of the Army this 15th day of June 1971.

UNITED STATES OF AMERICA

By: B A Fisher
B. A. FISHER
Acting Chief, Real Estate Division

The above instrument, together with all the conditions thereof, is hereby accepted this 13th day of July 1971.

NIAGARA MOHAWK POWER CORPORATION

By: John W. Powers
~~John W. Powers, Asst. Treasurer~~

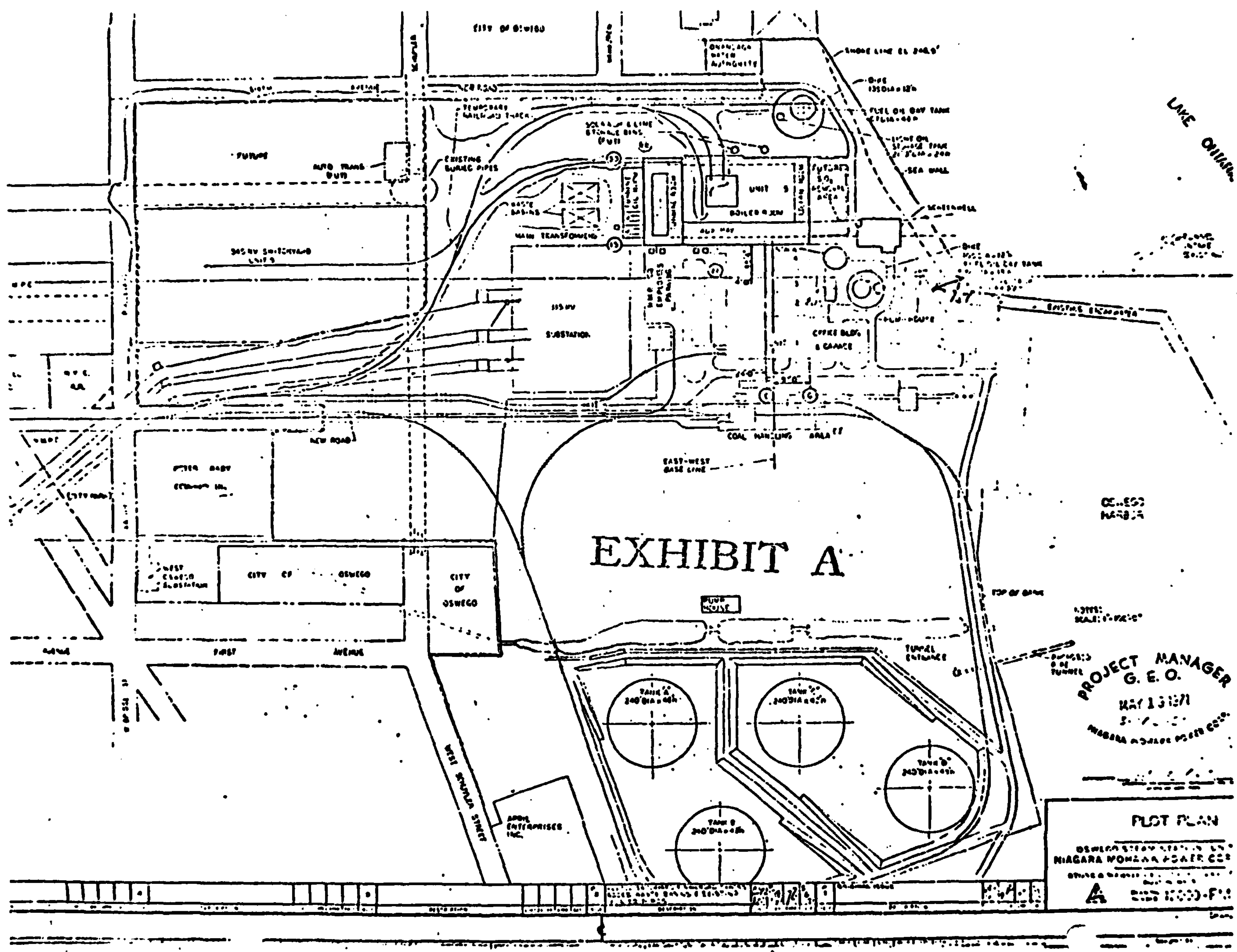


EXHIBIT A
LAKE ONTARIO
OSWEGO HARBOR
CITY OF OSWEGO
FUTURE
345 KV SWITCHYARD UNITS
345 KV SUBSTATION
UNIT 5
BOILER ROOM
MAIN TRANSFORMERS
WASTE BASINS
OFFICE BLDG. & GARAGE
COAL HANDLING AREA
EAST-WEST BASE LINE
PUMP HOUSE
TUNNEL ENTRANCE
TOP OF BANK
SHORE LINE EL 248.0'
SEA WALL
EXISTING BURIED PIPES
NEW ROAD
CITY OF OSWEGO
CITY OF OSWEGO
FIRST AVENUE
WEST SCHUYLER STREET
APPLE ENTERPRISES INC.
PROJECT MANAGER
G. E. O.
PLOT PLAN
NIAGARA MOHAWK POWER CORP.

