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Docket
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NRR Reading
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STSG
AESteen
WPasciak
BHarless
DEisenhut
RVollmer
ACRS (16)
GLear
GKnighton
OPA (CMiles)
DRoss
TERA
JRBuchanan
RDiggs

Docket No. 50-220

MARCH 26 1979

Mr. Donald P. Dise
Vice President - Engineering
Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

Dear Mr. Dise:

The Commission has issued the enclosed Amendment No. 29 to Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station Unit 1. The amendment consists of a major change to the Appendix B Environmental Technical Specifications (ETS).

Your Environmental Specifications have been under review since early 1977. The enclosed totally revised ETS reflects your submittals of January 24, 1977, October 26, 1977, March 22, 1978 and June 22, 1978 as well as numerous meetings and phone conversations with Niagara personnel.

Of the many changes made, the following are the most significant: (1) Deletion of the environmental monitoring program, (2) Modifications to the chemical limiting conditions of operation, and (3) Modifications to the radiological monitoring program.

By letters dated January 24, 1977 and June 22, 1978 you proposed deletion of all portions of the environmental non-radiological aquatic biological monitoring programs with the exception of impingement sampling. The staff has reviewed and approved most deletions. However, your proposal has been modified with regard to maintaining a low intensity fish sampling program to complement impingement monitoring. This modification was agreed to by your staff.

Conf cp.

By letter dated January 24, 1977 you proposed changes to ETS Section 2.3, Chemical Limiting Conditions of Operation. The staff has reviewed and approved these changes.

7904060004

OFFICE➤						
SURNAME➤						
DATE➤						

NRC FORM 318 (9-76) NRCM 0240 ★ U.S. GOVERNMENT PRINTING OFFICE: 1976 - 265 - 769

By letter dated October 26, 1977 you proposed changes to the Site Radiological Environmental Monitoring Program. The staff has reviewed and approved these changes. However, these changes will be subject to future review upon staff implementation of "as low as is reasonably achievable (ALARA)" criteria as set forth in Appendix I to 10 CFR Part 50.

The amendment does not involve significant new safety information of a type not considered by a previous Commission safety review of the facility. It does not involve a significant increase in the probability or consequences of an accident, does not involve a significant decrease in a safety margin, and therefore does not involve a significant hazards consideration. We have also concluded that there is reasonable assurance that the health and safety of the public will not be endangered by this action.

Copies of the Environmental Impact Appraisal and the Notice of Issuance are also enclosed.

Sincerely,

Original signed by
Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendment No. 29 to DPR-63
2. Environmental Impact Appraisal
3. Notice

cc w/enclosures:
See next page

AS TO AMENDMENT AND FR NOTICE ONLY (AS RMB BM BORDENICK REQD)
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3/22/79

OFFICE ➤	ORB #3	ORB #3	RSB	DOR	AD:E&P	ORB #3
SURNAME ➤	SSheppard	PPolk:mjf	GLear	GKnighton	BGrimes	TIppolito
DATE ➤	3/15/79	3/15/79	3/19/79	3/15/79	3/19/79	3/26/79

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Oswego County Office Building
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 29
License No. DPR-63

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The applications for amendment by Niagara Mohawk Power Corporation (the licensee) dated January 24, 1977, October 26, 1977, March 22, 1978 and June 22, 1978, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-63 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 29, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 26, 1979

ATTACHMENT TO LICENSE AMENDMENT NO. 29

FACILITY OPERATING LICENSE NO. DPR-63

DOCKET NO. 50-220

Replace the existing Appendix B Technical Specifications in their entirety with the enclosed Technical Specifications.

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

APPENDIX B

TO

FACILITY OPERATING LICENSE NO. DPR-63

FOR

NINE MILE POINT NUCLEAR STATION

UNIT 1

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

MARCH 1, 1979

COMPLETE REVISION

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1.0 DEFINITIONS

1.1 Reactor Operating Conditions

a. Power Operating Condition

(1) Reactor mode switch is in startup or run position.
(2) Reactor is critical or criticality is possible due to control rod withdrawl.

b. Normal Station Operation

Normal operation is with the reactor critical and above one percent rated power and in conformance with the requirements of the Technical Specifications.

c. Hot Shutdown Condition

(1) The reactor mode switch is in the shutdown position.
(2) No core alterations leading to an addition of reactivity are being performed.
(3) Reactor coolant temperature is greater than 212 F.

1.2 Major Refueling Outage

For the purpose of designating frequency of testing and surveillance, a major refueling outage shall mean a regularly scheduled refueling outage; however, where such outages occur within 8 months of the end of the previous refueling outage, the test or surveillance need not be performed until the next regularly scheduled outage.

1.3 Operating Cycle

An operating cycle is that portion of Station operation between reactor startups following each major refueling outage as defined above.

1.4 Equipment Status

a. Operable

A system or component shall be considered operable when it is capable of performing its intended function in its required manner.

b. Operating

Operating means that a system or component is performing its required functions in its required manner.

1.5 Instrument Test Procedures

a. Instrument Channel Calibration

Instrument channel calibration means adjustment of channel output such that it responds, with acceptable range and accuracy, to known values of the parameter which the channel measures. Calibration shall encompass the entire channel including equipment actuation, alarm, or trip.

b. Instrument Channel Test

Instrument channel test means injection of a simulated signal into the channel to verify its proper response including, where applicable, alarm and/or trip initiating action.

c. Sensor Check

A sensor check is qualitative determination of acceptable operability by observation of sensor behavior during operation. This determination shall include, where possible, comparison of the sensor with other independent sensors measuring the same variable.

1.6 Circulating Water Heat Treatments

a. Tempering

During tempering, a gate in the screenwell is partially opened to recirculate part of the heated circulating water in the screenwell discharge bay to the intake bay. The procedure is used to maintain condenser inlet temperature at times of low lake temperature.

b. Normal Flow

In the normal flow configuration, circulating water is drawn from the lake into the screenwell intake bay through the intake tunnel. Heated water in the discharge bay is discharged to the discharge tunnel.

c. Reverse Flow

In the reverse flow configuration, circulating water is drawn from the lake into the screenwell intake bay through the discharge tunnel. Heated water in the discharge bay is discharged to the intake tunnel. This procedure is used to correct intake structure icing.

1.6.c (Cont'd)

The term "reverse flow operations" designates the period from the time reverse flow is initiated until two hours after normal flow is restored.

The reverse flow configuration includes a tempering arrangement similar to that described in 1.6.a but using a different gate.

1.7 Prior to Dilution

Liquid effluent concentrations prior to dilution are concentrations in the circulating water discharge tunnel, prior to dilution in Lake Ontario.

1.8 Ambient Lake Temperature

The temperature of incoming lake water, as measured in the screenhouse, before tempering.

2.0 LIMITING CONDITIONS FOR OPERATION

2.1 Thermal

2.1.1 Maximum ΔT

OBJECTIVE

The purpose of this Specification is to limit the thermal stress to the aquatic ecosystem by limiting the maximum ΔT across the condenser.

SPECIFICATION

Maximum ΔT across the main condenser during normal Station operation shall be limited to 32 F. If during normal Station operation the main condenser ΔT exceeds 32 F for eight hours in any given 24 hour period the cause of this deviation shall be investigated and positive action shall be taken to reduce the ΔT to within the Specification. Positive action also shall be taken to prevent any such deviations in the future. In addition, a report shall be submitted in accordance with Section 5.6.2.

MONITORING REQUIREMENT

The main condenser ΔT shall be monitored and recorded once per hour.

The temperatures at the main condenser inlet and in the screenwell discharge bay (upstream from the discharge tunnel) shall be measured by two Resistance Temperature Detectors (RTD) in each location. The RTD's shall be accurate to ±2.0 F. The difference of these temperatures, ΔT_1, shall be computed.

BASES

Nine Mile Point Unit 1 holds a permit from the New York State Department of Health to discharge cooling water to Lake Ontario when operating with a maximum ΔT across the main condenser of 32 F[1]. Lake studies and operating experience indicate that mortality of plankton, eggs, and larvae entrained in the condenser will not have a significant effect on the populations of the species involved.[2,3]

Station service water flow is 40 cubic feet per second (cfs), with a maximum temperature rise of 20 F. When the main condenser flow of 557 cfs with a maximum temperature rise of 32 F is mixed with the service water flow, the maximum temperature rise of the combined flow is 31.2 F.

2.1.2 Maximum Discharge Temperature

NOT APPLICABLE

2.1.3 Maximum BTU Per Hour

NOT APPLICABLE

2.1.4 Rate of Change of Discharge Temperature

OBJECTIVE

The purpose of this Specification is to limit the temperature changes to which aquatic organisms in the discharge plume may be subjected during Station startups, shutdowns, and power level changes.

SPECIFICATION

The discharge temperature shall not be changed by more than 18 F in any hour. This Specification shall not apply to temperature changes occurring during forced shutdowns, or to the temperature increase at the intake resulting from flow reversal.

MONITORING REQUIREMENT

Discharge temperature shall be monitored and recorded hourly as provided in the Monitoring Requirement of Section 2.1.1.

BASES

The cooling water discharge is diluted by a factor of at least 2.5 as it rises from the submerged discharge ports, outside of a conical volume of 100 foot maximum radius extending from the discharge structure to the lake surface. Therefore, outside of this volume, an 18 F per hour discharge temperature change would result in a maximum lake water temperature change of 7 F per hour. Moreover, while the specified rate of change may be reached in the first hour of a shutdown or power change, the rate will be less than 10 F per hour in subsequent hours. This would produce a 4 F per hour change in the lake, as described above.

Fish in Lake Ontario experience natural lake water temperature changes of 6 to 9 F per hour with a frequency greater than the expected frequency of changes induced by the Station. In 1974, for example, temperature drops of 9.5, 8.5, and 6.5 F per hour were recorded in the Station logs on July 29, September 3, and August 15, respectively.

2.1.5 Heat Treatment of Circulating Water System

OBJECTIVE

To limit the thermal stress to the aquatic ecosystem by limiting the circulating water temperature increase over lake ambient temperature resulting from tempering and reverse flow procedures.

SPECIFICATION

When the lake inlet temperature is between 32 F and 50 F, the discharge temperature shall not exceed the lake inlet temperature by more than 50 F, except during reverse flow operations. At no time during tempering, except during reverse flow operations shall the discharge temperature exceed 82 F.

Following a flow reversal, the discharge temperature shall not exceed the lake inlet temperature by more than the following values:

70 F for the first hour following flow reversal
60 F for the second hour following flow reversal
50 F two hours following flow reversal and thereafter

MONITORING REQUIREMENT

The discharge temperature shall be monitored and recorded hourly as provided in the Monitoring Requirement of Section 2.1.1.

BASES

When lake temperature is less than 50 F, part of the discharge flow in the screenwell may be recirculated to the intake to maintain condenser inlet temperature between 40 F and 50 F. This procedure is known as "tempering." The maximum circulating water temperature rise due to tempering is 18 F, and occurs when the lake temperature is 32 F. When this is added to the 32 F ΔT, the maximum rise is 50 F over lake inlet temperature. Maintaining the condenser inlet temperature at no more than 50 F during tempering ensures that the discharge temperature will not exceed 82 F during tempering.

The amount of tempering is controlled by moving a gate in the screenwell, and is normally adjusted to maintain the optimal condenser inlet temperature of approximately 45 F. The gate can be adjusted to achieve this temperature within an error of approximately 5 F.

2.1.5 (Cont'd)

Flow reversal is required to correct intake icing at low intake temperatures. Flow reversal is also required to return to normal flow operations from reverse flow operations.

Prior to flow reversal Station power is reduced to approximately 75 percent power or less. Reversal is achieved by moving gates in the screenwell. Immediately after flow reversal, heated water in the discharge tunnel at essentially the condenser outlet temperature is drawn through the condenser. The reverse flow configuration also requires that some tempering be continued. Accordingly, the 70 F maximum difference between discharge temperature and lake inlet temperature was determined taking into account the elevated intake water temperature, a temperature rise due to tempering, and the condenser rise.

All of the heated water contained in the discharge tunnel at the time of flow reversal passes through the condenser within approximately 6 minutes. Operating experience has shown that dilution of the heated lake water near the discharge structure, sufficient to achieve a discharge temperature no more than 60 F higher than the lake inlet temperature, occurs within one hour after flow reversal. Within two hours the lake temperature near the discharge structure is essentially the lake inlet temperature. Therefore, the discharge temperature can be maintained within 50 F above the lake inlet temperature subsequent to this two hour interval.

Operating experience has shown that reverse flow is required less than five times each winter.

2.2 Hydraulic

NOT APPLICABLE

2.3 Chemical

2.3.1 Biocides

OBJECTIVE

The purpose of this Specification is to protect the quality and purity of Lake Ontario waters.

SPECIFICATION

No biocides shall be used in the main condenser cooling water or service water systems.

MONITORING REQUIREMENT

No monitoring is required because no biocides shall be used in the main condenser cooling water or service water systems.

BASES

The Specification will ensure that the lake water quality is not jeopardized by the introduction of biocides from the main condenser cooling water or service water systems.

2.3.2 Corrosion Inhibitors

OBJECTIVE

The purpose of this Specification is to protect the quality and purity of Lake Ontario waters.

SPECIFICATION

The Station shall not normally discharge corrosion inhibitors to the lake. If inplant system leakage occurs and chromate corrosion inhibitor must be discharged to the lake, the discharge shall not exceed the limits shown in Table 2.3-1, and shall be made to the circulating water system.

MONITORING REQUIREMENTS

Waste tanks shall be analyzed for chromium as shown in Table 2.3-2.

BASES

Adherence to the Specification will ensure that the lake water quality is not jeopardized by the introduction of corrosion inhibitors from the Station.

Chromate corrosion inhibitor is used in the diesel generator closed loop cooling system. No discharges from this system are made to the lake. If leakage from this system should occur, the chromate would be collected in floor drains and routed to the waste tanks. It would ultimately be discharged in the cooling water under controlled conditions. Prompt action will be taken to correct any such leakage.

