DAVIS—BESSE
NUCLEAR POWER PLANT
UNIT NO. 1
TECHNICAL SPECIFICATIONS

APPENDIX "B"
TO
LICENSE NO. NPF - 3

APR 22 1977

ISSUED BY THE UNITED STATES NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

LIST OF TABLES

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

LIST OF FIGURES

1.0 DEFINITIONS

Beach Sampling Station - Sampling station located on the discharge conduit at the beachfront approximately 2700 feet from the collection box.

Chlorination - The period of chlorine injection.

Circulating Water System - System for conveying waste heat from the condensers to the cooling tower for rejection to the atmosphere.

Circulating Water - Water used for heat transport in the circulating water system.

Commercial Operation - When the unit is declared commercial by the Toledo Edison Company.

Collection box - A structure which collects all unit discharges to Lake Erie and discharges them to the discharge conduit.

Cooling Tower Blowdown - The portion of the circulating water removed from the coldside of the cooling tower and discharged to the collection box, then to the lake to maintain circulating water dissolved solids at or below the desired concentration.

Daily - Every day except Saturdays, Sundays and Holidays (New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day).

ΔT - The temperature difference between the unit's discharge water temperature, as measured in the discharge conduit, and ambient lake temperature, as measured at the beginning of the intake canal at the beach, in Fahrenheit degrees.

Discharge Conduit - 72 inch diameter conduit, underground and beneath the lake bottom to convey the unit's discharge water from the collection box to the discharge structure in Lake Erie.

Initial Criticality - The first attainment of a self-sustaining fission reaction within the reactor core.

Intake Canal - Open canal, with earthen embankments, to convey lake water from the intake conduit to the intake structure.

Intake Conduit - 96 inch diameter conduit, beneath the lake bottom, to convey lake water from the intake crib to the intake canal.

Intake Crib - Submerged wooden crib in Lake Erie approximately 3,000 feet offshore used as the station water intake.

Intake Structure - Reinforced concrete structure located at the west end of the intake canal forebay containing pumps supplying lake water to the unit's support systems.

Monthly - At least once every 31 days with a maximum allowable extension of 25%.

Quarterly - At least once every 92 days with a maximum allowable extension of 25%.

Station - Davis-Besse Nuclear Power Station as related to the entire site and not Unit No. 1 in particular.

Unit - Davis-Besse Nuclear Power Station Unit No. 1

Unrestricted Area - Any area access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

Weekly - At least once every seven days with a maximum allowable extension of 25%.

2.0 LIMITING CONDITIONS FOR OPERATION

2.1 Thermal

2.1.1 Maximum Discharge Temperature Difference, Above Ambient Lake Temperature

Objective

The purpose of this specification is to limit thermal stress to the aquatic ecosystem by limiting the maximum discharge ΔT.

Specification

The maximum discharge temperature for station liquid effluents shall not exceed $20^{\circ}F$ above ambient lake water temperature. At times when the discharge temperature exceeds this temperature difference dilution water shall be supplied, from the dilution pump, to the collection box to keep the discharge temperature difference within the limit specified.

Monitoring Requirement

Temperature measuring elements shall be provided to monitor the discharge temperature, in the discharge conduit at the beach sampling station and the ambient lake temperature, in the intake canal at the end of the intake conduit. The output from these temperature elements shall go to the unit computer where the ΔT shall be computed and scanned once a minute. The discharge temperature, ambient lake temperature, and ΔT shall be logged hourly. If the ΔT reaches $19^{\circ}F$ an alarm shall be actuated. Upon receipt of this alarm the operator shall start the dilution pump so the discharge ΔT does not exceed the specified limit. The temperature sensing elements shall have a range of $32^{\circ}F$ to $212^{\circ}F$ and accuracy of $\pm 0.1^{\circ}F$. If either of the temperature measuring elements or the computer should fail, the dilution pump shall be turned on and the ΔT measured once daily between the hours of 10 a.m. and 6 p.m., Monday thru Friday except holidays, using a thermometer having a range of $0^{\circ}F$ to $100^{\circ}F$ and accuracy of $\pm 1^{\circ}F$, on grab samples taken from the end of the intake canal at the end of the intake conduit and the beach sampling station.

Bases

Tests for sudden temperature changes indicate that sudden changes up to $20^{\circ}F$ can generally be tolerated by fish found in the vicinity of the site.[1,2] However, the temperature extremes to which fish are subjected can be important. The greatest stress to fish is from a winter cold shock (a fish acclimated to the plume temperature being forced into ambient lake water temperature) such as during a unit shutdown. This should not be a serious problem because the $20^{\circ}F$ isotherm is extremely small (about 0.1 acres), and few fish could swim against the current long enough to enter and become acclimated to the warmest water. Hot shock tests at $20^{\circ}F$ above ambient have shown generally no harm to fish in the spring, fall, or winter, but some stress in summer. Fish which are able to enter the warmest water may suffer temporary immobilization but would be swept away by the discharge velocity to cooler water where they will recover.

The intake canal and discharge conduit temperature elements provide ambient lake and discharge temperatures. The ambient lake temperature element is 2100 feet upstream from the point where service water will be discharged to the intake canal forebay for winter ice control. There is sufficient separation that the service water will not affect the ambient lake water temperature sensing element. In the event of a failure of either of the temperature measuring element or the computer placing the dilution pump in operation should provide reasonable assurance that the $20^{\circ}F$ ΔT is not exceeded. It is predicted that under maximum heat load condition that the ΔT with the dilution pump on will not exceed $20^{\circ}F$[3]. To verify that the ΔT does not exceed $20^{\circ}F$ the ambient lake water and discharge temperatures shall be manually measured and the ΔT computed once daily between the hours of 10 a.m. and 6 p.m.

References

1. C. E. Herdendorf and J. M. Reutter, Laboratory Estimates of Fish Response to the Heated Discharge from the Davis-Besse Nuclear Power Station, Lake Erie, Ohio, D-J Project F-41-R-4, Study No. II, Ohio Division of Wildlife, 1973.

2. J. M. Reutter and C. E. Herdendorf, Thermal Discharge from a Nuclear Power Plant: Predicted Effects on Lake Erie Fish, Ohio Journal of Science. 76(1):39.1976

3. The Toledo Edison Company, Davis-Besse Nuclear Power Station Unit No. 1, Supplement to the Environmental Report - Operating License Stage, Docket No. 50-346, Page 5.1-4.

2.0 LIMITING CONDITIONS FOR OPERATION

2.3 Chemical

2.3.1 Biocides

Objectives

The purpose of this specification is to limit discharge concentration of biocides, in the units liquid effluent, so as to protect the biota from lethal and sublethal effects.

Specification

The only biocide that is planned to be used at the unit is chlorine. After July 1, 1977 total residual chlorine in the effluent from the collection box measured at the beach sampling station shall meet the following limitations:

1. Shall not exceed 0.2 mg/l as a daily maximum.

2. Total residual chlorine shall not be discharged from the unit in excess of 2 hours per day.

The above limits shall become effective July 1, 1977 unless by July 1, 1977 The Licensee files a request for modification of these limits proposed in their Ohio NPDES Permit No. 211* AD, in accordance with Ohio Revised Code Chapter 119 and Chapter 3745-33.

In the event The Licensee does file a request for modification by July 1, 1977 the enforcement of the above limits shall be stayed and the following limitations, consistent with 40 CFR Part 423, shall be effective until final action is taken on the Licensee's request for modification:

1. A daily average concentration of 0.2 mg/l free available chlorine and a daily maximum concentration of 0.5 mg/l free available chlorine.

2. The discharge of free available chlorine shall be limited to two hours per day.

Monitoring Requirements

Monitoring shall be as specified in Environmental Technical Specification Section 3.1.1.a.3.

Bases

The unit's Ohio NPDES Permit, 211* AD limits the concentration of total residual chlorine to a daily maximum 0.2 mg/l and discharge to a maximum of two hours per day. However, Part III Items 11 and 13 of the NPDES Permit provides that:

"11. The effectiveness of the requirement that Permittee comply with the chlorine limits on page 3 comply with mixing zone requirements for chlorine set forth in Chapter 3745-1 of Ohio Administrative Code shall be stayed in the event that Permittee files a request for modification of those provisions in accordance with Ohio Revised Code Chapter 119 and Chapter 3745-33 prior to July 1, 1977. Such stay shall continue in effect either:

(i) until Director grants the requested modification and such grant has become effective; or

(ii) if the Director denies the requested modification, or until all rights of Permittee to contest such denial before Ohio EPA have either been exhausted, or waived by failure to pursue such remedies in a timely manner."

"13. In the event that there is a stay of the effectiveness of the limitations and conditions for chlorine discharge as set forth on page 3 of the permit that continues after July 1, 1977, the effluent limitations for chlorine will, after July 1, 1977, and during the term of the stay of limitations described above, be a daily average concentration of 0.2 mg/1 free available chlorine and a daily maximum concentration of 0.5 mg/1 free available chlorine, to be measured at the point of plant discharge to the waters of the state, and discharge of free available chlorine shall be allowed for no more than two hours per day per unit."

The specified level and duration of release of residual chlorine is within the values evaluated and found acceptable in FES section 5.5.3. FES section 12.3.12 evaluated the licensee's proposal to request from EPA either different effluent concentration limitations or different discharge duration limitations on residual chlorine as allowed by the Ohio revised code. The FES analysis concluded that a demonstration of the necessity and environmental acceptability of these proposals is needed. This study is being performed by the licensee under ETS section 4.3. The results of this study will be utilized in determining final limitations on residual chlorine discharges.

2.3.2 pH

Objective

The purpose of this specification is to limit hydrogen ion concentration (pH) within the normal range of ambient lake water so as to protect and preserve aquatic life.

Specification

The pH of the effluent from the collection box measured at the beach sampling station shall not be less than 6.0 and shall not be more than 9.0 at any time except that it may be less than 6.0 or more than 9.0 if there is no contribution of acidic or alkaline pollution attributable to unit activities.[1] At times when the effluent pH exceeds these limits the component of the unit's discharge which is responsible for the effluent pH exceeding these limits shall be terminated.

Monitoring Requirements

The pH will be monitored at the beach sampling station. Grab samples shall be collected on a daily basis.

Bases

The pH of a solution is an index of the hydrogen ion concentration and may range from 0 to 14. Low values indicate the presence of acids or acid-forming salts. High values indicate the presence of alkalies. The most significant effect of extreme values of pH is their possible lethal effect on fish and other aquatic life. The limiting specification is established for the preservation of indigenous species and is consistent with the State of Ohio Water Quality Standards published in Ohio EPA publication EP-1.

The collection box effluent quality during power operation is primarily influenced by the cooling tower blowdown. Spent effluents from regeneration of the makeup demineralizers will be neutralized in a separate neutralizing tank before discharge and will have a negligible effect on pH of the collection box effluent.

The circulating water will have its hydrogen ion concentration controlled within a narrow range to prevent scaling in the condenser and on other heat exchanger surfaces. Due to this narrow control range, wide variations of hydrogen ion concentration will not take place and daily sampling and analysis will be satisfactory to protect the aquatic environment.

The collection box effluent quality during unit shutdowns for maintenance and refueling is primarily influenced by the discharge from the service water system which will be operated as a once through cooling system. During this time the pH of the service water discharge will be the same as the intake water, Lake Erie, which during the unit's pre-operational monitoring program has exceeded 9.0 on several occasions. Spent effluents from regeneration of the makeup demineralizers will be neutralized to between 6.0 to 9.0 in a separate neutralizing tank prior to discharge. If neutralizing equipment is not available to neutralize the regenerant effluents the discharge shall be terminated until the neutralizing equipment is available.

References

1. Ohio EPA Regulation EP-1, Water Quality Standards, Section EP-1-02(D), January 8, 1975.

2.3.3 Other Chemicals

The purpose of this specification is to limit the concentration of sulfate bearing compound at levels below which detrimental effects have been observed on aquatic life.

Specification

The concentration of sulfate ion shall be limited to 1,500 mg/l as a maximum. At times when the sulfates in the discharge exceed this limit, dilution water shall be provided by the dilution pump. If dilution-water is not available and the sulfate limits are exceeded, discharge from the neutralizing tank shall be terminated.

Monitoring Requirements

The concentration of sulfate ion shall be determined once per week from a grab sample collected at the beach sampling station during the discharge of the neutralizing tank. If there is no discharge from the neutralizing tank, sampling shall be once per week.