New York State Department of Environmental Conservation
Albany, N Y 12201 Division of Pure Waters

Henry L. Diamond
Commissioner

August 31, 1971

Mr. Richard C. Clancy, Manager
Environmental Engineering
Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

Gentlemen:

Re: Cooling Water Disposal Unit #5
Niagara Mohawk Power Corporation
Oswego (T), Oswego County

Transmittal

The construction permit for this project, dated July 16, 1971, is attached.

One approved copy of the design report and plans is being forwarded separately.

Permit to Construct

This permit carries qualifying conditions:

1. Permit filing
2. Revocability and modification
3. Construction conformance
4. Start of Operation
5. Construction supervision
6. Construction certification
7. Construction time limitations
8. Construction modification

THE ATTACHED CONSTRUCTION PERMIT DOES NOT CONSTITUTE AUTHORITY TO OPERATE THE APPROVED FACILITIES. PLEASE NOTE INSTRUCTIONS BELOW REGARDING OPERATION PERMIT.

Permit to Operate

Pursuant to provisions of Part 73 of Title 10 of the official compilation of Codes, Rules and Regulations of the State of New York, a permit to operate the constructed facilities is required.

Upon completion of the facilities, application for the permit to operate should be promptly submitted to the Bureau of Industrial Wastes of the New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York 12201, accompanied by a Certificate of Construction Compliance, executed by the New York State licensed professional engineer supervising construction.

The Bureau of Industrial Wastes will contact you in the near future to provide application forms and instructions for the operating permit.

Assistance

Information can be obtained from this office regarding construction certification.

Facilities Approved

Approved plans call for the installation of an outfall/diffuser system including:

1) Approximately 1,360 ft. of main tunnel from existing shoreline at Oswego, into Lake Ontario.

2) Approximately 260 ft. of diffuser, below approximately 26 ft. of water, consisting of six raisers, each with two feet diameter diffuser ports at 20° between ports, with risers spaced at 40 feet on center.

Very truly yours,

Thomas E. Quinn, P.E., Chief
Industrial Facility Section

Enclosure
Permit
TEQ/WL/no

cc: Syracuse Regional Office
Quirk, Lawler & Matusky
Acres American, Inc.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT TO CONSTRUCT A WASTE DISPOSAL SYSTEM

This permit is issued under the provisions of Article 12 of the Public Health Law and 10 NYCRR 73.

1. Name of Permittee:	2. Location of Works (C.V.T):	3. County:	4. Entity or Area Served:
Niagara Mohawk Power Corporation	Oswego (T)	Oswego	Unit #5 Cooling Water Discharge

By initiating construction of the approved works, the permittee accepts and agrees to abide by and conform with the following:

1. THAT the construction permit shall be maintained on file by the permittee.
2. THAT the permit is revocable or subject to modification or change pursuant to Article 12 of the Public Health Law.
3. THAT the facilities shall be fully constructed and completed in compliance with the engineering report, plans and specifications as approved.
4. THAT the facilities shall not be placed in operation until construction has been completed and an operation permit has been issued, or unless ordered to be operated by the Commissioner or by a Court.
5. THAT the construction of the facilities shall be under the supervision of a person or firm qualified to practice professional engineering in the State of New York under the Education Law of the State of New York, whenever engineering services are required by such law for such purposes.
6. THAT where such facilities are under the supervision of a professional engineer, he shall certify to the Department and to the permittee that the constructed facilities have been under his supervision and that the works have been fully completed in accordance with the approved engineering reports, plans, specifications and permit.
7. THAT the construction of the facilities shall commence by June 1, 1972 and be fully completed by December 31, 1973.
8. THAT whenever required by the Department of Environmental Conservation, the proposed work shall be modified in accordance with plans first submitted to and approved by the Department of Environmental Conservation.

ISSUED FOR THE STATE COMMISSIONER OF ENVIRONMENTAL CONSERVATION

[signature]

Designated Representative

DATE 7/16/71

Distribution: White – Applicant; Pink – Central Office (BED); Yellow – File (LUO or DHO); Green – Other

San. 3

Project Description:

5. Type of Ownership:

- [ ] Municipal
- [X] Industrial 4911
- [ ] Commercial
- [ ] 6 Sewage Works Corp.
- [ ] 67 Private-Home
- [ ] 68 Private-Other
- [ ] Private-Institutional
- [ ] 26 Board of Education
- [ ] 1 Authority
- [ ] 19 Federal
- [ ] 20 State
- [ ] 30 Interstate
- [ ] 40 International
- [ ] 16 Indian Reservation