TABLE 2.3-1

LIMITING VALUES FOR CHEMICALS IN LIQUID EFFLUENTS

Parameter	Maximum Increase Over Lake Ambient Concentration (mg/l Prior to Dilution)	Maximum Annual Discharge From Plant Sources (lbs/year)
Total Suspended Solids	15.0	
Total Dissolved Solids	50.0	4,900
Calcium (as Ca)	5.0	27,000
Sodium (as Na)	1.5	49,000
Sulfate (as SO_4^{-2})	3.0	10
Total Phosphorous (as P)	1.0	(1)
Chromium (as Cr)(1)	0.05	

NOTES

1. Annual discharge of chromium shall normally be zero. Small amounts of chromium may be discharged if chromate leakage from the diesel generator closed loop cooling system should occur. Such leakage would be handled as discussed in the Bases of Section 2.3.2. Small amounts of chromium occur in Station waste water as corrosion products.

TABLE 2.3-2

CHEMICAL LIQUID WASTE ANALYSIS

Sample	Sample Frequency	Type of Analysis (3)	Sensitivity of Analysis
Cooling water Discharge	Monthly (1) Composite	pH	± 0.5 pH units
		Total Dissolved Solids	± 10.0 mg/liter
		Total Suspended Solids	± 5.0 mg/liter
Cooling water Intake	Monthly (1) Composite	pH	± 0.5 pH units
		Total Dissolved Solids	± 10.0 mg/liter
		Total Suspended Solids	± 5.0 mg/liter
Waste Tanks	Each Batch	pH	± 0.5 pH units
		Conductivity	± 1.0 μmho/cm
	Monthly Proportional Composite (2)	pH	± 0.5 pH units
		Total Dissolved Solids	± 10.0 mg/liter
		Total Suspended Solids	± 5.0 mg/liter
		Ca^{+}	± 1.0 mg/liter
		Na^{+}	± 1.0 mg/liter
		SO_4^{-2}	± 1.0 mg/liter
		PO_4^{-3}	± 1.0 mg/liter
		Cr	± 0.5 mg/liter

(1) The cooling water intake and discharge are sampled continuously, for each week. The monthly composite includes an aliquot from each week's collection. If the continuous sampler is unavailable, grab samples shall be taken at a maximum interval of 96 hours.

(2) The monthly proportional composite shall be composited from a representative aliquot of each waste tank batch discharge.

(3) Standard techniques such as ASTM or equivalent methods shall be used for analyses.

(4) This sensitivity applies only to measurements below 10 μmho/cm.

2.3.3 Suspended and Dissolved Solids

OBJECTIVE

The purpose of this Specification is to limit the suspended solids, total dissolved solids and individual solute concentrations in the cooling water discharge to values consistent with the classifications and standards governing the quality and purity of Lake Ontario waters.

SPECIFICATION

For suspended solids, total dissolved solids, and individual solutes in the cooling water discharge, the increase in concentration over lake **inlet** shall not exceed the limits shown in Table 2.2-1. Total annual discharge of individual solutes shall not exceed the limits shown in Table 2.3-1.

If these limits are exceeded, corrective action shall be taken to decrease concentrations to within the Specification.and a report shall be submitted in accordance with Section 5.6.2 a(1).

MONITORING REQUIREMENT

Liquid wastes discharged to Lake Ontario shall be monitored and analyzed as shown in Table 2.3-2.

BASES

Adherence to the Specification will ensure that the water quality of Lake Ontario is not jeopardized by suspended and dissolved solids in Station discharges.

The data obtained from waste tank monthly proportional composite samples will be used with known flow rates to determine the increase in cooling water chemical concentrations over lake inlet concentrations resulting from waste tank releases. Analyses of the cooling water intake and discharge will provide a check against gross errors in the proportional composite sample analysis.

Records of waste tank analyses will provide sufficient information to ensure that the annual discharge limits will not be exceeded.

2.3.4 pH and Conductivity

OBJECTIVE

The purpose of this Specification is to limit the liquid effluent pH to a range of values consistent with the classifications and standards governing the quality and purity of Lake Ontario waters.

SPECIFICATION

The pH of treated water in the waste tanks prior to being discharged into the discharge tunnel shall be between 6.0 and 9.0. When the conductivity of a waste tank is below 10 μmho/cm, the pH shall be between 4.0 and 9.0. If water with a pH value outside these limits is discharged, corrective action shall be taken and a report shall be filed in accordance with Section 5.6.2a (1).

MONITORING REQUIREMENT

Sampling and analysis for pH and conductivity shall be performed in accordance with Table 2.3-2.

BASES

Lake Ontario is designated Class A-Special (International Boundary Water). This classification specifies a lake water pH range of 6.7 to 8.5. However, pH observations performed during site monitoring programs have fallen predominantly in the range from 8.0 to 9.0, and have frequently exceeded 8.5.

Waste tank releases are diluted by a factor of more than 2,000 in the circulating water prior to discharge. After such dilution the discharge is at essentially the same pH as the incoming lake water. Therefore, waste tank releases will have insignificant impact on the frequency with which Class A - Special limits are exceeded when maintained within the Specification.

With increased usage of the waste concentrator, pure water inventory increases. To allow for discharge of water with only CO_2 as contaminant, a lower pH is allowed for low conductivity tanks.

2.4 Radioactive Discharges

OBJECTIVE

To define the limits and conditions for the controlled release of radioactive materials in liquid and gaseous effluents to the environs to ensure that these releases are as low as reasonably achievable. The release rate for all effluent discharges shall be within the limits specified in 10 CFR Part 20.

To ensure that the releases of radioactive material above background to unrestricted areas will be as low as reasonably achievable as defined in Appendix I to 10 CFR Part 50, the following design objectives apply:

For liquid wastes:

a. The annual dose above background to the total body or any organ of an individual from all reactors at a site should not exceed 5 mrem in an unrestricted area.

b. The annual total quantity of radioactive materials in liquid waste, excluding tritium and dissolved gases, discharged from each reactor should not exceed 5 Ci.

For gaseous wastes:

c. The annual total quantity of noble gases above background discharged from the site should result in an air dose due to gamma radiation of less than 10 mrad, and an air dose due to beta radiation of less than 20 mrad, at any location near ground level which could be occupied by individuals at or beyond the boundary of the site.

d. The annual total quantity of all radioiodines and radioactive material in particulate forms above background from all reactors at a site should not result in an annual dose to any organ of an individual in an unrestricted area from all pathways of exposure in excess of 15 mrem.

e. The annual total quantity of iodine-131 discharged from each reactor at a site should not exceed 1 Ci.

2.4.1 SPECIFICATIONS FOR LIQUID WASTE EFFLUENTS

a. The concentration of radioactive materials released in liquid wastes from all reactors at the site shall not exceed the values specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas.

b. The cumulative release of radioactive materials in liquid waste effluents, excluding tritium and dissolved gases, shall not exceed 10 Ci/reactor/calendar quarter.

c. The cumulative release of radioactive materials in liquid waste effluents, excluding tritium and dissolved gases, shall not exceed 20 Ci/reactor in any 12 consecutive months.

d. The radiation monitor on the discharge line from the waste disposal tanks to the discharge tunnel shall continuously monitor released activity and shall be set to alarm prior to exceeding Specification 2.4.1.a.

e. If Specification 2.4.1.d cannot be met, continued release of liquid effluents shall be permitted only during the succeeding 72 hour period. Two independent samples of each tank shall be analyzed and two Station personnel shall independently check valving prior to discharge.

f. The equipment installed in the liquid radioactive waste system shall be maintained and shall be operated to process radioactive liquid wastes prior to their discharge when the projected cumulative release could exceed 1.25 Ci/reactor/calendar quarter, excluding tritium and dissolved gases.

g. The maximum radioactivity to be contained in any liquid radwaste tank that can be discharged directly to the environs shall not exceed 10 Ci, excluding tritium and dissolved gases.

h. If the cumulative release of radioactive materials in liquid effluents, excluding tritium and dissolved gases, exceeds 2.5 Ci/reactor/calendar quarter, the licensee shall make an investigation to identify the causes of such release rates, define and initiate a program of action to reduce such releases to the design objective levels listed in Section 2.4, and report these actions to the Commission within 30 days from the end of the quarter during which the release occurred.

2.4.2 SPECIFICATIONS FOR LIQUID WASTE SAMPLING AND MONITORING

a. Plant records shall be maintained of the radioactive concentration and volume before dilution of liquid waste intended for discharge, and the average dilution flow and length of time over which each discharge occurred. Sample analysis results and other reports shall be submitted in accordance with Section 5.6.1 of these specifications. Estimates of the sampling and analytical error associated with each reported value shall be included.

b. Prior to release of each batch of liquid waste, a sample shall be taken from that batch and analyzed for the concentration of each significant gamma energy peak in accordance with Table 2.4-1 to demonstrate compliance with Specification 2.4.1 using the flow rate of the stream into which the waste is discharged during the period of discharge.

c. Sampling and analysis of liquid radioactive waste shall be performed in accordance with Table 2.4-1. Prior to taking samples, at least two tank volumes of entrained fluid shall be recirculated through the mixing nozzles.

d. The radioactivity in liquid wastes shall be continuously monitored during release. Whenever the monitor is inoperable for a period not to exceed 72 hours, two independent samples of each tank to be discharged shall be analyzed and two plant personnel shall independently check valving prior to the discharge. If the monitor is inoperable for a period exceeding 72 hours, no release from a liquid waste tank shall be made and any release in progress shall be terminated.

e. The flow rate of liquid radioactive waste shall be continuously measured and recorded during release.

f. The liquid effluent radiation monitor shall be calibrated at least quarterly by means of a radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall also have an instrument channel test monthly and a sensor check prior to making a release.

g. The location of process and effluent monitors and samples shall be as stated in Table 2.4-2.

REPORTING REQUIREMENTS

Exceeding limiting conditions for operation contained in this section shall be reported on the prompt schedule.

TABLE 2.4-1

RADIOACTIVE LIQUID SAMPLING AND ANALYSIS

	Liquid Source	Sampling Frequency	Type of Activity Analysis	Detectable Concentrations (μCi/ml)(3)
A.	Waste Tank Releases	Each Batch	1. I-131	1. 10^{-6}
			2. Principal Gamma Emitters (Ba-La-140)	2. 5×10^{-7} (2)
		One Batch/Month	1. Dissolved Gases	1. 10^{-5}
		Monthly Composite(1)	1. H-3	1. 10^{-5}
			2. Gross α	2. 10^{-7}
			3. Sr 89,90	3. 5×10^{-8}
B.	Primary Coolant	Weekly(4)	1. I-131, I-133	1. 10^{-6}

NOTES FOR TABLE 2.4-1

1. A composite sample shall be formed by mixing together individual samples, each of which is proportional in volume to the volume of liquid discharge during the period represented by the sample.

2. For certain mixtures of gamma emitters, it may not be possible to measure radionuclides in concentrations near their sensitivity limits when other nuclides are present in the sample in much greater concentrations. Under these circumstances, it will be more appropriate to calculate the concentrations of such radionuclides using measured ratios with those radionuclides which are routinely identified and measured.

3. The detectability limits for activity analysis are based on technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable and when nuclides are measured below the stated limits, they should also be reported.

4. The power level and cleanup or purification flow rate at the sample time shall also be reported.

TABLE 2.4-2

Nine Mile Point Unit 1 Liquid Waste System

Location of Process and Effluent Monitors and Samplers Required By Technical Specifications

Process Stream or Release Point	Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	Measurements					
					Gross Activity	I	Dissolved Gases	Alpha	^{3}H	Isotopic Analysis
High purity waste sample (test) tank*	(a)			X	X	X	X	X	X	X
Floor drain waste sample (test) tank	(a)			X	X	X	X	X	X	X
Chemical waste sample (test) tank	(a)			X	X	X	X	X	X	X
Detergent waste collector tank**	(a)			X	X	X	X	X	X	X
Primary coolant system	(b)			X	X	X				
Liquid radwaste discharge pipe	(c)		X	X	X					
Service water discharge pipe	(c)		X	X	X					
Emergency cooling system vent	(c)	X	X		X					
Nuclear closed cooling system	(c)		X	X	X					

NOTES TO TABLE 2.4-2

(a) High liquid level alarms are provided for these tanks.

(b) A conductivity alarm is provided for this system.

(c) Radiation alarms are provided for these locations.

*. In some BWR's the High Purity Waste Storage may not have a waste sample (test) tank. The processed liquid will be routed directly to the condensate storage tank or to the floor drain waste sample (test) tank.

** In most BWR's the contents of the detergent waste collector tank are sampled, analyzed and then filtered prior to release through the liquid radwaste discharge pipe. The detergent waste system must be designed with either a split tank or two separate collection or sample (test) tanks to permit isolation of the tanks for mixing, sampling and analysis prior to release.

BASES FOR LIQUID WASTE SPECIFICATIONS

The release of radioactive materials in liquid waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20 and should be as low as practicable in accordance with the requirements of 10 CFR Part 50.36a. These Specifications provide reasonable assurance that the resulting annual dose to the total body or any organ of an individual in an unrestricted area will not exceed 5 mrem. At the same time, these Specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the design objective levels but still within the concentration limits specified in 10 CFR Part 20. It is expected that by using this operational flexibility under unusual operating conditions, and exerting every effort to keep levels of radioactive material in liquid wastes as low as reasonably achievable, the annual releases will not exceed a small fraction of the concentration limits specified in 10 CFR Part 20.

The design objectives have been developed based on operating experience taking into account a combination of variables including defective fuel, primary system leakage, and the performance of the various waste treatment systems, and are consistent with Appendix I to 10 CFR Part 50.

Specification 2.4.1.a requires the licensee to limit the concentration of radioactive materials in liquid waste effluents released from the site to levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas. This Specification provides assurance that no member of the general public will be exposed to liquid containing radioactive materials in excess of limits considered permissible under the Commission's Rules and Regulations.