Bases

A literature search has shown that the minimum 96 hour TLm concentration of listed sulfate salts that are toxic to Lepomis macrochirus (Bluegill Sunfish) is calcium sulfate at 2,980 mg/l. This specification establishes a limit well below this value.

Sulfate compounds are the only chemical resulting from unit operation that will be discharged to the environment in concentration signficantly different from ambient lake water.

During unit operation sulfates will predominately be discharged with cooling tower blowdown. They will also result from neutralization of the regenerant wastes and operation of the domestic water plant.

Due to the feed of sulfuric acid to the cooling tower circulating water for alkalinity control calcium sulfate will be formed. Another sulfate present is magnesium sulfate.

Some discharge of sulfate will occur from the water treatment plant. The spent sulfuric acid and sodium hydroxide regenerants are neutralized in the neutralizing tank. A solution containing calcium sulfate, magnesium sulfate, and sodium sulfate will result.

During unit shutdowns for maintenance and refueling, sulfates will predominately be discharged from the neutralization tank. The neutralized regenerant wastes will be diluted with the other unit effluents in the collection box. The resultant unit effluent sulfate concentration will be within the limits specified.

Weekly sampling will be taken during periods when the neutralizing tank is being discharged to monitor periods of maximum sulfate concentrations.

2.0 LIMITING CONDITIONS FOR OPERATION

2.4 Radioactive Effluents

Introduction

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. These releases should not result in radiation exposures in unrestricted areas greater than a few percent of natural background exposures. The concentrations of radioactive materials in effluents shall be within the limits specified in 10 CFR Part 20.

To ensure that the releases of radioactive material above background to unrestricted areas be as low as reasonably achievable as defined in the Annex to 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 with half-lives greater than eight days, 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 waste effluents 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. During release of radioactive wastes, the effluent control monitor shall be set to alarm and to initiate the automatic closure of each waste isolation valve prior to exceeding the limits specified in 2.4.1.a above.

e. The operability of each automatic isolation valve in the liquid radwaste discharge lines shall be demonstrated quarterly.

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 for such releases, 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 NRC in accordance with Environmental Technical Specification 5.4.2.c(1).

i. An unplanned or uncontrolled offsite release of radioactive materials in liquid effluents in excess of 0.5 curies requires notification. This notification shall be in accordance with Environmental Technical Specification 5.4.2.c(3).

2.4.2 Specifications for Liquid Waste Sampling and Monitoring

a. Unit 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 as required by Section 5.4.1 of these Environmental Technical Specifications. Estimates of the sampling and analytical errors, as described in Regulatory Guide 1.21, associated with each reported value shall be included.

b. Prior to any planned release of each batch of radioactive 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 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 from a tank to be discharged to the environment, at least two tank volumes shall be recirculated, except the condensate demineralizer backwash receiving tank which shall be mixed by air for 10 to 15 minutes prior to sampling.

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

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

f. All liquid effluent radiation monitors shall be calibrated at least quarterly by means of a known radioactive source. The source used to calibrate the known source shall be calibrated by a measurement system which is traceable to the National Bureau of Standards. Each monitor shall also have a functional test monthly and an instrument check prior to making a release.

Bases: 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 reasonably achievable 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 practicable, 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, primary to secondary system leakage, and the performance of the various waste treatment systems, and are consistent with the Annex to 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 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 unit and the liquid waste treatment systems are functioning as designed. Releases of up to these levels will result in concentrations of radioactive material in liquid waste effluents at small percentages of the limits specified in 10 CFR Part 20.

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

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 50.36a. 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 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 restricts the amount of radioactive material that could be inadvertently released to the environment to an amount that will not exceed the Environmental Technical Specification limit.

In addition to limiting conditions for operation listed under Specifications 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 as required by Specification 5.4.2 of these Environmental Technical Specifications.

Specification 2.4.1.i provides for reporting spillage or release events which, while below the limits of 10 CFR Part 20, could result in releases higher than the design objectives.

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 unit'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 5.4.1 of these Environmental 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.

The points of release to the environment to be monitored in Section 2.4.2 include all the monitored release points as provided for in Table 2.4-3.

2.4.3 Specifications for Gaseous Waste Effluents

The terms used in these Specifications are as follows:
subscripts v, refers to vent releases
i, refers to individual noble gas nuclide
(Refer to Table 2.4-5 for the noble gas nuclides considered)

Q_T = the total noble gas release rate (Ci/sec)

$= \sum_i Q_i$ sum of the individual noble gas radionuclides determined to be present by isotopic analysis.

$\bar{K}$ = the average total body dose factor due to gamma emission (rem/yr per Ci/sec)

$\bar{L}$ = The average skin dose factor due to beta emissions (rem/yr per Ci/sec)

$\bar{M}$ = The average air dose factor due to beta emissions (rad/yr per Ci/sec)

$\bar{N}$ = the average air dose factor due to gamma emissions (rad/yr per Ci/sec)

The values of $\bar{K}$, $\bar{L}$, $\bar{M}$ and $\bar{N}$ are to be determined each time isotopic analysis is required as delineated in Specification 2.4.4. Determine the following using the results of the noble gas radionuclide analysis:

$$\bar{K} = (1/Q_T) \sum_i Q_i K_i$$

$$\bar{L} = (1/Q_T) \sum_i Q_i L_i$$

$$\bar{M} = (1/Q_T) \sum_i Q_i M_i$$

$$\bar{N} = (1/Q_T) \sum_i Q_i N_i$$

where the values of K_i, L_i, M_i and N_i are provided in Table 2.4-5, and are site dependent gamma and beta dose factors
Q = the measured release rate of the radioiodines and radioactive materials in particulate forms with half-lives greater than eight days.

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

$$2.0 \left[\overline{Q}_{Tv} \overline{K}_v \right] \leq 1$$

and

$$0.33 \left[\overline{Q}_{Tv} (\overline{L}_v + 1.1 \overline{N}_v) \right] \leq 1$$

(2) The release rate limit of all radioiodines 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 such that

$$1.5 \times 10^5 \, Q_v \leq 1$$

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

$$13 \left[\overline{Q}_{Tv} \overline{N}_v \right] \leq 1$$

and

$$6.3 \left[\overline{Q}_{Tv} \overline{M}_v \right] \leq 1$$

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

$$25 \left[\overline{Q}_{Tv} \overline{N}_v \right] \leq 1$$

and

$$13 \left[\overline{Q}_{Tv} \overline{M}_v \right] \leq 1$$

(3) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight day during any calendar quarter shall be such that

$$13 \left[1.5 \times 10^5 \, \overline{Q}_v \right] \leq 1$$

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

$$25 \left[1.5 \times 10^5 \, Q_v \right] \leq 1$$

(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 any of 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 NRC 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 such that

$$50 \left[Q_{Tv} \bar{N}_v \right] > 1$$

or

$$25 \left[Q_{Tv} \bar{M}_v \right] > 1$$

(2) If the average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater that eight days during any calendar quarter is such that

$$50 \left[1.5 \times 10^5 \, Q_v \right] > 1$$

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

d. During the release of gaseous wastes from the waste gas decay tanks the effluent monitors listed in Table 2.4-4 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 shall be demonstrated quarterly.

e. The maximum activity to be contained in one waste gas storage tank shall not exceed 45,000 curies (considered as Xe-133).

f. An unplanned or uncontrolled offsite release of radioactive materials in gaseous effluents in excess of 5 curies of noble gas or 0.02 curie of radioiodine in gaseous form requires notification. This notification shall be in accordance with Environmental Technical Specification 5.4.2.c(3).

2.4.4 Specifications for Gaseous Waste Sampling and Monitoring

a. Unit records shall be maintained and reports of the sampling and analyses results shall be submitted in accordance with Section 5.4 of these Environmental Technical Specifications. Estimates of the sampling and analytical error, as described in Regulatory Guide 1.21, associated with each reported value should be included.

b. Gaseous releases to the environment, except from the turbine building ventilation exhaust and as noted in Specification 2.4.4.c, shall be continuously monitored for gross radioactivity and the flow continuously measured and recorded. 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. During the release of gaseous wastes from a waste gas decay tank, the gross activity monitor, the iodine collection device, and the particulate collection device shall be operating.

d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source. The source used to calibrate the known source shall be calibrated by a measurement system traceable to the National Bureau of Standards system. Each monitor shall have a functional test at least monthly and instrument check at least daily.

e. Sampling and analysis of radioactive material in gaseous waste, including particulate forms and radioiodines shall be performed in accordance with Table 2.4-2.

Bases: 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 reasonably achievable in accordance with the requirements of 10 CFR Part 50.36a. 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, that no individual in an unrestricted area will receive an annual dose to the total body greater than 5 mrem or an annual skin dose greater than 15 mrem from fission product noble gases, and that the annual dose to any organ of an individual from radioiodines and radioactive material in particulate form with half-lives greater than eight days 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. Even with this operational flexibility under unusual operating conditions, if the licensee exerts 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.**

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

Specification 2.4.3.a(1) limits the release rate of noble gases from the site so that the corresponding annual gamma and beta dose rate above background to an individual in an unrestricted area will not exceed 500 mrem to the total body or 3000 mrem to the skin in compliance with the limits of 10 CFR Part 20.

For Specification 2.4.3.a(1), gamma and beta dose factors for the individual noble gas radionuclides have been calculated for the unit gaseous release points and are provided in Table 2.4-5. The expressions used to calculate these dose factors are based on dose models derived in Section 7 of Meteorology and Atomic Energy-1968 and model techniques provided in Regulatory Guide 1.109.

Dose calculations have been made to determine the site boundary location with the highest anticipated dose rate from noble gases using on-site meteorological data and the dose expressions provided in Regulatory Guide 1.109. The dose expression considers the release point location, building wake effects, and the physical characteristics of the radionuclides.

The offsite location with the highest anticipated annual dose from released noble gases is 720 meters in the N direction.

The release rate Specifications for a radioiodine and radioactive material in particulate form with half-lives greater than eight days are dependent on existing radionuclide pathways to man. The pathways which were examined for these Specifications are: 1) individual inhalation of airborn radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, and 3) deposition onto grassy areas where milch animals graze with consumption of the milk by man. Methods for estimating doses to the thyroid via these pathways are described in Regulatory Guide 1.109. The offsite location with the highest anticipated thyroid dose rate from radioiodines and radioactive material in particulate form with half-lives greater than eight days was determined using on-site meteorological data and the expressions described in Regulatory Guide 1.109.

Specification 2.4.3.a(2) limits the release rate of radioiodines and radioactive material in particulate form with half-lives greater than eight days so that the corresponding annual thyroid dose via the most restrictive pathway is less than 1500 mrem.

For radioiodines and radioactive material in particulate form with half-lives greater than eight days, the most restrictive location is a milk cow located 4300 meters in the WSW direction (vent $X/Q = 1.5 \times 10^{-7}$ sec/m^3).

Specification 2.4.3.b establishes upper offsite levels for the releases of noble gases and radioiodines and radioactive material in particulate form with half-lives greater than eight days 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. In addition to the limiting conditions for operation of Specification 2.4.3.a and 2.4.3.b, the reporting requirements of 2.4.3.c provide that the cause shall be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter and that the proposed program of action to reduce such release rates to the design objectives shall be described.

Specification 2.4.3.d requires that suitable equipment to monitor and control the radioactive gaseous releases are operating during any period these releases are taking place.

Specification 2.4.3.e limits the maximum quantity of radioactive gas that can be contained in a waste gas decay tank. The calculation of this quantity should assume instantaneous ground release, a X/Q based 5 percent meteorology, the average gross energy is 0.19 Mev per disintegration (considering Xe-133 to be the principal emitter) and exposure occurring at the minimum site boundary radius using a semi-infinite cloud model. The calculated quantity will limit the offsite dose above background to 0.5 rem or less, consistent with Commission guidelines.

Specification 2.4.3.f provides for reporting release events which, while below the limits of 10 CFR Part 20, could result in releases higher than the design objectives.

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 unit's performance relative to radioactive waste effluents released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents are furnished to the Commission on the basis of Section 5.4.1 of these Environmental 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.

The points of release to the environment to be monitored in Section 2.4.4 include all the monitored release points as provided for in Table 2.4-4.

Specification 2.4.4.b excludes monitoring the turbine building ventilation exhaust since this release is expected to be a negligible release point. Many PWR reactors do not have turbine building enclosures. To be consistent in this requirement for all PWR reactors, the monitoring of gaseous releases from turbine buildings is not required.