6. Type & Nature of Construction:

Collection: [ ] 1 New [ ] 2 Additions or Alterations

Treatment and/or Disposal: [X] 1 New [ ] 2 Additions or Alterations

7. Estimated Cost of Construction:

Collection System ______ Treatment and/or Disposal ______

8. Type of Waste: [ ] 1 Sewage [ ] Industrial Specify ______ [X] Other Specify 49 cooling water

9. Degree of Treatment: [ ] 1 None [ ] 2 Septic Tank [ ] 3 Primary [ ] 4 Intermediate [ ] 5 Secondary [ ] 6 Tertiary [ ] 7 Complete [X] 8 Not Applicable

10. Point of Discharge:

Location (C,V,T) Oswego (T) Major Drainage Basin Lake Ontario

Surface Water: Name of Watercourse Lake Ontario Surface Water Class "A"

Ground Water: Name of Watercourse to which ground water is tributary ______ Ground Water Class ______

11. Name of Receiving Treatment Works:	12. Grade of Plant Operator Required:	13. Disinfection Required:
Niagara Mohawk Power Corporation	N/A	[ ] 1 Continuous [ ] 2 Seasonal [X] 3 None
14. Design Flow (Gals./day):	**15. Design Equivalent Population (BOD Basis):**	**16. Design Plant Efficiency (% BOD Removal):**
412×10^6	N/A	N/A

Description of works, such as number, name and capacity of units:

1) Approximately 1,360 ft. of main tunnel from existing shoreline at Oswego, into Lake Ontario.

2) Approximately 260 ft. of diffuser, below approximately 26 ft. of water, consisting of six raisers, each with two feet diameter diffuser ports at 20° between ports, with risers spaced at 40 feet on center.

New York State Department of Environmental Conservation
Albany, N. Y. 12201

Henry L. Diamond
Commissioner

June 14, 1971

Niagara Mohawk Power Corporation
300 Erie Boulevard, West
Syracuse, New York 13202

Attention Harold J. Bogan, Assistant Secretary

Gentlemen:

Re: Application No. 4-5-71
Seawall & Fill - Lake Ontario
at Oswego, New York
NCBCO-S 71-27

In response to your application of January 26, 1971 and in accordance with Section 21-b of the Water Quality Improvement Act of 1970 (P.L. 91-224) the Department of Environmental Conservation hereby certifies that there is reasonable assurance that the adopted water standards of the waters of the State of New York will not be contravened by construction of the proposed works, to install approximately 850 lineal feet. Riprap seawall is not to exceed 100 feet from existing shoreline and backfill with clean grnaular materials in Lake Ontario at lands of applicant at Oswego, New York.

This Department reserves the right to comment at a later date concerning other environmental features of the project.

I am forwarding a copy of this letter to the Buffalo District, Corps of Engineers,

Very truly yours,

Robert S. Drew

Robert S. Drew
For Department of Environmental
Conservation

cc: Corps of Engineers - Buffalo District
Environmental Protection Agency
U. S. Department of the Interior
Mr. Peter J. Smith
Mr. Donald Stevens
Mr. Charles H. Jennings
Mr. Kenneth Wich
Mr. John E. Wilson
Mr. Robert A. Abendschein
Mr. Frederick Howell

STATE OF NEW YORK
CONSERVATION DEPARTMENT *Division of Fish and Gam*

Box 84, Rt. 37 Watertown, N.Y. 13601

June 24, 1971

Niagara Mohawk Power Corp.
300 Erie Blvd., West
Syracuse, N.Y. 13202

Re: WRC Permit No. 4-5-71-OS
Town of Oswego
County of Oswego

Enclosed is your permit for construction as proposed in application for permit under Conservation Law, Article V, Part III-A. Please note the special conditions included and feel free to contact this office if you have any questions.

Also enclosed is a sign which you are to post in a conspicuous location on the work site and adequately protect from the weather.

Sincerely yours,

John E. Wilson

John E. Wilson
Local Permit Agent

JEW:crm

Encls.

DWR-133

DWR-3

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT FOR ARTICLE 5 PART 3A OF CONSERVATION LAW

PERMIT NO. 4-5-71-OS

DAM NO.

PERMITTEE
Niagara Mohawk Power Corp.

PERMITTEE'S ADDRESS
300 Erie Blvd., West Syracuse, N.Y. 13202

PERMITTEE IS HEREBY PERMITTED TO:
construct a breakwall in Lake Ontario

FOR CARRYING OUT THE FOLLOWING WORKS:
Install approximately 850 lineal feet of rip-rap seawall which extends not more than 100 feet from existing shoreline and backfill with clean granular materials, as shown on the attached drawings which become part of this permit.

LOCATION
County Oswego | City Oswego

SECTION OF STREAM TO WHICH THIS PERMIT APPLIES
Lake Ontario at lands of applicant in Oswego, N.Y.