Specifications 2.4.1.b and 2.4.1.c establish the upper limits for the release of radioactive materials in liquid effluents. The intent of these Specifications is to permit the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the levels normally achievable when the plant and the liquid waste treatment systems are functioning as designed. Releases of up to these limits will result in concentrations of radioactive material in liquid waste effluents at small percentages of the limits specified in 10 CFR Part 20.

Specifications 2.4.1.d and 2.4.1.e require that suitable equipment to control and monitor the releases of radioactive materials in liquid wastes is operating during any period these releases are taking place consistent with the requirements of 10 CFR Part 50, Appendix A, Design Criterion 64.

Specification 2.4.1.f requires that the licensee maintain and operate the equipment installed in the liquid waste systems to reduce the release of radioactive materials in liquid effluents to as low as reasonably achievable consistent with the requirements of 10 CFR Part 50.36. Normal use and maintenance of installed equipment in the liquid waste system provides reasonable assurance that the quantity released will not exceed the design objective. In order to keep releases of radioactive materials as low as reasonably achievable, the Specification requires, as a minimum, operation of equipment whenever it appears that the projected cumulative discharge rate will exceed one-fourth of this design objective annual quantity during any calendar quarter.

Specification 2.4.1.g limits the amount of radioactive material that could be inadvertently released to the environment to an amount that will not exceed the Technical Specification limit.

In addition to limiting conditions for operation listed under Specification 2.4.1.b and 2.4.1.c, the reporting requirements of Specification 2.4.1.h delineate that the licensee shall identify the cause whenever the cumulative release of radioactive materials in liquid waste effluents exceeds one half the design objective annual quantity during any calendar quarter and describe the proposed program of action to reduce such releases to design objective levels on a timely basis. This report must be filed within 30 days following the calendar quarter in which the release occurred.

The sampling and monitoring requirements given under Specification 2.4.2 provide assurance that radioactive materials in liquid wastes are properly controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive liquid wastes released to the environment. Reports on the quantities of radioactive materials released in liquid waste effluents are furnished to the Commission according to Section 5.6.1 of these Technical Specifications in conformance with Regulatory Guide 1.21. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

2.4.3 SPECIFICATIONS FOR GASEOUS WASTE EFFLUENTS

a. (1) The release rate limit of noble gases from the site shall be:

$$\sum_i [Q'_{is}(1.6\,\bar{E}_{i\gamma} + 0.3\,\bar{E}_{i\beta}) + Q_{is}(2.7\,\bar{E}_{i\gamma} + 0.5\,\bar{E}_{i\beta}) + Q_{iv}(11.0\,\bar{E}_{i\gamma} + 24.0\,\bar{E}_{i\beta})] \leq 1$$

where Q'_s = release rate from Nine Mile Point Unit 1 main stack in Ci/sec (as elevated release)

Q_s = release rate from the FitzPatrick main stack in Ci/sec (as elevated release)

Q_v = release rate from the FitzPatrick vents in Ci/sec (ground release)

i = the individual nuclide

$\bar{E}_\gamma$ = the average gamma energy per disintegration

$\bar{E}_\beta$ = the average beta energy per disintegration

Refer to Table 2.4-3 for $\bar{E}_\gamma$ and $\bar{E}_\beta$ values to be used.

(2) The release rate limit of all radionuclides and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of the gaseous wastes from the site shall be:

$$1.2 \times 10^4 (Q'_s + 0.08\,Q_s + 5.5\,Q_v) \leq 1$$

where Q'_s = release rate from Nine Mile Point Unit 1 main stack in Ci/sec (as elevated release)

Q_s = release rate from the FitzPatrick main stack in Ci/sec (as elevated release)

Q_v = release rate from the FitzPatrick vents in Ci/sec (ground release)

TABLE 2.4-3

AVERAGE ENERGY PER DISINTEGRATION

Isotope	$\bar{E}_\gamma$, mev/dis	(Ref)	$\bar{E}_\beta$, mev/dis[3]	(Ref)
Kr-83m	0.00248	(1)	0.0371	(1)
Kr-85	0.0022	(1)	0.250	(1)
Kr-85m	0.159	(1)	0.253	(1)
Kr-87	0.793	(1)	1.32	(1)
Kr-88	1.95	(1)	0.377	(1)
Kr-89	2.22	(2)	1.37	(2)
Kr-90	2.10	(2)	1.01	(2)
Xe-131m	0.0201	(1)	0.143	(1)
Xe-133	0.0454	(1)	0.135	(1)
Xe-133m	0.042	(1)	0.19	(1)
Xe-135	0.247	(1)	0.317	(1)
Xe-135m	0.432	(1)	0.095	(1)
Xe-137	0.194	(1)	1.64	(1)
Xe-138	1.18	(1)	0.611	(1)

(1) ORNL-4923, Radioactive Atoms - Supplement I, M. S. Martin, November 1973.

(2) NEDO-12037, "Summary of Gamma and Beta Emitters and Intensity Data"; M. E. Meek, R. S. Gilbert, January 1970. (The average β energy was computed from the maximum energy using the ICRP II equation, not the 1/3 value assumption used in this reference).

(3) The average β energy includes conversion electrons.

2.4.3 (Cont'd)

b. (1) The average release rate of noble gases from the site during any calendar quarter shall be:

$$\sum_i \bar{E}_{i\beta} [0.9\ Q'_{is} + 1.7\ Q_{is} + 74.0\ Q_{iv}] \leq 1$$

AND

$$\sum_i \bar{E}_{i\gamma} [10.0\ Q'_{is} + 17.0\ Q_{is} + 71.0\ Q_{iv}] \leq 1$$

(2) The average release rate of noble gases from the site during any 12 consecutive months shall be:

$$\sum_i \bar{E}_{i\beta} [1.8\ Q'_{is} + 3.4\ Q_{is} + 149.0\ Q_{iv}] \leq 1$$

AND

$$\sum_i \bar{E}_{i\gamma} [21.0\ Q'_{is} + 35.0\ Q_{is} + 142.0\ Q_{iv}] \leq 1$$

(3) The average release rate from the site of all iodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter shall be:

$$1.5 \times 10^5\ (Q'_s + 0.08Q_s + 5.5\ Q_v) \leq 1$$

(4) The average release rate from the site of all iodines and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months shall be:

$$3.0 \times 10^5\ (Q'_s + 0.08Q_s + 5.5\ Q_v) \leq 1$$

(5) The amount of iodine-131 released during any calendar quarter shall not exceed 2 Ci/reactor.

(6) The amount of iodine-131 released during any period of 12 consecutive months shall not exceed 4 Ci/reactor.

c. Should the conditions of 2.4.3.c(1), (2) or (3) listed below exist, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Section 2.4 and report these actions to the Commission within 30 days from the end of the quarter during which the releases occurred.

(1) If the average release rate of noble gases from the site during any calendar quarter is:

$$\sum_i \bar{E}_{i\beta} \left[3.5\, Q'_{is} + 6.8\, Q_{is} + 282.0\, Q_{iv}\right] > 1$$

OR

$$\sum_i \bar{E}_{i\gamma} \left[41.0\, Q'_{is} + 68.0\, Q_{is} + 310.0\, Q_{iv}\right] > 1$$

(2) If the average release rate from the site of all iodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter is:

$$5.8 \times 10^5 \left(Q'_s + 0.08\, Q_s + 5.5\, Q_v\right) > 1$$

(3) If the amount of iodine-131 released during any calendar quarter is greater than 0.5 Ci/reactor.

2.4.3 (Cont'd.)

d. An air ejector off-gas monitor shall be operating and set to alarm and to initiate the automatic closure of the waste gas discharge valve prior to exceeding the limits specified in 2.4.3.a above. The operability of each automatic isolation valve in the gaseous radwaste discharge line shall be demonstrated quarterly.

e. If no air ejector off-gas monitor is operating, shutdown shall be initiated so that the reactor will be in the hot shutdown condition within 10 hours.

f. If the release rate from the site of noble gases from the main condenser vacuum system is:

$$\sum_i \bar{E}_{i\beta} \left[1.8\, Q'_{is} + 3.4\, Q_{is} + 149.0\, Q_{iv}\right] > 1$$

OR

$$\sum_i \bar{E}_{i\gamma} \left[21.0\, Q'_{is} + 35.0\, Q_{is} + 142.0\, Q_{iv}\right] > 1$$

for a period of greater than 48 hours, the licensee shall notify the Commission in writing within 10 days, identifying the causes of activity. The report should include the flow rate of the off-gas from the main condenser vacuum system, and the activity measured downstream of the main condenser vacuum system prior to holdup, and at a point upstream of the point of release.

g. The drywell shall be purged through the standby Gas Treatment System until Specification 2.4.3 a(1) and 2.4.3 a(2) can be met using normal containment purge systems.

h. A hydrogen monitor in the off-gas line downstream of the recombiners shall be operable during power operation. If the hydrogen concentration reaches an alarm set point of four percent by volume, recombiner section of the Off-Gas System shall be isolated. Whenever the hydrogen monitor is inoperable during power operation, grab samples shall be taken and analyzed for hydrogen concentration each shift. Calibration of the monitoring system shall be performed weekly.

2.4.4 SPECIFICATIONS FOR GASEOUS WASTE SAMPLING AND MONITORING

a. Plant records shall be maintained and reports of the sampling and analysis results shall be submitted in accordance with Section 5.6.1 of these Specifications. Estimates of the sampling and analytical error associated with each reported value should be included.

b. The flow rate of Gaseous releases to the environment shall be measured and recorded. Gross radioactivity shall be continuously monitored except as noted in Specification 2.4.4.c below. Whenever these monitors are inoperable, grab samples shall be taken and analyzed daily for gross radioactivity. If these monitors are inoperable for more than seven days, these releases shall be terminated.

c. An isotopic analysis shall be made of a representative sample of gaseous activity downstream of the steam jet air ejectors and at the stack sample point:

   (1) at least monthly

   (2) following each refueling outage within one week of attaining steady state power

   (3) if the offgas monitors indicate an increase of greater than 50% in the steady state fission gas release after factoring out increases due to power changes.

d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall have an instrument channel test at least weekly and a sensor check at least daily.

e. Sampling and analysis of radioactive material in gaseous waste, particulate form, and radioiodine shall be performed in accordance with Table 2.4-4.

TABLE 2.4-4

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS

	Gaseous Source	Sampling Frequency	Type of Activity Analysis	Detectable Concentrations (μCi/ml)(1) (3)
A.	Drywell Atmosphere	Each Purge	Principal Gamma Emitters	10^{-4}
			H-3	10^{-6}
B.	Environmental Release Points	Monthly (Gas Samples) (2)	Principal Gamma Emitters	10^{-4}
			H-3	10^{-6}
		Weekly (Charcoal Sample) (4)	I-131	10^{-12}
		Weekly (Particulates)(4)	Principal Gamma Emitters (at least for Ba-La-140,I-131)	10^{-11}
		Monthly (Charcoal Sample)	I-133	10^{-10}
		Monthly Composite (5) (Particulates)	Sr-89, Sr-90	10^{-11}
		Monthly	Gross α	10^{-11}

NOTES FOR TABLE 2.4-4

1. **The detectability limits for activity analysis are based on technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable and when nuclides are measured below the stated limits, they should also be reported.**

2. **Gamma analyses shall also be performed following each refueling, startup, or similar operational occurrence which could alter the mixture of radionuclides.**

3. **For certain mixtures of gamma emitters, it may not be possible to measure radionuclides at levels near their sensitivity limits when other nuclides are present in the sample at much higher levels. Under these circumstances it will be more appropriate to calculate the levels of such radionuclides using observed ratios with those radionuclides which are measurable.**

4. When the average daily gross radioactivity release rate exceeds that given in 2.4.3.c(1) or when the release rate is in excess of 1000μCi/sec and steady state gross release rates increase by 50% over previous corresponding power level steady state release rate, the iodine and particulate collection device shall be removed and analyzed to determine the change in iodine-131 and particulate release rate. The analysis shall be done daily following such change until it is shown that a pattern exists which can be used to predict the release rate; after which it may revert to weekly sampling frequency.

5. To be representative of the average quantities and concentrations of radioactive materials in particulate form released in gaseous effluents, samples should be collected in proportion to the rate of flow of the effluent stream.

BASES FOR GASEOUS WASTE SPECIFICATIONS

The release of radioactive materials in gaseous waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20, and should be as low as practicable in accordance with the requirements of 10 CFR Part 50.36. These Specifications provide reasonable assurance that the resulting annual air dose from the site due to gamma radiation will not exceed 10 mrad, and an annual air dose from the site due to beta radiation will not exceed 20 mrad from noble gases, and that the annual dose to any organ of an individual from iodines and particulates will not exceed 15 mrem per site. At the same time these Specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided with a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the design objective levels but still within the concentration limits specified in 10 CFR Part 20. It is expected that using this operational flexibility under unusual operating conditions, and by exerting every effort to keep levels of radioactive material in gaseous waste effluents as low as reasonably achievable, the annual releases will not exceed a small fraction of the concentration limits specified in 10 CFR Part 20. These efforts should include consideration of meteorological conditions during releases.

There is a reduction factor of 243 by which the maximum permissible concentration of radioactive iodine in air should be reduced to allow for the grass-cow-milk pathway. This factor has been derived for radioactive iodine, taking into account the milk pathway. It has been applied to radionuclides of iodine and to all radionuclides in particulate form with a half-life greater than eight days. The factor is not appropriate for iodine where milk is not a pathway of exposure, or for the other radionuclides.

The design objectives have been developed based on operating experience taking into account a combination of system variables including defective fuel, primary system leakage, and the performance of the various waste treatment systems.