2.4.5 Specification for Solid Waste Handling and Disposal

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

b. Estimates shall be made of the principal gamma radionuclides composition of all radioactive solid waste shipped offsite.

c. Reports of the radioactive solid waste shipments, volumes, principle radionuclides, and total curie quantity, shall be submitted in accordance with Section 5.4.1 of these Environmental Technical Specifications.

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 packaged in conformance with 10 CFR Part 20, 10 CFR Part 71, and 49 CFR Parts 170-178.

TABLE 2.4-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS

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

[a] The detectability limits for activity analysis are based on the 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.

[b] 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.

[c] A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged.

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

[e] For dissolved noble gases in water, assume a MPC of 4×10^{-5} μCi/ml of water.

TABLE 2.4-2

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS

Gaseous Source	Sampling & Analysis Frequency	Type of Activity Analysis	Detectable Concentrations (μCi/ml)[a]
A. Waste Gas Decay Tank Batch Releases	Each Tank	Principal Gamma Emitters	10^{-4}[b]
		H-3	10^{-6}
B. Containment Purge Releases	Each Purge	Principal Gamma Emitters	10^{-4}[c]
		H-3	10^{-6}
C. Condenser Air Ejector and Vacuum System Discharge	Monthly	Principal Gamma Emitters	10^{-4}[b,c]
		H-3	10^{-6}
D. Other Environmental Continuous Releases (Unit Vent)	Monthly (Gas Samples)	Principal Gamma Emitters	10^{-4}[b,c]
		H-3	10^{-6}
	Weekly (Charcoal Sample)	I-131	10^{-12}
	Monthly (Charcoal Sample)	I-133, I-135	10^{-10}
	Weekly (Particulates)[d]	Principal Gamma Emitters	10^{-11}
	Monthly Composite[d] (Particulates)	Gross α	10^{-11}
	Quarterly Composite[d] (Particulates)	Sr-90	10^{-11}
		Sr-89	10^{-11}

[a] The above 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.

[b] 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.

[c] Analyses shall also be performed following each refueling, startup, or similar operational occurrence which could alter the mixture of radionuclides.

[d] 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.

TABLE 2.4-3

PRESSURIZED WATER REACTOR LIQUID WASTE SYSTEM
LOCATION OF PROCESS AND EFFLUENT MONITORS AND SAMPLERS REQUIRED BY TECHNICAL SPECIFICATIONS[e]

Process Stream or Release Point	Radiation Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	Measurement						High Liquid Level Alarm
					Gross Activity	I	Dissolved Gases	Alpha	H-3	Isotopic Analysis	
Clean Waste Monitor Tanks				X		X	X	X	X	X	X
Miscellaneous Waste Monitor Tank				X		X	X	X	X	X	X
Detergent Waste Drain Tank[a]				X		X	X	X	X	X	X
Reactor Coolant System				X		X					
Liquid Radwaste Discharge Pipes	X	X	X		X						
Condensate Demineralizer Backwash Receiving Tank[d]	X		X	X	X	X	X	X	X	X	X
Service Water System	X		X		X						
Primary Water Storage Tank				X[b]	X					X	X
Borated Water Storage Tank				X[b]	X					X	X
Component Cooling Systems	X		X		X						
Turbine Building Sumps (Floor Drains)[c]				X	X					X	

[a] In most PWR'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 should 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.

[b] Grab sample to be taken and analyzed for gross activity upon a high liquid level alarm and each 4 hours thereafter during alarm conditions.

[c] A grab sample shall be taken every 8 hours whenever activity in the secondary system exceeds 10^{-5} microcuries/ml.

[d] A grab sample shall be taken prior to each discharge to the environs when the secondary system activity exceeds 10^{-5} microcuries/ml. No sampling will be required when this discharge is routed to the Miscellaneous Liquid Radioactive Waste Treatment System via the Condensate Polishing Demineralizer Holdup Tanks.

[e] These monitors and samplers must be in place and operational prior to initiation of mode 2 operation.

TABLE 2.4-4

PRESSURIZED WATER REACTOR GASEOUS WASTE SYSTEM
LOCATION OF PROCESS AND EFFLUENT MONITORS AND SAMPLERS REQUIRED BY TECHNICAL SPECIFICATIONS[d]

Process Stream or Release Point	Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	Measurement				
					Noble Gas	I	Particulate	H-3	Alpha
Waste Gas Decay Tanks	X	X	X	X	X	X	X	X	X
Condenser Air Ejector[a,b] Vacuum System Discharge[a,b]	X		X	X	X	X	X	X	X
Unit Vent[a]	X		X	X	X	X	X	X	X
Building Ventilation Systems									
Reactor Containment Vessel (whenever there is flow)	X	X[c]	X	X	X	X	X	X	X
Auxiliary Building, Radwaste Area[a]	X		X	X	X	X	X	X	X
Auxiliary Building Fuel Handling Area[a]	X		X	X	X	X	X	X	X
Waste Evaporator Condenser Vent[a]	X		X	X	X	X	X	X	X

[a] If any or all of the process streams or building ventilation systems are routed to a single release point, the need for a continuous monitor at the individual discharge point to the main exhaust duct is eliminated. One continuous monitor at the final release point is sufficient.

[b] The common discharge of steam and mechanical hoggers and steam jet air ejector.

[c] The auto control controls the fans and dampers on the ventilation system. Radiation monitors in the containment control the isolation valves in the containment purge discharge line.

[d] These monitors and samplers must be in place and operational prior to initiation of mode 2 operation.

TABLE 2.4-5

GAMMA AND BETA DOSE FACTORS

Noble Gas Radionuclide	Dose Factors for Vent			
	K_{iv} Total Body $\frac{\text{rem/yr}}{\text{Ci/sec}}$	L_{iv} Skin $\frac{\text{rem/yr}}{\text{Ci/sec}}$	M_{iv} Beta Air $\frac{\text{rad/yr}}{\text{Ci/sec}}$	N_{iv} Gamma Air $\frac{\text{rad/yr}}{\text{Ci/sec}}$
Kr-83m	1.6×10^{-4}	0	4.9	0.097
Kr-85m	1.6	25	34	1.7
Kr-85	0.019	23	33	0.020
Kr-87	5.1	170	180	5.4
Kr-88	12	41	50	13
Kr-89	3.9	170	180	4.1
Xe-131m	0.56	8.2	19	0.73
Xe-133m	0.44	17	25	0.61
Xe-133	0.52	5.2	18	0.65
Xe-135m	2.6	12	13	2.8
Xe-135	2.3	32	42	2.5
Xe-137	0.49	210	220	0.52
Xe-138	6.1	71	82	6.4

3.0 ENVIRONMENTAL SURVEILLANCE

3.1 Non-Radiological Surveillance

Environmental surveillance programs shall be developed to monitor the non-radiological impacts from the Davis-Besse Nuclear Power Station Unit No. 1. This surveillance shall generally consist of aquatic and terrestrial environmental monitoring programs described in this Section 3.1. In general these programs shall commence at commercial operation of the unit and continue as described in the following paragraphs for approximately two years of unit operation. The actual length of the programs described below may be shorter or longer than two years depending upon results. Upon review and approval by the Nuclear Regulatory Commission, a less intensive program shall be implemented to maintain a check on the unit's non-radiological impact for the life of the unit. The details of this less intensive program shall be determined upon analysis of the first two years data. It is anticipated that this program shall be similar to the one described below but reduced in frequency and intensity.

3.1.1 Aquatic Environmental Montoring Program

Objective

To conduct special chemical, physical and biological studies in the area of the unit's intake and discharge in Lake Erie. This will permit the determination of any changes in water quality or stress placed on the aquatic ecosystem by unit operation. Sampling stations that will be used in these studies are shown in Figure 3.1-1.

3.1.1.a.1 Water Quality Analysis

Objective

To determine the magnitude and extent of changes in Lake Erie water quality at the site as a result of unit operation.

Specification

Water quality samples shall be collected at sampling stations number 1, 8 and 13 at the water surface and approximately 50 cm above the bottom once every 30 days during ice free periods (normally April through November). If weather does not permit sample collection once every 30 days, samples shall be taken at the earliest time weather permits, following the scheduled date.

The following analysis shall be performed on each sample utilizing the methods indicated:

	Parameter	
1.	pH	ASTM D1293-65 (1973)
2.	D.O.	Std. Methods, 13th Ed., 218B (1971)
3.	Temperature	Std. Methods, 13th Ed., 162 (1971)
4.	Conductivity	ASTM D1135-64 (1973)

5.	Transparency	Secchi disk (Welch, 1948)
6.	Turbidity	Std. Methods, 13th Ed., 163A (1971)
7.	Solar Radiation	G.M. Mfg. and Instr. Corp.
8.	Total Alkalinity	Std. Methods, 13th Ed., 102 (1971)
9.	Suspended Solids	Std. Methods, 13th Ed., 224C (1941)
10.	Dissolved Solids	USEPA, Chem. Analysis, Water (1971)
11.	NO_3	ASTM D992-71 (1973)
12.	SO_4	ASTM D516-68C (1973)
13.	Total P	Std. Methods, 13th Ed., 223F (1971)
14.	SiO_2	ASTM D859-68B (1973)

Measurements of temperature dissolved oxygen, conductivity, transparency and solar radiation shall be made in the field. Water quality samples shall be collected at each of the sampling locations using a 3-liter Kemmerer sampler. These samples shall be placed in polyethylene containers and taken to the laboratory to analyse for the remainder of the parameters.

Bases

The collection and analysis of water quality data from the vicinity of the intake crib, discharge structure and an unaffected control station will permit evaluation of the impact of unit operation on local water quality. These analysis will be made at the same sampling stations where pre-operational data has been previously collected so that direct comparisons of local water quality prior to and during unit operation can be made.

3.1.1.a.2 Chemical Usage

Objective

To monitor major chemicals used at the unit to determine the amounts used.

Specification

The quantities of chlorine, sulfuric acid, sodium hydroxide, calcium hydroxide and sodium aluminate used at the unit shall be recorded monthly and reported annually. Chemical Usage shall be recorded in a format similar to Table 3.1-1.

Bases

The major chemicals which will be used at the unit that could possibly be released into the unit's discharge are chlorine, sulfuric acid, sodium hydroxide, calcium hydroxide and sodium aluminate.

Chlorine will be used in the cirulating and service water systems as a biocide and in the potable water and sewage treatment systems for disinfection. A small portion of the total amount of chlorine used will be discharged from the unit. The chlorine demanding constitutants of the circulating and service water and chloramine stripping in the cooling tower will consume the majority of the chlorine used.

Sulfuric acid will be used for alkalinity control in the circulating water, regeneration of the demineralizers, neutralization of caustic wastes, and stabilization of clarified and softened potable water. Any sulfuric acid that is discharged from the unit will be discharged as sulfate compounds.

Sodium hydroxide will be used for regeneration of the demineralizers and neutralization of acidic wastes. Any sodium hydroxide that is discharged from the unit will be discharged as sodium compounds.

Calcium hydroxide and sodium aluminate will be used for clarification and softening in the water treatment process. These chemicals will be discharged in the form of sludge to the settling basin where the sludge will be dewatered and the supernatant, containing very low if any concentrations of calcium hydroxide and sodium aluminate, will be pumped to the collection box.

3.1.1.a.3 Chlorine Monitoring

Objective

To monitor the maximum concentrations of free residual and total residual chlorine in the unit's discharge.

Specification

During power operation the maximum concentrations of free residual and total residual chlorine shall be monitored at the beach sampling station. A grab sample shall be taken and analyzed daily. The grab sample shall be taken at a time during or following chlorination of the circulating water system when the expected maximum chlorine residual is present at the beach sampling station. During unit shutdowns for maintenance and/or refueling this monitoring shall be performed during or following chlorination of the service water system when the expected maximum chlorine residual is present at the beach sampling station.

All test procedures shall be those prescribed in 40 CFR Part 136, as amended, "Test Procedures for The Analysis of Pollutants." Chlorine determinations shall be made by amperometric titration.

This monitoring shall be continued until the Ohio Environmental Protection Agency completes action on the Unit's NPDES Permit.

