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