The Specification 2.4.3.a(1) dose calculations have been made for the critical sector. These calculations consider site meteorology, buoyancy characteristics, and radionuclide content of the effluent from Nine Mile Point Unit 1 and from the FitzPatrick Plant. Meteorological calculations for offsite locations were performed, and the most critical one was selected to set the release rate. The controlling distance is 1900 meters to the east of Nine Mile Point Unit 1.

The gamma dose contribution was determined using the equation 7.63 in Section 7-5.2.5 of Meteorology and Atomic Energy - 1968. The releases from vents are considered to be ground level releases which could result in a beta dose from cloud submersion. The beta dose contribution was determined using Equation 7.21, as described in Section 7-4.1 of Meteorology and Atomic Energy - 1968. The beta dose contribution was determined on the basis of an infinite cloud passage with semi-infinite geometry for a ground level release (submersion dose). The beta and gamma components of the gross radioactivity in gaseous effluents were combined to determine the allowable continuous release rate. Based on these calculations, a continuous release rate of gross radioactivity from the site in the amount specified in 2.4.3.a(1) will not result in offsite annual doses above background in excess of the limits specified in 10 CFR Part 20.

The average gamma and beta energy per disintegration used in the equation of Specification 2.4.3.a(1) will be based on the average composition of gases determined from the plant stack and ventilation exhausts. The average energy per beta or gamma disintegration for those radioisotopes determined to be present from the isotopic analyses are given in Table 2.4-3. Where isotopes are identified that are not listed in Table 2.4-3, the gamma energies are determined from Table of Isotopes, C. M. Lederer, J. M. Hollander, and I. Perlman, Sixth Edition, 1967 and the beta energy shall be as given in USNRDL-TR-802, II. Spectra of Individual Negatron Emitters (Beta Spectra), O. Hogan, P. E. Zigman and J. L. Macklin.

For Specification 2.4.3.a(2), dose calculations have been made for the critical sectors and critical pathways for all radioiodines and radioactive material in particulate form with half-lives greater than eight days. The calculations consider site meteorology for these releases.

For radioiodines and radioactive materials in particulate form with half-lives greater than eight days, the critical location for ground releases is the east sector at a distance of 990 meters from the FitzPatrick Plant vent where the X/Q is 1.6×10^{-6} sec/m^3 for the dose, due to inhalation. The critical location for elevated releases is the east sector at a distance of 1900 meters from the Nine Mile Point Unit 1 stack where the X/Q is 1.9×10^{-8} sec/m^3 for the dose, due to inhalation. The nearest milk cow is located in the Nine Mile Point Unit 1 SW sector at a distance of 1250 meters where the X/Q is 4×10^{-7} sec/m^3 for ground releases (FitzPatrick vent), and 1.2×10^{-8} sec/m^3 for Nine Mile Point Unit 1 elevated releases. The grass-cow-milk-child thyroid chain is controlling.

The assumptions used for these calculations are: (1) onsite meteorological data for the most critical 22.5 degree sector; (2) credit for building wake; and (3) a reconcentration factor of 243 and a grazing factor of 0.41 were applied for possible ecological chain effects from radioactive iodine and particulate releases where applicable.

Specification 2.4.3.b establishes upper site levels for the releases of noble gases, iodines and particulates with half-lives greater than eight days, and iodine-131 at twice the design objective annual quantity during any calendar quarter, or four times the design objective annual quantity during any period of 12 consecutive months. The intent of this Specification is to permit the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in higher releases than the objectives.

In addition to the limiting conditions for operation of Specifications 2.4.3.a and 2.4.3.b, the reporting requirements of 2.4.3.c delineate that the cause be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter, and describe the proposed program of action to reduce such release rates to the design objectives.

Specification 2.4.3.d and 2.4.3.e are in accordance with Design Criterion 64.

Specification 2.4.3.f is to monitor the performance of the core. A sudden increase in the activity levels of gaseous releases may be the result of defective fuel. Since core performance is of utmost importance in the resulting doses from accidents, a report must be filed within 10 days following the specified increase in gaseous radioactive releases.

Specification 2.4.3.g requires that the primary containment atmosphere receive treatment for the removal of gaseous iodine and particulates prior to its release.

Specification 2.4.3.h requires that hydrogen concentration in the system shall be monitored at all times.

BASES FOR GASEOUS WASTE SPECIFICATIONS (Cont'd.)

The sampling and monitoring requirements given under Specification 2.4.4 provide assurance that radioactive materials released in gaseous waste effluents are properly controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive wastes released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents are furnished to the Commission in conformance with 10 CFR 50.36a(a)(2) on a semi-annual basis. Data is summarized on a quarterly basis in the Semi-annual Radioactive Effluent Release Report and in conformance with Regulatory Guide 1.21. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

2.4.5 SPECIFICATIONS FOR SOLID WASTE HANDLING AND DISPOSAL

a. Measurements shall be made to determine or estimate the total curie quantity and principal radionuclide composition of all radioactive solid waste shipped offsite.

b. Solid wastes in storage and preparatory to shipment shall be monitored and packaged to assure compliance with 10 CFR Part 20, 10 CFR Part 71, and 49 CFR Parts 171-178.

c. Reports of the radioactive solid waste shipments, volumes, principal radionuclides, and total curie quantity, shall be submitted in accordance with Section 5.6.1.

BASES

The requirements for solid radioactive waste handling and disposal given under Specification 2.4.5 provide assurance that solid radioactive materials stored at the plant and shipped offsite are properly controlled, monitored, and packaged in conformance with 10 CFR Part 20, 10 CFR Part 71, and 49 CFR Parts 171-178. These requirements provide the data for the licensee and the Commission to evaluate the handling and storage facilities for solid radwaste, and to evaluate the environmental impact of offsite shipment and storage. Reports on the quantities and amounts of the radionuclides, and volumes of the shipments, shall be furnished to the Commission according to Section 5.6.1 of these Technical Specifications. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

3.0 ENVIRONMENTAL SURVEILLANCE

3.1 Nonradiological Surveillance

Major nonradiological environmental surveys have been conducted beginning in 1972. In 1975, the data obtained from the surveys was used to demonstrate no harm to the water body from Nine Mile Unit 1. The demonstration document was submitted to the Environmental Protection Agency in December 1975 under the provisions of paragraph 316(a) Federal Water Pollutant Control Act Amendments of 1972. Based on the substantial documentation of no harm to the water body Niagara Mohawk has established a program to provide for monitoring of nonradiological environmental parameters in order to ensure early discovery of adverse long range environmental trends.

3.1.1 Meteorological Monitoring

OBJECTIVE

The objective of meteorological monitoring is to adequately measure and document meteorological conditions at the site.

SPECIFICATION

The meteorological monitoring system shall measure parameters as prescribed by Table 3.1-1 to provide data that is representative of atmospheric conditions that exist at all gaseous effluent release points.

REPORTING REQUIREMENTS

Meteorological data shall be compiled for quarterly periods in a format consistent with Table 3.1-2. Summaries of data and observations shall be available to the Nuclear Regulatory Commission upon request. Data shall be reported in conjunction with the Semi-Annual Radioactive Effluent Release Report as specified in Section 5.6.1.b. If the outage time of any of the required meteorological instruments exceeds seven consecutive days, the total outage time and dates of outage, the cause of the outage, and the instrument(s) involved shall be reported within 30 days of the initial time of the outage to the Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation. Modifications to the meteorological monitoring program as described above shall have the written approval of the Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, prior to initiation of the modification.

BASES

The collection of meteorological data at the plant site will provide information which may be used to develop atmospheric diffusion parameters to estimate potential radiation doses to the public resulting from actual routine or accidental releases of radioactive materials to the atmosphere. A meteorological data collection program as described above is necessary to meet the requirements of sub-paragraph 50.36 a (a) (2) of 10 CFR Part 50, Appendix L of 10 CFR Part 50, and 10 CFR Part 51.

TABLE 3.1-1

Meteorological Measurement

PARAMETER	INSTRUMENT ACCURACY	NOMINAL TOWER ELEVATION
Wind Direction	$\pm 5^{\circ}$ (Instantaneous Value)	30', 200'
Wind Speed	$\pm$0.5 mph (2.5-10 mph time average) $\pm$1.0 mph (10-50 mph, time average) +2.5 mph (Starting Speed)	200'
	$\pm$0.5 mph (Time Average) <1.0 MPH (Starting Speed)	30'
Temperature	$\pm 1.0\ ^{\circ}F$ (Time Average)	27'
Temperature Difference	$\pm 0.2\ ^{\circ}F$ (Time Average)	(200'-27')

TABLE 3.1-2

METEOROLOGICAL DATA FORMAT[a]

PERIOD OF RECORD:

STABILITY CLASS:

ELEVATION:

Wind Direction	Wind Speed (mph) at 10m Level						
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N							
NNE							
NE							
ENE							
E							
ESE							
SE							
SSE							
S							
SSW							
SW							
WSW							
W							
WNW							
NW							
NNW							
VARIABLE							

Total
Periods of calm (hours):
Hours of missing data:

[a] In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

3.1.2 Biotic

a) Impingement of Organisms

OBJECTIVE

To estimate the number and weight and to determine the species of fish impinged on the traveling screens in the intake screenwell.

SPECIFICATION

The species and numbers of fish removed from the traveling screens during a 24-hour period shall be recorded.

The number of sampling days per month will be designated using the stratified random program as outlined on Table 3.1-3,

All fish collected will be separated by species. A random sample of 40 fish per species will be analyzed for length and weight from collections with more than 40 fish of a species only.

Based upon the mean weight of individuals of each species, an estimate of the number of fish by species will be calculated. In the event of large collections, sub-sampling during the 24-hour collection will be satisfactory and estimates of the number of fish of each species impinged can be based on volume. When the number of fish collected during a 24-hour period exceeds 20,000 sampling shall be continued until the number of fish is diminished to less than 20,000 in a 24-hour period.

REPORTING REQUIREMENTS

When the number of fish collected during a 24-hour period exceeds 20,000, the NRC Regional Office shall be notified by telephone within 24 hours after sample collections are completed. When the number of fish collected during a 24-hour period is reduced to less than 20,000, a licensing event report shall be prepared. In the event that collection exceeds 20,000 for more than 7 days, an LER shall be filed at the end of the seventh day and every seventh day thereafter.

When the average daily number of fish impinged for a specific month exceeds the range specified in Table 3.1-4, the NRC Regional Office shall be notified by telephone within 24 hours of determining such, and an environmental impact assessment will be conducted and a report of the assessment will be included in the Annual Environmental Operating Report.

Table 3.1-3

Frequency of Sampling

Nine Mile Point Area of Lake Ontario

Survey Group	Frequency	Sampling Days Per Month(2)	Period(1)
Water Quality	Monthly		April-December
Fish Gill Netting	Monthly		April-December
Impingement of Organisms			Throughout Year
	January	4	
	February	4	
	March	4	
	April	16	
	May	20	
	June	4	
	July	4	
	August	6	
	September	4	
	October	4	
	November	4	
	December	4	

(1) Sampling shall not be required when prevented by inclement weather.

(2) Days are to be randomly assigned within each month.

Table 3.1-4

Impingement Range[1]

Month	Daily Average # of Fish	
	Low	High
January	231	631
February	211	718
March	482	2,864
April	5,552	20,923
May	8,501	50,759
June	1,366	3,213
July	718	2,648
August	0	5,020
September	0	1,397
October	154	338
November	103	1,565
December	294	1,713

(1) 99% confidence level, based on impingement collections for the years of 1974 through 1977.

REPORTING REQUIREMENTS (Continued)

A report of impingement sampling results shall be included in the Annual Environmental Operating Report, submitted to the Director of the NRC Regional Office, in accordance with Section 5.6.1.

BASES

The program described in the Specification will monitor the magnitude of fish impingement at the Nine Mile Point site.

3.1.2 b. Lake Program

OBJECTIVE

To monitor effects of plant operation with respect to selected ecological parameters.

SPECIFICATION

Field sampling shall be performed as described below to the extent weather permits. Table 3.1-3 summarizes the lake monitoring program. Sampling locations and type of sampling shall be in accordance with Figure 3.1-1.

(i) Nekton

From April through August bottom gill nets shall be set twice monthly at the 30' depth at all four transects. From September through December bottom gill nets shall be set once monthly at the 30' depth at all four transects (see Figure 3.1-1). Nets will be set at night for a period of approximately 12 hours. In order to provide comparative data between impingement collections and the Lake Program, each gill net collection will be scheduled for the night preceding an impingement collection. All fish collected will be separated by species. A random sample of 40 fish per species will be analyzed for length and weight from collections with more than 40 fish of a species only.

(ii) Water Quality

Temperature and dissolved oxygen will be measured in conjunction with each gill net set.

REPORTING REQUIREMENTS

At the end of each year of study, the results from the Lake Program shall be summarized in the Annual Environmental Operating Report.

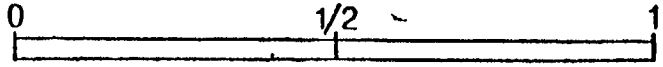
BASES

The information outlined in the Specification will provide data for interpretative analysis of the situation existing in the aquatic ecosystem of Lake Ontario in the Nine Mile Point area.