Bases

During power operation the unit's service water will be used for cooling tower makeup except during cold weather when it could be recycled to the intake structure for ice control. During these periods makeup water for the cooling tower will be taken directly from the intake canal forebay. The service water system, when its discharge is used for cooling tower makeup, or cooling tower makeup taken from the forebay may be continuously chlorinated at the intake structure to maintain a low chlorine demand in the cooling tower circulating water. During refueling and/or maintenance periods when the service water system is discharged directly to the lake the system will only be chlorinated two hours per day.

During power operation gaseous chlorine periodically added to the cooling tower circulating water and water used for cooling tower makeup. In addition, gaseous chlorine and sodium hypochlorite will be used in the water treating plant and hypouchlorite at the sewage treatment plant. The effluent of the sewage treatment plant is pumped to the collection box and mixed with the continuous blowdown from the cooling tower. The maximum concentration of chlorine that could be present in the circulating water and thus in the continuous blowdown would occur during or just after periods of chlorination of the cooling tower circulating water.

During shutdowns for maintenance and/or refueling gaseous chlorine will be periodically added to the service water system which will be discharged directly to the collection box. In addition, gaseous chlorine and sodium hypochlorite will be used in the water treating plant and hypochlorite at the sewage treatment plant. The effluent from the sewage plant is pumped to the collection box and mixed with the continuous service water discharge. The highest concentration of chlorine that could be present in the unit's discharge would occur during or just after periods of chlorination of the service water.

3.1.2.a.1 Plankton Studies (Phytoplankton and Zooplankton)

Objective

To determine the magnitude and extent of changes in the plankton community that may occur due to unit operation.

Specification

Plankton samples shall be collected at sampling station numbers 1, 3, 6, 8, 13, 14 and 18 once every 30 days during ice free periods (normally April through November) for two years. If weather does not permit sample collection once every 30 days, samples shall be taken at the earliest time weather permits, following the schedule date. These sampling stations may be modified, with NRC approval, during the course of the study if it is determined it shall result in the collection of more meaningful data.

Duplicate vertical tows, bottom to surface, shall be taken at each of the sampling locations with a Wisconsin plankton net (12 cm mouth; No. 20, 0.080 mm mesh). Each sample shall be concentrated and preserved in 5% formalin. One millimeter of each sample shall be used for counting. The volume of each sample shall be computed by multiplying the length of the tow by the area of the net mouth. Analysis as to the number and kind of plankton present shall be made.

Bases

The collection and analysis of plankton from sampling stations in the immediate vicinity of the intake crib, discharge structure and those areas unaffected by unit operation will be used to evaluate the extent of apparent biological alterations. Since continued study in a manner consistent with the pre-operational study will be undertaken, direct comparisons can be made of the plankton community before and during unit operation.

3.1.2.a.2 Benthic Studies

Objective

To determine the magnitude and extent of changes that may occur, in the benthic community as a result of unit operation.

Specification

Benthic samples shall be collected at sampling stations 1, 3, 8, 9, 13, 14, 15, 17, 18 and 26 once every 60 days during ice free periods (normally April through November) for two years. If weather does not permit sample collection once every 60 days, samples shall be taken at the earliest time weather permits, following the schedule date. These sampling stations may be modified, with NRC approval, during the course of the study if it is determined it shall result in the collection of more meaningful data.

Three replicate samples shall be taken at each sampling location with a Ponar dredge ($A = 0.52 m^2$). Samples shall be sieved through a U.S. No. 40 sieve and preserved in 10% formalin. Individuals shall be identified as far as possible (usually to genus; to species where possible) and reported as numbers of individuals per square meter.

Bases

The impact of unit operation on the benthic community in the vicinity of the site particularily near the intake crib and discharge structure are not anticipated to be significant. However, the biomass of the benthos may change slightly due to the addition of additional nutrients to the sediments from the remains of entrained plankton which will, upon discharge, become available as a food source. The species composition, abundance and diversity of the benthic community is not anticipated to be effected by unit operation. To confirm these predictions monitoring will be performed at the same sampling stations as the pre-operational monitoring and comparisons made.

3.1.2.a.3 Fisheries Population Studies

Objective

The objective of monitoring fish is to assess the effects of unit operation on the fish populations found near the site and in particular, the influence of the unit's intake and discharge.

Specification

Every 30 days fish populations shall be sampled during ice free periods (normally April through November) for two years. If weather does not permit sample collection once every 30 days, samples shall be taken at the earliest time weather permits.

A series of four five-minute bottom trawls shall be run between the intake crib (Station 8) and the area of the thermal plume (Station 13). Towing speed of the 16 ft. otter trawl (1/8-inch mesh) shall be 3 to 4 knots/hr and shall cover a distance of approximately 2000 ft. A control trawl shall be run between sample Stations 3 and 26.

Duplicate bag seine samples shall be taken at sampling stations 23, 24 and 25. The bag seine used shall be approximately 100 ft. long and have a 6 mm bar mesh. In addition, gill nets (125 ft. x 6 ft. and composed of continuous panels of 1/2, 3/4, 1, 1 1/2 and 2-inch bar mesh) shall be set in the vicinity of the intake crib (Station 8) and area of thermal plume (Station 13). Nets shall will be set on the bottom for 24 hours. Stations 3 and 26 shall serve as control stations. Nets at Stations 3 and 13 shall be set perpendicular to the discharge conduit and nets at Stations 8 and 26 parallel to the intake conduit.

Bases

This program will permit an analysis of the impact of unit operation on the fish component of the aquatic community. Trawls and gill nets in the vicinity of the intake crib and discharge and shore seines along the shore, all at stations sampled during the pre-operational monitoring program, will permit a comparison of fish populations and species during and prior to unit operation. Comparing samples collected in the vicinity of the intake crib and discharge structures with the control stations will indicate whether fish are congregating in the vicinity of the intake and discharge.

3.1.2.a.4 Ichthyoplankton

Objective

The objective of studying ichthyoplankton, fish eggs and larvae, is to monitor the importance of the Davis-Besse site as a spawning and nursery area and to determine the impact of unit operation on the ichthyoplankton component of the aquatic community.

Specification

Ichthyoplankton samples shall be taken once every ten days during the anticipated spawning season, April through August. Thereafter samples shall be collected once every 30 days during ice free periods. If weather does not permit sample collection at the prescribed interval samples shall be taken at the earliest time weather permits, following the scheduled date. The program shall be for a two year duration.

Duplicate samples surface and bottom shall be collected in the vicinity of the intake crib (Station 8), the area of the thermal plume (Station 13), two control stations (Station 3 and 29) and at the Toussaint Reef. Samples at the Toussaint Reef shall be collected only during the anticipated spawning season. If samples are expectionally large then subsampling shall be done.

Samples shall be collected by five minute circular tows (3 to 4 knots/hr) at the surface and bottom, using a 0.75 meter diameter oceanography plankton net (No. 00,0.75 mm mesh). Ichthyoplankton shall be counted and identified to the lowest taxonomic level possible.

Bases

This program will permit the characterization of the effect of unit operation on this component of the aquatic ecosystem. Sampling at the intake crib, the thermal plume area and the two control stations will permit a determination to be made of the ichthyoplankton concentration in the vicinity of the site. The two control stations will also be used to determine whether spawning is occurring on the rock fills around the intake crib and discharge structure. The monitoring of ichthyoplankton in the vicinity of the site and at Toussaint Reef, a known spawning area, will permit a continuing evaluation of the area around the site as a spawning area.

3.1.2.a.5 Fish Egg and Larvae Entrainment

Objective

The objective of this study is to investigate the number and species of fish eggs and larvae that are entrained as a result of unit operation. This study shall be conducted for two years.

Specification

Fish eggs and larvae (ichthyoplankton) shall be sampled once every ten days during the anticipated spawning season, April through August in the vicinity of the intake crib (Station 8) and at two control stations (Station 3 and 29). If weather does not permit sample collection at the precribed interval, samples shall be taken at the earliest time weather permits, following the scheduled date. These samples shall be those collected under the ichthyoplankton monitoring program of these Environmental Technical Specification, Section 3.1.2.a.4. Concurrently the daily flow (24 hour total) into the unit shall be recorded for the day on which the ichthyoplankton samples are collected. The observed ichthyoplankton concentrations in the lake in the vicinity of the intake and the water flow into the unit shall be used to estimate the number of fish eggs and larvae entrained by unit operation.

Bases

Fish eggs and larvae are free floating (i.e. are not capable of moving by themselves) and hence are passively carried from place to place by water movement. Therefore, by monitoring the ichthyoplankton concentrations in the vicinity of the unit's intake and the quantity of water taken into the unit, an estimate of the number of entrained fish eggs and larvae through the units cooling systems can be made.

3.1.2.a.6 Fish Impingement

Objective

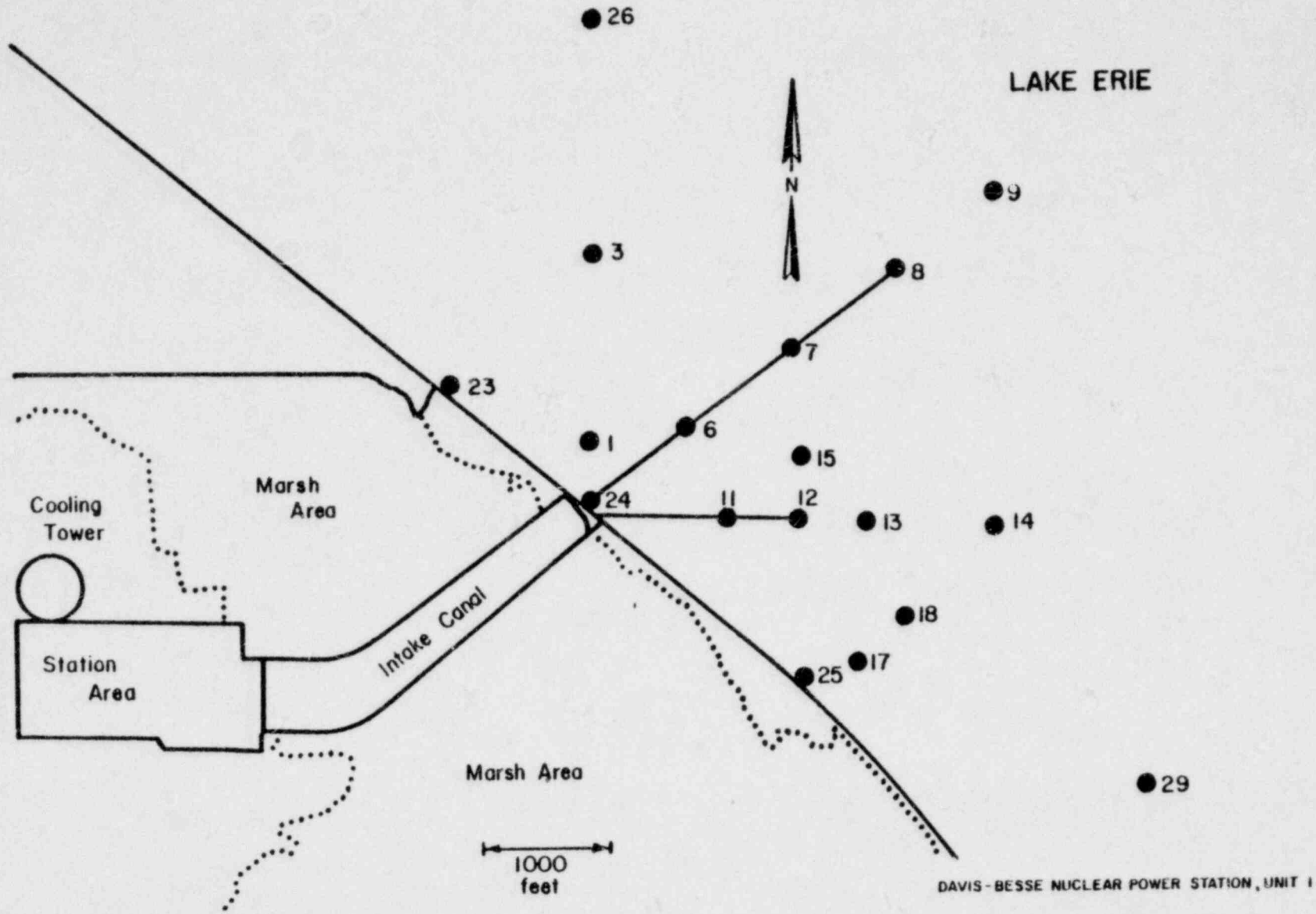
The objective of this monitoring is to document fish impingement losses prior to commercial operation of the unit.