Note: (a) This permit does not relieve the permittee of responsibility for damages to riparian owners or others.
(b) If the structure or work herein authorized is not completed on or before 31 day of December, 1972, this permit, if not specifically extended, shall cease and be null and void.

CONDITIONS

1. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.

2. The permittee shall file in the office of the Local Permit Agent a notice of intention to commence work at least 48 hours in advance of the time of commencement and shall also notify him promptly in writing of the completion of the work.

3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

4. Any material dredged in the prosecution of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of the waterway, or deep holes that may have a tendency to cause injury to navigable channels or to the banks of the waterway.

5. Any material to be deposited or dumped under this permit, either in the waterway or on shore above high-water mark, shall be deposited or dumped at the locality shown on the drawing hereto attached, and, if so prescribed thereon, within or behind a good and substantial bulkhead or bulkheads, such as will prevent escape of the material into the waterway.

6. There shall be no unreasonable interference with navigation by the work herein authorized.

7. That if future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or endanger the health, safety or welfare of the people of the State, or loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State; and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

8. That the State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

9. That if the display of lights and signals on any work hereby authorized is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the owner.

10. All work carried out under this permit shall be performed in accordance with established engineering practice and in a workmanlike manner.

11. This permit shall not be construed as conveying to the applicant any right to trespass upon the lands of others to perform the permitted work or as authorizing the impairment of any right, title or interest in real or personal property held or vested in a person not a party to the permit.

12. Nothing in this permit shall be deemed to affect the responsibility of the permittee to comply with any applicable Rules and Regulations of the U.S. Army Corps of Engineers or any other governmental agency having jurisdiction.

OTHER CONDITIONS:

13. The granting of this permit does not relieve the permittee of the responsibility of obtaining a Grant of Easement or other necessary approval from the Bureau of Surplus Real Property of the Office of General Services which may be required for any encroachment upon State owned lands underwater.

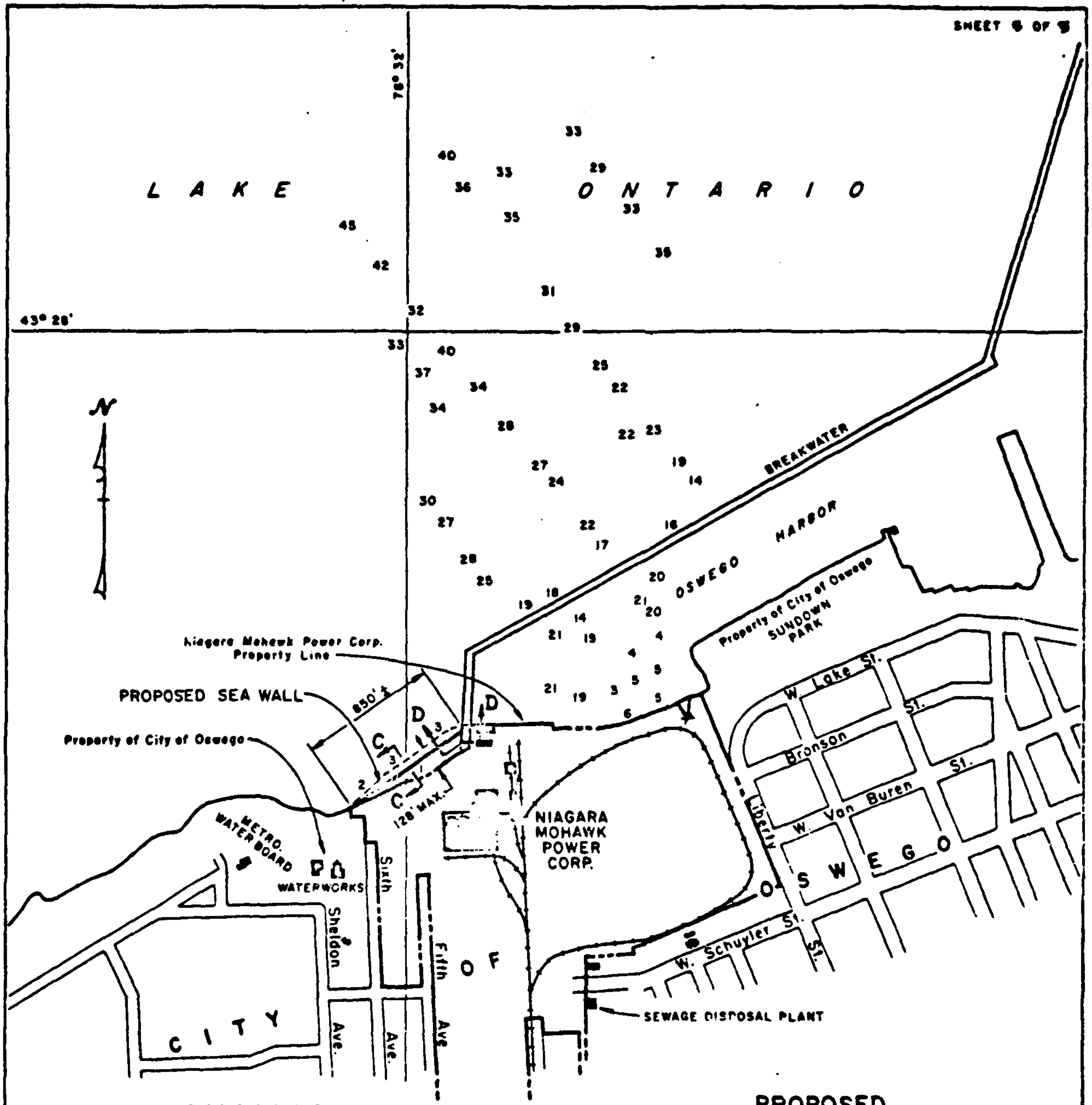
The issuance of this permit certifies that it is not contrary to the public interest that the proposed works be done. The applicant in accepting this permit signifies his agreement to abide by the conditions set forth above.