SAMPLING LOCATIONS

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

NINE MILE POINT SITES



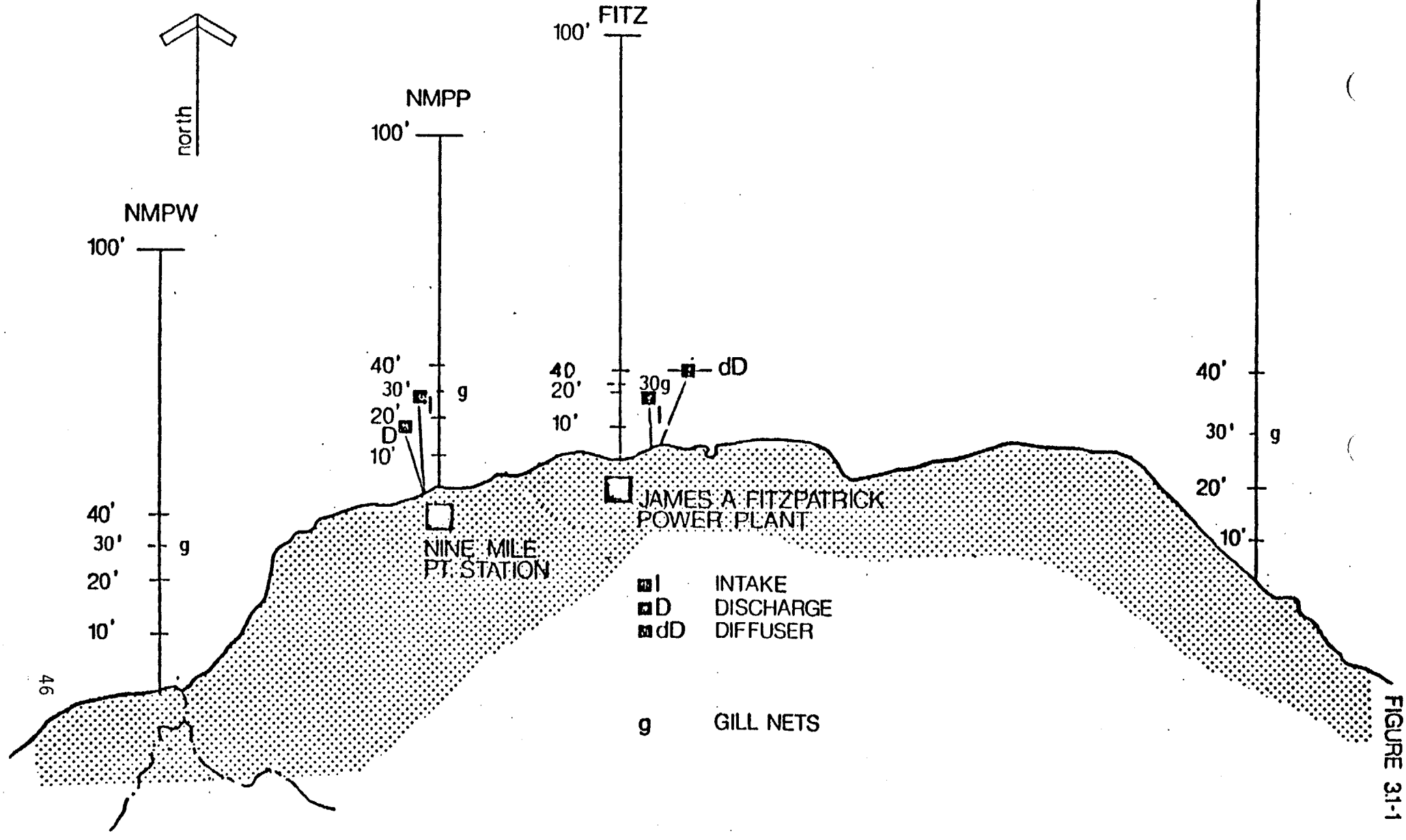


FIGURE 3.1-1

3.2 Radiological Environmental Monitoring

OBJECTIVE

An environmental radiological monitoring program shall be conducted to evaluate the effects of Station operation on the environs and to verify the effectiveness of the controls on radioactive materials sources.

SPECIFICATION

An environmental radiological monitoring program shall be conducted as follows:

a. The environmental radiation monitoring program specified in Table 3.2-1 shall be conducted. Variations from the frequency and location of samples are permitted if due to sample unavailability or seasonal conditions.

b. Reporting requirements for the environmental radiological monitoring program are outlined in Section 5.6.

c. During the seasons that animals producing milk for human consumption are on pasture at locations that may be significantly affected* by emissions from Nine Mile Point-1, samples of fresh milk shall be obtained monthly. For those animals on pasture for which the milk chain dose has been calculated to exceed 15 mrem/year, sampling shall be done weekly. Samples shall be analyzed for their radioiodine content, calculated as I-131. Analysis shall be carried out within eight days (one I-131 half-life) of sampling. Suitable analytical procedures shall be used to determine the radioiodine concentration to a sensitivity of 0.5 picocuries per liter of milk at the time of sampling. For activity levels at or above 0.5 picocuries per liter, overall error (two sigma confidence level) of the analysis shall be within $\pm$ 50 percent. Results shall be reported with associated calculated error, as picocuries of I-131 per liter of milk at the time of sampling.

   Special attention shall be paid to those locations where milk is produced for direct consumption by humans; e.g., the family farm.

d. A census shall be conducted twice annually, (during the beginning and midpoint of the grazing season) to determine the location of cows in potentially affected areas.

---

* For the purposes of this requirement, "Significantly affected" means that calculations, using standard NRC staff assumptions, predict that a two year old child drinking milk produced by animals at that location may receive a thyroid dose of 1 mrem/year or greater.

TABLE 3.2-1

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. LAKE PROGRAM(1)

	MEDIA	SENSITIVITY	ANALYSIS	FREQUENCY	LOCATIONS(2)	
1.	Fish	80 pCi/Kq, dry	GSA, ^{89}Sr & ^{90}Sr	2/yr	2 onsite	1 offsite
2.	Cladophora	N/A	GSA	in season	2 onsite	1 offsite
3.	Lake Water	N/A	GSA ^{3}H, ^{89}Sr, ^{90}Sr	M Comp. Qtr. Comp.	3(3)	
4.	Sediment	N/A	GSA	Semi-Annual	Dam Shoreline	1 offsite

NOTES:

(1) Program continued for at least three years after the startup of James A. FitzPatrick Nuclear Power Plant.
(2) Onsite samples collected in the vicinity of discharges, offsite samples collected at a distance of at least five miles from site.
(3) The three lake water samples to include Nine Mile Point Unit 1 intake water, James. A. FitzPatrick intake water, and Oswego city raw water.

TABLE 3.2-1 (Cont'd.)

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B. LAND PROGRAM(1)

	MEDIA	ANALYSIS	FREQUENCY	NO. OF LOCATIONS	LOCATIONS	
1.	Air Particulates	GB GSA	W M Comp(4)	At least 10	7 onsite	6 offsite
2.	Soil	GSA, ^{90}Sr	Every 3 years	13	7 onsite	6 offsite
3.	TLD	Gamma Dose	Qtr.	20	14 onsite	6 offsite
4.	Radiation Monitors	Gamma Dose	C	At least 7	7 onsite	1 offsite
5.	Airborne - I^{131}	GSA	W	At least 10	7 onsite	6 offsite
6.	Milk	I GSA, ^{90}Sr	M(5) M	4(5)	(6)	
7.	Human Food Crops	GSA, ^{131}I	A	3	(6)	
8.	Meat, Poultry, Eggs	GSA Edible Portions	SA	3	(6)	

NOTES: (Cont'd.)

(4) Onsite samples counted as two composites; offsite samples counted as two composites; any high gross beta count samples counted separately (not included in composite).
(5) Frequency applied only during grazing season.
(6) Samples to be collected from farms within a 10-mile radius having the highest potential concentrations of radionuclides.

Abbreviations:

M Comp. - Monthly composite of weekly or bi-weekly samples
GB - Gross beta analysis
GSA - Gamma spectral analysis on a NaI or GeLi system (quantitative)

A - Annually
W - Weekly
M - Monthly
C - Continuous
BW - Bi-weekly (alternate wks.)
Qtr. - Quarterly
SA - Semiannually

3.2 (Cont'd.)

If it is learned from this census that animals producing milk for human consumption are present at a location which yields a calculated infant thyroid dose greater than from previously sampled animals, the new location shall be added to the surveillance program as soon as practicable. The sampling location having the lowest calculated dose may then be dropped from the surveillance program at the end of the grazing season during which the census was conducted

BASES

The number and distribution of sampling locations and the various types of measurements described in Table 3.2-1 together with the preoperational background data, will provide verification of the effectiveness of Station effluent control and indication of measurable changes in the activity of the environment.

The concentration of I-131 in milk of 2.4 picocuries per liter will result in a dose to the thyroid of a 0-2 year old child of 15 mrem/year, based upon consumption of one liter per day for the year. To assure that no child will receive a dose of greater than 15 mrem/year to the thyroid it is necessary to know the radioiodine concentration in the milk to the sensitivity given above, 0.5 pCi/liter.

Ground water sampling is not required because ground water in the vicinity of the station flows north to the lake, away from any nearby wells.

4.0 SPECIAL SURVEILLANCE AND STUDY ACTIVITIES

NOT APPLICABLE

5.0 Administrative Controls

OBJECTIVE

Administrative controls for implementation of the Environmental Technical Specifications are the means by which environmental protection is subject to Station management control and independent review and audit. These measures ensure that the Environmental Technical Specifications will be properly implemented.

5.1 Responsibility

5.1.1 The responsibilities of the General Superintendent-Nuclear Generation as prescribed in paragraph 6.1.1 Appendix A shall include the continuing protection of the environment.

5.1.2 Operation of the Station in compliance with the Environmental Technical Specifications is the responsibility of the Station Superintendent with the assistance of the Station staff organization.

5.1.3 The structure of corporate responsibility is shown in Figure 6.2-1 of Appendix A.

5.2 Organization

5.2.1 The Station organization and its relationship to the site organization is shown in Figure 6.2-2 of Appendix A to Facility Operating License No. DPR-63, "Radiological Technical Specifications".

5.2.2 Environmental monitoring will be performed by site technical personnel and when requested by environmental consultant personnel. Engineers from the corporate staff will be available for technical assistance when required.

5.3 Review and Audit

5.3.1 Units for review and audit of environmental matters shall be as described in section 6.5 of Appendix A to Facility Operating License No. DPR-63, "Radiological Technical Specifications." In addition to the regular members of the Site Operations Review Committee, a responsible supervisor from each consultant organization performing environmental monitoring shall participate in Committee meetings as required.

5.3.2 The responsibilities and authorities of the environmental review and audit units are as detailed in section 6.5 of Appendix A.

5.4 Action to be Taken if a Limiting Condition for Operation is Exceeded

5.4.1 Remedial action as permitted by the Technical Specification shall be taken until the condition can be met.

5.4.2 Exceeding a limiting condition for operation shall be investigated by the Site Operation Review Committee.

5.4.3 A report for each occurrence shall be prepared in accordance with one of the schedules specified in Section 5.6.2 or as required by the particular specification involved.

5.5 Procedures

5.5.1 Detailed written procedures, including applicable checkoff lists and instructions, shall be prepared, approved as specified in Section 5.5.2 and adhered to for operation of all systems and components involved in carrying out the environmental monitoring program. Procedures shall include sampling, instrument calibration, analysis, and actions to be taken when specified limits or report levels are approached or exceeded. Calibration frequencies for instruments used in performing the measurements required by the environmental Technical Specifications shall be included. Testing frequency of any alarms shall be included. These frequencies shall be determined from experience with similar instruments in similar environments and from manufacturers' technical manuals.

5.5.2 Prior to implementation, all procedures described in 5.5.1 above, and changes hereto, shall be reviewed as provided in Section 5.3 and approved by the Station Superintendent. Temporary changes to procedures which do not change the intent of the original procedure may be made, provided such changes are approved by the Station Superintendent and one of the following Supervisors: Assistant Radiochemistry and Radiation Protection Supervisor, Radiochemistry and Radiation Protection Supervisor, or Result Supervisor. Such changes shall be documented, subsequently reviewed as provided in Section 5.3 and approved on a timely basis.

5.6 Plant Reporting Requirements

5.6.1 Routine Reports

a. Annual Environmental Operating Report

PART A: Nonradiological Report

A report on the environmental surveillance programs for the previous 12 months of operation shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) as a separate document within 6 months after January 1 of each year. The report shall include summaries of the nonradiological environmental surveillance activities (Section 3) for the report period. If harmful effects or evidence of damage are detected by the monitoring, the licensee shall provide an analysis of the problem and a proposed course of action to alleviate the problem.

PART B: Radiological Report

A report on the radiological environmental surveillance programs for the previous 12 months of operation shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) as a separate document within 4 months after January 1 of each year. The reports shall include summaries of the radiological environmental surveillance activities for the report period. The reports shall also include the results of land use censuses required by the specifications. If harmful effects or evidence of irreversible damage are detected by the monitoring, the licensee shall provide an analysis of the problem and a proposed course of action to alleviate the problem.

Results of all radiological environmental samples taken shall be summarized and tabulated on an annual basis in the format of Table 5.6-1. In the event that some results are not available within the 6 months period, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

b. Radioactive Effluent Release Report

A report on the radioactive discharges released from the site during the previous 6 months of operation shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) within 60 days after January 1 and July 1 of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant.

The report shall include a summary of the meteorological conditions concurrent with the release of gaseous effluents during each quarter as prescribed in Section 3.1.1(b)(3).

5.6.2 Nonroutine Reports

a. Nonroutine Environmental Operating Reports

A report shall be submitted in the event that (a) a limiting condition for operation is exceeded (as specified in Section 2, "Limiting Conditions for Operation") or (b) a report level or specification is reached (as specified in Section 3, "Environmental Surveillance"). Reports shall be submitted under one of the report schedules described below:

TABLE 5.6-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REPORT

Facility Nine Mile Point Unit 1 Docket No. 50-220

A. Sample Results

Medium/Sample	Location	Quarter 1	Quarter 2	Quarter 3	Quarter 4
		Average Quarterly Results 2/ (specify radionuclide or entity)			
AIRBORNE					
Particulate					
1)					
2)					
Iodine					
1)					
2)					
Soil					
1)					
2)					
DIRECT					
1)					
2)					
WATERBORNE					
Surface					
1)					
2)					
Ground					
Drinking					
1)					
2)					

TABLE 5.6-1 (cont.)

AQUATIC

Sediment

1)
2)

Benthic Organisms

1)
2)

Plants

1)
2)

INGESTION

Milk

1)
2)

Fish and Shellfish

1)
2)

Meat and Poultry

1)
2)

OTHER

B. Evaluation

(Include a summary evaluation of the results from the monitoring program).