Specification

Prior to commercial operation of the unit Environmental Technical Specification 4.2.1 shall be followed.

Bases

It is conceivable that important impingement losses could occur prior to commercial operation at the unit. This specification will assure that such occurrences are documented.



DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

AQUATIC SAMPLING STATIONS

FIGURE 3.1-1

Table 3.1-1
DAVIS-BESSE NUCLEAR POWER STATION
UNIT NO. 1

CHEMICAL USAGE _____, 19____

CHEMICAL	SYSTEM	USE	QUANTITY	DISCHARGE	
				INTERMEDIATE	FINAL
Chlorine	Circulating Water	Biocide		N/A	Unit discharge via cooling tower blowdown
	Service Water	Biocide		Cooling Tower Makeup	Unit discharge via cooling tower blowdown
	[a]Cooling Tower Makeup	Biocide		Cooling Tower Makeup	Unit discharge via cooling tower blowdown
	Water Treatment	Disinfection		N/A	Water dist. sys.
	Sewage Treatment	Disinfection		N/A	Unit discharge
Sulfuric Acid	Circulating Water	Alkalinity Control		Reacts with circulating water	Unit discharge via cooling tower blowdown
	Demineralizers	Regeneration		Neutralizing tank for neutralization	Unit discharge
	Water Treatment	Stabilization		N/A	Water dist. sys.
	Neutralizing Tank	Neutralization		N/A	Unit discharge

[a]Only used when the unit is operating and service water is being returned to the forebay.

TABLE 3.1-1 (Con't.)

CHEMICAL	SYSTEM	USE	QUANTITY	DISCHARGE	
				INTERMEDIATE	FINAL
Sodium Hydroxide	Demineralizers	Regeneration		Neutralizing Tank for neutralization	Unit discharge
	Neutralizing Tank	Neutralization		N/A	Unit discharge
Calcium Hydroxide	Water Treatment	Clarification and Softening		Sludge to the Settling Basin	Supernatant from the settling basin to the unit discharge
Sodium Aluminate	Water Treatment	Clarification and Softening		Sludge to the Settling Basin	Supernatant from the settling basin to the unit discharge

3.1.2.b Terrestrial Environmental Monitoring Program

Objective

1. To monitor the effects of the unit's cooling tower on migrating birds.
2. To monitor changes in vegetation cover types on and adjacent to the site.

3.1.2.b.1 Bird Collisions

Specification

The cooling tower shall be monitored during the migratory periods (i.e. April, May, late August, September and October) to determine instances when 100 or more birds have collided with the cooling tower in a twenty-four hour period. When there are 100 or more bird impacts in a twenty-four hour period the number and species composition shall be recorded.

Bases

During migratory periods the possibility exists that during adverse weather conditions when birds are forced to fly at low altitudes and visibility is limited, the potential exists for a large (>100) bird impact on the cooling tower. This potential does not exist during nonmigratory periods.

3.1.2.b.2 Vegetation Survey

Specification

Color infrared aerial photography shall be used during the first two years of the unit's operation to detect changes in the composition, areal extent and general health of vegetation cover types. The photography shall be taken under clear sky's with low haze during July or August at a scale of 1 inch equals 500 feet. The area of coverage shall be a two mile radius from the unit and for each year the flight lines; altitude; time of day; make and model of camera, lens and filter; and film type and processing shall be the same.

Interpretation of the aerial photography shall include ground observations of vegetation cover types. The presence, distribution and health of dominant plant species shall be recorded (e.g. changes in distribution of emergent aquatic plants). Information for the growing season concerning lake levels, ground water levels, precipitation, and temperature shall be summarized to aid in the photographic interpretation.

Bases

The infrared aerial photography will serve as means to documenting significant changes in the vegetation cover types adjacent to the unit. Based on the best available knowledge concerning impacts from nuclear power plants, no adverse impacts are predicted during operation of the Davis-Besse Nuclear Power Station, Unit 1. Should significant changes in the vegetation be observed, additional studies will be conducted to determine the causes for such changes.

3.0 ENVIRONMENTAL SURVEILLANCE

3.2 Environmental Radiation Monitoring

Objective

To establish a sampling schedule for the purpose of detecting, measuring, and evaluating any significant effects of unit operation and waste releases on the environment.

Specification

A. Environmental samples and external radiation levels shall be taken from locations and at frequencies listed in Tables 3.2-1 and 3.2-2, and shall be analyzed according to the routine listed in Table 3.2-1, using procedures which shall provide concentration values with minimum detectable limits which are equal to or less than those listed on Table 3.2-3.

B. Reports shall be sumitted in accordance with the requirements of Section 5.4, unit reporting requirements.

C. For animals producing milk for human consumption, samples of fresh milk shall be obtained from these animals at locations and frequencies shown in Table 3.2-1, and analyzed for their radioiodine content, calculated as iodine-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 above 0.5 picocuries per liter the overall error (one sigma confidence level) of the analysis shall be within ± 25%. Results shall be reported, with associated calculated error, as picocuries of I-131 per liter of milk at the time of sampling.

D. An annual census of animals producing milk for human consumption shall be conducted at the start of the grazing season to determine their location and number with respect to the site. The census shall be conducted under the following circumstances:

1. Within a 1 mile radius from the unit or the calculated 15 mrem/year isodose line* whichever is larger: A door to door or equivalent counting technique shall be utilized.

2. Within a 5 mile radius for cows and a 15 mile radius for goats: Enumeration by using referenced information from sources such as county agricultural agents or other reliable sources.

A change in sampling locations shall occur if, after census takings, a new milk animal is found to be in a more critical location from the standpoint of dispersion of radioiodine than one of those specified. A suitable substitution shall be made if samples from a location of milk animals are no longer available due to removal of the animals from the location.

*Dose to be calculated using models and assumptions presented in NRC Regulatory Guide 1.109.

E. Deviations are permitted from the required schedule if specimens are unobtainable due to hazardous conditions, unavailability or to malfunction of automatic sampling equipment. If the latter, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be described in the annual report.

Bases

Environmental media which are sampled and analyzed for radioactivity are shown by the two diagrams on Figure 3.2-1. The upper diagram shows the critical pathways; the lower diagram shows the other monitored pathways.

A pre-operational radiological monitoring program was conducted in order to determine the magnitude of the radioactivity in the environment surrounding the site and to study fluctuations in the radioactivity levels prior to operation of the unit. The information will serve as a guide and baseline in evaluating any changes in environmental radioactivity levels that may possibly be attributed to the unit. The pre-operational radiological environmental monitoring program, to establish baseline values, was begun in July 1972 and will continue until initial criticality of the unit.

The operational radiological environmental monitoring program, similar to the pre-operational radiological monitoring program, will also be conducted with the sampling and analysis schedule related to the level of radioactivity found in the unit discharge and in the environmental samples. The operational surveillance program shall consist of: (1) a program of measurements of radioactivity in environmental media which is outlined in Table 3.2-1, (2) reporting all results of this program on a routine basis as described in Section 5.4-1 of these Environmental Technical Specifications, and (3) reporting the results of measurements of radioactivity in critical pathway environmental media samples on the non-routine bases described in Section 5.4-2 of these Environmental Technical Specifications. The critical pathway environmental media are air, drinking water, milk and external radiation.

Measurement of radiation levels are carried out in such a manner so as to ensure compliance with 10 CFR Part 20 and the intent of 10 CFR Part 50.34a. The survey is designed such that releases of unit origin can be differentiated from natural or other sources of environmental radiation. This is accomplished from samples collected at locations near the site, indicator locations, where concentrations would be expected to be the highest if a release should occur, and comparing to samples collected at locations remote to the site, control locations. Statistical calculations will be carried out to determine whether there is a significant difference between the indicator and control sample locations. Specific radionuclide analyses will be also performed to determine whether they are related to known unit discharges.

If significant increases in radiation levels are detected by the radiological environmental monitoring program, dose estimates to man will be carried out.

TABLE 3.2-1

Radiological Environmental Monitoring Program

Sample	Sampling Location	Type[a]	Sampling Frequency	Analysis
Airborne Particulates	1	I	Weekly	Gross beta
	2	I		
	3	I		On quarterly composite of all indicator filters and all control filters:
	4	I		1. Gamma spectral analysis
	7	I		2. Sr-89, 90
	8	I		
	9	C		
	11	C		
	12	C		
	23	C		
	27	C		
Airborne Iodine	1	I	Weekly	Gamma spectral analysis on charcoal canister for I-131
	2	I		
	3	I		
	4	I		
	7	I		
	8	I		
	9	C		
	11	C		
	12	C		
	23	C		
	27	C		
External Radiation Levels	1	I	Monthly Quarterly	Gamma dose
	2	I		
	3	I		
	4	I		
	5	I		
	7	I		
	8	I		
	9	C		
	11	C		
	12	C		
	23	C		
	24	C		
	27	C		

TABLE 3.2-1

Radiological Environmental Monitoring Program (Cont'd.)

Sample	Sampling Location	Type	Sampling Frequency	Analysis
Untreated Surface Water	3	I	Weekly Grab[(b)]	Gross beta in dissolved and suspended fractions
	11	C	Composited Monthly	
	12	C		
	28	I	Hourly Grab Composited Monthly	Tritium - Quarterly On quarterly composite of all indicator and all control samples: 1. Gamma spectral analysis 2. Sr-89, 90
Treated Surface Water	11	C	Weekly Grab Composited Monthly	Similar to analysis performed on untreated surface waters
	12	C		
	28	I		
Groundwater	7	I	Quarterly[(b)]	Similar to analysis performed on untreated surface waters
	17	I		
	27	C		
Bottom Sediments	27	C	Semi-Annually	Gross beta Sr-89, 90 Gamma spectral analysis
	29	I		
	30	I		
Fish (two species)	33	I	Semi-Annually	Flesh-Gross beta Gamma spectral analysis
	35	C		
Soil	1	I	Once Every 3 Years	Gamma spectral analysis
	2	I		
	3	I		
	4	I		
	7	I		
	8	I		
	9	C		
	11	C		
	12	C		
	23	C		
	27	C		

TABLE 3.2-1

Radiological Environmental Monitoring Program (Cont'd.)

Sample	Sampling Location	Type	Sampling Frequency	Analysis
Fruit or Vegetables (two varieties)[c]	8 ≥ 10 mi from the 25	I C I	Semi-Annually	Edible Portion Gamma spectral analysis Sr-89, 90
Green[h] Leafy Vegetables	36 37	I C	Monthly[i]	I-131
Milk[d]	8 20 24	I I C	Semi-Monthly[f]	Sr-89, 90 I-131 Calcium Gamma spectral analysis
Edible Meat	32[g] 34[g] 31 33	I C I I	Semi-Annually Annually	Gamma spectral analysis
Animal - Wildlife Feed	8[e] 34 31	I C I	Semi-Annually Annually	Gamma spectral analysis

(a) "C" designates control location
"I" designates indicator location
(b) Except when ice conditions prohibit sampling
(c) Locations for fruit or vegetable samples are subject to change based on availability
(d) Locations for milk samples are subject to change based on availability and milk animal census
(e) Cattle feed is collected the 1st quarter, and grass is collected the 3rd quarter
(f) During the grazing season, May through October, monthly from November through April
(g) Domestic meat
(h) Where access to green leafy vegetables from private garden is not possible, nonedible plants with similar leaf characteristics from the same vicinity may be substituted.
(i) During periods when green leafy vegetables are harvested.

Table 3.2-2

Sampling Locations

Davis-Besse Nuclear Power Station

Sampling Point[a]	Location[b]
1	Site boundary, NE of station, near intake canal.
2	Site boundary, E of station.
3	Site boundary, SE of station, near Toussaint River and storm drain.
4	Site boundary, S of station, near Locust Point and Toussaint River.
5	Main entrance of site, W of unit.
7	Sand Beach, 0.9 miles NNW of site.
8	Earl Moore Farm, 2.7 miles WSW of site.
9	Oak Harbor, 6.8 miles SW of site.
11	Port Clinton, 11.5 miles SE of site.
12	Toledo, 23.5 miles WNW of site.
17	Onsite well, 0.7 miles SW.
20	Daup Farm, 5.4 miles SSE of site.
23	Put-In-Bay Lighthouse, 14.3 miles ENE of site.
24	Sandusky, 24.9 miles SE of site.
25	Miller Farm, 3.7 miles S of site.
27	Magee Marsh, 5.3 miles WNW of site.
28	Unit 1 water supply, onsite.
29	Lake Erie, Intake Area 1.5 mile NE of site.
30	Lake Erie, Discharge Area 0.9 mile ENE of site.
31	Onsite.
32	Land, within 5 miles of the site.
33	Lake Erie, within 5 miles of the site.
34	Land, further than 10 miles from the site.
35	Lake Erie, further than 10 miles from the site.
36	The private garden or farm having the highest X/Q.
37	Farm 10 to 20 miles from the site in the least prevelent wind direction.