Application Date	Expiration Date	Permit Issued
January 27, 1971	December 31, 1972	June 24, 1971

By (Permit Agent) Local [signature] for

(Name and Address) John E. Wilson Box 84, Rt. 37 Watertown, N.Y.

CC: Bob Drew
Ken Wich
Corps of Engineers
Mr. Walter Rich
Charles Jennings
CO William Gilbert
Bob Kilthau



● SEE SHEET 4 FOR SECTIONS C-C, D-D.

FROM U.S.L.S. CHART NO. 225, AUGUST 1968.
SOUNDINGS ARE IN FEET AND REFER TO LOW WATER DATUM EL. 242.8 (INTERNATIONAL GREAT LAKES DATUM 1955)

0 500 1000 1500
SCALE – FEET

PROPOSED

SHORE PROTECTION SEA WALL

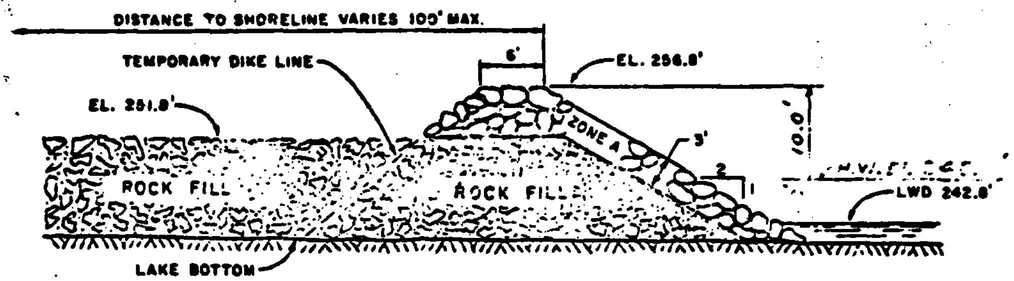
IN LAKE ONTARIO AT CITY OF OSWEGO
OSWEGO COUNTY, NEW YORK

Application by

NIAGARA MOHAWK POWER CORPORATION

JANUARY 6, 1971
REVISED-FEBRUARY 9, 1971

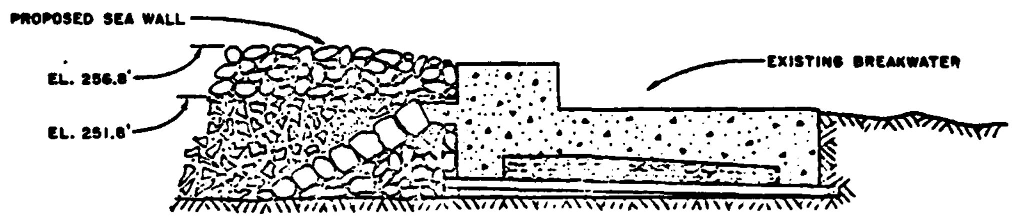
Notice No. 71-27



ZONE A — WELL GRADED RIPRAP, AVG. SIZE - 24", MAXIMUM 36", SIZED TO 1" SPALLS.