NOTES FOR TABLE 5.6-1

1) Specify location and its distance and direction from the facility, and indicate which is used for background.

2) Use the following units; direct radiation, mrem/quarter; particulate pCi/m^3, iodine, water and milk, pCi/l, precipitation, nCi/m^2; sediment, and vegetation, pCi/gm dry.

5.6.2 (Cont'd.)

(1) Prompt Report. Those events requiring prompt reports shall be reported within 24 hours by telephone, telegraph, or facsimile transmission to the Director of the NRC Regional Office and within 10 days by a written report to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation).

(2) 30-Day Report. Those events not requiring prompt reports shall be reported within 30 days by a written report to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation).

Reports concerning unusual or important events shall be reported on the prompt schedule.

Written 10-day and 30-day reports and, to the extent possible, the preliminary telephone, telegraph, or facsimile reports shall (a) describe, analyze, and evaluate the occurrence, including extent and magnitude of the impact, (b) describe the cause of the occurrence, and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

b. Nonroutine Radiological Environmental Operating Reports

If a confirmed measured level of radioactivity in any environmental medium exceeds ten times the control value, a written report shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) within 10 days after confirmation.* This report shall include an evaluation of any release conditions, environmental factors, or other aspects necessary to explain the anomalous result.

* A confirmatory reanalysis of the original, a duplicate, or a new sample may be desirable, as appropriate. The results of the confirmatory analysis shall be completed at the earliest time consistent with the analysis, but in any case within 30 days.

5.6.2 (Cont'd.)

c. Nonroutine Radioactive Effluent Reports

If the quantity of radioactive material released in effluents to unrestricted areas during any calendar quarter is such that the resulting radiation exposure or cumulative activity release exceeds one-half the design objective annual exposure derived pursuant to Appendix I 10 CFR Part 50, as stated in the Objective of Section 2.4, the licensee shall make an investigation to identify the causes of such releases and define and initiate a program of action to reduce such releases to the design objective levels. A written report of these actions shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) within 30 days from the end of the quarter during which the release occurred. The release levels at which such a report is required are given in Specifications 2.4.1.h and 2.4.3.c for liquid and gaseous releases, respectively. In addition, Specification 2.4.3.f gives conditions under which a report is required within 10 days.

5.6.3 CHANGES IN ENVIRONMENTAL TECHNICAL SPECIFICATIONS

a. A report shall be made to the NRC prior to implementation of a change in plant design, in plant operation, or in procedures described in Section 5.5 if the change would have a significant effect on the environment or involves an environmental matter or question not previously reviewed and evaluated by the NRC. The report shall include a description and evaluation of the change and a supporting benefit-cost analysis.

b. Request for changes in environmental technical specifications shall be submitted to the Director, Office of Nuclear Reactor Regulation, for review and authorization. The request shall include an evaluation of the environmental impact of the proposed change and a supporting benefit-cost analysis.

5.7 RECORDS RETENTION

5.7.1 Records and logs relative to the following areas shall be made and retained for the life of the plant:

a. Records and drawings detailing plant design changes and modifications made to systems and equipment as described in Section 5.6.3.

b. Records of all data from environmental monitoring, surveillance, and special surveillance and study activities required by these Environmental Technical Specifications.

5.7.2 All other records and logs relating to the Environmental Technical Specifications shall be retained for five years following logging or recording.

LAND MANAGEMENT

It is Niagara Mohawk's policy to encourage growth of desirable species of trees, shrubs and ground covers which will preserve and enhance the ecological values of unoccupied land on its generating sites and transmission rights-of-way. Transmission line maintenance is accomplished on a scheduled basis under the supervision of Niagara Mohawk personnel and includes selective use of herbicides, approved for such use by appropriate governmental agencies. The guides for the use of herbicides are as follows and apply within the site boundary:

a. Selective use of herbicides shall be employed to maintain "tight ground cover" which will allow growth of compatible weeds and woody species and tend to encourage wildlife habitat growth.

b. No herbicide shall be used in an application for which it is restricted by the New York State Department of Environmental Conservation (DEC) restricted use list.

c. Herbicides such as 2, 4, 5-T or similar compounds which are approved for use by the U. S. Environmental Protection Agency and DEC for the purpose intended shall be used as prescribed and directed by registered label.

d. No formulation with a dioxin contamination level that exceeds 0.1 parts per million shall be used.

e. No contamination of potable water supplies shall be permitted.

f. Application of herbicides to potential human foodstuffs including wild berries shall be avoided.

g. Niagara Mohawk policy mandates fee ownership of transmission rights-of-way. If herbicides are to be applied to an area where a grazing easement is in effect, the holder of the easement shall be notified of product label requirements regarding grazing prior to application of the herbicides.

h. Treatment shall not be more than once per year.

i. When the Administrator of EPA and the DEC issue standards for pesticide applicators, all spraying shall be done by an individual meeting these standards or under his immediate supervision. Implementation of these requirements shall conform to any compliance schedule contained in such standards.

j. When it becomes necessary to cut or spray vegetation which in the wilting stage has a potential for physiological harm to grazing animals, precautions shall be taken to preclude availability of such material to livestock.

h. Only selective use of herbicides shall be employed on vegetation used for road and stream screening. Such application may be used to eliminate undesirable species which would encroach on the right-of-way and inhibit the growth of more desirable species. Treatment shall be such that visual impact is minimized. Treatment of stream screening vegetation shall be performed such that no herbicide shall be introduced into the water body.

l. Aerial spraying operations shall be performed only when wind speed is less than 5 mph. During such operations a procedure to control drift shall be employed. Two examples of an acceptable procedure are:

(1) A thickening agent may be added to the herbicide mix to permit "on target" deposition.

(2) A "microfoil" delivery system may be used to control droplet size.

m. Work of contractors performing spray operations shall be inspected for compliance with these specifications. Records (field logs) shall be kept for each inspection.

Subject to the above restrictions, herbicides may be used in initial clearing operations and in right-of-way maintenance. Following initial clearing, stumps will be treated with herbicides to prevent "resurge". It is Niagara Mohawk policy to effectively remove tall-growing species from the right-of-way which can invade the "wire security zone" through the use of herbicides. This policy allows low-growing compatible species to occupy the growing space. Subsequently, as field observations dictate, various herbicides may be employed on a selective basis to prevent the growth of those species which could result in interference and potential short circuit of transmission lines.

6.0 REFERENCES

1. New York State Department of Health Permit to Discharge Sewage or Wastes into the Waters of the State, issued to Niagara Mohawk Power Corporation for the Nine Mile Point Nuclear Power Station on April 28, 1965. This Permit is presented as Item 5 of Appendix G in the Nine Mile Point Nuclear Station Unit 1 Environmental Report.

2. Nine Mile Point Nuclear Station Unit 1 Environmental Report, Sections 5.1.3, 5.5.1-5.5.4, 9.5.1.2.2

3. Nine Mile Point Nuclear Power Station Unit 2, Effect of Circulating Water Systems on Lake Ontario Water Temperature and Aquatic Biology, Volume I.

4. Final Environmental Statement Related to operation of Nine Mile Point Nuclear Station Unit 1, pg. 2-16.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENVIRONMENTAL IMPACT APPRAISAL BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 29 TO LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 Introduction

1.1 Environmental Non-Radiological Aquatic Biological Monitoring Program

By letters dated January 24, 1977 and June 22, 1978, Niagara Mohawk Power Corporation (the licensee) requested an amendment to the Appendix B Non-Radiological Environmental Technical Specifications (ETS) for Nine Mile Point Nuclear Station, Unit 1. The licensee proposes to delete all portions of the environmental non-radiological aquatic biological monitoring program in section 3 with the exception of impingement sampling, which they propose to reduce in sampling intensity. The staff has modified the licensee's proposal by maintaining a low-level fish sampling program in the lake to complement the impingement monitoring, and the licensee has agreed to this. This appraisal reviews the results of and provides a basis for deleting Specifications: 3.1.1.a; 3.1.2.a(1) (except for a low-intensity fish sampling program to complement the impingement monitoring); 3.1.2.a(3); and reducing the intensity of sampling required by Specification 3.1.2.a(2).

The evaluation of this portion of the modification is discussed in Section 2.1.

1.2 Chemical and Thermal Limiting Conditions of Operation

By letter dated January 24, 1977, the licensee requested an amendment to the Appendix B Non-Radiological Environmental Technical Specifications for Nine Mile Point Unit 1. The licensee proposes changes to Section 2.3, Chemical Limiting Conditions for Operation (LCO's) involving:

a) Section 2.3.2. The licensee proposes to monitor and limit discharges of chromium rather than chromate.

b) Section 2.3.4. The licensee proposes to monitor conductivity and to discharge effluents with a pH between 4.0 and 9.0 when the conductivity of the waste tank is below 10.0 μ mno/cm.

The evaluation of this portion of the modification is discussed in section 2.2.

During informal discussions regarding LCO's the licensee proposed changes to Section 2.1, Thermal Limiting Conditions for Operation involving monitoring requirements. No allowance has been made for dilution of the main condenser cooling water by the cooler service water, thus, in effect, allowing an increase in ΔT of 0.8°F. Also, the RTDs in the proposed license amendment package need only have an accuracy of ± 2.0°F. The end result is that the proposed changes could conceivably allow operation with a ΔT up to 2.3°F higher than is authorized under the current ETS.

The evaluation of this portion of the modification is also discussed in Section 2.2.

1.3 Radiological Effluent and Environmental Monitoring Program

By letter dated October 26, 1977 the licensee requested an amendment to the Appendix B Non-Radiological Environmental Technical Specifications for Nine Mile Point Unit 1.

The proposed changes to the radiological effluent and environmental monitoring programs (Sections 2.4 and 3.2) include the following:

1. Deleting the requirement for monthly analysis for I-135 on gaseous releases;

2. Performing monthly analysis (instead of quarterly) for SR 90 on liquid and gaseous releases;

3. Deleting the environmental sampling and analysis programs for mollusk, gammarus, periphyton, and adding cladophora sampling and analysis;

4. Reducing the number of environmental sampling locations for air particulates, soil, direct radiation monitors, and airborne I-131 from 9 onsite locations to 7 onsite locations (offsite locations have remained the same).

The evaluation of this portion of the modification is discussed in section 2.3.

2.0 Evaluation

2.1 Environmental Non-Radiological Aquatic Biological Monitoring Program

Specification 3.1.1.a requires monthly sampling of eleven water quality parameters at six stations. The objective of this program is to measure and document water quality conditions in the vicinity of the

site and to provide data on those factors which are related to plant operation. The Final Environmental Statement (FES) states that the water quality surveys will be conducted to complement the biological sampling program. Comparison of annual averages for each parameter indicates that no cumulative changes in any of the parameters have occurred over the four years of plant operation. In addition, analyses of the data from the annual reports have not indicated either short or long-term effects of plant operation on water quality in the Nine Mile Point area. The major influences on water quality identified by our review were effects of the nearby Oswego River and naturally occurring seasonal fluctuations and short-term variations due to lake upwellings. The lack of any identifiable effect on water quality as a result of plant operation indicates that no significant adverse impacts are likely in the future (assuming that the plant operating mode does not change). Therefore, the water quality program in the lake is not needed to follow plant induced changes. Furthermore, the deletion of the biological sampling program in the lake eliminates the need for water quality data for interpretation of biological data. However, the low-intensity fish sampling program in the lake will be accompanied by measurements of temperature and dissolved oxygen.

Specification 3.1.2a(1) requires a general ecological survey consisting of monitoring programs for phytoplankton, microzooplankton, macrozooplankton, ichthyoplankton, periphyton, benthos, and fish. The specific objectives of the general ecological survey (as outlined in the FES) are as follows:

(1) Determination of distribution and relative abundance of species in space and time in the biotic groups (phytoplankton, zooplankton, periphyton, benthos, and fish);

(2) Determination of changes in biological parameters and their significance within and out of the area influenced by the thermal plume;

(3) Determination of the relationship of changes within and among biotic groups and with the physical and chemical characteristics of the environment; and

(4) Determination of the relationship of changes to the operation of the plant and significance of the effect of such changes on the ecosystem.

This survey, described in the FES and designed to be descriptive in nature, was to span at least a two-year period, ending approximately in June 1975 and was to be used to: (1) identify which of the biological parameters require continual monitoring throughout the life of the plant and establish limiting conditions and report levels for these biological parameters, or (2) establish that measurement of such parameters is

unnecessary due to insignificant impact. Data collected during more than nine years of plant operation, combined with the preoperational data, have documented cyclic short-term seasonal variations in the lake, but have failed to indicate that operation of Nine Mile Point Unit 1 is causing a significant adverse impact on any segment of the biota as described below:

(1) Phytoplankton

Surface (50% light transmittance level) whole water phytoplankton samples have been collected monthly at stations along four transects (two thermally influenced and two control) at four depths (10, 20, 40 and 60-ft contours) since 1973. Also samples have been taken at the 25% and 1% light transmittance levels at five of these stations since 1975. Abundance, species composition, and chlorophyll were measured during all years; biovolume and primary productivity (uptake of ^{14}C) were measured during some, but not all years. With this comprehensive data base, encompassing both potentially impacted and non-impacted areas in the Nine Mile Point vicinity, any significant changes to phytophankton community composition or productivity due to plant operation would be evident.

The seasonal patterns of phytoplankton abundance and species composition observed in the vicinity of Nine Mile Point since 1973 reflect seasonal patterns typical of Lake Ontario. There is some phytoplankton growth throughout the year, with species identified from all phytoplankton groups (diatoms, green algae, blue-green algae and flagellates). The annual cycle is usually characterized by two periods of rapid and intense phytoplankton growth, termed "pulses" or "blooms." One pulse during the spring is dominated by diatoms, while the fall pulse is usually dominated by blue-green algae. Maximum chlorophyll "a" generally occurs during the summer, although peaks also occur in the spring and sometimes during the fall. The seasonal patterns are correlated closely with natural changes in physical conditions, i.e., water temperature and light intensity, and with the supply of dissolved inorganic nutrients.