(a) There are no sampling points number 6, 10, 13, 14, 15, 16, 18, 19, 21, 22 and 26.

(b) Distance measured from the center of the Unit No. 1 shield building.

Table 3.2-3

Typical Estimated Minimum Detectable Concentrations

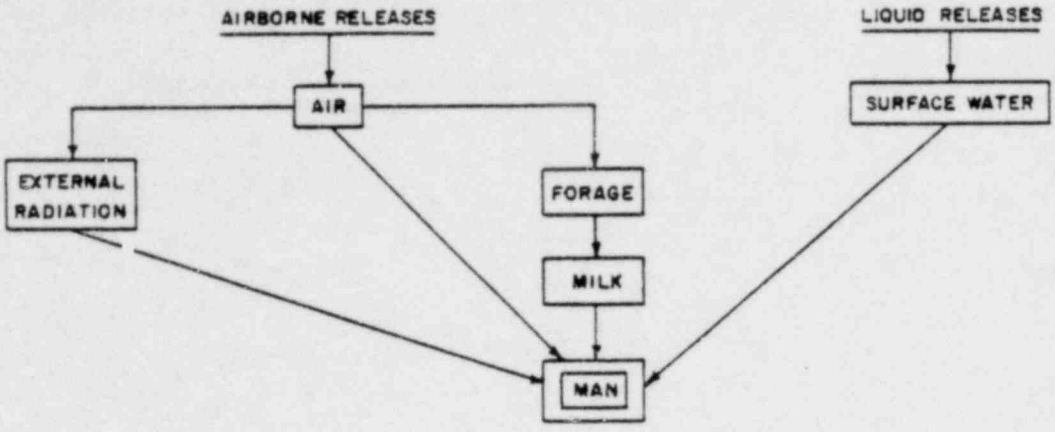
Type of Sample	Analysis	Typical Minimum Sensitivity
Water	Gross β	2 pCi/l
	H-3	330 pCi/l
	Co-58	15 pCi/l
	Co-60	15 pCi/l
	Ba/La-140	15 pCi/l
	Sr-89	10 pCi/l
	Sr-90	2 pCi/l
	Cs-134	15 pCi/l
	Cs-137	15 pCi/l
	Zn-65	30 pCi/l
	Mn-54	15 pCi/l
	I-131	0.4 pCi/l
Air Particulates	Gross β	0.01 pCi/m^3
	Sr 89	0.005 pCi/m^3
	Sr-90	0.001 pCi/m^3
	Cs-134	0.01 pCi/m^3
	Cs-137	0.01 pCi/m^3
Air Gases	I-131	0.07 pCi/m^3
Milk	Sr-89	10.0 pCi/l
	Sr-90	2.0 pCi/l
	Cs-134	15.0 pCi/l
	Cs-137	15.0 pCi/l
	I-131	0.5 pCi/l*
Beef, Wildlife and Fish	Co-58	130 pCi/kg
	Co-60	130 pCi/kg
	Cs-134	130 pCi/kg
	Cs-137	130 pCi/kg
	Zn-65	260 pCi/kg
	Mn-54	130 pCi/kg
	Sr-89	40 pCi/kg
	Sr-90	8 pCi/kg
Vegetables or Fruit	Cs-134	80 pCi/kg
	Cs-137	80 pCi/kg

Table 3.2-3

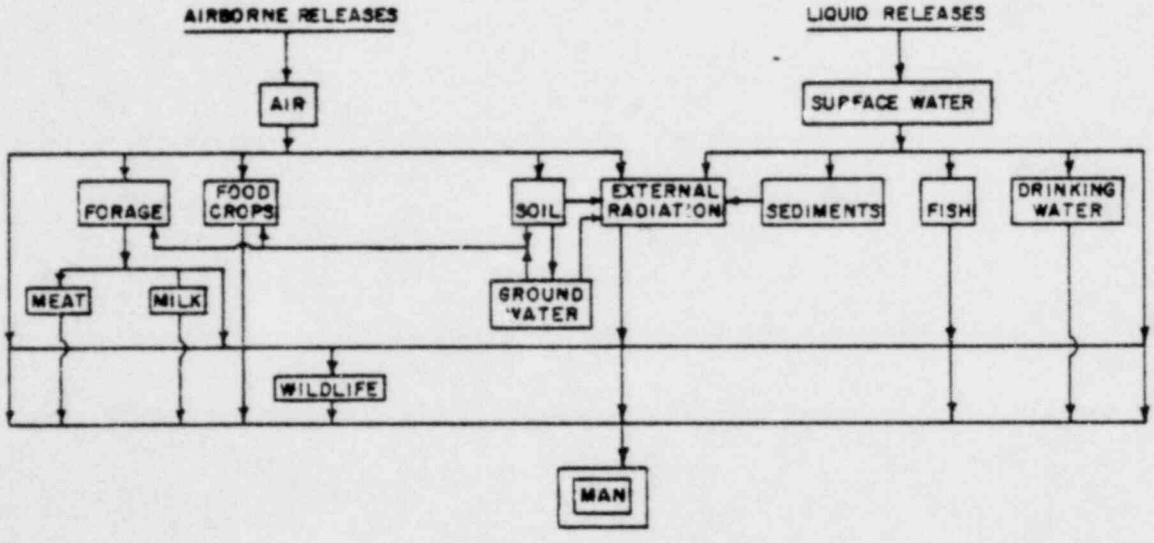
Typical Estimated Minimum Detectable Concentrations (Cont'd.)

Type of Sample	Analysis	Typical Minimum Sensitivity
Vegetables or Fruit	I-131	80 pCi/kg
External Radiation	Beta/Gamma	1 mrem
Soil and Sediment	Sr-90	150 pCi/kg
	Cs-137	150 pCi/kg

* The I-131 determination in milk will be done by the technique described in USAEC Regulatory Guide 4.3 issued September 1973; hence, the value for minimum detectable limit is expected to be smaller than this value in the future.

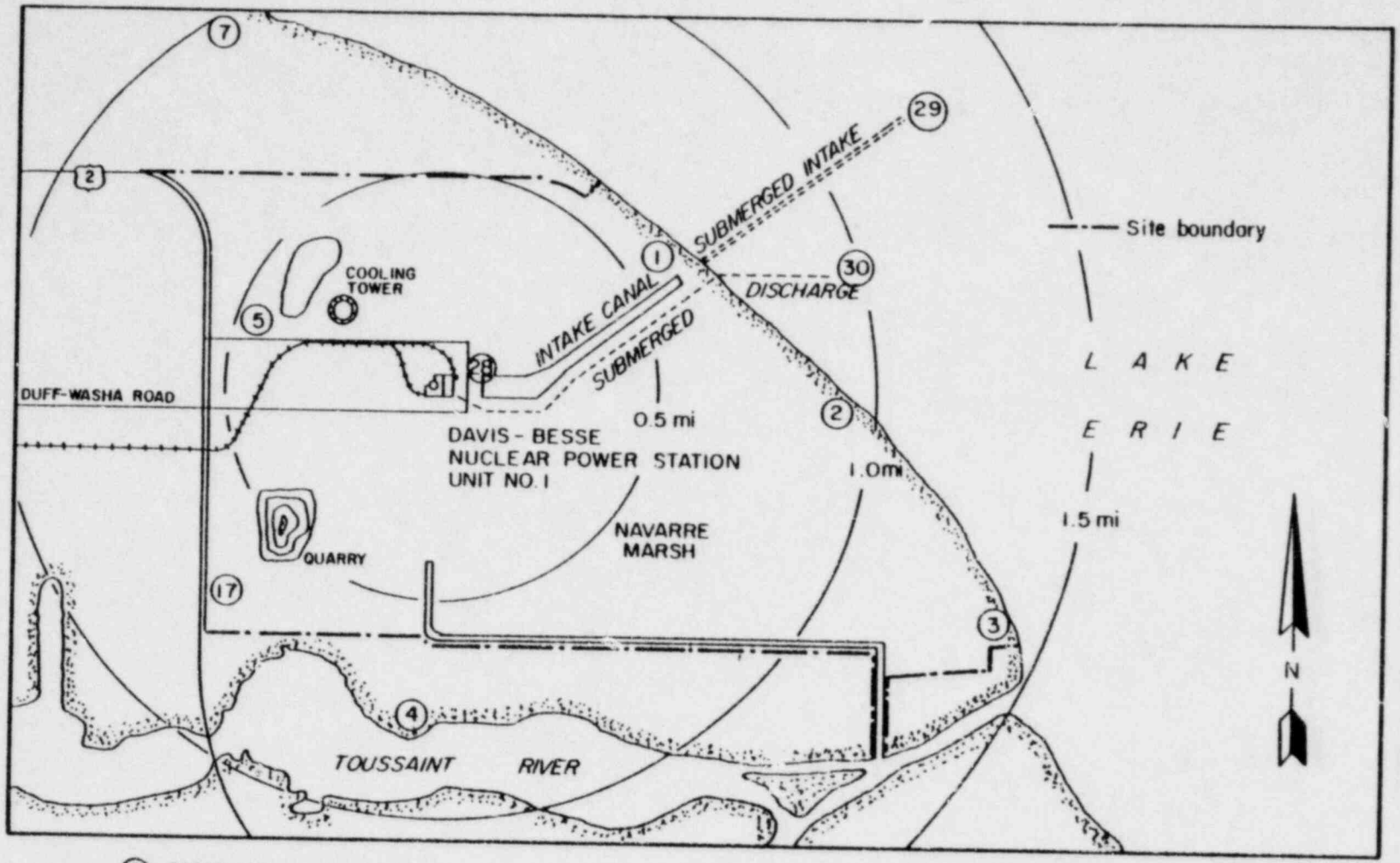


CRITICAL PATHWAYS



OTHER MONITORED PATHWAYS

DAVIS-BESSE NUCLEAR POWER STATION
ENVIRONMENTAL MEDIA AND EXPOSURE PATHWAYS
FIGURE 3.2-1

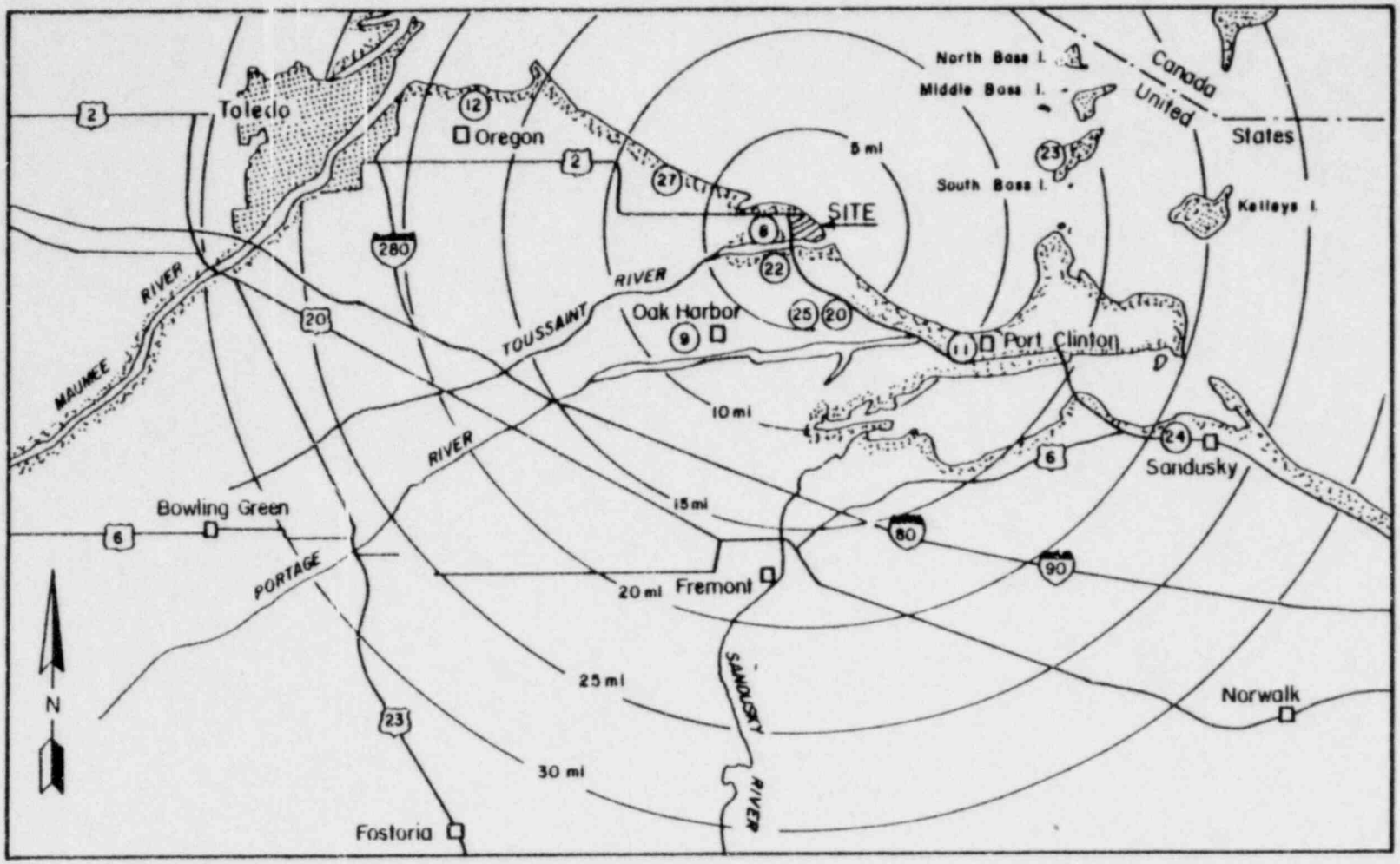


(2) SAMPLING LOCATIONS

DAVIS-BESSE NUCLEAR POWER STATION
SAMPLING LOCATIONS ON THE SITE PERIPHERY
FIGURE 3.2-2

3.2-10

DB-1



(2) SAMPLING LOCATIONS

DAVIS-BESSE NUCLEAR POWER STATION
SAMPLE LOCATIONS (EXCEPTING THOSE ON THE SITE PERIPHERY)
FIGURE 3.2-3

4.0 SPECIAL SURVEILLANCE, AND STUDY ACTIVITIES

4.1 Operational Noise Surveillance

Objective

The objective of this program is to conduct a noise survey in the vicinity of the Davis-Besse site during normal unit operation. The results of the survey shall be used to assess the noise impact of the operation of Unit No. 1.

Specifications

Methodology

In devising the methodology to be used during the operational noise survey, consideration shall be given to ANSI S3W50[1] which establishes a method for the evaluation of noise in an area in which the ambient sound levels result from the superposition of multiple noise sources. The survey periods and the number of sampling points in the survey area shall be chosen in order to develop a statistical statement of the noise levels in the vicinity of the site. During the survey, noise sensitive land use and specific noise sources shall be identified. Measurements shall be obtained near critical locations of noise sensitive land use such as the nearest resident, school, hospital, cemetery, and wildlife refuge which may be affected by noise from unit operation. Measurements shall be obtained in the vicinity of the unit during the hours of daytime (0700-1900 hours), evening (1900-2200 hours), and nighttime (2200-0700 hours) over a two day period during representative environmental conditions and while Davis-Besse Unit No. 1 is operating at full load within one year after the unit has achieved operation at rated load. The survey shall be conducted during a period when the construction activities associated with the Davis-Besse site shall be minimal and do not contribute significantly to the noise levels.

The instrumentation which shall be used during the operational noise survey shall consist of the following:

1. Brüel and Kjaer Type 2209 Precision Sound Level Meter
2. Brüel and Kjaer Type 1613 Octave Filter Set
3. Brüel and Kjaer Type 4145 Condenser Microphone
4. Brüel and Kjaer Type 4220 Pistonphone

This instrumentation meets the requirements of the International Electrotechnical Commission (IEC)[2] for a Type I or precision sound level meter. A 1-inch diameter condenser microphone shall be used to assure that accurate low ambient sound level measurements can be made. The meter shall be acoustically calibrated using the B&K Pistonphone before and after each measurement period to assure continued accuracy. All measurements shall be made using an open-celled polyurethane foam wind screen to attenuate the effect of wind generated noise. Headphones shall be used to determine any distortion, improper amplication characteristics, and intermittent electrical connections.

Sound level measurements shall be made with the precision sound level meter operated in the A-weighted slow response mode. Th field measurements shall conform to the recommendations of ANSI S3W50 except for Paragraph 2.2, "Instrument Reading Procedures". This paragraph states that one should observe the A-level reading for five seconds and record the best estimate of the central tendency and the range of the meter deflections, with observations repeated until the number of readings equals or exceeds the spread (in decibels) of all the readings. This method was modified, based on experience at other sites, because large fluctuations of the readings due to local sources such as rustling leaves and creatures of nature will not permit a central tendency to be determined with a five second period. The method to be used involves the observation of the meter once every five seconds regardless of the location of the needle within its swing. These measurements are repeated until a statistically reliable sample is obtained. The number of readings required to achieve this condition is determined by the variability of the ambient sound level, which in most cases consists of at least 100 readings that are recorded at each sampling point during each measurement period. The measurement approach of taking a sample every five seconds results in a statistically independent sample because the interval is considerably greater than the meter averaging time.

Octave band analyses shall be obtained to assess the nature of any complex noise source or to identify the presence of any pure tone associated with the operation of Davis-Besse Unit No. 1.

Meteorological conditions during the survey shall be documented by obtaining hourly readings of the wind speed, wind direction, temperature, temperature lapse rate (ΔT), and dew point from the onsite meteorological tower. Supplemental data such as barometric pressure shall be obtained from nearby airports.

The operating conditions of Davis-Besse Unit No. 1 during the survey shall be documented by obtaining hourly readings of the steam flow rate power output (MWe), circulating water flow through the natural draft cooling tower, and supporting operating data.

The data obtained during the noise survey shall be analyzed with the NUS computer code DBFRE to obtain the A-weighted L_{10}, L_{50}, L_{90}, L_{eq}, and L_{dn} sound levels along with the cumulative percent distribution and the standard deviation of the data at each sampling point during each measurement period. The L_{50} sound levels (sound levels exceeded 50% of the time) at each sampling point shall then be used to construct A-weighted sound level contours on a site map.

Operational Noise Impact Assessment

The results of the noise survey during unit operation shall be compared to the pre-operational background noise levels documented in Section 2.9 of the Davis-Besse Unit No. 1 Supplement to the Environmental Report - Operating License Stage and several noise level criteria to assess the final operational noise impact of Davis-Besse Unit No. 1. These results shall also provide a check on the predicted noise impact of the operation phase presented in Section 5.7 of the Davis-Besse Unit No. 1 Supplement to the Environmental Report - Operating License Stage.

Consideration shall be given to several noise level criteria in evaluating the final noise impact of the operation phase. The HUD Noise Criteria[3] states that sound levels up to 45 dBA are "acceptable" for continuous 24-hour exposure; levels up to 65 dBA are "normally acceptable" provided that 65 dBA is not exceeded more than 8 hours per day; levels exceeding 65 dBA more than 8 hours per day are "normally unacceptable"; and levels which exceed 75 dBA more than 8 hours per day or 80 dBA more than 60 minutes per day are "unacceptable".

The EPA proposed noise level guidelines[4] state that in residential environments, the time weighted day/night outdoor average level, below which no effects on public health and welfare occur due to activity or speech interference, is 55 dBA. Such levels would also protect the majority of the exposed population under most conditions against annoyance.

Stevens, Rosenblith, and Bolt[5] suggest another method that compares the background noise levels with the intruding noise. Since its introduction, this method has been shown to be valid by the results of additional studies, and it is an approach commonly used by acousticians. It indicates that up to a 5 dBA increase in the ambient will usually not generate any complaints due to annoyance. Up to a 10 dBA increase may cause a slight amount of annoyance.

REFERENCES

1. American National Standards Institute, "Draft Method for Measurement of Community Noise," ANSI S3W50 (November 11, 1969).

2. International Organization for Standardization, "Specifications for Precision Sound Level Meters," IER-179 (1971).

3. U.S. Department of Housing and Urban Development, "Noise Abatement and Control, Department Policy, Implementation Responsibilities, and Standards," Circular 1390.2 (July 16, 1971).

4. Environmental Protection Agency, "Information on the Development of Environmental Noise Requirements to Protect Public Health and Welfare With an Adequate Margin of Safety," EPA 550/9-74-004 (March 1974).

5. Stevens, K.N., W.A. Rosenblith, and R.H. Bolt, "A Community's Reaction to Noise, Can It Be Forecasted?", Noise Control, Vol. 1, No. 1, pp. 63-71 (January 1955).

4.0 SPECIAL SURVEILLANCE AND STUDY ACTIVITIES

4.2 Fish Impingement Study

General

The objective of this study is to investigate the number and species of fish which are impinged on the traveling water screens at the Davis-Besse Nuclear Power Station, Unit No. 1, and to evaluate the impact of such impingement. This study shall be divided into three phases. Phase I of the study shall be conducted for the first year of commercial operation to determine if the fish being impinged, as a result of unit operation, are of significant number and value to adversely effect the fish population in the vicinity of the site and the lake as a whole. Phase II of the study, if necessary, shall be conducted during the second year of unit commercial operation and shall be designed to determine if the fish being impinged on the traveling screens originate from the lake proper or from a resident population in the intake canal. Phase III of the study, if necessary, shall be conducted during the third year of unit commercial operation and shall be designed to evaluate the effectiveness of the bubble screen around the intake crib in preventing entrapment of fish from the lake. Decision criteria for determining whether to proceed from one phase to the next phase shall be developed no later than nine months after initiation of the phase in progress.

A decision whether or not to proceed from one phase to the next phase shall not be made until a report presenting the findings and recommendations of the completed phase of the study is submitted to and approved by the NRC. This report shall be submitted for each phase undertaken within 90 days after the completion of one years sampling for that phase. If this report recommends termination of the study the sampling required under the previous phase shall be continued until NRC approval is obtained to terminate the study.

If it is determined during the Phase I study that impingement is minimal and not of a level significantly high enough to cause an adverse impact to the fish population in the vicinity of the site or the lake, Phase I shall be terminated and Phases II and III shall not be implemented upon obtaining NRC approval.

Phase II shall commence only if the Phase I impingement study has proved that significant impingement is occurring. If however, the Phase II study commences and reveals that the majority of impinged fish are from a resident population of the intake canal, then the fish impingement study shall be terminated with approval from the NRC.

If the Phase II study shows that there is significant levels of impingement of fish from the lake, then the Phase III study shall be implemented to determine the effectiveness of the bubble screen.

4.2.1 Phase I Study

Objective

To investigate the number and species of fish that are impinged on the traveling screens as a result of unit operation.

Specification

The traveling screens shall normally be backwashed for thirty minutes each day (24 hours) to remove any impinged material which has collected over the past 24 hours which could block the flow of water through the screens. The backwash water shall be sluiced to the screen wash catch basin. Between the traveling screens and the screen wash catch basin the backwash water shall be screened in the sluiceway using a screen having the same mesh size (1/4 inch clear openings) as the traveling screens. Counts and species composition of the impinged fish shall be made three times a week. The fish of each species shall be placed in a container and a total species weight taken. One sample a month shall be taken for length and weight of each fish impinged.

Bases

All pumps that supply water to the unit are located behind the traveling screens located in the intake structure[1]. These pumps are the service water pumps, cooling tower makeup pumps, dilution pump and water treatment feed pump. Therefore, monitoring of impinged fish on the traveling screens will furnish the impingement loss resulting from unit operation.

The impingement losses resulting from unit operation are expected to be minimal. This is based on the following design parameters:

1. At the design maximum intake flow of 42,000 gpm the maximum intake velocity, at the intake crib, will be 0.25 ft/sec, at the nominal design flow of 20,850 gpm the approximate intake velocity will be about 0.12 ft/sec, and at the expected average flow rate of 16,700 gpm the intake velocity will be about 0.10 ft/sec.[2]

2. The water velocity in the intake canal conservatively based on low water datum and the design maximum flow will be 0.11 ft/sec. This velocity will be further reduced in the deeper and wider forebay portion of the intake canal to 0.02 to 0.03 ft/sec.

3. The velocity across the traveling screens, in the intake structure, will be a maximum of 0.25 ft/sec.

The proposed monitoring will be adequate to confirm the anticipated low level of fish impingement losses. If higher than anticipated impingement losses should be observed, the Phase II study will be initiated.

4.2.2 Phase II Study

Objective

The objective of this study is to determine what portion of the fish impinged on the unit's traveling screens are from the lake proper and what portion are from a resident population in the intake canal.

Specification

A hoop net shall be placed in front of the end of the intake conduit where it empties into the intake canal. The net shall be fished for four consecutive days each month during ice free periods, normally April through November. Quarterly during ice free periods, the net shall be fished for eight consecutive days. Each day the net is fished it shall be pulled and emptied at dawn and dusk. All fish captured shall be identified to the species level, measured, tagged and returned alive to the intake canal. Concurrently with hoop net fishing at the end of the intake conduit, fish impingement shall be monitored at the traveling screens.

Bases

Fish that enter the intake canal from Lake Erie and are impinged on the traveling screens must first pass through the intake conduit. By monitoring the number of fish entering the intake canal through the intake conduit and the number of fish impinged on the traveling screens it will be possible to determine what portion of the impinged fish originate from the lake proper and what portion are part of a resident population in the intake canal.

The difference between the number of adult fish entrapped and tagged at the end of the intake conduit and those impinged on the traveling screen will provide an estimate of the portion of impinged fish originating from the lake proper and the portion that originate from a resident intake canal population.

4.2.3 Phase III Study

Objective

The objective of this study is to determine the effectiveness of the bubble screen at the intake crib in preventing fish entrapment at the intake crib.

Specification

A hoop net shall be placed in front of the end of the intake conduit where it empties into the intake canal. The net shall be fished for four consecutive days (two with the bubble screen on and two with it off) each month during ice free periods, normally April through November. Quarterly during ice free periods the net shall be fished for eight consecutive days (four with the bubble screen on and four with it off). Each day the net is fished it shall be pulled and emptied at dusk and dawn. All fish captured shall be identified to the species level and noted whether they were captured with the bubble screen on or off.

Bases

Fish that are entrapped at the intake will be carried through the intake conduit and deposited in the intake canal. By monitoring the number of fish entering the intake canal at the end of the intake conduit the number of fish entrapped at the intake crib can be determined. Monitoring of the fish entrapped at the intake crib during periods when the bubble screen is operating and not operating will permit an assessment to be made of its effectiveness in reducing fish entrappment.

References

1. The Toledo Edison Company, Davis-Besse Nuclear Power Station Unit No. 1, Supplement to the Environmental Report - Operating License Stage, Docket No. 50-346, Page 3.4-4.

2. Ibid, Page 3.4-3

4.0 SPECIAL SURVEILLANCE AND STUDY ACTIVITIES

4.3 Chlorine Toxicity Study

Objective

To investigate the effect of total residual chlorine discharges from the unit on representative fish species found in the vicinity of the unit's discharge.

Specification

A special laboratory study shall be conducted to determine the levels of total residual chlorine that when discharged on a periodic bases, stimulating unit operation, shall not exceed the 96-hour Median Tolerance Limit for fisn species expected to be found in the area of the unit's discharge. This study shall be completed by March 31, 1978.

Bases

This special study is to fulfill the requirements of Ohio NPDES Permit No. B211*AD, Part III, Item 2 which requires:

> "B. To comply with the 96-hour Median Tolerance Limit for total residual chlorine in the mixing zone as required in EP-1. The plan may include a program for minimizing the use of chlorine as well as bioassays using representative fish species expected to be found in the area of the discharge."

The purpose of the study is to provide the necessary information to determine the final effluent limitations for residual chlorine in the plant discharge.

Also see Basis 2.3.1.

5.0 ADMINISTRATIVE CONTROLS

5.1 Review and Audit

Review and audit of environmental matters and compliance with these Environmental Technical Specifications in particular shall be provided by the Station Review Board, the Company Nuclear Review Board, and the Quality Assurance Manager. This activity shall be controlled in accordance with QAP 5000 of the Toledo Edison Nuclear Quality Assurance Manual.

5.1.1 Station Review Board

A Station Review Board, composed of technically qualified station personnel has been established to perform timely and continuing reviews of unit Operation. The makeup of the Board, specification of quorum, and meeting frequency are set forth in Section 6.0 of the Unit's Appendix "A" Technical Specifications. The Board's review responsibility will include all new or revised unit environmental procedures, proposed changes or modifications to unit structures or equipment, reported violations of the unit's Environmental Technical Specifications, proposed changes to the unit's Environmental Technical Specifications, results of the Environmental Monitoring Programs prior to their submission in each Environmental Operating Report, and any occurance of a safety limit being exceeded.

5.1.2 Company Nuclear Review Board

A Company Nuclear Review Board, composed of technically qualified personnel, has been appointed by the Vice President, Facilities Development, to perform independent reviews of unit operation. The makeup of the Board, specification of quorum and meeting frequency are set forth in Section 6.0 of the Unit's Appendix "A" Technical Specifications. The Boards independent review responsibility will include all new or revised unit environmental procedures, proposed changes or modifications to unit structures or equipment, reported violations of the unit's Environmental Technical Specifications, proposed changes to the unit's Environmental Technical Specifications, station operation, and minutes of the Station Review Board meeting.

5.1.3 Quality Assurance Manager

The Quality Assurance Manager shall be responsible for verification of compliance with the Environmental Technical Specifications. Planned periodic reviews and audits will be conducted in accordance with the provisions of the quality assurance program for unit operation described in the Unit's Final Safety Analysis Report. The Quality Assurance Manager shall also be responsible for reviewing all nonconformance reports concerning Environmental Technical Specifications including corrective actions taken to prevent any recurrence of the same nonconformance.

5.0 ADMINISTRATIVE CONTROLS

5.2 Action to be taken in the event of violation of an Environmental Technical Specification.

5.2.1 Remedial action as permitted by the unit's Environmental Technical Specification shall be taken until the specification can be met.

5.2.2 Exceeding a limiting condition for operation shall be investigated by the independent review and audit authority.

5.2.3 A report for each occurance shall be prepared as specified in Section 5.4.2.

5.0 ADMINISTRATIVE CONTROLS

5.3 Operating Procedures

5.3.1 Written procedures or instructions, including applicable check lists and instructions, shall be prepared and adhered to for all activities, performed by Toledo Edison, involved in carrying out the Environmental Technical Specifications. Procedures will include sampling, instrument calibration, analysis, and actions to be taken when limits are approached or exceeded. Testing frequency of any alarms will be included. These frequencies will be determined from experience with similar instruments in similar environments and from manufacturers' technical manuals.

Procedures shall be prepared for assuring the quality of the programs that are contracted to outside consultants. These procedures shall provide for audits to review procedures and to review and evaluate the program reports and results.

5.3.2 Unit operating procedures which involve actions or operations which could have an impact on the environment shall be identified. These procedures shall include provisions as necessary to ensure that the unit and all its systems and components are operated in compliance with the unit's Environmental Technical Specifications.

5.3.3 All procedures described in Section 5.3.2, and all changes thereto will be reviewed by the unit's Station Review Board.

5.0 ADMINISTRATIVE CONTROLS

5.4 Unit Reporting Requirements

5.4.1 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 90 days after January 1 of each year. The period of the first report shall begin with the date of commercial operation. The report shall include descriptive summaries and presentation of results, if available, of the special surveillance and study activities (Section 4), summaries, interpretations, and statistical evaluation of the results of the nonradiological environmental surveillance activities (Section 3) and the environmental monitoring programs required by limiting conditions for operation (Section 2) for the report period, including a comparison with preoperational studies, operational controls (as appropriate), and previous environmental surveillance reports and an assessment of the observed impacts of the unit operation on the environment. In the event that some results are not available within the 90 day period, the report shall be submitted noting and explaining the reason for the missing results. The missing data shall be submitted as soon as possible in a supplementary report. 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.

Part B - 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 90 days after January 1 of each year. The period of the first report shall begin with the date of initial criticality. The reports shall include summaries, interpretations, and statistical evaluation of the results of the radiological environmental surveillance activities for the report period, including a comparison with preoperational studies, operational controls (as appropriate), and previous environmental surveillance reports and an assessment of the observed impacts of the unit operation on the environment. The report shall also include the results of land use censuses required by the specification. 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 following a format similar to Table 1 of Regulatory Guide 4.8, December 1975. In the event that some results are not available within the 90 day 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 unit during the previous six months of operation shall be submitted to the Director of the Regional NRC 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 period of the first report shall begin with the date of initial criticality. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", with data summarized on a quarterly basis following the format of Appendix B thereof.

The report shall include a summary of the meterological conditions concurrent with the release of gaseous effluents during each quarter as outlined in Regulatory Guide 1.21, with data summarized on a quarterly basis following the format of Appendix B thereof. Calculated offsite doses to humans resulting from the release of effluents and their subsequent dispersion in the atmosphere shall be reported as recommended in Regulatory Guide 1.21.

5.4.2 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) an unusual or important event occurs that causes a significant environmental impact, that affects potential environmental impact from unit operation, or that has high public or potential public interest concerning environmental impact from unit operation. Reports shall be submitted under the report schedule described below:

1. Prompt Report - Those events requiring prompt reports shall be reported within 10 days by a written report to the Director of the Regional NRC Office (with a copy to the Director, Office of Nuclear Reactor Regulation).

The reporting schedule for reports concerning limiting conditions for operation and report levels shall be specified in the licensee's technical specifications. Reports concerning unusual or important events shall be reported on the prompt schedule.

Written 10 day 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 repitition of the occurrence and to prevent similar occurrences involving similar components or systems.

The significance of an unusual or apparently important event with regard to environmental impact may not be obvious or fully appreciated at the time of occurrence. In such cases, the NRC shall be informed promptly of changes in the licensee's assessment of the significance of the event and a corrected report shall be submitted as expeditously as possible.

B. Nonroutine Radiological Environmental Operating Reports

The nonroutine reporting requirements for radiological environmental monitoring are divided into several sections. The section on anomalous measurements applies to specifications for all nuclear power plants.

1. Anomalous Measurement Report. If a confirmed measured level of radioactivity in any environmental medium exceeds ten times the control station 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.

C. Nonroutine Radioactive Effluent Reports

1. Liquid Radioactive Wastes Report. If the cumulative releases of radioactive materials in liquid effluents, excluding tritium and dissolved gases, should exceed one-half the design objective annual curie quantity during any calendar quarter, 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.

2. Gaseous Radioactive Wastes Report. Should the conditions (a), (b), or (c) listed below exist, the licensee shall make an investigation to identify the causes of the release rates and define and initiate a program of action to reduce the release rates to 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 releases occurred.

   (a) If the average release rate of noble gases for the site during any calendar quarter exceeds one-half the design objective annual quantity.

(b) If the average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter exceeds one-half the design objective annual quantity.

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

3. Unplanned or Uncontrolled Release Report. Any unplanned or uncontrolled offsite release of radioactive materials in excess of 0.5 Curie in liquid or in excess of 5 Curies of noble gases or 0.02 Curie of radioiodines in gaseous form requires notification. This notification must be made by a written report within 30 days to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation). The report shall describe the event, identify the causes of the unplanned or uncontrolled release and report actions taken to prevent recurrence.

5.4.3 Change in Environmental Technical Specifications

A. A report shall be made to the NRC prior to implementation of a change in unit design, in unit operation, or in procedures described in Section 5.3 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.

5.0 ADMINISTRATIVE CONTROLS

5.5 Records Retention

5.5.1. Records and logs relative to instrument calibration and chemical analysis shall be retained for five years except as described in Section 5.5.2.

5.5.2 All records and logs relative to the following areas shall be retained for the life of the unit:

5.5.2.1 Records and drawing changes reflecting unit design modifications made to systems and equipment described in the unit's Environmental Report.

5.5.2.2 Records of environmental monitoring surveys.

5.5.2.3 Records of radioactivity in liquid and gaseous effluents released to the environment.

5.5.2.4 Minutes of Station Review Board and Company Nuclear Review Board meetings.

5.5.2.5 Copies of all superseded operating procedures which affect the environment.