CONSTRUCTION — A DIKE CONSISTING OF ROCK FILL AND PROTECTED WITH DUMPED RIPRAP, AS SHOWN, SHALL BE CONSTRUCTED FIRST. ROCK FILL SHALL THEN BE PLACED BEHIND THE DIKE

SECTION C–C
(SEE SHEET 1)



SECTION D–D
(SEE SHEET 1)

0 10 20 30
SCALE — FEET

ELEVATIONS BASED ON I.G.L.D. 1955

PROPOSED

SHORE PROTECTION SEA WALL

IN LAKE ONTARIO AT CITY OF OSWEGO,
OSWEGO COUNTY, NEW YORK

Application by :

NIAGARA MOHAWK POWER CORPORATION

JANUARY 6, 1970

PERMIT

No. 4-5-71-05

(TO ALTER OR CHANGE A STREAM OR WATERCOURSE)

has been issued to Niagara Mohawk Power Corp

of 300 Erie Blvd., West Syracuse, New York 1320

for constructing a breakwall in Lake Ontario

under the Conservation Law, Part III A, Art. 5

John E. Wilson
LOCAL Permit Agent

December 31, 1972
Expiration Date

New York State
Department of Environmental Conservation

DWR-93

New York State Department of Environmental Conservation
Albany, N Y 12201 Division of Resource Management Services
Bureau of Water Regulation

Henry L. Diamond
Commissioner

September 21, 1971

District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

Public Notice No. 71-37
Application No. 4-22-71
Niagara Mohawk Power Corporation

The New York State Department of Environmental Conservation has no criticisms or protests to offer with regard to the proposed project to construct a submerged water intake structure and a submerged discharge structure in connection with its Unit No. 5 at its Oswego electric generating station.

The description of the work accompanying the public notice indicates that these works will occupy State-owned lands underwater for which a Grant or Easement may be required from the State Office of General Services for State-owned lands underwater.

In the event that you issue a permit to this applicant, please send a copy to Mr. Charles H. Jennings, Chief, Bureau of Surplus Real Property, Office of General Services, 26th floor, Alfred E. Smith State Office Building, Albany, New York, 12225.

This letter is also our assurance that the water quality standards as described in Section 21-b of the Water Quality Improvement Act of 1970 (P.L. 91-224) will not be contravened by the construction of the aforementioned water intake and discharge facilities.

Very truly yours,

Robert S. Drew
For Department of Environmental
Conservation

cc: Mr. C. Jennings
Mr. L. Blake
Mr. B. Griffin
Mr. K. Wich
Mr. D. Stevens
Mr. F. Howell
Environmental Protection Agency - Chicago
Quirk, Lawler & Matusky Engineers
Applicant

New York State Department of Environmental Conservation
Albany, N Y 12201 Division of Resource Management Services
Bureau of Water Regulation

Henry L. Diamond
Commissioner

September 21, 1971

Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

Attention Mr. T. J. Brosman
Vice President & Chief Engineer

Gentlemen:

Permit No. 4-22-71
Niagara Mohawk Power Corporation
City of Oswego, County of Oswego

Enclosed is your permit for construction as proposed in application for permit under Conservation Law, Article V, Part III-A. Please note the special conditions included and feel free to contact this office if you have any questions.

Also enclosed is a sign which you are to post in a conspicuous location on the work site and adequately protect from the weather.

Very truly yours,

Robert S. Drew

Robert S. Drew
Acting Central Permit Agent

Enclosures

cc: Mr. L. Blake
Mr. B. Griffin
Mr. R. Abendschein

New York State Department of Environmental Conservation
Albany, N Y 12201 Division of Resource Management Services
Bureau of Water Regulation

Henry L. Diamond
Commissioner

September 21, 1971

District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

Public Notice No. 71-37
Application No. 4-22-71
Niagara Mohawk Power Corporation

Enclosed is a copy of Permit No. 4-22-71 issued to Niagara Mohawk Power Corporation, 300 Erie Boulevard West, Syracuse, New York, 13202, Attention Mr. T. J. Brosman, Vice President and Chief Engineer, to install submerged water intake and submerged discharge tunnels in Lake Ontario in connection with the proposed construction of Unit No. 5 at its Oswego electric generating station, City of Oswego, County of Oswego, New York.

In our attached companion letter dated September 21, 1971, for this same project we have indicated that the Department has no objections to your issuing a permit within the area of jurisdiction.

Very truly yours,

Robert S. Drew
For Department of Environmental Conservation

Enclosure

cc: Mr. D. Stevens
Mr. C. Jennings
Mr. K. Wich
Mr. L. Blake
Mr. B. Griffin
Applicant
Mr. R. Abendschein

DUM-3

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT FOR ARTICLE 5 PART 3A OF CONSERVATION LAW

PERMIT NO. 4-22-71

DAM NO.

PERMITTEE

Niagara Mohawk Power Corporation, Attention: Mr. T. J. Brosman, Vice President & Chief Engineer

PERMITTEE'S ADDRESS

300 Erie Boulevard West, Syracuse, New York 13202

PERMITTEE IS HEREBY PERMITTED TO:

Install submerged water intake and submerged discharge tunnels in Lake Ontario in connection

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

with the proposed construction of Unit No. 5 at its Oswego electric generating station. Said construction of these facilities shall be at the general location and be carried out in the general manner as outlined on the attached sketches.

LOCATION

County Oswego | XXXX City of Oswego

SECTION OF STREAM TO WHICH THIS PERMIT APPLIES

Lake Ontario

Note: (a) This permit does not relieve the permittee of responsibility for damages to riparian owners or others.

(b) If the structure or work herein authorized is not completed on or before 31st day of December, 1973, this permit, if not specifically extended, shall cease and be null and void.

CONDITIONS

1. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.

2. The permittee shall file in the office of the Local Permit Agent a notice of intention to commence work at least 48 hours in advance of the time of commencement and shall also notify him promptly in writing of the completion of the work.

3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

4. Any material dredged in the prosecution of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of the waterway, or deep holes that may have a tendency to cause injury to navigable channels or to the banks of the waterway.

5. Any material to be deposited or dumped under this permit, either in the waterway or on shore above high-water mark, shall be deposited or dumped at the locality shown on the drawing hereto attached, and, if so prescribed thereon, within or behind a good and substantial bulkhead or bulkheads, such as will prevent escape of the material into the waterway.

6. There shall be no unreasonable interference, with navigation by the work herein authorized.

7. That if future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or endanger the health, safety or welfare of the people of the State, or loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State; and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

8. That the State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

9. That if the display of lights and signals on any work hereby authorized is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the owner.

10. All work carried out under this permit shall be performed in accordance with established engineering practice and in a workmanlike manner.

11. This permit shall not be construed as conveying to the applicant any right to trespass upon the lands of others to perform the permitted work or as authorizing the impairment of any right, title or interest in real or personal property held or vested in a person not a party to the permit.

12. Nothing in this permit shall be deemed to affect the responsibility of the permittee to comply with any applicable Rules and Regulations of the U.S. Army Corps of Engineers or any other governmental agency having jurisdiction.

OTHER CONDITIONS:

13. Granting of this permit does not relieve the applicant of the responsibility of obtaining any grant or easement from the Bureau of Surplus Real Property of the Office of General Services which may be required for any encroachment on State-owned lands underwater.

14. Provisions shall be incorporated in the final plans and thereafter constructed in the intake structure to prevent entrapment of fish and for the transfer of fish from screens back to Lake Ontario.

15. Appropriate precautions shall be taken during construction of the intake and discharge structures to minimize any damage to the fish and aquatic resources of Lake Ontario.

16. Any excavated material not required for backfill shall be placed on upland property above high water.

The issuance of this permit certifies that it is not contrary to the public interest that the proposed works be done. The applicant in accepting this permit signifies his agreement to abide by the conditions set forth above.

Application Date	Expiration Date	Permit Issued
March 30, 1971	December 31, 1973	September 21,1971

By (Permit Agent) Robert S. Drew

Acting Central Permit Agent
Division of Resource Management Services

(Name and Address)
New York State Department of Environmental Conservation
Albany, New York 12201

Conditions (continued):

17. Applicant shall be further subject to meeting all conditions of the Department of Environmental Conservation contained in a "Permit to Construct a Waste Disposal System," dated July 16, 1971, issued for the cooling water discharge facility.

Enclosures

cc: Corps of Engineers - Buffalo
Mr. C. Jennings, Office of General Services
Mr. L. Blake, Watertown
Mr. B. Griffin, Cortland
Mr. K. Wich
Mr. D. Stevens
Environmental Protection Agency - Chicago
Quirk, Lawler & Matusky Engineers, New York City
Mr. R. Abendschein

THE CITY OF OSWEGO
OSWEGO, NEW YORK 13126

ANTHONY A. LEOTTA
CITY ENGINEER

April 22, 1971

Mr. John W. Keib, Attorney
Niagara Mohawk Power Corporation
33 Erie Boulevard West
Syracuse, New York 13202

RE: Building Permits
Oswego Steam Station

Dear Mr. Keib:

Reference is made to your April 19, 1971, letter addressed to Mayor John O'C Conway and the accompanying Building Permits Applications.

The following building permits have been issued for work currently underway at the Oswego "Steam Plant":

No. 609 - Alteration of existing four (4) units
No. 610 - New Oil Storage Structures
No. 611 - New building addition - unit five (5)
No. 612 - New 345 KV Switch Yard

The Oswego Common Council has set a maximum building permit fee of $10,000.00 for projects exceeding a certain size. A copy of adopted resolution No. 119, Dated April 13, 1971 is attached herewith for your records.

Enclosed herewith are the four (4) building permits outlined above, a receipt for $10,000.00, and plaques for display at the project site.

Your patience and cooperation have been greatly appreciated.

Very truly yours,

Anthony A. Leotta
City Engineer

cc: Mayor John O'C Conway
Edwin M. Allen, Admin Ass't
Paul R. Miller, City Chamb.
Burt P. McGann, Purchasing Agent
All Alderman

Enclosure
AAL/dac

CITY OF OSWEGO, N. Y.

Building Permit #609

(XXXXX) — (Construction)

April 22, 1971

This certifies that permission is granted to Niagara Mohawk Power Corp.

to ~~construct, enlarge,~~ alter ~~or repair~~ a n Exist. Steam Sta. building located on lot No. ______,

Block No. ______, ~~No.~~ Liberty and Lake Street, in accordance with the plans and specifications and lot diagram accompanying the application of this permit.

Width 220' Depth 310' Height 100'

Number of stories Ten (10)

Proposed use Electric Power Generating Station

Estimated cost $ 7,000,000

This permit is subject to all existing city ordinances and rules and expires by limitation if no work is commenced within one year from date.

This permit is voidable unless compensation is furnished before construction is started and it is subject to the rules and regulations of the State Labor Commission.

A. A. Leotta
A. A. Leotta City Engineer

Per ______

CITY OF OSWEGO, N. Y.

Building Permit #610

(XXXXX — (Construction)

April 22, 1971

This certifies that permission is granted to Niagara Mohawk Power Corp

to construct, ~~enlarge, alter or repair a~~ Storage Tanks ~~building~~ located on lot No. ——,

Block No. ——, ~~House No.~~ Liberty and Lake Street, in accordance with the plans and specifications and lot diagram accompanying the application of this permit.

Width 240' Dia Depth —— Height 48'

Number of stories Five (5)

Proposed use Storage of Fuel oil for Steam Plant

Estimated cost $ 10,000,000

This permit is subject to all existing city ordinances and rules and expires by limitation if no work is commenced within one year from date.

This permit is voidable unless compensation is furnished before construction is started and it is subject to the rules and regulations of the State Labor Commission.

A. A. Leotta

A. A. Leotta, City Engineer

Per ——

CITY OF OSWEGO, N. Y.

Building Permit #611

(XXXXXX-- (Construction)

April 22, 1971

This certifies that permission is granted to Niagara Mohawk Power Corp.

to construct, ~~enlarge, alter or repair~~ a Steam Station building located on lot No. ______,

Block No. ______, ~~House No.~~ Liberty and Lake Street, in accordance with the plans and specifications and lot diagram accompanying the application of this permit.

Width 180' Max Depth 346' Max. Height 700' Max.

Number of stories ______

Proposed use Electric Power Generation

Estimated cost $ 130,000,000

This permit is subject to all existing city ordinances and rules and expires by limitation if no work is commenced within one year from date.

This permit is voidable unless compensation is furnished before construction is started and it is subject to the rules and regulations of the State Labor Commission.

A. A. Leotta

A. A. Leotta, City Engineer

Per ______

CITY OF OSWEGO, N. Y.

Building Permit #612

(ZONING) — (Construction)

April 22, 1971

This certifies that permission is granted to Niagara Mohawk Power Corp.

to construct, ~~enlarge, alter or repair~~ a 345 KV Switch Yard ~~building~~ located on lot No. ——,

Block No. ——, ~~House No.~~ Liberty and Lake Street, in accordance with the plans and specifications and lot diagram accompanying the application of this permit.

Width 500' Depth 300' Height 42'

Number of stories one (1)

Proposed use Electric Power Switching

Estimated cost $ 3,000,000

This permit is subject to all existing city ordinances and rules and expires by limitation if no work is commenced within one year from date.

This permit is voidable unless compensation is furnished before construction is started and it is subject to the rules and regulations of the State Labor Commission.

A. A. Leotta, City Engineer

Per

APPENDIX D

BIBLIOGRAPHY

Reference Number	Description
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2	Great Lakes Pilot, 1971
3	The Surface Tides of Lake Ontario, R.E. Simpson and D.V. Anderson, Res. Rept. No. 76, Ontario Dept. Lands & Forests, Ontario, Canada, 1967
4	Limnology, Nine Mile Point Lake Ontario, Dr. John F. Storr, Appendix Preliminary Safety Analysis Report Nine Mile Point Nuclear Station, Niagara Mohawk Power Corp., Syracuse, New York, 1964
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12	Oswego, N.Y. Master Plan, Zoning Ordinance, Subdivision Regulations, Brown and Blauvelt, July 1958
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24 Literature Review on Effects of Passage Through Power Plants (Entrainment) and Thermal Discharge on Water Quality, Bacteria, and Macro-Invertebrates, G.L. Lauer, New York University Medical Center, February 1971

25 Biological Aspects of Thermal Pollution, I: Entrainment & Discharge Canal Effects, Charles C. Coutant, CRC Critical Reviews in Environmental Control, November 1970

26 Handbook of Freshwater Fishery Biology, K.D. Carlander, Wm. C. Brown Pub. Co., 1950

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28 Letter from John R. Shadley (Bolt, Beranek, and Newman Inc.) to Allen Goldman (Stone & Webster Engineering Corporation), Dated September 28, 1970

29 "Omit"

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