The species composition of the phytoplankton community in the Nine Mile Point vicinity has been relatively consistent throughout the years despite considerable natural variation. Green algae tends to be the dominant component of the phytoplankton in the late summer, with a large increase in abundance during July being dominated by the same species reported to exist throughout the lake. The spatial difference in abundance, species composition and productivity in the site vicinity appear to be related to natural phenomena such as lake circulation patterns and the Oswego River. West to east trends (Oswego River influence) of decreasing standing crop have been noted. Trends of decreasing abundance and chlorophyll "a" at offshore stations compared to nearshore ones have also been noted. No consistent trend of increased or

decreased species abundance or chlorophyll "a" was detected in the near field. Although primary productivity was occasionally enhanced in the discharge area, the effect was not noted outside of a localized area, nor was it present during each year or consistent throughout the year.

The phytoplankton species in the vicinity of Nine Mile Point conform closely to the inventory of species recorded for shoal waters in Lake Ontario. The taxonomy, distribution and abundance of phytoplankton in the area are essentially the same as have been determined for the lake as a whole. It can be concluded that the impact of the Nine Mile Point Nuclear Station is not detectable above natural variations and is not significant since no large-scale shifts in the composition of the phytoplankton community have occurred over the last five years. The phytoplankton community is expected to continue to display similar seasonal and spatial trends in standing crop and species composition in the future. This fact plus the lack of any significant plant impacts make further monitoring of the phytoplankton community unnecessary.

(2) Zooplankton

For the purpose of the studies undertaken at Nine Mile Point, the zooplankton were separated by size into two categories: microzooplankton and macrozooplankton. "Macrozooplankton" are those invertebrate zooplankton retained in a 571-micron mesh zooplankton net, while "microzooplankton" are functionally defined as the zooplankton ranging in size from 76 to 571 microns. Microzooplankton were collected at least monthly from 1973 through 1977. Samples were collected by oblique or vertical tows through the entire water column along four transects (two potentially thermally influenced and two controls) at four depth contours (10, 20, 40, and 60-ft depth contours) and species composition and abundance were measured.

(3) Microzooplankton

The microzooplankton fraction of the total zooplankton community in the vicinity of Nine Mile Point was composed of four major taxonomic groups: rotifers, cladocerans, copepods and protozoans. Strong seasonal trends were evident in all years, with maximum microzooplankton abundance occurring during the summer, and a secondary peak often occurring in the fall. Rotifers contributed the greatest percentage of microzooplankton abundance in the

vicinity of Nine Mile Point, exhibiting a bimodal pattern, peaking once during the summer with a second smaller pulse in the early fall.

Statistical analysis performed by the licensee indicated that the abundance at the transects were not significantly different. A three-way ANOVA indicated that the greatest variance in the data was attributable to differences among dates followed by contour depths at the stations and finally at transects. The only consistent trend was one of decreasing microplankton densities recorded offshore at all transects and was unrelated to plant operation. Some changes have been documented in the microzooplankton community between years, but no consistent or unidirectional change has been noted over the past five years. The same species have dominated the community during each year, and no long-term increases or decreases in the standing crop of any group have been observed. The seasonal patterns are similar to those reported by other researchers. Variations in the temporal and spatial patterns appear to be primarily the result of natural fluctuations.

(4) Macrozooplankton

Macrozooplankton samples were collected concurrently with the ichthyoplankton samples since the same sampling gear was used for both. Samples were collected during 5-minute tows with a 571 micron plankton net from surface, mid and bottom depths at 15 stations distributed in three concentric arcs (0.5, 1.0 and 3.0 mile radii from the Nine Mile Point plant) on five depth contours (20, 40, 60, 80, and 100-ft contours). Sampling was conducted weekly and collections were made both day and night and were analyzed for species composition and abundance. The dominant macrozooplankton groups were cladocerans, copepods and amphipods (many of the same species collected in the microzooplankton samples due to the wide range of sizes encompassed by the developmental stages of these organisms), with the macrozooplankton community frequently dominated by the cladoceran Leptodora and the amphipod Gammarus. The species composition of the macrozooplankton community remained relatively stable over the years studied, with the same species occurring each year. Some macrozooplankton, such as Gammarus typically exhibited diel vertical migrations, moving into the water column during the night and remaining on the bottom during the day. Highest abundances for the dominant organisms occurred during the summer when seasonally warm water temperatures and abundant food supplies (both of which affect reproduction and growth) are prevalent.

Pontoporeia and Mysis, both cold-water species (glacial relects) were observed primarily during periods of cold water upwellings. Patterns of spatial distribution have been variable over the years, but it appears that there is an increase in the abundance of Gammarus and Diptera toward the eastern stations where more sand and silt are found in the substrate beyond the 20-ft contour. In addition, a trend of decreasing Gammarus abundance with increasing depth has been noted. These trends are similar to those found in the benthic collections. No significant or consistent changes appear to have occurred in the macrozooplankton community that can be attributed to plant operation. Rather, most of the variability noted seems to be related to natural environmental fluctuations.

(5) Ichthyoplankton

Ichthyoplankton samples collected concurrently with the macrozooplankton samples for the five years from 1973 through 1977 were comprised of eggs and larvae of several fish species. Seasonal patterns of egg and larval abundance indicated two periods of larval presence. The first was comprised of the late fall, winter and early spring-spawning fish. Rainbow smelt and yellow perch were the most abundant species collected during this period, with occasional occurrences of burbot and cisco in low numbers. The second period included summer-spawning fish species dominated by the alewife. Rainbow smelt were generally the second most abundant larvae and were present in more collections over a longer period (but in lower numbers) than the alewife. Larvae of other species were collected in low numbers or not at all. The egg collections (as might be expected from the larvae fish collections) were dominated by alewife and rainbow smelt. Eggs of the other species were collected in extremely low numbers and on only ten sampling dates. Eggs and larvae of all species were collected in greater concentrations in all years at the 20 ft depth contour than at the deeper contours throughout the study area. As the larvae mature, they emigrate to the deeper water, creating an onshore-offshore distribution. Diel patterns, in which alewife eggs and larvae and rainbow smelt larvae were more abundant in night collections than day collections, suggest greater spawning activity at night for alewives and greater larval activity at night for both alewives and rainbow smelt. Furthermore, the licensee's data indicates that the Nine Mile Point area is not a major spawning area for most Lake Ontario fishes. However, for those species that do utilize the area, (principally alewife and rainbow smelt) no consistent patterns in distribution of eggs and larvae between plume and non-plume areas have been found. These conclusions confirm the FES predictions that plant operation would have a minimal effect on ichthyoplankton and would not adversely affect fish populations in the area.

(6) Periphyton

The artificial substrate periphyton program conducted near Nine Mile Point since 1973 consists of bottom and bouy (suspended) periphyton samplers. Bottom periphyton were collected by placing artificial substrates on the lake bottom along two experimental and two control transects at five depth contours (5, 10, 20, 30, and 40-foot depth contours). Buoy periphyton were collected by suspending substrates at defined depths (2, 7, 12, and 17 ft) in the water column at three transects (one experimental and two control) along the 40-ft depth contour. Samplers were placed in the water after the spring thaw, and the substrates were retrieved and replaced by clean ones every 2-4 weeks until the end of the year. Species composition, numerical abundance, biomass (dry weight and ash-free dry weight), and photosynthetic pigments (chlorophyll "a" and phaeophyten) were measured.

The periphyton community on the artificial substrates was composed primarily of diatoms in the spring, green and/or blue green algae during the warm months, and diatoms again in the fall. Protozoa, primarily ciliates and suctorians, were common particularly at the deeper depth where light intensity was lower. The presence of a relatively large blue-green algal component is consistent with recent reports of increasing eutrophication of Lake Ontario, particularly in the nearshore waters. Numerical densities were greater on buoy than bottom substrates probably due to lower siltation and higher light intensity on the suspended samplers. Biomass on buoy periphyton was generally higher at the experimental station than at either of the controls, and the difference was statistically significant. (However, ratios of biomass to chlorophyll did not differ between control and experimental transects, indicating no change in the ratio of primary to secondary production). Similar results were not observed for biomass of bottom periphyton, for which statistical analysis indicated no difference associated with the experimental versus the control station. This observation demonstrates that if increased production is a plume effect, it is not reflected in the periphytic community on the lake bottom, which is the natural habitat for these organisms. (Thus, the results of the buoy study are not directly applicable, since the periphytic community does not naturally inhabit the upper regions of the water column in 40-ft of water). The species composition and standing crop of the bottom periphyton have remained relatively constant over the five year study period. No consistent trends attributable to plant operation were observed among years or among transects for bottom periphyton, which is the more realistic indication of the local periphyton community, as periphyton is present only on the lake bottom.

(7) Benthos

Replicate quantitative benthic samplers have been collected from 20 stations (10, 20, 40 and 60-ft depth contours on each of four transects) during alternate months between April and December from 1973 through 1977. These benthic studies have spanned a sufficient length of time to allow comparisons between pre and post-operational years and the number of stations were sufficient to provide data from plume and non-plume areas over a range of depths. Thus, the benthic program was adequate to detect significant plant-induced effects as well as describe natural cycles in the benthic community.

All organisms were enumerated and identified to the lowest possible taxon (over 120 taxa comprising seven different phyla have been identified). Visual observation of the type of substrate in the area of Nine Mile Point established a gradient of increasing sedimentation eastwards, with the two westernmost transects dominated more by bedrock than by sand and silt. The two easternmost transects were characterized as having bedrock and rubble in the inshore areas with sand and silt prevalent beyond the 20-ft contour.

Benthic invertebrates in the Nine Mile Point area have a seasonal growth and reproduction pattern similar to that expected for temperate latitudes. Benthic organisms were most abundant in the June-August months. The trend of greater benthic invertebrate abundance during the summer is mainly due to the presence of actively growing Cladophora, a filamentous green algae which provides food and refuge for many invertebrate populations. Seasonally, the distribution of macroinvertebrates was as follows: polychaetes and gastropods were dominant in April, the oligochaetes and ostracods in June, the amphipod Gammarus and polychaetes in August, Gammarus and oligochaetes in October and Gammarus in December. Differences observed in the distribution and species abundance of benthic invertebrates between stations and transects are attributed to animal-substrate relationships. For example, Grammarus and the polychaete Manayunkia were dominant and associated with bedrock substrate while the nematode Dorylaimus, tubificids and the dipteran Cryptochironomus were abundant where the substrate was mostly sand and silt. In general, more organisms were found in deep areas where silt content was high and in shallow water in association with Cladophora beds, while fewest organisms were found at intermediate depths. Abundance and biomass also showed an increasing trend from west to east similar to the trend of increasing silt content.

Gammarus was the single dominant organism in the benthic samples. The U.S. EPA identified it as a representative important species for the purposes of the "316(a) and (b) demonstrations"* at Nine Mile Point 1 and FitzPatrick because of its importance as a food source for fish in the area. Therefore, particular emphasis was placed on Gammarus through the study. The analysis of long-term abundance data showed no significant differences in Gammarus abundance between pre and post-operational years. In addition, analysis of seasonal data indicate that the organism is successfully completing annual reproductive cycles in the area. Typical seasonal fluctuations in mean density of Gammarus in the study area were between 100 and 6,000 organisms/ meter^2, with less than 2% of the animals suspended in the water column above the bottom (as shown by the macrozooplankton tows). Spatial distribution of Gammarus was shown to be the result of substrate variation and seasonal growth patterns. Comparison of observed abundance between plume and non-plume stations with similar substrates showed no significant differences on Gammarus or other benthic macroinvertebrates, indicating that the heated discharge has had no discernable effect on the benthic community.

Although scouring has been observed in the immediate vicinity of the high velocity (15 fps) FitzPatrick discharge located 0.5 miles to the east, the low exit velocity (4 fps) of the Nine Mile Point 1 discharge precludes any significant scouring effect on the benthic community in the vicinity of the discharge. None of the spatial, seasonal or annual fluctuations in the benthic community were found to be related to plant operation. The benthic community has exhibited normal population dynamics in response to the natural spatial and temporal variations in habitat and environment. Because there have been no significant adverse impacts on the benthic community as a result of plant operation and because the FES predictions of no impact have been verified, this study may be terminated.

(8) Fish

Fishes have been collected from four transects twice monthly from April through December in the vicinity of Nine Mile Point with gill nets, trawls, beach seines and trap nets since 1973. Fish collected in trap nets were identified, counted, tagged and released. Fish collected from gill nets, trawls and seines were identified to species, weighed and measured. Detailed secondary

*Federal Water Pollution Control Act; 1972. PL 92-500, Sections 316(a) & (b).

analyses, including coefficient of maturity, age, and growth and food habit studies were conducted for yellow perch, smallmouth bass and white perch. Detailed analyses of abundance data comparing catch-per-effort between control and experimental transects were made yearly for the above three species and for the alewife and rainbow smelt.

The fish species identified as representative and important by the EPA for the purposes of the 316(a) and (b) demonstrations of Nine Mile Point 1 and FitzPatrick were the alewife, brown trout, coho salmon, rainbow smelt, smallmouth bass, three spine stickleback, and yellow perch. The range of fishery gear types, and the spatial distribution and frequency of fish collections, were adequate to collect data that would indicate the presence of any significant plant-induced impacts on the fish populations in the area of Nine Mile Point.

A total of 72 species have been identified in fish samples collected near Nine Mile Point. Approximately 75% of the fish collected were alewives. Rainbow smelt, spottail shiner, yellow perch, and white perch comprised approximately 18% of the total fish collected, indicating the small numbers of the other species reported in the taxonomic listing of the fish community. On a seasonal basis, the greatest abundance of fish was observed during the spring months, corresponding to the shoreward migration of rainbow smelt and alewives. Fish diversity (Shannon-Weaver index) was high during the spring due to the onshore migration of a number of lake fishes. Diversity was lowest during the warm-water months when alewives reached their greatest abundance, and increased during the fall when the offshore movement of the alewife resulted in a more even distribution of fishes among the species. The greatest fish concentrations were found at the two eastern transects, which is consistent with findings for other trophic levels. The shoreline community, evaluated through the use of beach seines, was found to be low in abundance and dominated by young alewife. Cyprinids (mainly the important forage species, spottail shiner), centrarchids, and white perch, were the other major community members in the nearshore environment.

There were few changes in the fish community between pre and post-operational years as determined by gill net collections. Gizzard shad abundance has been reported to be increasing in Lake Ontario and data collected on gizzard shad indicate an increasing shad population in the Nine Mile Point vicinity, with the greatest concentrations occurring during the fall. Yearly catch-per-effort data for rainbow smelt, white perch and smallmouth bass collected by gill nets show no significant difference among years from 1969 to 1974. Alewives have increased in abundance, with significantly greater numbers collected in 1974 compared to earlier years (alewives

have been shown to undergo large year-to-year fluctuations in population size in other land-locked situations). Yellow perch exhibited a general decline in abundance over the six years with significantly fewer collected in 1974. The following year, however, the abundance of yellow perch collected in gill nets increased by three-fold. These seem to be normal fluctuations in population dynamics, unrelated to plant operation.

The alewife, rainbow smelt, white perch, yellow perch, and smallmouth bass were collected in sufficient quantity and at all stages of development to demonstrate completion of the normal life cycle in the vicinity of Nine Mile Point. The salmonids (brown trout and coho salmon) were collected infrequently, but year-to-year changes in abundance of these species in gill net collections reflected the stocking intensity as reported by the New York State Department of Environmental Conservation. The licensee's statistical analyses of monthly species diversity using a three-way ANOVA indicated that there were no significant differences between transects for any temporal comparison. In addition, there was no significant difference in mean annual species diversity. These results indicate that thermal discharges from Nine Mile Point 1 are not causing significant adverse impacts on the fish populations in the area.

The licensee's 316(a) demonstration examined the indirect effects of the Nine Mile Point 1 discharge. These factors include effects of current shear, pressure change, and dissolved oxygen. The changes found to occur in each of these parameters were all well within the tolerance limits of the species present or similar species. As a result of the extensive field sampling program conducted in the vicinity of Nine Mile Point, personnel have been present during several plant shutdowns, which included shutdowns during colder water periods. To date no observations of cold shock mortality on fish have been made as a result of shutdown by Nine Mile Point 1. The summer maximum upper incipient lethal temperature thresholds, corresponding to the most critical temperature period for the representative important species, were evaluated to determine the potential of thermal kill occurring during the warmer months. Only three species (brown trout, coho salmon, and rainbow smelt) have lethal threshold temperatures that may be exceeded in the thermal plume downstream of the initial mixing of the discharge. However, these species are normally found in cooler offshore water during the summer months when the discharge would represent a potential lethal factor. The preference for colder water would normally limit the number of these fish in the warmer nearshore zone during the summer months.

The results of these studies have shown that: the thermal discharge from Nine Mile Point 1 is not causing a significant adverse impact on fish populations in the area; the predictions of no harm presented in the FES have been validated; and the potential for damage to fish populations in the future is considered small if the plant continues operation in its present mode. For these reasons the present fish sampling study may be terminated, except for a reduced gill netting program which is to complement the impingement sampling.

(9) Impingement

Specification 3.1.2a(2) requires collection of fish impinged on the intake travelling screens during a 24-hour period at a frequency of three times weekly. One of these weekly collections consisted of 24 one-hour samples to determine day-night differences in the rate of impingement. Additionally, when daily collections result in 20,000 or more fish, 24-hour samples are conducted on subsequent days until the total number impinged drops below 20,000 fish/day. The licensee has requested that they be allowed to redesign the impingement program. The licensee proposes a stratified random sampling program which the licensee indicates will provide the same degree of statistical precision with half the sampling effort, compared to the present program. (This is the approach advocated by staff at Argonne National Lab after analysis of years of impingement data at several different nuclear power plants throughout the U.S.[1]). The reporting requirements and the requirement to continue sampling on successive days if impingement exceeds 20,000 fish in a 24-hour period are not being changed. The staff finds the licensee's proposal acceptable, particularly if the licensee maintains the requirement that whenever impingement levels reach 20,000 fish/day, the licensee will continue sampling until the number of fish impinged drops below 20,000 in a 24-hour period. However, the staff feels that one data point on the shore (represented by impingement data) will not give an accurate enough estimate of the fish population in the area, in order to quantify changes in fish populations and evaluate the significance of impingement impacts. For this reason a reduced gill netting program for fish has been retained in Specification 3.1.2.a(1).

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[1] I. P. Murarka, and D. J. Bodeau, 1977. Sampling Designs and Methods for Estimating Fish Impingement Losses at Cooling Water Intakes. Argonne National Laboratory. ANL/ES-60. 277p.

This low-level lake fish sampling program will be accompanied by collection of a minimal number of physical-chemical parameters (temperature and dissolved oxygen) with each sample to aid in interpretation of the data collected. Impingement levels (both high and low) based on five years of impingement data have been proposed that will trigger the licensee to perform an environmental impact assessment and a report to the NRC when impingement levels are significantly different than those recorded in the past. The environmental impact assessment shall be conducted to determine what caused the impingement anomaly, whether or not it was plant-related, and the significance of the impact.

The licensee also proposed to terminate the modified impingement program at the end of 1979. The FES predicted that between 2 and 4 million fish could be impinged at Nine Mile Point 1 each year and that these kills may not be manageable without design changes to the existing intake or development and implementation of other preventive methods, or both. Because we have an ongoing responsibility to assess the level of plant impacts, and because EPA has not issued a 316(b) determination for Nine Mile Point 1, we find that the licensee's impingement program should not automatically terminate in 1979.

(10) Entrainment

Specification 3.1.2.a(3) requires entrainment sampling of plankton, and fish eggs and larvae twice each month from April through October. Only alewife and rainbow smelt eggs or larvae were collected in sufficient numbers to allow evaluation of impact. Because larval fish and eggs which are entrained are exposed to a ΔT of 32°F for over three minutes, 100% mortality of entrained ichthyoplankton was assumed. Due to the lakewide nature of spawning populations of both alewife and rainbow smelt, a lakewide assessment of larvae cropping by both Nine Mile Point 1 and nearby FitzPatrick was done. This analysis by the licensee yielded cropping estimates of 0.26% for both species assuming that both plants were operating at full flow throughout the larval season. The estimated total number of eggs of both the alewife and rainbow smelt entrained at Nine Mile Point 1 were evaluated in terms of the number of spawning females required to produce the eggs. Based on average fecundity data and local standing stock estimates for adult fish, the required number of females represented 0.006 and 0.004% of the mature females in the local standing stocks of alewife and smelt. (The eggs losses due to entrainment of FitzPatrick are expected to be slightly greater due to a slightly greater plant capacity and intake flow). These cropping estimates for eggs and larvae are sufficiently low to preclude any significant effect on the populations.

Laboratory studies indicate that mortality to the amphipod Gammarus (the most important macrozooplankter) is expected to be around 40%. The FitzPatrick 316(b) demonstration indicates that less than 1% of the Gammarus standing stock is entrained. Losses of Gammarus due to entrainment at Nine Mile Point are expected to be slightly smaller due to lower intake flow, and these losses are not considered to be significant. The FES predicts that even with 100% mortality of zoo-and phytoplankton, the entrainment effects will be diffused over a wide area, and are not expected to be measurable. Results of the general ecological survey (discussed earlier) substantiate this prediction, as no changes beyond natural fluctuations have been detected. Because the FES predictions have been verified and no significant entrainment effects have been detected, this program may be deleted.

2.2 Chemical and Thermal Limiting Conditions of Operation

Environmental Impacts of Proposed Action

The following is a discussion of the environmental impact for each change proposed by the licensee:

a. The licensee proposes to monitor and limit discharges of chromium (Cr) rather than chromate (CrO_4^{-2}). Although there is no intentional discharge of chromium, some could appear in the discharge due to leakage from the diesel generator closed loop system, where chromate is used as a corrosion inhibitor. If leakage from this system should occur, the chromate would be collected in floor drains and routed to the waste tanks, where its release to the circulating water system could be controlled. The new specification requires that prompt action be taken to correct any such leakage. The licensee is presently monitoring chromate but is proposing to monitor total chromium. Total chromium measurement would allow for the assessment of all oxidation states of Cr, including chromate. This change would result in analysis for all species of chromium released and, hence, would allow for a more complete and total assessment of Cr in the effluent and a reduction in the qualtity of the discharges. Therefore, impact would be less than that permitted by existing ETS and is acceptable.

b. The licensee proposes to increase the pH range of discharge effluents to between 4.0 and 9.0 when the conductivity of the waste tank is below 10 μ mho/cm and to monitor the conductivity. The pH is still restricted to a range of 6.0 to 9.0 when the conductivity exceeds 10 μ mho/cm. A condition of low conductivity could occur when increased usage of the waste concentrator increases the pure water inventory, with only CO_2 as

a contaminant, or when a small amount of acid occurs in a poorly buffered solution. It is calculated that less than 2 mg/l of sulfuric acid in distilled water would produce a conductivity in excess of 10 μ mho/cm. The presence of any additional salts beyond this biologically insignificant amount would increase conductivity, and the discharge would have to be neutralized to bring the pH within the 6.0 to 9.0 range. The low pH waste would be discharged at a maximum rate of 100 gpm into the circulating water discharge of 250,000 gpm. Thus, a dilution of 2500 to 1 occurs before the station discharge enters the lake. After dilution, the discharge is at essentially the same pH as the ambient lake water; and no adverse impact on biota in the lake is expected. As indicated in the FES, the impact on the lake due to losses of biota within the circulating water system would be small even assuming 100% mortality of entrained organisms; thus, minor impacts during dilution within the station piping are acceptable as well.

c. The licensee proposes to modify the Thermal Limiting Conditions of Operation to allow operation with a thermal ΔT up to 2.3°F higher than is currently allowed. The FES states that even with 100% mortality of entrained plankton, fish eggs and larvae, the impact would not be measurable in the area. Thus, an increase in the ΔT of 2.3°F would not be expected to increase the impact of plant operation due to entrainment. A slight increase in the size of the various isotherms in the thermal plume might also be expected, but as the ΔT increase is less than 10%, these impacts would also be minimal. No significant increase in mortality of juvenile fish drawn into the plume is expected, nor are significant shifts in algal species from diatoms and green algae to blue-green algae expected to occur.

2.3 Radiological Effluent and Environmental Monitoring Program

The changes to the radiological effluent and environmental monitoring program do not reduce the effectiveness of the programs. These changes are consistent with current NRC guidelines as set forth in Regulatory Guide 1.21 and the Radiological Assessment Branch Technical Position on Radiological Environmental Monitoring.

1. The radioisotope I-135 with a 6.7 hour half-life does not significantly contribute to the radiation dose pathway to man. Therefore, deleting the sampling analysis does not alter the effectiveness of the program.

2. The increased analysis for SR-90 is more rigorous than the current program of quarterly analysis.

3. The deletion of the aquatic environmental sampling media have been evaluated to assure the effectiveness of the program. In the past these samples have been difficult to obtain. Also, they do not represent a dose pathway to man. With the required sampling of fish and the addition of cladophora, the potential biological accumulation of radionuclides in the aquatic environment and any potential aquatic dose pathways to man (eating fish) are adequately monitored.

4. The reduction in the number of terrestrial monitoring locations does not alter the effectiveness of the program. The results of past sampling have not demonstrated any significant leads to plant related radioactivity in the terrestrial environment. With the number of sampling locations being retained, the program more than adequately meets the required number of sampling locations that are necessary to evaluate the effect of plant related radioactivity on the environment.

It should be noted that the radiological effluent and environmental monitoring Technical Specifications for Nine Mile Point will be revised within the current calendar year to adopt the recently NRC developed Radiological Effluent Standard Technical Specifications, which among other things will implement the requirements of Appendix I to 10 CFR Part 50. This amendment in no way relieves the licensee of the requirement to evaluate the Nine Mile Point Technical Specification for consistency with the Radiological Effluent Standard Technical Specifications. The licensee is still required to submit amended Technical Specifications on the schedule date of 90 days after November 15, 1978.

Conclusion and Basis for Negative Declaration

On the basis of the foregoing analysis, it is concluded that there will be no environmental impact attributable to the proposed action other than has already been predicted and described in the Commission's FES for Nine Mile Point Unit 1. Having made this conclusion, the Commission has further concluded that no environmental impact statement for the proposed action need be prepared and that a negative declaration to this effect is appropriate.

Dated: March 26, 1979

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-220

NIAGARA MOHAWK POWER CORPORATION

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY

OPERATING LICENSE

AND NEGATIVE DECLARATION

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 29 to Facility Operating License No. DPR-63, issued to Niagara Mohawk Power Corporation, which revised Technical Specifications for operation of the Nine Mile Point Nuclear Station, Unit No. 1 (the facility) located in Oswego County, New York. The amendment is effective as of its date of issuance.

The amendment consists of a major change to the Appendix B Environmental Technical Specifications.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has prepared an environmental impact appraisal for this action and has concluded that an environmental impact statement for this particular action is not warranted because there will be no significant impact attributable to the action other than that which has already been predicted and described in the Commission's Final Environmental Statement for the facility dated June 1973.

For further details with respect to this action, see (1) the applications for amendment dated January 24, 1977, October 26, 1977, March 22, 1978 and June 22, 1978, (2) Amendment No. 29 to License No. DPR-63, and (3) the Commission's Environmental Impact Appraisal. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Oswego County Office Building, 46 E. Bridge Street, Oswego, New York 13126. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland this 26th day of March 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors