## Appendix B

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December 6, 2006 USEPA Comment Letter to FPL



#### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1 1 CONGRESS STREET, SUITE 1100 BOSTON, MASSACHUSETTS 02114-2023

December 6, 2006



Mr. James Peschel Regulatory Programs Manager FPL Energy Seabrook Station P.O. Box 300 Seabrook, NH 03874

# RE: Seabrook Station, National Pollutant Discharge Elimination System Permit No. NH0020338, Proposal for Information Collection

Dear Mr. Peschel:

FPL Energy Seabrook, LLC (Permittee, Seabrook) submitted a Proposal for Information Collection (PIC), dated May 4, 2006, for the Seabrook Station (Station) located in Seabrook, New Hampshire, pursuant to requirements under the Phase II Regulations promulgated by U.S. Environmental Protection Agency (EPA) under Section 316(b) of the Clean Water Act (Phase II Rule). EPA- Region I has reviewed this report and provides suggestions and comments included in this letter.

Based on EPA-Region I's review, the PIC provides insufficient information to support the Comprehensive Demonstration Study (CDS). Additional information is needed (regarding previous biological studies) to fully evaluate the validity of the statements and conclusions made in regard to compliance with rule requirements for Impingement Mortality and Entrainment (IM&E) reductions. EPA-Region I requires that all comments in this letter are incorporated into the data collection, analysis, and presentation aspects of the CDS. Please be advised that failure to act in accordance with EPA's comments puts the Permittee at risk for not having acceptable data for permit reissuance. These comments are outlined below and organized by the Sections identified in the document.

#### 3.2 Source Water Physical Data

The source water description included in this section of the PIC is very brief, cursory, and provides very little information not already discussed in earlier sections (i.e., location of the CWIS). Given that the PIC does not include a plan to do any further biological sampling and the Permittee is attempting to demonstrate that they are in full compliance with required IM&E reductions, more information on the physical nature of the source waterbody is necessary in order to make determinations on the validity of the reduction calculations and compliance conclusions.

#### 4.1 Applicable Performance Standards

Seabrook plans to claim IM&E reduction credits based on deviations from a baseline configuration (shoreline intake with traveling screens). These deviations are:

- offshore intake
- velocity caps
- reductions in flow volume due to withdrawing cooler offshore water as compared to withdrawing water from an onshore location
- re-circulation of some discharge water back into the intake

These credits are quantified in the PIC from comparisons with IM&E at the Pilgrim Station, which has a shoreline intake on allegedly the same waterbody (calculations in Appendices A, B and C). Such a comparison is allowed by the Phase II Rule, specifically, "... the calculation baseline could be estimated by evaluating existing data from a facility nearby without impingement and/or entrainment control technology (if relevant) or by evaluating the abundance of organisms in the source waterbody in the vicinity of the intake structure that may be susceptible to impingement and/or entrainment." However, the Phase II Rule further requires, "If you propose to use existing data, you must demonstrate the extent to which the data are representative of current conditions and that the data were collected using appropriate quality assurance/quality control procedures." Data were presented in the PIC to establish the appropriateness of the comparison between these facilities, but information was lacking on the source(s) of these data, how the samples were collected, quality assurance/quality control (QA/QC) procedures, or how the data might be representative of current conditions. A complete complement of this type of information would allow a determination of the validity of the comparison, calculations, and conclusions made from these data. Examples of required information (to evaluate the validity of comparisons between the sites) include: sampling methods used in collection of existing data, QA/QC procedures applied during the process, the relationship of existing data to current conditions (e.g., age of data and, if necessary, relationship to community structure documented in more recent studies), and any other useful information regarding the physical and ecological similarities between the waters in the vicinity of the intake for the Seabrook and Pilgrim facilities.

In addition, the baseline reduction credits that Seabrook cites (indicating that the facility is already compliant in IM&E reductions) are at the lower limit of the mandated performance range (i.e., 80% reduction for IM and 60% reduction for E). Given that no information is provided to establish the appropriateness or validity of the data used in these calculations, no estimates of error or confidence intervals are given for the reduction estimates, and that no additional biological studies are planned, more information should be provided in the Comprehensive Demonstration Study (CDS) to support these assertions before any determinations of compliance can be made. The appendices that detail the calculations (Appendix A, B and C) do not completely address these concerns.

Furthermore, EPA has not yet determined what limits within the performance ranges are potentially achievable at Seabrook Station. In the preamble to the Phase II Regulations, EPA indicates that many facilities can and have achieved a percent reduction in the "higher end of the range" and that "[i]n specifying a range, EPA anticipates that facilities will select the most cost-effective technologies or operational measures to achieve the performance level (within the stated range) based on conditions found at their site, and that Directors will review the facility's application to ensure that appropriate alternatives were considered" (emphasis added). 69 Fed. Reg. 41600 (July 9, 2004).

#### 4.2 Existing Technology, Operational, and/or Restoration Methods

#### Flow Reduction Due to Recirculation

During the winter months, a portion of the heated cooling water is recirculated to the transition structure to prevent subcooling. Subcooling occurs when cold cooling water passing through the condensers reduces the steam condensate temperature to a point where additional heat is required to bring the temperature back up to generate steam when it is returned to the boiler. This results in an overall loss in generating efficiency when the intake water temperature is excessively cold. Since the cooling water pumps are single speed, subcooling is prevented by recirculating a portion of the condenser effluent to the transition structure. The result is a reduction in intake flow volume equal to the volume of recirculated water.

The Phase II Regulations dictate that the Station must reduce impingement mortality by 80 to 95 percent, and reduce entrainment by 60 to 90 percent, of the facility's "calculation baseline." 40 C.F.R. § 125.94(b). The PIC indicates that the recirculation of cooling water discharge is an operational measure, already being implemented at Seabrook Station, that reduces IM&E and that the facility's calculation baseline should be based on an estimate of the IM&E that would occur without this measure.

EPA must disagree. The calculation baseline for Seabrook Station must be based on impingement mortality and entrainment levels that reflect this existing operational step. The calculation baseline is defined in 40 C.F.R. § 125.93 as "...an estimate of impingement mortality and entrainment that would occur at your site assuming that ... [,among other things,] the baseline practices, procedures, and structural configuration are those that your facility would maintain in the absence of any structural or operational controls, including flow or velocity reductions, implemented in whole or in part for the purposes of reducing impingement mortality and entrainment." The above-mentioned recirculation of heated condenser water is a baseline operational practice that the Station has historically implemented for power plant operational reasons (to prevent subcooling) and not for the purpose (or partial purpose of) reducing impingement mortality and entrainment. As a result, the Permittee may not consider the reduction in flow by recirculation of baseline flow.

EPA does, however, acknowledge that a reduced volume of cooling water is withdrawn due to the colder water at the offshore location of the intakes compared to an inshore location and that this difference can be taken into account when calculating baseline.

#### Differences Due to Intake Water Temperatures

The volume of flow recirculation varies as the surface water temperature and cooling requirements vary. When the intake water temperature drops below the threshold of 46-47 °F, recirculation begins and typically occurs from mid to late November to mid to late May. A baseline configuration (shoreline intake) would experience similar periods of reduced cooling water flow demand due to subcooling and, because there is an economic incentive to do so, would also have similar recirculation measures in the cooling system design.<sup>1</sup> So, when comparing to a baseline configuration, the flow volume reduction associated with the difference between the two should be based on the much less pronounced difference in inlet temperatures between these two locations during the colder months.

In fact, while the average maximum monthly intake temperature for the baseline intake is 6.6 °F higher than for the existing submerged inlet, the baseline intake temperature is only 1.1 °F lower during the coldest month; thus, the baseline intake would actually experience a period of slightly higher recirculation rates during the very coldest part of the year. Since the difference in temperature is inverted at the coldest period, gradually increasing from mid winter to mid summer, and is most pronounced when no recirculation occurs, the overall difference in recirculation between the existing configuration and baseline configuration is much smaller than the 16.4% maximum and 7.4% overall reduction cited in the PIC. This needs to be clarified in the CDS.

During the summer, the PIC estimated that the baseline intake maximum monthly average intake temperature would be 62 °F as opposed to the value of 55.4 °F at the existing submerged offshore location. The PIC analysis in Section A-1 assumes that the existing calculated maximum effluent temperature of 94.4 °F, based on a change in temperature or "delta-T" ( $\Delta$ T) of 39 °F and an intake temperature of 55.4 °F, would be the equivalent permit limit for a system using the shoreline intake. Using this assumption, the PIC estimated the  $\Delta$ T limit would be 32.4 °F, resulting in a design flow that would need to be 8.1% higher. This analysis assumes that the baseline system would also employ single speed pumps and, therefore, the increased flow volume needed at the baseline intake during the summer would apply year-round.

This assumption may have some validity, since single speed pumps were common at the time of initial plant construction. However, depending on the basis for the existing NPDES permit  $\Delta T$  limit of 39 °F, the calculated baseline  $\Delta T$  limit of 32.4 °F may be

<sup>&</sup>lt;sup>1</sup> Recirculation is not the only means of achieving flow reduction to prevent subcooling; variable speed pumps provide an alternative to recirculation with similar results in terms of intake flow volume reduction and would be accompanied by reduced pumping energy requirements.

lower than what would have been applied. Since the 39 °F  $\Delta$ T limit is based on a 316(a) variance and a higher than 94.4 °F maximum effluent temperature may have been applied, then the 8.1% reduction may not be a valid estimate of the difference between the existing and baseline intake. In the CDS, the facility needs to clarify the assumptions used to estimate an 8.1% reduction.

#### 4.3 Proposed Technology, Operational, and/or Restoration Measures

Appendix D of the PIC provides a summary of available impingement and entrainment reduction technologies initially evaluated for consideration. The PIC assumes that the intake technologies would be used in conjunction with the existing submerged intake. One important aspect of the submerged intake that affects the technology selection is the stress placed on fish as they pass through the intake tunnel system. Fish are exposed to rapid changes in pressure that occur after they enter the intake and quickly descend to a depth of 160 ft, then travel laterally for about an hour to a depth of 240 ft, and then quickly rise back to the surface. The PIC asserts that this results in significant mortality even before fish encounter the traveling screens. It is probably a reasonable assumption that such rapid changes in pressure would result in significant fish mortality. As such, all technology improvements located downstream of the intake tunnel (e.g., Conventional Traveling Screens with a Fish Return System, Modified Traveling Screens, and Angled Screens) are correctly considered as being potentially ineffective, as many fish will have already been killed prior to reaching the transition structure.

The PIC's conclusion that cylindrical wedgewire screens would cost approximately \$8 million is similar to EPA estimates. And while feasible, the screens would pose a significant risk for loss of flow due to plugging of the intake with debris if an airburst system was not included. While the intake location results in a generally lower risk of high debris loading compared to a shoreline intake, the relative inaccessibility of the screens increases the difficulty of executing corrective actions in a timely manner. Thus, an airburst system is probably a necessary safety feature. However, the PIC cost estimate for an airburst system of \$24 to \$100 million appears to be high. A more detailed cost review of the airburst system must be provided in the CDS.

EPA agrees that the two flow reduction measures (adding variable frequency drive's and increased flow recirculation) should be evaluated further as having a potential for added flow reduction.

#### 4.4 Costs for Compliance

The PIC refers to Appendix A of the Phase II rule and notes that zero costs were estimated for Seabrook. The PIC also cites the preamble language explaining the zero cost facilities, "...some entries in Appendix A have NA indicated for the EPA assumed design intake flow in column 2. These are facilities for which EPA projected that they would already meet otherwise applicable performance standards based on existing technologies and measures. EPA projected zero compliance costs for these facilities.... These facilities should use \$0 as their value for the costs considered by EPA for a like facility in establishing the applicable performance standard." (69 FR 41646). The PIC asserts that this language suggests that Seabrook Station already meets the applicable performance standards based on existing installed technologies and operational measures. However, although zero compliance costs were estimated for Seabrook Station as part of the national-level costing for the Phase II regulation, this value should not be used as an indicator of compliance on a facility-specific basis. Rather, the rule requires that the facility "demonstrate" compliance through one of the five compliance alternatives (40 CFR 125.94(a)).

#### 5.0 Ecological Studies and Historical Impingement Mortality and Entrainment Studies

The summary of IM&E studies, which are the basis of the IM&E reduction credit calculations, provide no information on methodology, QA/QC procedures, or relevance of the data to current conditions. This information must be provided for compliance to be evaluated.

#### 7.0 Sampling Plans

Seabrook Station believes it is in compliance for IM& E reductions, and therefore has not planned any additional sampling. As stated above, the appropriateness of this conclusion cannot be evaluated with the information provided in this PIC. Further verification monitoring may be required to support the facility's belief that it is in compliance with Phase II performance standards.

If you have any questions concerning this letter, please contact Phil Colarusso of my staff at (617) 918-1506 or Sharon DeMeo at (617) 918-1995.

Sincerely,

which Chat. J.

Melville P. Coté, Chief Ocean and Coastal Protection Unit Office of Ecosystem Protection

cc: Phil Colarusso, EPA-Region I Sharon DeMeo, EPA-Region I Jeffrey Andrews, NHDES Mike Johnson, NMFS

## Appendix C

March and Nyquist 1976 Model Test Report for Seabrook Intake Structures

# EXPERIMENTAL STUDY OF INTAKE STRUCTURES PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE SEABROOK STATION, UNITS 1 AND 2

FOR

YANKEE ATOMIC ELECTRIC COMPANY

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#### ABSTRACT

Hydraulic model tests were conducted to provide information necessary for evaluating alternative designs for Seabrook Station's intake structures. Sectional models constructed to a scale ratio of 1: 35.2 were used to determine vertical flow patterns and velocities in the vicinity of individual intake structures. An overall model facility was used to determine loss coefficients and to determine horizontal flow patterns in the vicinity of an array of three intake structures. Seabrook Alternative A and Alternative C intake designs were tested in the overall model.

For an ambient current of 0.2 kt and a water depth of 60 ft, the Alternative A intake withdrew from the bottom 35 ft of the approaching fluid, and for an ambient current of 0.4 kt, the intake withdrew from the bottom 25 ft of the approaching fluid. At a water depth of 30 ft, the Alternative A intake withdrew from the entire depth for 0.2 kt ambient current and from the bottom 25 ft for the 0.4 kt ambient current. For zero ambient current at both water depths, the Alternative A intake withdrew from the entire depth.

At water depths of 30 ft and 60 ft, the velocity profiles at the upstream face of the Alternative A intake were relatively uniform and generally less than 1 ft/sec for ambient currents of 0, 0.2, and 0.4 kt. Downstream velocity profiles were skewed for ambient currents of 0.2 and 0.4 kt, and the maximum measured velocity was about 1.3 ft/sec.

At the 60 ft water depth, velocities upstream from the Alternative A intake dropped to the ambient current values within one-half intake diameter for both the 0.2 and 0.4 kt ambient currents.

No significant interference between intakes was observed for the Alternative A intakes at a water depth of 60 ft and ambient currents of 0.2 kt S, 0.4 kt S, 0.2 kt S-65°W, and 0.4 kt S-65°W. For all of the ambient currents tested, each intake appeared to operate independently from the other intakes. Each intake's range of influence was limited horizontally to about one intake diameter on either side of the intake periphery for the 0.2 kt S and the 0.2 kt S- $65^{\circ}W$ ambient currents, and to about one-half intake diameter to either side for the 0.4 kt S and the 0.4 kt S- $65^{\circ}W$  ambient currents. Similar results were also obtained for the Alternative C intakes.

The average intaking (normal flow) loss coefficient was 0.35 for Alternative A and 3.7 for Alternative C. The average backflushing (reverse flow) loss coefficient was 1.04 for Alternative A and 2.5 for Alternative C.

Because of the low, relatively uniform entrance velocities, minimal interference between intakes, and low losses during normal intaking operation and backflushing operation, the Alternative A intake design was recommended.

#### INTRODUCTION

Cooling water for the Public Service Company of New Hampshire's Seabrook Station will be withdrawn from the Atlantic Ocean through three velocity-cap intake structures and discharged through a multiple port diffuser. During normal operation, water is withdrawn through the intake structures and discharged through the diffuser nozzles. During backflushing operation, water is taken into the circulating water system through the discharge structures and discharged through the intake structures for the purpose of reducing biological fouling in the intake tunnel.

Knowledge of the head losses associated with the intake structures during normal operation and backflushing operation is important for sizing the pumps in the circulating water system, calculating normal plant circulating water flow and temperature rise, and predicting backflushing transients. Information on the flow patterns and velocities in the vicinity of the intake structures is required to help evaluate the potential for entrainment of marine organisms.

The primary objective of this study was to provide the loss coefficient, flow pattern, and velocity information necessary for evaluating the intake structure designs. A sectional model was used to determine vertical flow patterns and velocities in the vicinity of an individual intake. An overall model was used to determine loss coefficients and to determine horizontal flow patterns in the vicinity of the three intake structures.

#### DESCRIPTION OF PROTOTYPE

The Seabrook Station will have two nuclear-powered generating units with a combined net generating capability of 2300 MWe. For this study, the total plant flow rate was estimated at 1822 ft<sup>3</sup>/sec, and the design velocity at the face of each intake was 0.9 ft/sec. The estimated maximum plant flow rate during backflushing operation was also 1822 ft<sup>3</sup>/sec, and the estimated typical plant flow rate during backflushing operation was approximately one-half the maximum flow rate. Subsequent calculations, based in part on the results of this study, predict a maximum plant flow rate of 1897 ft<sup>3</sup>/sec (including service water) during normal operation and backflushing operation. Actual flow rates in the circulating water system during backflushing will vary, depending on the power level and transients during flow reversal.

With the present design for the intake portion of the circulating water system, the three intake structures will be spaced 110 ft apart along the same line. Riser shafts of 9 ft in diameter will connect the intake structures to a 19 ft inside diameter tunnel extending about 17,000 ft (or 13,500 ft, depending on the site selected) to the circulating water pumphouse.

Two sites have been proposed for the intake structures. The "offshore" site, shown in Figure 1, is located about two miles offshore from Hampton Beach, New Hampshire, in approximately 60 ft of water. The "onshore" site is located about one mile offshore from Hampton Beach in approximately 30 ft of water. The original intake design, Alternative A, is shown in Figure 2. Another intake design, Alternative C, is shown in Figure 2. The Alternative C intakes were designed for the purpose of increasing the thermal dilution at the onshore location during backflushing operation (Nyquist, et al., 1976). The intake structure for Niagra Mohawk Power Corporation's Nine Mile Point Station, shown in Figure 4, was also included in this study for comparison purposes.

#### SCALING CRITERIA

#### General Remarks

Although the model size should be maintained as large as practicable to minimize viscous scale effects, other factors, such as costs, availability of materials, and capacity of existing facilities, must also be considered in determining the geometric scale ratio. For this study, a model to prototype scale ratio of 1:35.2 was selected. This was the largest scale ratio which allowed adaptation of existing ARL facilities for the study and modeling of the riser tunnel with a standard pipe size.

In any physical model study, the choice of a scaling criterion for relating model results to prototype conditions is determined by the relative magnitudes of forces which control the phenomena under consideration. In this study, Froude scaling was used for determining and interpreting velocities and flow patterns. Euler scaling was used for the head loss tests. These scaling criteria are described in more detail in the following sections.

#### Froude Scaling Criterion

The dominant forces determining flow patterns in the vicinity of the intake structures are inertial and gravitational forces. The Froude number, F, which represents the ratio of these forces, is given by the expression

$$\mathbf{F} = \mathbf{V}/\sqrt{\mathbf{g} \mathbf{L}} \tag{1}$$

where V is a characteristic velocity, L is a characteristic length, and g is the acceleration of gravity.

The Froude scaling criterion requires that

$$\mathbf{F}_{m} = \mathbf{F}_{p} \tag{2}$$

where the subscripts m and p refer to model and prototype, respectively. Because the acceleration of gravity is almost exactly equal in model and prototype, Equations (1) and (2) can be combined and simplified:

$$\frac{V_{m}}{V_{p}} = \left(\frac{L_{m}}{L_{p}}\right)^{1/2} = \left(\frac{1}{35 \cdot 2}\right)^{1/2} = \frac{1}{5 \cdot 93}.$$
 (3)

Other relevant scale ratios can be determined in a similar manner.

#### Euler Scaling Criterion

Because of the complex intake geometries and the relatively abrupt changes in shape, the major internal losses come from the dissipation of energy in turbulence created by shape, rather than from viscous shear at flow boundaries. The Euler number, E, indicates the relative importance of inertial and pressure forces, and equality of the Euler numbers for model and prototype is necessary and sufficient for proper flow similarity.

The Euler number, E, can be expressed as

$$\mathbf{E} = \mathbf{V} / \sqrt{2\Delta \mathbf{P} / \rho} \tag{4}$$

where V is a characteristic velocity,  $\Delta P$  is a characteristic differential pressure, and  $\rho$  is the fluid density. The Euler scaling criterion requires that

$$\mathbf{E}_{\mathbf{m}} = \mathbf{E}_{\mathbf{p}} \,. \tag{5}$$

The densities of the working fluids are almost equal in model and prototype, and Equations (4) and (5) can be combined and simplified into the expression

$$\frac{\Delta P_{m}}{\Delta P_{p}} = \frac{\Delta h_{m}}{\Delta h_{p}} = \frac{V_{m}^{2}}{V_{p}^{2}}.$$
(6)

In Equation (6), the head loss  $\Delta h$  has been substituted for the equivalent pressure loss  $\Delta P$ .

A loss coefficient, K, is defined as the ratio of head loss  $\Delta h$  to velocity head  $V^2/2g$ :

$$K = \frac{\Delta h}{V^2/2g} .$$
 (7)

Equations (6) and (7), therefore, indicate that the loss coefficients are equal in the model and the prototype if the Euler numbers are equal. The principal requirement for equal Euler numbers is that viscous effects must be negligibly small compared to inertial effects. The Reynolds number, R, which represents the ratio of inertial to viscous forces, can be defined as

$$R = \frac{V d}{v}$$
(8)

where d is a characteristic length and v is the kinematic viscosity of the working fluid. Previous research shows that viscous effects are often negligible and the requirements of the Euler scaling criterion are satisfied for Reynolds numbers larger than about 10<sup>5</sup> (McNown, 1968).

#### DESCRIPTION OF TEST FACILITIES AND MODELS

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#### Introduction

A sectional model and an overall model were constructed for this research. The sectional model, consisting of half an intake structure placed against the glass sidewall of a flume, was used to determine the "elevation view" streak lines in the vicinity of a single intake structure and the velocities across the upstream and downstream faces of the structure. The overall model, which included three complete intake structures, was used to determine "plan view" streak lines, velocity distribution at the intake face during reverse flow, and head loss coefficients for normal operation and reverse flow operation. These models are described in detail in the following sections.

#### Sectional Model

Sectional models of the Alternative A intake structure (Figure 2) and the Nine Mile Point intake structure (Figure 4) were fabricated from transparent acrylic plastic (PMMA) to a uniform geometric scale of 1: 35.2. The sectional models were tested individually in a flume which measured 4 ft wide by 4 ft deep by 32 ft long. The test facility is shown schematically in Figure 5.

Each sectional model was mounted against the transparent sidewall of the flume. A centrifugal pump was used to withdraw water through the sectional intake, and the flow rate through the intake was measured with a calibrated orifice plate and an air-water differential manometer. Another centrifugal pump was used for circulating water through the flume to provide the ambient current. Flow rate through the flume was measured with an orifice plate and an air-water differential manometer. Water depth was controlled by draining or filling the flume to the proper depth as measured with a staff gage.

Streak lines in the vicinity of the intake were determined by sketching and photographing isokinetic dye releases. A sample dye trace is shown in Figure 6. A Thermo-Systems, Inc. Series 1050 hot film anemometer was used for velocity measurements in the vicinity of the intake.

#### Overall Model

Models of the three Alternative A intakes and the three Alternative C intakes were fabricated from transparent acrylic plastic (PMMA) to a uniform geometric scale of 1: 35.2. Each group of three intakes was tested in an elevated tank which measured 20 ft wide by 2 ft deep by 30 ft long. The test facility is shown schematically in Figure 7.

The riser for the center intake was placed in a fixed location, and the risers for the other two intakes could be moved to an additional location. Orientations corresponding to prototype ocean currents from North to South (S current) and from North-65°East to South-65°West (S-65°W current) were provided in the model. An axial flow pump supplied water for providing ambient currents in the model. Flow rate through this supply line was measured with an orifice plate and an air-water differential manometer. Two rows of perforated plates were used to produce a uniform velocity distribution across the tank. An adjustable weir located at the downstream end of the model was used to control water depth, as measured with a staff gage.

For normal intaking operation, water drained by gravity through the three intakes and into the sump. For backflushing operation, water was pumped to the intakes through a branch line from the ambient current supply line. Metering sections in the lines connected to the three intakes were constructed with pressure taps at one diameter and one-half diameter on each side of the orifice plates. These metering sections were calibrated for both flow directions and were used to measure flow rate from each intake during normal operation and to each intake during backflushing operation.

A probe which discharged dye from multiple ports, as shown in Figure 6, and a dye probe with a single release port were used for determining the streak lines in the vicinity of each intake structure. Multiple exposure photographs of drogues (i.e., small surface floats with subsurface vanes at varying depths) were used to verify the uniformity in speed and direction of the ambient current. The velocity profile at the face of the center intake was measured during backflushing operation using the hot-film anemometer.

Piezometer taps, placed at the locations shown in Figure 8 along the riser for the center intake, and air-water manometers were used to determine the head losses for the center intake structure during normal operation and backflushing operation. A calibrated elbow meter and an air-water differential manometer were used to determine the flow rate to or from the center intake during head loss tests.

#### EXPERIMENTAL PROCEDURE

#### Sectional Model - Flow Pattern Tests

The water level in the test facility was adjusted to the correct depth. The flume recirculating pump was turned on, and the control valve in the recirculating line was adjusted to produce a manometer reading corresponding to the approximate ambient current desired. A drogue with vanes located at mid-depth was timed over a known distance in order to determine ambient current speed, and final adjustments in the ambient current speed were made with the control valve. The intake pump was switched on, and the control valve in the intake line was adjusted to produce a manometer reading corresponding to the correct flow rate through the intake.

Dye was discharged at numerous locations in the vicinity of the intake structure, and the dye patterns were sketched and photographed. Streak lines were determined in this manner for each sectional intake at ambient currents of 0, 0.2, and 0.4 kt. The Seabrook Alternative A intake was tested at water depths of 30 ft and 60 ft and a flow rate of 607 ft<sup>3</sup>/sec (i.e., plant flow rate of 1822 ft<sup>3</sup>/sec). The Nine Mile Point intake was tested at a water depth of 26.5 ft and a plant flow rate of 600 ft<sup>3</sup>/sec.

For another series of tests with the Alternative A intake, the intake flow rate and water level were adjusted to correspond to a plant flow rate of 1822  $ft^3$ /sec and a water depth of 60 ft. The hot-film velocity probe was positioned at the centerline height of the intake. Velocities were measured as a function of distance upstream from the intake for ambient currents of 0.2 and 0.4 kt.

#### Overall Model - Flow Pattern Tests

For the intaking mode tests, the ambient current supply pump was switched on, the supply valve and bypass valve were adjusted to produce a manometer reading corresponding to the approximate ambient current, and the water level was adjusted to the correct depth. Drogues were timed over a known distance in order to determine ambient current speed, and final adjustments were made with the supply valve. The valves in the intake riser lines were adjusted to produce manometer readings corresponding to a prototype flow rate of 607 ft<sup>3</sup>/sec for each intake (plant flow rate of 1822 ft<sup>3</sup>/sec).

Dye was discharged at numerous locations in the vicinity of the intake structure, and the dye patterns were sketched and photographed. Streak lines were determined in this manner for the Alternative A intakes and the Alternative C intakes at ambient currents of 0.2 kt S, 0.4 kt S, 0.2 kt S-65°W, and 0.4 kt S-65°W. The Alternative A intakes were tested at a water depth of 60 ft, and the Alternative C intakes were tested at a water depth of 30 ft.

For the backflushing mode tests, ambient current and water level were adjusted according to the procedure described above. The valves were adjusted to provide flow out of the intakes, and dye was injected into the riser pipes just upstream from the intakes. Dye patterns from the Alternative A intakes were observed for estimated plant flow rates of 869 ft<sup>3</sup>/sec (100% power level), 684 ft<sup>3</sup>/sec (63% power level), and 535 ft<sup>3</sup>/sec (33% power level) at ambient currents of 0.2 kt S and 0.4 kt S. Dye patterns from the Alternative C intakes were observed and photographed for the same range of flow rates and ambient currents. The Alternative A intakes were tested at a water depth of 60 ft and the Alternative C intakes were tested at a water depth of 30 ft.

#### Overall Model - Velocity Profile During Backflushing

The values were adjusted for backflushing operation. With the Alternative A center intake in place, a water depth of 60 ft, and no ambient current in the model, the flow rate out of the center intake was adjusted to 607 ft<sup>3</sup>/sec (plant flow rate of 1822 ft<sup>3</sup>/sec). Velocity measurements were taken vertically across the face of the intake using a hot-film anemometer. A dye probe was used to determine the direction of flow.

The hot-film probe was also positioned 0.5 ft (prototype) below the bottom of the intake roof, and voltages corresponding to the exit velocities were recorded on a strip-chart recorder as the flow rate to the intake was varied. Chart records were analyzed using a graphical spectrum analysis technique to determine frequency of velocity fluctuations as a function of velocity in the riser pipe.

#### Overall Model - Head Loss Tests

For the intaking mode tests and the backflushing mode tests, the water level was maintained at a prototype depth of 60 ft for the Alternative A intake and 30 ft for the Alternative C intake. The flow rate into (or out of) the center intake was varied to produce a range of Reynolds numbers. For each flow rate, the differential head across the elbow meter, the manometer reading for each group of piezometers along the riser shaft, the manometer reading from the tank piezometers, and the water temperature were recorded.

Riser pipe Reynolds numbers were computed from the measured flow rates by using Equation (8). Head loss measurements were converted into intaking loss coefficients  $(K_I)$  using Equation (7), with riser pipe velocity head as the reference velocity head. The expression used for computing intaking loss coefficients was derived by writing the Bernoulli equation between points A and B on the diagram in Figure 8, as shown below.

Definitions:

 $V_{A} = \text{velocity of water surface at point A}$   $h_{A} = \text{piezometric head at point A}$   $V_{B} = \text{riser pipe velocity at point B}$   $h_{B} = \text{piezometric head at point B}$   $\Delta h_{I} = \text{head loss between A and B}$   $K_{I} = \frac{\Delta h_{I}}{V_{B}^{2}/2g}$   $V_{A} = 0$ 

Assumptions:

Tank (ocean) floor is the datum for measuring piezometric heads.

Bernoulli equation:

$$\frac{V_{A}^{2}}{2g} + h_{A} = \frac{V_{B}^{2}}{2g} + h_{B} + \Delta h_{I}$$

$$\Delta h_{I} = h_{A} - h_{B} - V_{B}^{2}/2g$$

$$K_{I} = \frac{\Delta h_{I}}{V_{B}^{2}/2g} = \frac{h_{A} - h_{B} - V_{B}^{2}/2g}{V_{B}^{2}/2g}$$
(9)

The piezometric head at point B,  $h_B$ , was determined by extrapolating the hydraulic grade line obtained from the riser pipe piezometers.

For the backflushing tests, riser pipe Reynolds numbers were computed from the measured flow rates by using Equation (8). Head loss measurements were converted into backflushing loss coefficients  $(K_D)$  using Equation (7), with riser pipe velocity head as the reference velocity head. The expression used for computing backflushing loss coefficients was derived by writing the Bernoulli equation between points B and A on the diagram in Figure 8, as shown below.

Definitions:

v <sub>B</sub>	= riser pipe velocity at point B
h <sub>B</sub>	= piezometric head at point B
v <sub>A</sub>	= velocity of water surface at point A
h <sub>A</sub>	= piezometric head at point A
к <sub>D</sub>	$= \Delta h_{\rm D} / V_{\rm B}^2 / 2g$
v <sub>A</sub>	= 0

Assumptions:

Tank (ocean) floor is the datum for measuring piezometric heads.

Bernoulli equation:

$$\frac{V_{B}^{2}}{2g} + h_{B} = \frac{V_{A}^{2}}{2g} + h_{A} + \Delta h_{D}$$

$$\frac{V_{B}^{2}}{2g} + h_{B} - h_{A} = \Delta h_{D}$$

$$K_{D} = \frac{\Delta h_{D}}{V_{B}^{2}/2g} = \frac{V_{B}^{2}/2g + h_{B} - h_{A}}{V_{B}^{2}/2g}$$
(10)

The piezometric head at point B,  $h_B$ , was determined by extrapolating the hydraulic grade line obtained from the riser pipe piezometers.

#### Analytical Evaluation of Guard Bar Design

In addition to the experimental work described above, an analytical evaluation of the potential for flow-induced vibrations with the proposed guard bar design was also conducted. Guard bar failures due to flow-induced vibrations have been well-documented in the research literature (James and Katakura, 1971; Crandall et al., 1975).

For this study, circular steel guard bars measuring 1-1/2 in diameter by 84 in long were assumed, in accordance with the recommended guard bar design given in UE&C Drawing No. 303-02. A range of possible first mode natural frequencies, depending on end constraints, was determined from standard beam vibration formulas (Den Hartog, 1956). A mass correction was added for vibration in sea water. Vortex shedding frequency was computed as a function of approach velocity, using an assumed Strouhal number of 0.21 (Hoerner, 1965) for the proposed guard bar section.

#### TEST RESULTS

#### Sectional Model - Flow Pattern Tests

Streak lines for the Alternative A intake structure at the offshore site (water depth of 60 ft) with ambient currents of 0, 0.2, and 0.4 kt are presented in Figures 9, 10, and 11, respectively. For zero ambient current, the intake withdrew water uniformly from the surrounding fluid. For an ambient current of 0.2 kt, the intake withdrew from the bottom 35 ft of the approaching fluid, and for an ambient current of 0.4 kt, the intake withdrew from the bottom 25 ft of the approaching fluid. With the 0.4 kt ambient current, a region of flow separation at the downstream end of the intake roof was observed.

Streak lines for the Alternative A intake structure at the onshore site (water depth of 30 ft) with ambient currents of 0, 0.2, and 0.4 kt are presented in Figures 12, 13, and 14, respectively. These streak line results are similar to the results obtained for the offshore site. The intake withdrew from the entire depth for 0 and 0.2 kt ambient current and from the bottom 25 ft for the 0.4 kt ambient current.

Streak lines for the Nine Mile Point intake structure for ambient currents of 0, 0.2, and 0.4 kt are presented in Figures 15, 16, and 17, respectively. This intake withdrew from the entire depth for ambient currents of 0 and 0.2 kt and from the bottom 20 ft for the 0.4 kt ambient current. The streak line results indicate the presence of considerably larger vertical velocity gradients for the Nine Mile Point intake compared to the Seabrook Alternative A intake. Flow separation at the roof on the upstream and the downstream ends was observed for each of the ambient currents.

#### Sectional Model - Velocity Measurements

Velocity profiles across the upstream and downstream faces of the Alternative A intake at the offshore site with ambient currents of 0, 0.2, and 0.4 kt are presented in Figure 18. For zero ambient current, the upstream and downstream velocity profiles were uniform and about equal. For the 0.2 and 0.4 kt ambient currents, the velocity profiles at the upstream face remained uniform while the velocity profiles at the downstream face became more skewed, with the highest velocities occurring near the center and the bottom of the intake face. Similar velocity profiles were obtained for the Alternative A intake at the onshore site with ambient currents of 0, 0.2, and 0.4 kt, as shown in Figure 19. Velocity profiles for the Nine Mile Point intake structure are shown in Figure 20. Velocity profiles at both the upstream and the downstream faces of the intake were skewed for all ambient currents tested, including zero ambient current. The lower velocities measured near the intake roof and the higher velocities measured near the intake floor indicate the influence of the observed flow separation at the roof and the steeper pressure gradient at the bottom of the intake face on the velocity profiles.

The decrease in centerline velocity with increasing distance upstream from the Alternative A intake structure (offshore site) is shown in Figure 21. The measured velocities dropped to the ambient current value within one-half of an intake diameter upstream from the intake face for both the 0.2 and the 0.4 kt ambient currents.

#### Overall Model - Flow Pattern Tests

Plan-view streak lines for the Alternative A intake structures (offshore location, 60 ft water depth) with ambient currents of 0.2 kt S, 0.4 kt S, 0.2 kt S-65°W, and 0.4 kt S-65°W are presented in Figures 22, 23, 24, and 25, respectively. No significant interference between intakes was observed. For all of the ambient currents tested, each intake appeared to operate independently from the other intakes. Each intake's range of influence was limited to about one intake diameter on either side of the intake periphery for the 0.2 kt S and the 0.2 kt S-65°W ambient currents, and to about one-half intake diameter to either side for the 0.4 kt S and 0.4 kt S-65°W ambient currents. At all ambient currents tested, a small region of stagnant flow was observed behind each intake.

Plan-view streak lines for the Alternative C intake structures (onshore location, 30 ft water depth) with ambient currents of 0.2 kt S, 0.4 kt S, 0.2 kt S-65°W, and 0.4 kt S-65°W are shown in Figures 26, 27, 28, and 29. These streak line results are similar to the results obtained for the Alternative A intake, indicating that the internal geometry changes and the decreased water depth did not significantly modify the flow patterns in the vicinity of the intake structures.

During backflushing tests with dye injection, pulsations were observed in the flow out of the Alternative A intakes. The Alternative C intakes produced steady, welldefined jets. No substantial interference between intakes was observed during backflushing for either intake design.

#### Overall Model - Velocity Profile During Backflushing

Figure 30 shows the velocity profile measured in the model for the Alternative A intake during backflushing for a plant flow rate of  $1822 \text{ ft}^3/\text{sec}$ . At the intake periphery, the flow separation extended vertically across half of the intake face. Because of the entrainment produced by the discharge jet, the velocities into the intake during backflushing were actually slightly higher than velocities into the intake during normal operation. The maximum velocity in the discharge jet was about 7 ft/sec.

The measured frequencies of velocity fluctuations are shown as a function of riser velocity in Figure 31. Much of the scatter in this data can be attributed to the approximate nature of the graphical spectrum analysis. The periodic fluctuations were apparently related to vortex shedding associated with unstable flow separation at the junction of the riser tunnel and the intake floor. A dimensionless frequency parameter, the Strouhal number (S), can be defined as S = f d/V where f is frequency, V is velocity, and d is a characteristic length. The data from the model can be used to determine a Strouhal number of 0.68, based on the riser diameter. There is a paucity of data relating Strouhal number to Reynolds number at high Reynolds numbers. If this S = 0.68 is applicable to the prototype, the range of expected frequencies for velocity fluctuations during backflushing would be from 0.2 Hz to 0.7 Hz, depending on power level. These frequencies are outside of the range of expected natural frequencies for the guard bars, but the potential for exciting a structural resonance may exist.

#### Overall Model - Head Loss Tests

Intaking loss coefficients  $(K_I)$  for the Alternative A and Alternative C intakes, computed according to Equation (9), are plotted as a function of riser tunnel Reynolds number in Figure 32. The average intaking loss coefficient was 0.35 for Alternative A and 3.7 for Alternative C.

Backflushing loss coefficients  $(K_D)$  for the Alternative A and Alternative C intakes, computed according to Equation (10), are also plotted as a function of riser tunnel Reynolds number in Figure 32. The stronger Reynolds number dependence of the

backflushing loss coefficient for the Alternative C intake design is attributed to the increased importance of friction losses compared to form losses in the smoothly curved transition sections. The average backflushing loss coefficient was 1.04 for Alternative A and 2.5 for Alternative C.

The large intaking and backflushing loss coefficients for the Alternative C design are associated with the high velocity jets created at the internal restrictions. The low backflushing loss coefficient for the Alternative A design and the previously presented information on velocity profile during backflushing indicate that the flow is decelerated in the intake and part of the velocity head in the riser tunnel is recovered as pressure head. The low total energy loss for the Alternative A structure represents the energy associated with a discharge jet at a velocity of less than 7 ft/sec plus some small additional losses due to friction and entrainment.

Using the loss coefficient data presented above and Equations 9 and 10, prototype head losses can be computed for typical operating conditions:

	Plant Flow Rate			
Intake Design	Operating Mode	$(ft^3/sec)$	Head Loss (ft)	
А	Intaking (normal flow)	1897	0.5	
С	Intaking (normal flow)	1897	5.7	
Α	Backflushing (reverse flow)	949	0.4	
С	Backflushing (reverse flow)	949	1.0	

#### Analysis of Potential for Flow-Induced Vibrations of Guard Bars

In Figure 33, estimated guard bar vortex shedding frequency is plotted as a function of approach velocity, and a range of calculated natural frequency values for the guard bars is also indicated. The design intake velocity of 0.9 ft/sec, the maximum measured velocity of 6.9 ft/sec during backflushing for Alternative A, and the estimated maximum velocity of 7.2 ft/sec during backflushing for Alternative C correspond to vortex shedding frequencies which fall outside of the range of expected natural frequencies for the guard bars. Consequently, flow-induced vibrations are not expected to occur with the present guard bar design.

#### SUMMARY AND CONCLUSIONS

#### Summary of Results

Sectional models constructed to a scale ratio of 1:35.2 were used to determine vertical flow patterns and velocities in the vicinity of individual intake structures. The Seabrook Alternative A intake design was compared with Niagra Mohawk Power Corporation's Nine Mile Point intake. An overall model facility was used to determine loss coefficients and to determine horizontal flow patterns in the vicinity of an array of three intake structures. Seabrook Alternative A and Alternative C intake designs were tested in the overall model. An analytical investigation was also conducted to determine the potential for flow-induced guard bar vibrations. The more important results are summarized below:

- 1. For an ambient current of 0.2 kt and a water depth of 60 ft, the Alternative A intake withdrew from the bottom 35 ft of the approaching fluid, and for an ambient current of 0.4 kt, the intake withdrew from the bottom 25 ft of the approaching fluid. At a water depth of 30 ft, the Alternative A intake withdrew from the entire depth for 0.2 kt ambient current and from the bottom 25 ft for the 0.4 kt ambient current. For zero ambient current at both water depths, the Alternative A intake withdrew from the entire depth.
- 2. Streak line results indicated the presence of considerably larger vertical velocity gradients for the Nine Mile Point intake compared to the Seabrook Alternative A intake.
- 3. At water depths of 30 ft and 60 ft, the velocity profiles at the upstream face of the Alternative A intake were relatively uniform and generally less than 1 ft/sec for ambient currents of 0, 0.2, and 0.4 kt. Downstream velocity profiles were skewed for ambient currents of 0.2 and 0.4 kt, and the maximum measured velocity was about 1.3 ft/sec. Velocity profiles for the Nine Mile Point intake at both the upstream and the downstream faces of the intake were skewed for all ambient currents tested.

- 4. At the 60 ft water depth, velocities upstream from the Alternative A intake dropped to the ambient current valves within one-half intake diameter for both the 0.2 and 0.4 kt ambient currents.
- 5. No significant interference between intakes was observed for the Alternative A intakes at a water depth of 60 ft and ambient currents of 0.2 kt S, 0.4 kt S, 0.2 kt S-65°W, and 0.4 kt S-65°W. For all of the ambient currents tested, each intake appeared to operate independently from the other intakes. Each intake's range of influence was limited horizontally to about one intake diameter on either side of the intake periphery for the 0.2 kt S and the 0.2 kt S-65°W ambient currents, and to about one-half intake diameter to either side for the 0.4 kt S and the 0.4 kt S-65°W ambient currents. Similar results were also obtained for the Alternative C intakes.
- 6. During backflushing operation, a flow separation extended vertically across half of the intake face, and the maximum velocity in the discharge jet was about 7 ft/sec.
- The average intaking (normal flow) loss coefficient was 0.35 for Alternative A and 3.7 for Alternative C. The average backflushing (reverse flow) loss coefficient was 1.04 for Alternative A and 2.5 for Alternative C.
- 8. The analytical investigation indicated that flow-induced vibrations should not occur with the present guard bar design.

#### Conclusions

The Alternative A intake design provides low, relatively uniform entrance velocities, minimal interference between intakes, and low losses during normal intaking operation and backflushing operation. No design changes are considered necessary, and the Alternative A intake design is recommended.

#### REFERENCES

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FIGURES

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FIGURE 1



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FIGURE 2

PLAN VIEW



SECTION A-A





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PLAN VIEW



SECTION A-A



## SEABROOK ALTERNATIVE C INTAKE

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FIGURE 5

SCHEMATIC DIAGRAM SEABROOK INTAKE SECTIONAL MODEL



SECTIONAL MODEL (ALTERNATIVE A INTAKE)



OVERALL MODEL (ALTERNATIVE C INTAKE)

DYE TRACES SHOWING STREAK LINES SEABROOK INTAKE STRUCTURES





# LOCATION OF PIEZOMETER TAPS SEABROOK INTAKE STUDY -- OVERALL MODEL

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# STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE

WATER DEPTH 60 FEET AMBIENT CURRENT 0 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

 $\nabla$ 



FIGURE 9



WATER DEPTH 60 FEET AMBIENT CURRENT 0.2 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

# STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE

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FIGURE 11  $\nabla$ - AMBIENT CURRENT 00000 0 0.;4 Ċ RASS CONTRACTOR DE CARACTERIS

WATER DEPTH 60 FEET AMBIENT CURRENT 0.4 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

> STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE

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WATER DEPTH 30 FEET AMBIENT CURRENT 0 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

### STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE

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WATER DEPTH 30 FEET AMBIENT CURRENT 0.2 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

> STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE

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FIGURE 14



WATER DEPTH 30 FEET AMBIENT CURRENT 0.4 KNOTS PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

STREAK LINES IN SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE



WATER DEPTH 26.5 FEET AMBIENT CURRENT 0 KNOTS PLANT FLOW RATE 600 CFS

> STREAK LINES IN SECTIONAL MODEL NINE MILE POINT INTAKE



WATER DEPTH 26.5 FEET AMBIENT CURRENT 0.2 KNOTS PLANT FLOW RATE 600 CFS

# STREAK LINES IN SECTIONAL MODEL NINE MILE POINT INTAKE

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WATER DEPTH 26.5 FEET AMBIENT CURRENT 0.4 KNOTS PLANT FLOW RATE 600 CFS

> STREAK LINES IN SECTIONAL MODEL NINE MILE POINT INTAKE



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SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

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FIGURE

18

(OFF SHORE LOCATION) VELOCITY PROFILES AT INTAKE FACE

WATER DEPTH = 60.0 FT.



WATER DEPTH = 30.0 FT. (ON SHORE LOCATION)

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VELOCITY PROFILES AT INTAKE FACE SECTIONAL MODEL SEABROOK ALTERNATIVE A INTAKE FIGURE 19



PLAN '

AMBIENT CURRENT AMBIENT CURRENT 0.2 KTS. 0.4 KTS. 0.2 KTS. O KTS. 0 KTS. 0.4 KTS. \* 0 0 0 2 0 1 2 1 0 2 1 n - 7 FACE VELOCITY (FT/SEC) FACE VELOCITY (FT/SEC) NOTE: "\* " INDICATES LOCATIONS FOR VELOCITY MEASUREMENTS ELEV. WATER DEPTH = 26.5 FT. .

> VELOCITY PROFILES AT INTAKE FACE SECTIONAL MODEL (NINE MILE POINT INTAKE)

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DISTANCE UPSTREAM OF INTAKE FACE (FEET)

INTAKE APPROACH VELOCITIES SEABROOK ALTERNATIVE A INTAKE



ALTERNATIVE A INTAKE - SEABROOK OVERALL MODEL STREAK LINES - OFFSHORE LOCATION



AMBIENT CURRENT





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WATER DEPTH 60 FEET CURRENT MAGNITUDE 0.4 KNOTS CURRENT DIRECTION S PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE) ·•• -

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FIGURE 23

ALTERNATIVE A INTAKE - SEABROOK OVERALL MODEL STREAK LINES - OFFSHORE LOCATION · .





WATER DEPTH 60 FEET CURRENT MAGNITUDE 0.2 KNOTS CURRENT DIRECTION S-65°W PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

ALTERNATIVE A INTAKE - SEABROOK OVERALL MODEL STREAK LINES - OFFSHORE LOCATION

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FIGURE





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WATER DEPTH 60 FEET CURRENT MAGNITUDE 0.4 KNOTS CURRENT DIRECTION S-65°W PLANT FLOW RATE 1822 CFS (607 CFS PER INTAKE)

ALTERNATIVE A INTAKE - SEABROOK OVERALL MODEL STREAK LINES - OFFSHORE LOCATION

FIGURE 25





FIGURE 27



STREAK LINES - ONSHORE LOCATION



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WATER DEPTH 60.0 FEET AMBIENT VELOCITY 0 KNOTS PLANT FLOW RATE 1822 FT<sup>3</sup>/SEC (607 CFS PER INTAKE)

# VELOCITY PROFILE DURING BACKFLUSHING ALTERNATIVE A INTAKE - OFFSHORE LOCATION

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ACTUAL PIPE VELOCITY IN MODEL (FT/SEC)

INTAKE VELOCITY FLUCTUATIONS DURING REVERSE FLOW SEABROOK ALTERNATIVE A INTAKE



$\diamond$	ALTERNATIVE	С	INTAKE	 NORMAL	FLOW
0	ALTERNATIVE	С	INTAKE	 REVERSE	FLOW
$\Box$	ALTERNATIVE	А	INTAKE	 REVERSE	FLOW
≙	ALTERNATIVE	А	INTAKE	 NORMAL	FLOW

# LOSS COEFFICIENT DATA

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VELOCITY (FEET/SECOND)

GUARD BAR VORTEX SHEDDING FREQUENCY

# Appendix D

# July 31, 2007 USEPA Comment Letter to FPL



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 1 1 CONGRESS STREET, SUITE 1100 BOSTON, MASSACHUSETTS 02114-2023

# **CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

July 31, 2007

Mr. Allen L. Legendre Environmental Services Supervisor FPL Energy Seabrook, L.L.C. Seabrook Station Lafayette Road Seabrook, NH 03874-4213

Re: Supplemental Information Request Pursuant to Section 308 of the Clean Water Act to Supercede Previous Letter dated December 30, 2004 for Seabrook Station NPDES Permit Reissuance - [NPDES Permit No: NH0020338]

Dear Mr. Legendre:

The United States Environmental Protection Agency's office for the New England Region (EPA or the Region) is sending this letter to clarify and update certain information submission requirements for FPL Energy Seabrook related to the Seabrook Nuclear Power Station's (Seabrook Station or the Station) application for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit (NPDES Permit No. NH0020338). The information requirements in question pertain to your facility's cooling water intake structures (CWISs) regulated under section 316(b) of the Clean Water Act (CWA). See 33 U.S.C. § 1326(b).

Seabrook Station's NPDES permit authorizes the facility to discharge pollutants into, and withdraw cooling water from, the Atlantic Ocean. The Station's current permit expired on April 1, 2007. The permit was administratively continued, however, because the Station timely applied to EPA for permit reissuance. As a result, Seabrook Station remains subject to the existing permit until EPA issues it a new one.

With any NPDES permit reissuance, EPA evaluates a facility's current compliance with applicable standards, including the requirements of CWA § 316(b) governing CWISs. To satisfy § 316(b), the location, design, construction and capacity of a facility's CWISs must reflect the Best Technology Available (BTA) for minimizing adverse environmental impacts.

On December 30, 2004, EPA issued FPL Energy Seabrook an information request letter under CWA § 308 (the December 30, 2004 § 308 Letter). CWA § 308(a), 33 U.S.C. §1318(a), authorizes EPA to require the owner or operator of any point source to make reports and provide information as may reasonably be required to:

... carry out the objectives of ... [the CWA], including but not limited to: (1) developing or assisting in the development of any effluent limitation, or other limitation, prohibition ... or standard of performance under [the CWA] ...; (2) determining whether any person is in violation of any such effluent limitation, or other limitation, prohibition or effluent standard, ... or standard of performance; (3)any requirement established under this section; or (4) carrying out section ... 1342 ... of [the CWA] ....

The December 30, 2004 § 308 Letter required Seabrook Station to submit certain information to EPA by no later than January 7, 2008 for the purpose of developing CWIS limits under CWA § 316(b) for Seabrook Station's permit reissuance. EPA's Phase II Rule for CWISs under CWA § 316(b), 40 C.F.R. Part 125, Subpart J (the Phase II Rule or the Rule), set national performance standards for, and information submission requirements regarding, CWISs at large, existing power plants. Because Seabrook Station was subject to the Phase II Rule, EPA's December 30, 2004 § 308 Letter required the submission of information consistent with the requirements of the Rule. The required information included:

- 1. a Proposal for Information Collection (PIC) satisfying 40 C.F.R. §125.95(b)(1) by no later than October 7, 2006;
- 2. a Comprehensive Demonstration Study (CDS) satisfying 40 C.F.R. § 125.95 by no later than January 7, 2008; and
- 3. the information required by 40 C.F.R. §§ 122.21(r)(2), (3) and (5) by no later than January 7, 2008.

On January 25, 2007, the United States Court of Appeals for the Second Circuit issued its decision in a law suit challenging the Phase II Rule. See Riverkeeper, Inc. v. EPA, 475 F.3d 83 (2d Cir, 2007). The court struck down certain provisions of the Rule and remanded several others to the Agency for reevaluation. On March 20, 2007 Benjamin Grumbles, EPA Assistant Administrator for Water, sent a memorandum to EPA's Regional Administrators dictating that the Phase II Rule should be considered suspended because so many of its provisions are affected by the court decision. In addition, the March 20, 2007, memorandum directed that "[i]n the meantime, all permits for Phase II facilities should include conditions under § 316(b) of the Clean Water Act developed on a Best Professional Judgment (BPJ) basis. See 40 C.F.R. § 401.14." More recently, on July 9, 2007, EPA formally suspended the Phase II Rule, with the exception of 40 C.F.R. § 125.90(b), by publishing a notice of suspension in the Federal Register. See 72 Fed. Reg. 37107 (July 9, 2007). Under 40 C.F.R. 125.90(b), permitting authorities are directed to establish § 316(b) requirements on a BPJ basis for existing facilities not subject to categorical standards contained in EPA regulations. As the Federal Register notice states, the BPJ requirement is consistent with the CWA, case law, and the March 20, 2007 memorandum's direction to do so. See 72 Fed. Reg. at 37108.

In light of these developments, the Region is now issuing FPL Energy Seabrook this supplemental information request letter under CWA § 308. This letter clarifies and updates,

consistent with 40 C.F.R. § 125.90(b), the information submission requirements of the December 30, 2004 § 308 Letter. While the requirements of this letter are similar to those in the December 30, 2004 § 308 Letter, there are some differences. This new § 308 letter supersedes the December 30, 2004 § 308 Letter and seeks information to assist EPA in developing new CWIS limits under CWA § 316(b) on a BPJ basis, consistent with 40 C.F.R. § 125.90(b). Please be aware that any failure to comply with the requirements of this § 308 letter could, depending on the circumstances, subject FPL Energy to enforcement action pursuant to § 309 of the CWA, 33 U.S.C. § 1319.

### Schedule for Information Collection and Submission

- EPA received the Seabrook Station PIC dated May 4, 2006, pursuant to the December 30, 2004, § 308 letter. EPA reviewed the PIC and sent FPL Energy a letter, dated December 6, 2006, detailing additional information that EPA needed to develop and reissue Seabrook Station's NPDES permit. The information requested in EPA's December 6, 2006, letter is required as part of the response to this § 308 letter to be included in the CWIS Information Document, described in Attachment A.
- 2. As expeditiously as practicable, but not later than January 7, 2008, the Station shall submit a CWIS Information Document that satisfies the specifications detailed in Attachment A to this letter. The purpose of this document will be to:
  - characterize impingement, impingement-induced mortality, and entrainment by Seabrook Station's CWISs;
  - describe the operation of the facility's cooling water intake structures;
  - evaluate both the existing technologies and operational measures, as well as possible additional technologies and operational measures, as potential components of the BTA under § 316(b); and

 establish whether the technologies and/or operational measures already installed, or that the Station proposes to install, at the facility reflect the BTA under CWA § 316(b).

See Attachment A of this letter detailing the information requirements for the Station's CWIS Information Document.

- 3. The Station shall also submit to EPA by January 7, 2008, the information described in 40 C.F.R. §§ 122.21(r)(2) and (r)(3), which includes:
  - Source Water Physical Data
  - Cooling Water Intake Structure Data

With regard to the information that must be submitted under this letter, FPL Energy may assert a business confidentiality claim with respect to part or all of the information submitted to EPA in

the manner described at 40 C.F.R. § 2.203(b). Information covered by such a claim will be disclosed by EPA only to the extent, and by means of the procedures, set forth in 40 CFR Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to FPL Energy. Please note that "effluent data" under 40 C.F.R. § 2.302 may not be regarded as confidential business information.

Please note that to the extent you have already submitted any of the requested information to EPA as part of another submission, it is sufficient for you simply to reference where in the other submission the pertinent information is provided.

Please address your information submittals to:

# Damien Houlihan Office of Ecosystem Protection U.S. EPA Region 1 One Congress Street, Mail Code CIP Boston, MA 02114-2023

EPA looks forward to working with you on your new permit. If you have any questions concerning the required information requested above, please contact Damien Houlihan at (617) 918-1586.

4

Sincerely,

Stephen S. Perkins, Director Office of Ecosystem Protection

cc. Harry T. Stewart, NHDES Mark Stein, EPA Sharon DeMeo, EPA David Webster, EPA

# Attachment A

Information Requirements for the Cooling Water Intake Structure Information Document

## Source Waterbody Flow

Provide the delineation of the hydraulic zone of influence for your cooling water intake structure (CWIS).

Technology and Biological Assessment Information

- 1. Please provide a detailed description of Seabrook Station's cooling system, including:
  - a. the cooling water intake structure and related equipment,
  - b. the discharge canal or pipe,
  - c. a cooling process flow diagram depicting the flow of cooling water through the facility,
  - d. all pumps of any type used in the cooling system,
  - e. any equipment for adding disinfectant or biocide to the cooling water,
  - f. any equipment used for chilling the cooling water after it has been heated up in the power plant, and
  - g. design calculations showing the velocity at the entrance to each intake structure at minimum ambient source water surface elevations.

You must also provide a narrative description of the operation of the Station's cooling water system, the role of each CWIS in the overall cooling water system, the proportion of the design intake flow of each CWIS that is used in the system, the number of days of the year the cooling water system is in operation, and any seasonal changes in the operation of the system. In addition, you must include design and engineering calculations prepared by a qualified professional and relevant data to support your description of your cooling water system.

As part of this description, please also identify the age of the equipment and facilities involved and provide a brief description of all major upgrades and repairs to this equipment accomplished since January 2001.

- 2. Please identify the projected retirement date, if any, of Seabrook Station's existing operation.
- 3. Please provide a description of the processes employed at Seabrook Station with regard to boiler operation, condenser operation, CWIS operation, and effluent treatment operations (including any chilling or cooling of heated cooling water). To the extent that this information is provided under item No. 1 above, you may simply cross-reference to where in your submission the information is already provided.

- 4. Please describe the engineering aspects or considerations pertinent to considering the possible application of the following technologies at Seabrook Station:
  - a. Mechanical draft or natural draft cooling towers for use in a recirculating (or "closedcycle") cooling system for the generating unit and service water system at Seabrook Station. The analysis must specify the number of cooling tower cells required based on the facility's heat balance, space requirements, a discussion of the major components that would need to be added, and the major modifications to the facility that would need to be undertaken, to retrofit Seabrook Station with this technology.
  - b. CWIS screening systems or barrier technology that will minimize entrainment, impingement, and impingement mortality. Each analysis must include a discussion of the major components that would need to be added, and the major modifications to the facility that would need to be undertaken, to retrofit Seabrook Station with this technology.
  - c. The use of "grey" water for cooling purposes. Potential sources of grey water include the Seabrook Wastewater Treatment Plant and the Portsmouth Wastewater Treatment Plant.
  - d. The reduction of cooling water flow (i.e., "capacity") by using variable speed pumps and/or by reducing pumping operations from the current three pump operation.<sup>1</sup> Such evaluation shall include consideration of any configuration, and/or additional "stand-by" pumping systems that may be necessary to address any safety concerns.
  - e. Any other technology that you deem worthy of consideration for reducing Seabrook Station's entrainment and/or impingement mortality of aquatic organisms.
- 5. For each of the technologies evaluated under Item No. 4 above, please provide:
  - a. A detailed explanation of the process changes required to operate and maintain such technologies.
  - b. An estimate of the most stringent thermal discharge limits that Seabrook Station would be able to comply with utilizing the technology in question.
  - c. An estimate of the most stringent cooling water withdrawal flow limits that the facility would be able to comply with utilizing the technology in question.
  - d. An estimate of the most stringent cooling water intake velocity limits that the facility would be able to comply with utilizing the technology in question.

<sup>1</sup> As you are aware, Seabrook Station's CWIS was originally designed to provide cooling for two reactors. Since only one reactor was built, EPA believes that the capacity of Seabrook's CWIS may be as much as twice that which is necessary to cool the plant.


- e. An estimate of the extent to which (1) impingement, (2) impingement mortality, and (3) entrainment would be reduced at Seabrook Station by utilizing the particular technology.
- f. To the extent that you believe any of these technologies would be infeasible for implementation at Seabrook Station, provide a detailed explanation for your conclusion in this regard.
- g. An estimate of the cost for installing and operating each of these technologies.
- h. Please describe in detail the non-water quality environmental impacts (including energy, air pollution, noise, public safety), if any, that you have determined will occur from the use of each technology.
- 6. Please provide all fisheries data collected during entrainment and impingement sampling conducted from 2002 to 2007, including all data collected by Seabrook Station. Specifically, EPA requests the following for each sampling event that was conducted:
  - a. Number of eggs of each fish species collected;
  - b. Number of larvae of each fish species collected;
  - c. Number of fish (juvenile and adult) of each species collected;
  - d. Duration of sampling event (in hours);
  - e. The location and method of sampling; and
  - f. The ambient water temperature(s) measured during the sampling event.
- 7. Provide the following, based on the data described above in Item No. 6:
  - a. The estimated average number of eggs entrained per calendar month for each species, and the estimated annual total number of eggs entrained for each species, based on Seabrook Station's typical recent water withdrawal rate for each calendar month;
  - b. The estimated average number of larvae entrained per calendar month for each species, and the estimated annual total number of larvae for each species, based on Seabrook Station's typical recent water withdrawal rate for each calendar month;
  - c. The estimated average number of fish (juveniles and adults) of each species impinged per calendar month, and the estimated annual total number of each species impinged, based on Seabrook Station's typical recent operations for each calendar month;
  - d. The estimated number of "adult equivalent" fish of each species lost to entrainment and impingement for each calendar month, and an annual adult equivalent total for each species, based on Seabrook Station's typical recent water withdrawal rate and operations for each calendar month; and
  - e. All assumptions, methods and calculations for each of the above estimates of entrainment and impingement effects.

#### Other Information Requested

- a. Provide the information requested in EPA's December 6, 2006, letter.
- b. Provide a description of the combination of existing and proposed technologies and operational measures at Seabrook Station for which Seabrook Station believes the location, design, capacity, and construction reflect the Best Technology Available for minimizing adverse environmental impacts.

ARCADIS

Appendix E

Seabrook Station Facility Description Document **Seabrook Station** 

# FACILITY DESCRIPTION











SI PUMPS BUR PUMPS

CIN/IP







While every attempt has been made to incorporate the latest design and specification revisions into this volume, it was not designed to be used as a technical manual. Therefore, this *Seabrook Station Facility Description* should be used for informational purposes only.

**Produced by Seabrook Station Communications** 



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# OVERVIEW

Seabrook Station is located in Seabrook, New Hampshire on a peninsula slightly higher than the surrounding salt marsh and estuarine waters. The 900-acre site is two miles inland from the Atlantic Ocean, forty miles north of Boston, Massachusetts and eleven miles south of Portsmouth, New Hampshire.

The Station was designed to be a twin unit 1160 mega-watt nuclear generating station. Unit 2 was cancelled in 1986 at 25% completion. Unit 1 utilizes a pressurized water reactor design (PWR) developed by Westinghouse Electric Corporation and a turbine generator built by General Electric.



### **ENERGY FROM THE ATOM**

Seabrook Station uses the nuclear reaction called fission to generate heat. Fission is the splitting of the heavy nucleus, the center of an atom such as uranium, into two or more principal fragments, as well as lighter pieces, such as neutrons. In a nuclear reactor this splitting is induced by the collision of a neutron with a fissionable nucleus. Neutrons are one of the two basic parts of nuclei and, as noted, are released during fission and become available to induce subsequent fission events. A "chain" reaction is initiated which may be sustained under controlled conditions in a nuclear reactor. The fission process takes place entirely within the fuel assemblies which make up the core of the reactor.



The principal feature of a nuclear reactor is the

release of a large amount of energy from each fission that occurs in the core. On the average, a fission event releases about 200 million electron volts (MEV) of energy.

A typical chemical reaction releases about one electron volt—a difference of 200 million. This is why the complete fission of one pound of uranium would release roughly the same amount of energy as the combustion of 6000 barrels of oil or 1000 tons of high-quality coal.

The heat energy generated by fissions in the reactor core must be transferred into the energy of high pressure steam, then into mechanical energy and finally into electricity. The following schematic drawing is representative of the major heat transfer processes used in pressurized water reactor (PWR) generating stations, including Seabrook Station.

The process may be described by reference to the schematic and the numbered flow locations. Three major fluid or heat transfer cycles are used. The reactor coolant water shown (Labeled A) is a closed cycle loop using water at 2,235 pounds per square inch pressure (psi). The feed water and steam cycle (Labeled B) is also a closed loop operating at up to 1,200 psi. The condenser cooling or circulating water (Labeled C) uses water from the ocean. This is the only fluid stream or system open to the environment.

Heat generated in the reactor core(2) is transferred to the reactor coolant water which is pumped through the reactor vessel(1) to the four steam generators(5) and the connecting piping by four reactor coolant pumps(3). The pressurizer(4) maintains the reactor coolant system (also known as the primary system) at a pressure of 2,235 psi to prevent boiling and to keep the coolant in the liquid state. The reactor coolant, at an average temperature of 587 °F flows through the 5000 U-tubes in each of the four steam generators. Heat is transferred through the thin tubes of inconel to the feedwater on the out-side of the tubes. The steam side of the steam generators (also called the secondary side) operates at a pressure of 1000 psi. At this pressure and the temperature of 545 °F the feedwater boils producing steam.

The steam, produced at the rate of 15 million pounds per hour, flows from the steam generators(5) through valves to the turbine(6). The Seabrook Station turbine design uses one high-pressure unit and three low-pressure units connected on a single shaft to the generator(7).



The steam entering the turbine at 990 psi and 545 °F exhausts from the low pressure turbines into the condenser(10) at an absolute pressure measured as two inches of mercury (about 1 psi absolute) and a temperature of 100 °F. At this point, all the energy which can be usefully recovered from the steam has been converted to mechanical energy in spinning the turbine. The steam is condensed(10) to the liquid state and pumped(9) through a series of feedwater heaters back into the steam generators.

Condensing the steam back to feedwater requires removing heat. This is done by pumping ocean water(11) through titanium tubes in the condenser(10). Steam condenses on the outside of the tubes as its latent heat of condensation is transferred to the circulating water. The temperature of the circulating water is raised 34 °F in the process.

The electrical output of the unit leaves the generator(7), is raised in voltage by the step-up transformer(8) and transmitted at 345,000 Volts to the New England transmission grid.

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### **REACTOR CONTROL**

Each fission of a fuel atom produces an average of two additional neutrons. Maintenance of a stable chain reaction and power level requires that the excess number of neutrons be controlled. Two control processes are used to capture by absorption a portion of the excess neutrons. Moveable control rod assemblies composed of silver, indium, and cadmium clad in stainless steel are inserted in 57 of the 193 fuel assemblies. The amount of insertion is adjusted by the control rod drive mechanisms in response to signals from the reactor control system. The further into the core the control rod assemblies are inserted, the more neutron absorption will occur and the lower the power level will be. Full insertion of all the control rods shuts down the reactor. Control rods are primarily used to start-up and shutdown the reactor. During full power operation, the control rods are usually fully withdrawn from the core.

The second control method is based upon the neutron-absorbing property of boron. Boron in the form of boric acid is dissolved in the reactor coolant water so that the desired concentration of boron is present in the water and therefore present throughout the reactor core as the coolant flows up through the fuel assemblies. Early in a core cycle after new fuel has been loaded in the reactor, the number of neutrons to be controlled is higher than late in a core's life when other neutron absorbing fission products are present. Therefore, after refueling the boron concentration is highest. As fuel burnup occurs, the concentration is decreased towards 0 ppm by the end of the core life. Boric acid is the primary means of control during full power operation. Since boric acid would attack ordinary carbon steel, piping and equipment in contact with the reactor coolant water are made of stainless steel.



Westinghouse 17 X 17 FUEL ASSEMBLY



Westinghouse NUCLEAR REACTOR



The design of Seabrook Station has been determined by the summation of many regulatory requirements and management objectives. The most important objective of the owners and regulators is a unit which operates safely with a minimum risk to the public and the operators. Environmental protection is the second paramount objective. The third goal is efficient and reliable operation over an extended period to minimize energy cost.

A philosophy, often referred to as 'safety in depth,' has been practiced at Seabrook Station. Three levels of challenge to the station's safety are presumed for design and analysis purposes. In performing this analysis it must be remembered that as long as there is water in the reactor vessel, the core will be cooled and public risk is minimal. All safety features are designed to ensure the core has water around it at all times.

- Level One Prevent accidents through plant design by using high quality standards, redundancy, testing and inspection of equipment.
- Level Two Anticipate operating transients or operating errors by providing protective devices and systems, using conservative design practices and built-in safety margins, and by using redundant detection and actuation devices.
- Level Three Postulate occurrences of extremely unlikely circumstances by hypothesizing severe accidents and incorporating safety systems to handle the resulting situations.

The specific requirements upon which design and construction are based are listed in the Updated Final Safety Analysis Report. Since so many of the station's facilities and such a large percentage of its cost result from safety and environmental protection commitments, the principal design criteria are listed below. Individual systems and structures are described on the following pages. The artist's drawing on the center pages is useful in locating specific plant components.

#### SAFETY DESIGN CRITERIA

- Seismic design based on a ground acceleration of .25g
- 🖣 300 mph tornado advancing at 60 mph
- Ability to shut down the reactor safely from outside the control room
- Physical and electrical separation of redundant components
- Protection from flood waters 20.6 feet above mean sea level
- Protection from aircraft and wind-driven objects
- Protection against dynamic effects from ruptured pipes
- Piping supports designed as ASME code components
- Fire protection based on arbitrary fire
- No permanent facilities constructed in the salt marsh



The U.S. Nuclear Regulatory Commission (NRC) requires nuclear station owners to have legal control of the land around the station out to a distance called the exclusion boundary. At Seabrook Station, the radius of the exclusion boundary is 3000 feet from each reactor. In addition to the 730 acres defined by the exclusion radius, the site includes 170 acres outside the circle. Approximately 500 acres are considered wetlands and have not been infringed upon by the project. The site is underlain with competent granite bedrock upon which all the major structures are founded. The finished grade of 20 feet above mean sea level was selected to place the facilities above the highest wave run up calculated to result from an ocean storm having a probability of occurring only once in 10,000 years.

At the center of the site are the permanent structures of the station. They occupy about 50 upland acres as shown in the site drawing. A security fence encloses Unit 1 as required by the NRC security regulations. The Station had been arranged with Unit 2 to be a twin of Unit 1. Unit 2 was cancelled by the Joint Owners at about 25% completion. Many Unit 2 building shells remain on plant property outside the Protected Area fence.



#### **SITE ENVIRONS**

- A 2-mile radius
- B 5-mile radius
- C 10-mile radius

The map to the left shows the towns in the vicinity of Seabrook Station. The 10-mile radius, circle C, encompasses the towns involved in the emergency planning for the station



#### **STATION STRUCTURES**

- 1 Containment Building
- 2 Turbine Building
- 3 Administration Building
- 4 Diesel Generating Building
- 5 Control Building
- 6 Waste Process Building
- 7 Tank Farm
- 8 Primary Auxiliary Building
- 9 Fuel Storage Building
- 10 Cooling Tower
- 11 Security Building
- 12 Switchyard
- 13 Transformer Area
- 14 Condensate Storage Tank
- 15 Demineralized Water Tanks
- 16 Maintenance Building
- 17 Circulating Water Pump House
- 18 Service Water Pump House
- 19 Rad Water Storage Building
- 20 Intake Structure
- 21 Discharge Structure

- 22 Chlorination Building
- 23 Seawall
- 24 General Office Building
- 25 Training Center
- 26 Science & Nature Center
- 27 Fuel Oil Storage Tank
- 28 Fire House Pump and Tanks
- 29 Operation's Support Building
- 30 345 Kv Termination Area
- 31 Warehouse No. 1
- 32 Warehouse No. 2
- 33 Warehouse No. 3
- 34 Equipment Maintenance Shop
- 35 Siren Maintenance
- 36 Fire Protection
- 37 Pipe Shop
- 38 Hi-Rise Office Building
- 39 General and Specialty Training Dept.
- 40 Weld Shop
- 41 Electrical Shop

# **REACTOR COOLANT SYSTEM**

The reactor coolant system (RCS), also called the primary coolant system, consists of four similar heat transfer loops connected in parallel to the reactor pressure vessel. Each loop contains a reactor coolant pump, steam generator and associated piping and valves. In addition, the system includes a pressurizer, pressurizer relief tank, pressurizer relief and safety valves, interconnecting piping, pipe supports and instrumentation necessary for operational control. All the above components are located in the containment building. Collectively, this equipment is often referred to as the nuclear steam supply system (NSSS).

During operation, the RCS transfers the heat generated in the core to the steam generators where steam is produced to drive the turbine generator. Demineralized water to which boric acid has been added is pumped through the RCS at a flow rate and temperature consistent with achieving the required heat transfer and core cooling. The water also acts as a neutron moderator and reflector by slowing down the neutrons so they can effectively cause more fissions.

The RCS pressure boundary provides a barrier against the release of radioactivity generated within the reactor, and is designed to ensure a high degree of integrity throughout the life of the plant.

RCS pressure is controlled by the use of the pressurizer, where water and steam are maintained in equilibrium by electrical heaters and water sprays. Steam can be formed (by the heaters) or condensed (by the pressurizer spray) to minimize pressure variations due to contraction and expansion of the reactor coolant. Spring-loaded safety valves and poweroperated relief valves mounted on the pressurizer provide steam discharge to the pressurizer relief tank.

#### **REACTOR COOLANT SYSTEM DATA**

System operating pressure	23
Core power	34
NSSS power	34
Coolant flow rate	4(
Coolant inlet temperature	53
Coolant outlet temperature	6
Reactor vessel inside diameter	12
Reactor vessel height	4
Reactor coolant pump	7(
horsepower	
Steam generator over-all height	6
Reactor coolant pipe diameter	2

3411 mwt 3425 mwt 402,800 gpm 558° F 618° F 14 ft, 5 in. 43 ft, 10 in. 7000

STEAM.

235 psi

67 ft. 8in. 27.5 to 31 in.









### EMERGENCY CORE COOLING SYSTEMS-ECCS

evere accidents have been hypothesized in the "safety-in-depth" planning and design process for Seabrook Station. Although not expected to occur, these events provide yardsticks to measure the effectiveness of the engineered safeguards for the station, some of which are represented by the emergency core cooling system (ECCS). Analysis shows that as long as water is in contact with the reactor core, severe fuel damage (fuel or clad melt) will be avoided and public risk minimized. The ECCS ensures that water can be kept around the core under all the specified conditions.

Equipment is provided to respond to a wide range of loss of coolant conditions. To replace water lost if a small leak develops in the reactor coolant system, a high-pressure pump with a relatively small capacity is required. At the other end of the leakage, or pipe break spectrum, a large break would quickly reduce the RCS pressure. The ECCS in this situation is able to replace a large quantity of coolant at a low pressure. The components of the ECCS are arranged in two safety trains that are physically and electrically separate, designed to withstand earthquakes, protected from missiles and storms and operable following power failures. Some of the ECCS components also serve functions in other systems. For example the residual heat removal pumps serve as low pressure safety injection pumps as well as in their residual heat removal function. The diagram on the next page shows how equipment is utilized in the ECCS.

The design of the ECCS is based on using redundant sets of equipment and upon detecting coolant leakage by diverse types of instruments. A loss of water in the reactor coolant system can be recognized by falling water level in the pressurizer, reduced pressure in the system and increased make up flow. Independent of the reactor coolant system instrumentation, rising water in the containment sump or increasing humidity are conditions giving warning of a potential problem. The design of the ECCS equipment trains ensures that the same source of power is used to supply the instruments, valves and pumps in a train.

#### EMERGENCY CORE COOLING SYSTEMS

ECCS COMPONENT	<u>NUMBER</u>	<u>CAPACITY</u>	<b>PRESSURE</b>
Centrifugal charging pump	2	150-550 gpm	2700-675 psi
Safety injection pump	2	425-650 gpm	1650-1100 psi
Residual heat removal pumps	s 2	3000-4500 gpm	600-180 psi
Accumulators (passive)	4	850 cu. ft.	700 psi



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Several systems of pumps, piping, filters, controls, equipment and their physical supports are necessary to operate the reactor coolant system. The volume of water in the RCS needs constant adjustment. The purity of the reactor coolant and the concentration of chemical additives in it need continuous monitoring and maintenance. Periodically new reactor fuel and used or spent fuel need to be moved. Decay heat in the spent fuel also needs to be removed. In the following paragraphs the major primary auxiliary systems that carry out these functions are briefly described.

REACTOR AUXILLARY SYSTEMS

#### Residual Heat Removal System-(RHR)

After the reactor is shut down, heat is still produced in the fuel due to the continuing decay of fission-produced isotopes. This heat must be removed when the reactor is shut down and in the "cold" condition. For example, this is required during the refueling operation. To accomplish this, reactor coolant is pumped from two of the reactor coolant pipes leading to the steam generators (hot leg), through two RHR heat exchangers for cooling and back to two reactor coolant cold leg pipe connections and into the reactor vessel.

The RHR system also serves an emergency core cooling function. Under loss-of-coolant accident conditions, the RHR pumps would act as low-pressure safety injection pumps. Initially they would take borated water from the refueling water storage tank and pump it into the reactor coolant system. After the refueling water has been injected, the RHR pumps and heat exchangers would be used to recirculate and cool water from the containment for reinjection.

#### Chemical and Volume Control System-(CVCS)

The chemical and volume control system is designed to perform several complex functions which include:

- regulating the concentration of boron in the reactor coolant to control reactivity changes resulting from coolant temperature changes, fuel burnup, fission product buildup and xenon transients.
- maintaining the coolant inventory in the reactor coolant system.
- removing fission and activation products in ionic, gaseous or particulate form.
- counteracting the production of oxygen resulting from radiolysis of water in the core region.
- supplying filtered water to each reactor coolant pump shaft seal.

Some components of the system also perform an emergency core cooling function.

#### Fuel Handling System

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New and spent reactor fuel is transported between the reactor containment and the fuel storage building by manipulators and transport mechanisms. This function is accomplished underwater for shielding and cooling purposes.

#### **Sampling System**

Provision is made for sampling of water from various locations in the reactor coolant system. Gases from the pressurizer can also be collected and sampled. Sampling and analysis are an integral part of reactor coolant chemistry control. By careful chemistry control, equipment maintenance is reduced, better fuel economy realized and personnel exposure to radiation reduced.

#### Boron Recovery System-(BRS)

Water which is removed from the reactor coolant system as the system comes to power and heats up is collected and processed in the boron recovery system.

Likewise, as the fuel reactivity decreases with core burnup, water is removed from the RCS and replaced with water having a lower boric acid concentration so that fewer neutrons will be captured in the boron. The BRS is installed to evaporate the collected letdown water, concentrate the boric acid and condense the distillate. After further purification, the water and boric acid may be reused at cost savings.





## **REACTOR CONTAINMENT BUILDING**

The reactor containment building provides the third level of assurance in the "safety-indepth" concept. It is designed and built to the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2. In addition, 117 other codes and specifications, 19 NRC regulations and regulatory guides, and 30 United Engineers & Constructors specifications contain requirements applicable to the design, construction and testing of the structure. These are listed in the Updated Final Safety Analysis Report.

The containment building houses the major portion of the nuclear steam supply system. During the operating life of the plant, it also provides the following functions:

- a. Provides continuing radiation shielding during normal plant operation in accordance with 10CFR20 and during accident conditions in accordance with 10CFR100.
- b. Protects the reactor vessel and all other safety-related systems, equipment and components located inside the containment against all postulated external environmental conditions and resulting loads.
- c. Limits the leakage rate to 0.1 % by weight of the containment contained air mass per day under accident conditions.

The containment is a seismic Category I reinforced concrete dry structure, which is designed to function at atmospheric conditions. It consists of an upright cylinder topped with a hemispherical dome, supported on a reinforced concrete foundation mat which is keyed into the bedrock by the depression for the reactor pit and by continuous bearing around the periphery of the foundation mat. The inside diameter of the cylinder is 140 feet and the inside height from the top of the base mat to the apex of the dome is approximately 219 feet. The net free volume is approximately 2,704,000 cubic feet.

A welded steel 3/8-inch liner plate, anchored to the inside face of the containment, serves as a leaktight membrane. Although not a code requirement, welds that are embedded in concrete and not readily accessible are covered by a leak chase system which permits leak testing of those welds through-out the life of the plant. The liner on top of the nine foot thick foundation mat is protected by a four foot thick concrete mat which supports the containment intervals and forms the floor of the containment.

The containment walls are 4.5 feet thick reinforced concrete. The reinforcing steel in the walls is generally arranged in 11 layers using 18S reinforcing bars which are 2.25 inches in diameter. The same amount of steel used to make the reinforcing would make a plate 6 inches thick.



Located outside the containment building and having a similar geometry is the reinforced concrete containment enclosure building. This structure provides leak protection for the containment and protects it from certain loads. The containment enclosure building has an inside diameter of 158 feet and a wall thickness of 18 inches. The enclosure space is kept at a slight negative pressure should accident conditions occur. Together the containment building and the containment enclosure provide what is referred to as the double" containment.

Engineer's drawings of the containment are shown on pages 32 and 33. The containment is one of the engineered safety features of the station. The containment and the containment enclosure together with the enclosure exhaust system are designed to limit post-accident off-site doses to less than the requirements of Title 10 Code of Federal Regulations Part 100 (10CFR100). The design pressure of the containment is 52 psi which is 11 percent greater than the highest calculated accident pressure. The containment is designed to perform its functions concurrently with a loss of offsite power and an earthquake with a ground acceleration equal to one-quarter the acceleration of gravity. The containment is structurally tested by increasing the building pressure to 60 psi with air.

Heat removal from the containment during operation is accomplished with six air-to-water coolers which transfer heat from the air space to component cooling water. The reactor coolant pump motor heat is transferred directly to the component cooling water (as described in Section 12). Under accident conditions, heat must be removed from the containment to reduce the pressure in the building and minimize leakage outward. The containment building spray system (CBS) performs that function.

The CBS system uses two trains of redundant equipment to pump borated water from the refueling water storage tank and sodium hydroxide from the spray additive tank to ring headers mounted to the containment dome. The water sprays through nozzles in the headers cooling and condensing steam in the containment building. When the water has been injected from the refueling water storage tank, the containment spray pumps draw water from the containment sump. The spray water goes through the containment spray heat exchangers for cooling by primary component cooling water before returning to the spray headers. The CBS system is shown on page 15.

#### **CONTAINMENT BUILDING SPRAY SYSTEM**

Containment spray pumps (2) Refueling water storage tank Spray additive tank Containment spray heat exchangers (2) Spray headers Spray nozzles 3010 gpm each 475,000 gallons 10,700 gallons 96.7 x 10° BTU/Hr each 4 396 Sciple, they are the same systems found in any large steam-electric generating station. In a nuclear station the quantity of steam flowing per kilowatt-hour produced is higher than in a fossil station. Equipment therefore is larger in size but the function is the same.

The majority of the secondary plant components are located in the turbine building. They are generally not safety-related components. However, the secondary plant systems are designed so that failure of a component will not affect the functioning of any safety-related equipment. The design of the structures and systems are governed by professional society codes. Erection of pressure piping and vessels is inspected and approved by a code inspector before operation is permitted.

Flow Location	Flow #/hr	Temperature °F
А	10,413,427	101
В	10,413,427	215
С	10,413,427	316
D	4,726,573	366
E	15,140,000	440
		Pressure (PSIA)
F	15,140,000	1000
G	11,960,982	174
Н	10,217,778	166
1	7,821,418	2.0″ Hg



## **MAIN STEAM and FEEDWATER SYSTEMS**

Steam produced in the steam generators leaves the containment through four 30-inch main steam lines. These are seismically supported and restrained against a hypothetical pipe rupture until they reach the main steam isolation valves outside the containment. The isolation valves, like valves in every other containment penetration, will close if high pressure is sensed in the containment building. By closing, they seal the containment. Beyond the isolation valves, the main steam pipes continue to the stop and control valves of the turbine. The main steam at full load, has a pressure of 1000 psi, a temperature of 545 °F and a flow of 15,140,000 pounds per hour.

Main steam is admitted to the high pressure (HP) turbine where it expands while doing work and rotating the turbine. Approximately 60 percent of the usable energy is removed from the steam in the HP turbine. The steam exhausts from the HP turbine through piping to four moisture separator reheaters where the saturated steam is dried and reheated before admission to the three low-pressure (LP) turbines in parallel. All the turbines, one HP and three LP, are connected on the same shaft to the generator.

Steam exhausts from the LP turbines into the condenser where a high vacuum exists (two inches of mercury absolute pressure.)

Main steam is also used to power the small turbines which drive the steam generator feed pumps returning feedwater to the steam generators. In an emergency, main steam also powers an emergency feedwater pump to remove decay heat from the primary system via the steam generators. Main steam may be valved into the condenser through "dump" valves or via atmospheric relief valves to the outside air during start up or to reduce the abruptness of large load changes on the primary system.

Steam exhausted from the LP turbines is condensed back to water, which at this point in the cycle is called "condensate". The condensate is pumped through five stages of feedwater heaters to the steam generator feed pumps. The feed pumps raise the condensate pressure from 300 psi to feedwater pressure of 1180 psi. After one more stage of heating the feedwater goes through control valves and flows into the four steam generators at 1000 psi. From the hotwell of the condenser to the steam generators the condensate/feedwater has increased in pressure from a vacuum to 1000 psi and in temperature from 101 °F to 440 °F, thus completing the steam-feedwater cycle.





## CIRCULATING WATER SYSTEM—CWS

The function of the circulating water system (CWS) is to condense the turbine steam back to feedwater after the steam is exhausted from the low-pressure turbines. For this reason, the CWS is also referred to as the condenser cooling system. The major components of the CWS are the inlet and discharge tunnels, the three circulating water pumps, the condenser, travelling screens and valves. The screen wash and vacuum priming systems are integral to the functioning of the CWS.

Ocean water is drawn from three inlets located 7,000 feet offshore and 17,140 feet from the station by the three circulating water pumps. The inlets located in 60 feet of water are 110 feet apart. The water enters through a 30-foot diameter velocity cap designed to minimize fish entrapment. Nine-foot diameter shafts connect the inlets to the intake tunnel 160 feet below sea level. The tunnel, bored at a 22-foot diameter from the bedrock, is lined with reinforced concrete to a finished diameter of 19 feet. Dropping at a slope of .5 percent towards the station, the tunnel is 260 feet below sea level at the station where it connects to a vertical riser and transition structure. Eleven-foot diameter butterfly valves direct the flow from the transition structure to the circulating water pumphouse.

Biofouling in the inlet tunnel is controlled by a continuous low level of chlorination. The ability to reverse flow in the tunnels and use thermal shock for biofouling control has also been provided. A chlorination system injects sodium hypochlorite solution at various locations in the CW system.

The pumphouse is designed with three circulating water pumps which pump the ocean water to the condenser and through the condenser tubing. The pumps also provide sufficient pressure to pump the water back to its discharge point in the ocean.

The condenser is arranged in three shells, one under each LP turbine. It has a two-pass configuration and uses titanium tubes to minimize salt leakage into the feedwater. The circulating water temperature is raised 34 °F while in the condenser. The heated water returns to the ocean in the 16,483-foot long discharge tunnel and discharges through a series of 22 nozzles located just above the seabed. The nozzles form a diffuser which rapidly mixes the discharge flow and drops the temperature of the discharge plume to a maximum of 5 degrees above the intake temperature.





#### **CIRCULATING WATER SYSTEM DATA**

Flow	450,000 gpm	
Pumps	3 at 150,000 gpm	
Tunnels	19 feet ID, concrete lines	
Inlet tunnel	17,140 feet long	
Discharge tunnel	16,483 feet long	
Condenser	3 shell, double pass, 754,110 sq. ft.	
Tubing	530 miles, titanium	
Exhaust pressure	2.00″ HgA	
CW temperature	55 °F	
Temperature rise	34 °F	
Total heat rejected	7.6 x 10° Btu/hr	
Travelling screens	3 each 14 feet wide 64 feet high	



Leat must be removed from many pieces of equipment on both the primary and secondary side of the station. Bearings in large rotating equipment such as the turbine generator and the reactor coolant pump motors need cooling. The control room and containment building need to have the heat load removed for habitability and for other components to function. Steam from waste disposal and boron recovery evaporators must be cooled. This type of auxiliary cooling is performed by the primary and secondary component cooling systems and the service water system functioning together through heat exchangers.

AUXILIARY COOLING

#### Primary Component Coaling System-(PCC)

The PCC system uses two closed loops to remove heat from auxiliary equipment on the primary (reactor) side of the station. One loop serves A train equipment and the other serves the B train components. The PCC system is a safety system since it is depended upon to cool emergency core cooling system pumps, to remove decay heat and to cool the containment. The PCC system components, piping and supports are designed for seismic forces and post accident operation.

PRIMARY COMPONENT COOLING SYSTEM		
System pressure and temperature	150 psi, 120 °F	
PCC water pumps	4 at 700 hp and 11000 gpm	
PCC heat exchangers	2 at 210 x 10º Btu/hr.	
Heat loads served by each loop:		
Containment spray pump	Containment spray HX	
RHR pump	RHR heat exchanger	
Safety injection coolers	Charging pump	
Containment coolers	Enclosure cooler	
Spent fuel HX	Evaporators	

#### Secondary Component Cooling System (SCC)

Reactor coolant pumps

The SCC system removes heat from auxiliary equipment on the secondary (turbine) side of the station. It has two loops arranged to serve A and B train components independently.

#### SECONDARY COMPONENT COOLING SYSTEM

System pressure, temperature, flow SEC water pumps SEC heat exchangers

Turbine and generator coolers

Air compressor aftercoolers

Heat loads served:

50 psi, 85 °F, 10,000 gpm 3 at 5000 gpm, half-size 2 at 23.8 x 10° Btu/hr, 100 % capacity

Miscellaneous HX

Pump motor bearing coolers Isolated phase bus coolers

#### Service Water System-(SW)

The service water system transfers heat from the PCC, SCC and diesel generator heat exchangers to either the ocean or the cooling tower. The SW system is a safety class system since it may be called upon to handle post-accident cooling. All heat removed from the auxiliary components must ultimately be transferred to the environment especially in a post-accident situation. The ultimate heat sink at Seabrook Station is a combination of the ocean cooling tunnels which are tornado proof and the cooling tower which is seismically designed.

#### SERVICE WATER SYSTEM

Flow per train Heat load

SW pumps Cooling tower pumps Cooling tower basin 10,500 gpm normal 95.3 x 10° Btu/hr post accident 209 x 10° Btu/hr 4 at 10,500 gpm and 150 psi 4 at 13,000 gpm and 150 psi 4,000,000 gallons capacity



### **ELECTRICAL SYSTEMS**

The electrical power system is the source of power for the plant auxiliaries during normal operation, and for the plant protection system and engineered safety features during abnormal and accident conditions. The systems which comprise the electric power system are the utility grid and offsite power system, the onsite ac power system, and the onsite dc power system.

Seabrook Station has three ties to the New England 345 kV transmission grid. These ties are via transmission lines to substations at Scobie Pond near Derry, New Hampshire; at Tewksbury, Massachusetts; and at Newington, New Hampshire.

The onsite power systems include the 13.8 kV and the 4160 volt distribution systems, including the standby diesel-generators and the connections from the unit and reserve auxiliary transformers; the 480 volt distribution system; the 120 volt vital instrumentation and control power system; and the 125 volt dc distribution system including the batteries and battery chargers.

Under normal operating conditions, the main generator supplies electrical power through a generator circuit breaker via isolated phase bus ducts to the utility grid through the generator step-up transformers and to the plant through the unit auxiliary transformers. During startup and shutdown, auxiliary power may be taken from the 345 kV system in one of two ways; either by backfeeding through the generator step-up transformers and unit auxiliary transformers.





The design of the electrical systems and the components is governed by 31 industry standards and 36 NRC guides and technical positions. These include extensive requirements for seismic and environmental design and testing. Safety-related equipment is powered by two redundant trains of electrical equipment. Each train has its own emergency diesel generator and station batteries. Power and control cables for the two trains are physically separated in their raceways which may be cable tray, conduit or buried ducts.

Control and instrumentation of the station equipment is centralized in the main control room. Local control panels are used for equipment whose operation does not require immediate attention. The status of equipment and process systems is indicated in the control room directly or through multiplexing the signals to an extensive system of computers.







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### PRINCIPAL MATERIALS

<u>COMMODITY</u>	UNIT OF MEASURE	<u>UNIT 1 &amp; C</u>
Structural Conc.*	CY	274,914
Structural Rebar*	TN	34,160
Structural Formwork*	SF	2,796,747
Cadwelds	EA	47,975
Structural Steel	TN	12,168
Small Bore Pipe	LF	151,818
Large Bore Pipe	LF	168,216
Large Bore Welds	EA	19,846
Large Bore Hangers	EA	10,059
Large Bore Valves	EA	2,361
Conduit	LF	641,381 **
Cable Tray	LF	88,547
Cable Pulling	LF	6,160,931
Cable Terminations	EA	230,705
Tubing	LF	193,669

\*\*Exposed, Rigid & PVC Ductbank \*Excludes Tunnel Work





GENERAL ARRANGEMENT





# SEABROOK STATION during CONSTRUCTION





AUGUST 1981



SEPTEMBER 1983




FPL Energy Seabrook Station P.O. Box 300 Seabrook, NH 03874 (603) 773-7000

September 25, 2006

NPDES Permit No. NH0020338 SBK-L-06180

United States Environmental Protection Agency Region I 1 Congress Street, Suite 1100 Boston, MA 02114-2023

Attention: Shelley Puleo Environmental Protection Specialist Municipal Assistance Unit

#### Seabrook Station NPDES Permit NH0020338 Renewal Application

FPL Energy Seabrook LLC has enclosed a renewal application for National Pollutant Discharge Elimination System (NPDES) Permit NH0020338 pursuant to 40 CFR 122.21 (d). FPL Energy Seabrook is the principal owner and operator of Seabrook Station a nuclear electric generating facility located in Seabrook, NH. Seabrook Station commenced commercial operation in August 1990, generating in excess of 139 million megawatt hours of electrical energy with a capacity factor of approximately 85 percent. Seabrook Station has held the referenced NPDES Permit since construction of the facility began in 1976.

This renewal application is comprised of completed EPA Forms 1 "General Information" and 2C "Wastewater Discharge Information" per your letter of December 15, 2005, and the following supplemental information:

- Tab 1 EPA Form 1 and Supporting Information
- Tab 2 EPA Form 2C and Supporting Information
- Tab 3 Annotated NPDES Permit, Proposed Changes to Monitoring Requirements and Effluent Limitations
- Tab 4 Clean Water Act § 316 (a) and § 316 (b) Certification

FPL Energy Seabrook previously submitted on May 4, 2006, a Proposal for Information Collection (PIC) as required by CWA § 316 (b) Phase II Regulation, 40 CFR § 125.95 (b)(1). The Seabrook Station PIC is integral to this NPDES Permit renewal application. The PIC demonstrates that Seabrook Station's Cooling Water Intake Structure design is "best technology SBK-L-06180 Page 2

available" and meets the National Performance Standards of 40 CFR § 125.94 (b). The PIC also includes the information required by 40 CFR §§ 122.21(r)(2), (3) and (5) describing the source

water body, cooling water system intake structures and cooling water system operation respectively. FPL Energy Seabrook intends to submit a Comprehensive Demonstration Study (CDS) subsequent to receiving EPA review comments on the PIC but not later than January 7, 2008. The CDS will supplement this NPDES Permit renewal application.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions on this matter, please contact Mr. James M. Peschel, Regulatory Programs Manager, at (603) 773-7194.

Very truly yours,

FPL ENERGY SEABROOK, LLC

1+1

Gene St. Pierre Site Vice President

Mr. Jeffrey Andrews
 New Hampshire Department of Environmental Services (NHDES)
 Water Division
 29 Hazen Drive, P.O. Box 95
 Concord, New Hampshire 03302-0095

United States Nuclear Regulatory Commission Attn: Document Control Desk Washington, D.C. 20555-0001





# NPDES Permit NH0020338 Renewal Application

September 2006

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XI. MAP				
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Seabrook Station PIC



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Normandeau Associates, Inc.



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EPA Form 3510-2C (8-90)

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C. Except for st	YES (complete the fol	iowing table)	or the discharges	uescribed in Iti	NO (go to Sec	ction III)	sonal (			
				3. FRE	QUENCY			4. FLOW	· · · · ·	
	2.	OPERATION(s)		a. DAYS PER WEEK	b. MONTHS	a. FLOW RA	TE (in mgd)	B. TOTA (specify	L VOLUME with units)	
1. OUTFALL NUMBER (list)		(list)		(specify average)	PER YEAR (specify average)	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERI AVERAGE	2. MAXIMUI DAILY	M C. DURATIO
	This informatio following secti	n is provi ons titled	ied in the :			, •				
	EPA Form 2C Sec (Descriptions)	tion II, P and Section	art 3 1 V Part D Pach							
	outfall	2000, 201								
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Deed on offic		n nromulanto	hy EBA under S	action 204 of th	ha Class Water	Act apply to you	ur fo ailitu 2		· · · ·	
	YES (complete Item II	(I-B)	by EFA didei 3		NO (go to Sec	ction IV)			<u> </u>	<u></u>
3. Are the limita	ations in the applicable YES (complete Item II	e effluent guid	enne expressed ir	terms of prod	Uction (or other NO (go to Sec	measure of ope tion IV)	ration)?			
. If you answe applicable e	ered "yes" to Item III-I ffluent guideline, and	<ol> <li>list the qua indicate the at</li> </ol>	ntity which repres fected outfalls.	ents an actual	measurement	of your level of	production, exp	pressed in the	terms and ur	nits used in th
		1. A	VERAGE DAILY F	RODUCTION	N BRODUCT		~	2, AF	FECTED OU	TFALLS
a. QUANTITY	PER DAY b. UNIT	IS OF MEASU	IRE	c. UPERATIC	(specify)	MATERIAL, EI	U.		list outfall num	bers)
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/. IMPROVEM	ENTS									
. Are you now treatment eq permit condit	w required by any Fe uipment or practices tions, administrative o YES (complete the foll	ederal, State or any other e or enforcement owing table)	or local authority nvironmental prog orders, enforcem	to meet any grams which m ent compliance	implementation ay affect the dis e schedule lette NO (go to Iter	schedule for t charges descrit rs, stipulations, n IV-B)	ne construction bed in this appl court orders, a	n, upgrading i ication? This i nd grant or loa	or operations ncludes, but is an conditions.	of wastewat s not limited
. IDENTIFICAT AGREE	TION OF CONDITION EMENT, ETC.	1, 2. AF			3. BRIEF	DESCRIPTION	OF PROJECT	4.	FINAL COMP	LIANCE DAT
		a. NO,	b. SOURCE OF DI	SCHARGE				a.	REQUIRED	b. PROJECTE
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OPTIONAL: discharges)	You may attach add you now have underw	litional sheets ay or which y	describing any a ou plan. Indicate y	additional wate whether each p	er pollution cor program is now	trol programs ( underway or pl	or other envir anned, and ind	onmental proj licate your act	ects which m ual or planned	ay affect yo I schedules f
construction.	MARK "X" IF DESCR	IPTION OF A	DITIONAL CONT	TROL PROGR	AMS IS ATTAC	HED				
2510	20 (8 00)			5405.0						



CATTINUED FROM PAGE 2 VINTARE AND EFFLUENT CHARACTERISTICS A.B, G.C. See instructions before proceeding – Complete one sud of lables for each outfall – Annolate the outfall number in the space provided. NOTE: Tables VA, VS, and VC are included on asparate isbetis numbered V-1 through V-3. C. Use the space below to list any of the pollutants listed in Table 22-3 of the instructions, which you know of have reason to believe is discharged or may be discharged from any outfall of to be pollutants below to list. Table VA, VS, and VC are included on asparate isbetis numbered V-1 through V-3. T. I-POLLUTANT  I. POLLUTANT I. OLUTANT I. OL
V.ITARE AND EFFLUENT CHARACTERISTICS         A.B. & C. See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided.
A.B.G. See instructions before proceeding - Complete one set of tables for each outfull - Annotate the outfull number in the space provided.         D.Use the space below to list any of the pollutants listed in Table 2-3 of the instructions, which you know or have reason to believe is discharged or may be discharged for may be discharged or may be discharged in the space below to list any of the pollutants listed in Table 2-3 of the instructions, which you know or have reason to believe is discharged or may be discharged in the space below to list any of the pollutants listed in Table 2-3 of the instructions, which you know or have reason any basical data in your possession.         I. POLLITANT       2. SOURCE       1. POLLUTANT       2. SOURCE         B.P. Form 3G Section 11. Part       2. SOURCE       1. POLLUTANT       2. SOURCE         State of the pollutant listed in the space provided.       1. POLLUTANT       2. SOURCE       1. POLLUTANT       2. SOURCE         B.P. Form 3G Section 11. Part       2. SOURCE       1. POLLUTANT       2. SOURCE       1. POLLUTANT       2. SOURCE         V.P.OTENTIAL DISCHARGES NOT COVERED BY ANALYSIS       1.       1. POLLUTANT       2. SOURCE       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       2. SOURCE         V.P.OTENTIAL DISCHARGES NOT COVERED BY ANALYSIS       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT       1. POLLUTANT         V.P.OTENTIAL DISCHARGES NOT COVERED BY ANALYSIS<
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This information is provided in the following sections titled: ESA Form 2C Section 11, Part  3 (Descriptions) and Section  for each outfall  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS  VI. PO
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V Part D (List of Pollutants) for each outfall VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct? VES (list all such pollutants below ) VES (list all such pollutants below )
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VII. BIOLOGICAL TOXICITY TESTING DATA       Image: Contract Co	CONTINUED FROM THE FRONT	· · · · · · · · · · · · · · · · · · ·			
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K. CERTIFICATION         1 certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure the information submitted. Based on my inquiry of the person or presons who manage the system or those person tirectly responsible for gathering the information, including the possibility of time and imprisonment for knowing violations.         NAME & OFFICIAL TITLE (type or print)         ene. St. Pierre, Site Vice President         XigNATURE         Mean ML Query         Mean ML Query	Northeast Laboratory Services Mttn: Paul Lynch, Analytical Customer Service Manager	227 China Road Winslow, ME 04901		207 873-7711 x341	All non-radiological analyses
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Normandeau Associates, Inc.

## EPA Form 2C

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 001**

### **Circulating Water System**

### Discharge Information for Outfall 001 (Circulating Water System)

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies

Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater.

Section V, Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

All permitted outfalls from this facility ultimately combine with the Circulating Water System and are discharged to the Atlantic Ocean. These outfalls are sampled at representative sample points prior to introduction to the Circulating Water System to ensure compliance with NPDES Permit effluent limitations and monitoring requirements.

In addition to the identified permitted outfalls which discharge to the Circulating Water System, the sources below may also be introduced:

- Cooling water drawn from three intake velocity caps and discharged through eleven double discharge diffuser nozzles in the Atlantic Ocean
- Closed loop cooling system leakage into the Service Water System.
- Residual chlorine. Chlorine is injected into the Circulating and/or Service Water Systems to prevent biofouling.
- Neutralization Tank discharge of Condensate Polishing System and Makeup Water Treatment System wastewater
- Makeup Water Treatment System waste mineral concentrates
- System drainage from systems which are not directed to another outfall
- Various seawater containing sumps that collect seawater leakage and return it to the Circulating Water System.
- Condensate hotwell discharges performed to control chemistry parameters, lower hotwell level, or drain for system maintenance.
- Rinses of the Condensate Polishing System in support of start-up and periodically during standby conditions, rinses of the resin vessels following regenerations, regeneration wastewater, sampling system and grab sample waste, system leakage, and system drainage for maintenance (see description below).
- Steam Generator drainage
- Circulating Water System and Service Water System Forebay Water. Periodically sediment is removed from the forebays by a pumping process. The sediment is typically collected in lined dumpsters and the ocean water is returned to the forebay or may be directed to the Storm Drain System which ultimately discharges to Outfall 001.

#### **Discharge description:**

The Circulating Water System provides Atlantic Ocean cooling water to the main condensers where the steam exhausted from the low pressure sections of the turbine is condensed and subsequently returned to the Condensate System and Feedwater System. The Circulating Water System also supplies cooling to several mechanical vacuum pump heat exchangers in the Condenser Vacuum System. The Service Water System provides Atlantic Ocean cooling water to various subsystem heat exchangers which are required to support normal operating conditions, shutdown conditions and emergency conditions.

The cooling water flow in the Circulating Water System and Service Water System is conveyed by large high capacity centrifugal pumps. During normal full power operation three Circulating Water System pumps are in operation each with a rated pumping capacity of approximately 130,000 gpm and two Service Water System pumps

#### Outfall 001, p. 1

are in operation each with a rated pumping capacity of approximately 10,500 gpm. The actual operational capacities of these pumps has exceeded their documented rated capacities. The increased pumping capacity is attributable to conservative estimates of operational pumping capacities by the pump vendor and the operation of a single nuclear unit versus two unit operation. Operation of a single nuclear unit results in a reduction in the Circulating Water System flow resistance. During most periods of the year when ocean temperatures are cold, a portion of the ocean cooling water leaving the condenser is recirculated through the condenser to maximize plant efficiency by optimizing the temperature and pressure of the secondary coolant water exiting the condenser water boxes. During these periods when ocean cooling water is being recirculated through the condenser, total cooling water flow is reduced and the temperature rise across the condenser is elevated. The effect of condenser cooling water recirculation can be seen in monthly Discharge Monitoring Reports which document cooling water flow and temperature increase across the condensers. During plant shutdown conditions (e.g. plant refueling outages) there is no transfer of heat to the Main Condenser. During refueling, the Steam Generators are placed in a wet layup condition and the Condensate System and Feedwater System are not in operation. During refueling, the Service Water System pumps are operated to remove heat from the Spent Fuel Cooling System and to provide cooling to other plant heat loads. A Circulating Water System pump (or pumps) may be operated during a refueling outage to support effluent discharges.

The Circulating Water System consists of the following principal structures:

- Two tunnels connecting the plant site with three submerged offshore intakes and a multiport discharge diffuser
- An intake transition structure
- A pumphouse for the Circulating Water System and a pumphouse for the Service Water System
- Flumes which join the intake transition structure to the pumphouses
- A discharge transition structure
- An underground piping system, interconnecting the pumps in the pumphouses, the Main Condensers, heat exchangers and the transition structures

Current overview diagrams of the Circulating Water System and Service Water System follow this description. During normal operation, the Circulating Water System provides a continuous flow of approximately 390,000 gpm to the condensers and the Service Water System provides a continuous flow of approximately 21,000 gpm to various subsystem heat exchangers.

The Circulating Water System tunnels start 260 feet below the plant level (240 feet below mean sea level), at the bottom of vertical 19'-0" finished diameter land shafts, and extend out under the ocean at an ascending grade of about 0.5 percent until they reach their respective offshore terminus locations about 160 feet below the ocean's surface. The tunnels, which were machine bored through bedrock to a 22'-0" diameter, are concrete lined to provide the finished 19 foot finished diameter.

The intake tunnel is approximately 17,000 feet long, and is connected to the ocean by means of three 9'-10 1/2" finished diameter concrete-lined shafts, spaced between 103 and 110 feet apart and located approximately 7000 feet off the shoreline in 60 feet of water. A submerged 30'-6" diameter concrete intake structure intake head is mounted on the top of each shaft to minimize fish entrapment by reducing the intake velocity.

The discharge tunnel is approximately 16,500 feet long, and is connected to the ocean by means of eleven, 5'-1'' finished inside diameter concrete lined shafts, spaced about 100 feet apart, located approximately 5000 feet off the Seabrook Beach shoreline in water up to 70 feet deep. A double-nozzle diffuser is attached to the top of each shaft to increase the discharge velocity and diffuse the heated water.

The circulating water portion of the pumphouse encloses three 14' wide circulating water travelling screens and three circulating water pumps. A reinforced concrete wall separates the circulating water portion from the service water portion of the pumphouse. The Service Water System pumps are located in the service water portion of the pumphouse as are the service water travelling screens. The circulating water is pumped through a 11 foot diameter pipe to the condensers and is returned through a 10 foot diameter discharge pipe connected with the tunnel transistion structures. Water to the service water section of the pumphouse is supplied by two pipes branching off each of the tunnel transition structures.

This outfall receives inputs from all of the other outfalls described within this permit renewal application. All other sources listed in those outfalls ultimately are discharged via this system.

Outfall 001 also receives the effluent from the Water Treatment System. This effluent includes a waste mineral concentrate stream and the effluent from the Neutralization Tank.

Trace quantities of typical janitorial cleaning products may also be incidentally introduced into floor drains and into the Circulating Water System in conjunction with cleaning activities. The practice is to dispose of janitorial cleaning wastes which have been used outside of the Radiologically Controlled Area in the sanitary waste system which is discharged to the Town of Seabrook Publically Owned Treatment Works. Janitorial cleaning wastes which have been used inside of the Radiologically Controlled Area have the potential to contain radioactive contamination and therefore must be disposed of in floor drains or sinks which are directed to the Waste Test Tanks (Outfall 025D) and ultimately discharged to Outfall 001. Wastewater collected in the Waste Test Tanks is sampled for radioactivity content prior to each discharge to ensure Nuclear Regulatory Commission radioactive effluent limits are complied with prior to discharge. Compliance with Nuclear Regulatory Commission radioactive effluent limits specified in 10 CFR 20 is a requirement of the Seabrook Station Operating License.

#### Alternate paths for this discharge:

• None anticipated.

#### Potential chemicals in discharge:

Chemicals identified in all other outfalls.

Note: Some of the chemicals listed below are also listed in other outfalls. They are listed below because they are also discharged directly into this outfall.

- Total Residual Chlorine Sodium hypochlorite addition for biofouling control, Service and Circulating water leakage and drainage, Makeup Water Treatment System cleaning agent, potable water.
- Dynacool 1383 Antiscalant Chlorination line antiscalant
- Ammonia/Ammonium Hydroxide Hotwell discharges, Component cooling water drainage, Steam Generator drainage, trace quantities from silica analyzer cleaning
- Methoxypropylamine condenser hotwell discharges, Steam Generator drainage
- Brine (concentrated potable water constituents) makeup water treatment system waste
- Demineralized water water treatment effluent waste, cooloing water, flush and rinse water, Steam Generator drainage
- Domestic water constituents (washwater residual, hydrolazing, cooling water, fire protection, potable)
- Groundwater constituents various vaults/plant areas where groundwater in-filtration occurs
- Rainwater constituents rainwater that collects in vault areas
- Hydrazine condenser hotwell discharges, Component Cooling Water System drainage
- Hydrogen Peroxide Makeup Water Treatment System cleaning agent,
- Ethanolamine Condenser Hotwell discharges, Steam Generator drainage
- Diisopropylamine trace quantities from sodium analyzer drains
- Sodium Chloride Makeup Water Treatment System chemical additive
- Sodium Hydroxide Makeup Water Treatment System cleaning agent, Condensate Polishing System regenerant chemical.
- Suspended solids all potential inputs to the discharge
- Citric Acid trace quantities from silica analyzer drains
- Silica standard (500ppb) trace quantities from calibration of silica analyzers
- Ammonium molybdate trace quantities from silica analyzer drains
- Amino Acid trace quantities from silica analyzers

Outfall 001, p. 3

- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Sulfuric Acid CPS regenerant chemical.
- Bulab 9328 Corrosion inhibitor for freshwater systems (used on auxilliary cooling tower previously)
- Bulab 6002 Biocide for fresh water systems (used on auxilliary cooling tower previously)
- Acetaldehyde potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Cresol trace quantities from cleaning products, petroleum containing products
- Phenol trace quantities from cleaning products
- Flocon flocculent used in the Makeup Water Treatment System for removal of particulates
- Morpholine Secondary chemical additive, Steam Generator soak agent, hotwell discharges
- Sodium Thiosulfate Water Treatment System additive for chlorine removal

#### Proposed chemicals for future discharge:

• Chemicals identified in all other outfalls.

Note: Some of the chemicals listed below are also listed in other outfalls. They are listed below because they are also discharged directly into this outfall.

- Pyrolidine Secondary chemical additive
- Carbohydrazide Secondary and closed cooling loop additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- EDTA Steam Generator and Generator Stator Coolant System cleaning agent
- EVAC Biocide Under consideration for mollusk control in the Circulating Water System
- H-130M Biocide Under consideration for mollusk control in the Circulating Water System
- Thruguard 300 Under consideration to be used as an additive to the sodium hypochlorite injection line to reduce calcium carbonate scale formation.
- Diethylhydroxylamine- Secondary chemical additive
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

#### Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylene diamine Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit monthly average and maximum daily flow limit for this outfall is 720,000,000 GPD.

Average of monthly average values 2000 - 2004, 599 MGD Average of maximum daily flow values, 2000 - 2004, 684 MGD

#### **Discharge frequency:**

Outfall 001 is a continuous discharge.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Any chemical listed under all other outfalls Acetaldehyde Acetic acid Acrylonitrile Ammonium hydroxide Cresol Phenol Diethylamine Dimethylamine Hydrochloric Acid Monoethylamine Monomethylamine Phenol Sodium hypochlorite Sulfuric acid Triethanolamine

## **EPA Form 2C**

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

### **Outfall 003**

## **Thermal Backflush**

### Discharge Information for Outfall 003 Thermal Backflush

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies

Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater.

Section V, Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4.

#### Discharge includes wastewater from the following sources:

- Reversal of normal Circulating Water System flow as described in Outfall 001. Cooling water is drawn from eleven double discharge diffuser nozzles and discharged through three intake velocity caps in the Atlantic Ocean
- The NPDES Permit prohibits Circulating Water System chlorination during the thermal backflush evolution. Chlorination of the safety-related Service Water System during the backflush evolution is authorized.
- Additional discharge wastewater description to be provided in update to "Alternatives to Thermal Backflushing" study if thermal backflush is proposed to be used.

#### **Discharge description:**

The NPDES Permit requires that if thermal backflushing is proposed to be used, the December 16, 1994, "Alternatives to Thermal Backflushing" study will be updated and submitted to the Regional Administrator, the Director of the NH Department of Environmental Services and the Technical Advisory Committee prior to conducting this evolution.

A general description of thermal backflushing follows. Comprehensive discharge description to be provided in update to "Alternatives to Thermal Backflushing" study if thermal backflush is proposed to be used.

In addition to chlorination, thermal backflushing of the intake tunnel may be employed to remove sessile biofouling organisms attached to system components. This method involves the reversal of the normal cooling water flow such that the three intake structures serve as the discharge points (Outfall 003) and the discharge diffuser ports, conversely, function as the intake structure.

Temperatures within the intake tunnel will be elevated to a maximum of 120 <sup>o</sup>F for a maximum of 2 hours. The entire flow reversal and heat treatment cycle will occur over a six-hour period at a cooling water flow rate not exceeding 500,000 gallons per minute. There will be no chlorination of the condenser cooling water during the thermal backflushing treatment. The thermal backflushing operation may be used infrequently to compliment the normal Circulating Water System chlorination procedures for those sessile organisms that are not controlled by the sodium hypochlorite injection or for those organisms located upstream of the sodium hypochlorite injection points.

#### Alternate paths for this discharge:

None anticipated.

#### Potential chemicals in discharge:

Same list as specified for Outfall 001

#### Proposed chemicals for future discharge:

Same list as specified for Outfall 001

#### Maximum daily flow:

The NPDES Permit specifies a maximum daily flow of 500,000 GPM for Outfall 003. No change to this flow limit is proposed.

#### **Discharge frequency:**

Continuous discharge during the period of thermal backflush. This is an intermittent flow which has not been used as of the filing of this NPDES Permit renewal application.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Same list as specified for Outfall 001

## EPA Form 2C

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## Outfall 022

### **Oil/Water Separator Vault #1**

### Discharge Information for Outfall 022 Oil/Water Separator Vault # 1

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. SectionV, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Floor drains in the following buildings and rooms:

Emergency Feedwater Pumphouse Turbine Building Lube Oil Building Lube Oil Storage Room Auxiliary Boiler Room (from Oil/Water Separator Vault #2 when not in service) Diesel Generator Building (from Oil/Water Separator Vault #2 when not in service) Condensate Polisher Building

#### **Discharge description:**

The Floor Drainage Oil/Water Separation System is designed to process non-corrosive oily and potentially oily drainage and leakage sources to produce an effluent containing less than 15 mg/L oil content which conforms to the Effluent Guidelines and Standards set forth by the EPA in 40 CFR 423 for the Steam Electric Power Generating Point Source Category. The processed effluent is discharged directly to the Circulating Water (CW) discharge (Outfall 001).

The Oil/Water Separation System is comprised of an oil separator, which contains a gravity settling section to which the oil/water streams are piped, and a tilted plate separator section to effect separation of oil from water. An effluent tank with a pump and a coalescing filter are also provided. The filter is utilized for final polishing of the effluent prior to discharge. Operation of the Oil/Water Separation System is initiated upon reaching a setpoint level in the effluent tank.

Each separator is designed to process water with an oil content less than 1500 mg/L and discharge a maximum of 85 gpm (122,400 gpd). The gravity settling section is provided to limit suspended solid loading into the oil separation section to 20 ppm. The down flow tilted plate separator is designed to process an oil/water solution and produce an effluent with an oil concentration conforming to EPA effluent guidelines. The final polishing coalescing filter is included in the event that separator loadings exceed design values. This filter can reduce the oil content from about 15 mg/L to less than 10 mg/L. Separated oil is collected in the oil holding tank and is removed periodically. Settled solids in the gravity separator are likewise removed.

Oil/Water Separator Vault #1 is located in the yard area below grade adjacent to the east side of the Turbine Building. The location of the oil/water separator is sufficiently deep to prevent the freezing of the water at low or no-flow conditions. The vault housing the oil/water separator, sump and filter is covered to protect the system from the environment. The vault is ventilated by a ventilation fan. Electrical equipment and lighting in the vault area are explosion proof.

Oil/Water Separator Vault #1 processes influents from: the Turbine Building sump, Emergency Feedwater Pumphouse floor drains, Lube Oil Storage Building sump, Lube Oil Storage Room sump, and influent to Oil/Water Separator Vault #2 when it is out of service. The Turbine Building and Emergency Feedwater Pumphouse drains are arranged to collect leakage and drainage at the potential sources of oil in these buildings via floor and hub drains and to convey these fluids to the oil/water separator. The Lube Oil Storage Building and the Lube Oil Storage Room sumps are conveyed to an Oil Holding Tank. The Lube Oil Storage Building and Lube Oil Storage Room sump discharge valves are maintained closed and manually controlled to ensure excessive quantities of oil are not conveyed to the Oil Holding Tank.

The Emergency Feedwater Pumphouse drains may receive:

- pump shaft seal and valve stem leakage of demineralized water from the Condensate Storage Tank
- steam leakage from the Auxiliary Steam or Main Steam systems
- lubricating oil or turbine control oil leakage
- potable water with trace levels of cleaners
- Feedwater System leakage and drainage

The Turbine Building drains and sump may receive:

- secondary system leakage and drainage
- leakage of demineralized water, potable water and salt water sources to the sump
- leakage from pump seals which are supplied with demineralized or secondary plant water
- leakage from steam seals and blowdown of steam traps to the sump
- leakage of lubricating oil, hydraulic oil and seal oil from equipment in the Turbine Building

During refueling or maintenance outages, many of the secondary systems and seawater sytems may be drained to the Turbine Building sump and be processed by the oil/water separator. Steam Generator drainage may also be directed to this discharge point to allow use of raditation monitoring equipment present at the discharge of the Turbine Building sump.

The CPS Building drains and sump may receive:

- Sampling waste from CPS sample sink and process instrumentation
- Drainage from CPS system/components for maintenance
- leakage of ethylene glycol from the glycol mixing station (unanticipated)
- leakage of motor lubricants used for system pumps
- leakage of CPS fluids from pump seals or leakage.
- Demineralized water used for process instrumentation and safety shower
- Fire protection water (upon activation)

#### Alternate paths for this discharge:

- Oil/Water Separator Vault #2 (Outfall 023)
- Turbine Building Auxiliary Sump (holding only-not discharged)
- Circulating Water System forebay for Unit 2 (holding only-not discharged)

#### Potential chemicals in discharge:

• Any chemicals identified in Oil/Water Separator Vault #2 (Outfall 023), Steam Generator Blowdown (025A), Steam Generator Blowdown Demineralizer Rinses (025B), and Waste Holdup Sump (025C).

Note: Some of the chemicals listed below are also listed in outfalls 023, 025A, 025B, and 025C. They are listed below because they are also directly discharged into this outfall.



Outfall 022, p. 2

- Total Residual Chlorine chlorinated ocean cooling water system leakage and drainage, chlorinated Fire Protection System water
- Ammonia/Ammonium hydroxide secondary system leakage and drainage, Secondary Component Cooling Water System filter flushes, secondary system sampling waste, Condensate System flushes (including filter flushes), Steam Generator drainage, Feedwater System flushes, trace quantities from silica analyzer cleaning
- Methoxypropylamine- secondary system leakage and drainage, secondary system sampling waste, Steam Generator drainage, Condensate System flushes (including filter flushes), Feedwater System flushes
- Hydrazine secondary system leakage and drainage, secondary system sampling waste, Steam Generator Drainage, Secondary Component Cooling Water System filter flushes, Condensate System flushes (including filter flushes), Feedwater System flushes
- Ethanolamine secondary system leakage and drainage, secondary system sampling waste, Steam Generator drainage, Condensate System flushes (including filter flushes), Feedwater System flushes
- Ethylene glycol leakage from heating and cooling systems
- Diisopropylamine trace quantities from sodium analyzer drains
- Sodium Hydroxide trace quantities from hydrazine analyzer drains, ion chromatography analyzer drains
- Sodium tetraborate trace quantities from ion chromatography analyzer drains
- Methanesulfonic acid trace quantities from ion chromatography analyzer drains
- Sulfuric Acid trace quantities from ion chromatography analyzer drains
- Sodium Carbonate/Bicarbonate trace quantities from ion chromatography analyzer drains
- Potassium Chloride trace quantities used in calibration of conductivity instrumentation
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Groundwater constituents various vaults/plant areas where groundwater infiltration occurs
- Rainwater constituents rainwater collected in vault areas
- Suspended solids all potential inputs may contain suspended solids
- Lubricating oils turbine lube oil, seal oil, pump motor lubricating oils
- Electrohydraulic fluid Turbine valves electrohydraulic control system leakage
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Morpholine- Steam Generator drainage, secondary system leakage and drainage
- Acetaldehyde potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile- potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Cresol trace quantities from cleaning products
- Phenol trace quantities from cleaning products
- Sodium hypochlorite Chemical additive to Fire Protection System, Circulating Water system, Service Water System, and cleaning solutions
- Potassium Hydroxide trace quantities from oxygen analyzer drains
- Sodium Fluoride trace quantities form silica analyzer drains
- Hydrochloric Acid trace quantities from conductivity cell cleanings
- Citric Acid trace quantities from silica analyzer drains
- Silica standard trace quantities from calibration of silica analyzers
- Ammonium Molybdate trace quantities from silica analyzer drains
- Amino Acid trace quantities from silica analyzer drains

#### Proposed chemicals for future discharge:

• Any chemicals identified in Oil/Water Separator Vault #2 (Outfall 023), Steam Generator Blowdown (025A), Steam Generator Blowdown Demineralizer Rinses (025B), and Waste Holdup Sump (025C).

Note: Some of the chemicals listed below are also listed in outfalls 023, 025A, 025B, and 025C. They are listed below because they are also directly discharged into this outfall.

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- EDTA Steam Generator and Generator Stator Coolant System cleaning agent
- Carbohydrazide Secondary chemical additive, Closed cooling loop additive
- Diethylhydroxylamine- Secondary chemical additive
- Hydrogen peroxide- Generator Stator Coolant system cleaning agent
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylene diamine Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for this outfall is 122,400 GPD.

Outfall 022 has a maximum capacity of 85 gpm (122,400 GPD). The average daily flow for this outfall during the period 2000 – 2004 is approximately 17,866 GPD (average of average monthly flows reported in DMRs).

#### **Discharge frequency:**

Outfall 022 is a batch discharge, occurring intermittently when the oil/water separator vault reaches the level setpoint. The discharge is treated as a continuous discharge as the discharge normally occurs many times over the period of a day.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Hydrochloric Acid Monoethylamine Monomethylamine Phenol Potassium Hydroxide Sodium fluoride Sodium hypochlorite Sulfuric acid Triethanolamine Triethylamine Acetaldehyde Acetic acid Acrylonitrile

## EPA Form 2C

Section II, Part B (Descriptions)

### and

## Section V, Part D (List of Pollutants)

### **Outfall 023**

## **Oil/Water Separator Vault #2**

### Discharge Information for Outfall 023 Oil/Water Separator Vault #2

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. SectionV, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Floor drains in the in the following buildings and rooms:

Auxiliary Boiler Room Diesel Generator Building Emergency Feedwater Pumphouse (from Oil/Water Separator Vault #1 when not in service) Turbine Building (from Oil/Water Separator Vault #1 when not in service) Lube Oil Storage Room (from Oil/Water Separator Vault #1 when not in service) Lube Oil Building (from Oil/Water Separator Vault #1 when not in service)

#### **Discharge description:**

The Floor Drainage Oil/Water Separation System is designed to process non-corrosive oily and potentially oily drainage and leakage sources to produce an effluent containing less than 15 mg/L oil content which conforms to the Effluent Guidelines and Standards set forth by the EPA in 40 CFR 423 for the Steam Electric Power Generating Point Source Category. The processed effluent is discharged to the Storm Drainage System (Outfall 002B) and ultimately to the Circulating Water System (Outfall 001).

The Oil/Water Separation System is comprised of an oil separator, which contains a gravity settling section to which the oil/water streams are piped, and a tilted plate separator section to effect separation of oil from water. An effluent tank with a pump and a coalescing filter are also provided. The filter is utilized for final polishing of the effluent prior to discharge. Operation of the Oil/Water Separation System is initiated upon reaching a setpoint level in the effluent tank.

Each separator is designed to process water with an oil content less than 1500 mg/L and discharge a maximum of 85 gpm (122,400 gpd). The gravity settling section is provided to limit suspended solid loading into the oil separation section to 20 ppm. The down flow tilted plate separator is designed to process an oil/water solution and produce an effluent with an oil concentration conforming to EPA effluent guidelines. The final polishing coalescing filter is included in the event that separator loadings exceed design values. This filter can reduce the oil content from about 15 mg/L to less than 10 mg/L. Separated oil is collected in the oil holding tank and is removed. Settled solids in the gravity separator are likewise removed.

Oil/Water Separator Vault #2 is located in the yard area below grade adjacent to the west side of the Administration Building. The location of the separator is sufficiently deep to prevent the freezing of the water at low or no-flow conditions. The vault housing the oil separator, sump and filter is covered to protect the system from the environment. The vault is ventilated by a natural circulation system. Electrical equipment and lighting in the vault area are explosion proof.

Oil/Water Separator Vault #2 processes influents from: the Diesel Generator Building sumps, Auxiliary Boiler room floor drains, and influent to Oil/Water Separator Vault #1 when it is out of service. The Diesel Generator Building sumps collect drainage from the Auxiliary Steam and Condensate heater traps. Leakage of diesel engine lube oil and

#### Outfall 023, p. 1

fuel oil is also a potential source to the sumps. Effluent from the sump in the diesel fuel oil tank area is pumped directly to the oil separator settling section. Auxiliary Boiler room system equipment leakage consists of demineralized water, condensed steam, fuel oil, and lube oil. Other discharges to this discharge point include Auxiliary Boiler blowdown and drainage, Auxiliary Boiler stack drainage, and Sample System drainage. Effluent in this area is collected in the area floor and hub drains and gravity drains which are directed to the oil/water separator.

#### Alternate paths for this discharge:

- Oil/Water Separator Vault #1 (Outfall 022)
- Turbine Building Auxiliary Sump (holding only-not discharged)
- Unit II Circulating Water Forebay (holding only-not discharged)

#### Potential chemicals in discharge:

• Any chemical identified in Oil/Water Separator Vault #1 (Outfall 022) discharge

### Note: Some of the chemicals listed below are also listed in Outfall 022. They are listed below because they are also directly discharged into this outfall.

- Hydrazine additive in Auxiliary Steam System, may be present in auxiliary boiler blowdown and drains, auxiliary steam system leakage, sample system drainage
- Ammonia/Ammonium hydroxide auxiliary boiler blowdown and drains, auxiliary steam system leakage, sample system drainage
- Methoxypropylamine auxiliary boiler blowdown and drains, auxiliary steam system leakage, sample system drainage
- Ethanolamine- auxiliary boiler blowdown and drains, auxiliary steam system leakage, sample system drainage
- Domestic water constituents washing, hydrolazing, cooling water, fire protection water, potable water
- Groundwater constituents groundwater infiltration
- Rainwater constituents rainwater collection into sumps
- Suspended Solids all potential inputs may contain suspended solids
- Lubricating oils pump motor lubricating oils
- Fuel oils leakage from fuel oil delivery system to auxiliary boilers
- Fly Ash rain water wash of auxiliary boiler stack
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Morpholine- Auxiliary boiler condensate returns
- Sulfuric acid- Auxiliary boiler stack wash
- Acetaldehyde- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic acid- potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile- potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Cresol- trace quantities from cleaning products
- Phenol- trace quantities from cleaning products
- Sodium hypochlorite- chemical additive to Fire Protection water, Circulating Water system, Service Water system, and cleaning solutions

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#### Proposed chemicals for future discharge:

• Any chemical identified in Oil/Water Separator Vault #1 (Outfall 022) discharge

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for this outfall is 122,400 GPD.

Outfall 023 has a maximum capacity of 85 gpm (122,400 GPD). The average daily flow for this outfall over the period 2000 to 2004 is approximately 1,664 GPD (average of average monthly flows reported in DMRs).

#### **Discharge frequency:**

Outfall 023 is a batch discharge, occuring intermittently when the oil/water separator vault reaches the level setpoint. The discharge is treated as a continuous discharge as the discharge normally occurs many times over the period of a day.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Monoethylamine Monomethylamine Phenol Potassium Hydroxide Sodium hypochlorite Sulfuric acid Triethanolamine Triethylamine Acetaldehyde Acetic acid Acrylonitrile

## EPA Form 2C

## Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

### Outfall 024

## **Oil/Water Separator Vault #3**

### Discharge Information for Outfall 024 Oil/Water Separator Vault #3

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater.

SectionV, Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

- Fire Protection Pumphouse Drains
- Fire Protection Diesel Pump Fuel Oil Tank areas
- Auxiliary Boiler Fuel Oil Storage Tank area

#### **Discharge description:**

The Floor Drainage Oil/Water Separation System is designed to process non-corrosive oily and potentially oily drainage and leakage sources to produce an effluent containing less than 15 mg/L oil content which conforms to the Effluent Guidelines and Standards set forth by the EPA in 40 CFR 423 for the Steam Electric Power Generating Point Source Category. The processed effluent is discharged to the Storm Drainage System (Outfall 002B) and ultimately to the Circulating Water System (Outfall 001).

The Oil/Water Separation System is comprised of an oil separator, which contains a gravity settling section to which the oil/water streams are piped, and a tilted plate separator section to effect separation of oil from water. An effluent tank with a pump and a coalescing filter are also provided. The filter is utilized for final polishing of the effluent prior to discharge. Operation of the Oil/Water Separation System is initiated upon reaching a setpoint level in the effluent tank.

Each separator is designed to process water with an oil content less than 1500 mg/L and discharge a maximum of 85 gpm (122,400 gpd). The gravity settling section is provided to limit suspended solid loading into the oil separation section to 20 ppm. The down flow tilted plate separator is designed to process an oil/water solution and produce an effluent with an oil concentration conforming to EPA effluent guidelines. The final polishing coalescing filter is included in the event that separator loadings exceed design values. This filter can reduce the oil content from about 15 mg/L to less than 10 mg/L. Separated oil is collected in the oil holding tank and is removed periodically. Settled solids in the gravity separator are likewise removed.

Oil/Water Separator Vault #3 is located in the yard area below grade north of the fire pumphouse. The location of the separator is sufficiently deep to prevent the freezing of the water at low or no-flow conditions. The vault housing the oil separator, sump and filter is covered to protect the system from the environment. The vault is vented by natural circulation. Electrical equipment and lighting in the vault area are explosion proof.

Oil Water Separator Vault #3 processes influents from the Fire Protection pumphouse drainage trench, Auxiliary Boiler Fuel Oil Storage Tank area, and the diesel fire pump fuel oil day tank areas. There can be leakage of sodium hypochlorite, which is added to the fire protection water as a biocide. Additional sources of leakage are distilled water condensing on the steam heater as well as lubricating and fuel oil from the diesel engines. Effluent from the fire pumphouse floor and hub drains, and the curbed area for the fuel oil day tank (Tank 35A) is collected and piped to Collection Sump #4. This sump is designed to contain a tank rupture. From there it is discharged to Oil/Water Separator Vault #3. Effluent from the curbed area around the fuel oil day tank (Tank 35B) drains to a separate sump which is also directly connected to Oil/Water Separator Vault #3.

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#### Alternate paths for this discharge:

• There are no planned alternate paths for this discharge

#### Potential chemicals in discharge:

- Residual Chlorine fire protection water leakage, sampling, and drainage
- Fuel oil leakage from diesel engine systems, trace amounts from filling and sampling activities at storage tanks
- Lubricating oil leakage from fire pump diesel engines and motors
- Ethylene Glycol leakage from fire pump diesel engine(s) coolant
- Domestic water constituents washing, hydrolazing, cooling water, fire protection water, potable water
- Groundwater constituents groundwater infiltration into sumps
- Rainwater constituents rainwater collection in sumps
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Cresol trace quantities form cleaning products, petroleum containing compounds
- Phenol trace quantities form cleaning products
- Sodium Hypochlorite chemical additive to Fire Protection water

#### **Proposed chemicals for future discharge:**

None currently identified

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for this outfall is 122,400 GPD.

Outfall 024 has a maximum capacity of 85 gpm (122,400 GPD). The average daily flow for this outfall over the period 2000 to 2004 is approximately 637 GPD (average of average monthly flows reported in DMRs).

#### **Discharge frequency:**

Outfall 024 is a batch discharge, occurring intermittently when the oil water/separator vault reaches the level setpoint. The discharge is treated as a continuous discharge as the discharges may occur many times over the period of a day.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Cresol Phenol Sodium hypochlorite
# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 025A**

### **Steam Generator Blowdown**

### <u>Discharge Information for Outfall 025(A)</u> (Steam Generator Blowdown)

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Bottoms fluid from the Blowdown Flash Tank is discharged directly to the Circulating Water System (Outfall 001) when the Steam Generator Blowdown Recovery sub system is unavailable (e.g. during regeneration and rinsing of the demineralizer beds), during plant start up and shut down, and when the quality of the effluent is unacceptable for reuse in the Condensate System.

#### **Discharge description:**

Outfall #025 is a combination of four discrete waste streams which are individually sampled to ensure compliance with NPDES Permit effluent limitations and monitoring requirements. The four outfall designations are as follows:

025A -Steam Generator Blowdown 025B -Steam Generator Blowdown Demineralizer Rinses 025C -Waste Holdup Sump 025D -Waste Test Tanks and Recovery Test Tanks

The following description is for 025A Steam Generator Blowdown only. Because portions of the other 025 outfalls interface with 025A, they are also briefly discussed. The Steam Generator Blowdown System removes suspended solids and dissolved impurities from the secondary side of the Steam Generators. Removal of these solids and impurities minimizes chemical deposition on the Steam Generator tube surfaces. This is important for limiting any reduction in the heat transfer capability (primary to secondary) of the plant and for reducing the rate of Steam Generator tube corrosion. A current overview drawing of the Steam Generator Blowdown System follows this description.

The Steam Generator Blowdown System also aids in limiting the buildup of radioactive isotopes in the Steam Generators if a primary to secondary leak occurs.

During refueling or extended outages, a portion of the Steam Generator Blowdown System is used in conjunction with the Steam Generator Recirculation and Wet Layup System to maintain the required chemistry control regime in the Steam Generators.

The major sub-systems in the Steam Generator Blowdown System are:

#### Steam Generator Blowdown System Flash Tank Subsystem :

This sub-system receives the effluent from the (four) Steam Generators. The blowdown fluid pressure is reduced from 1000 psig to 55 psig. Approximately 30% of the blowdown liquid is flashed to vapor in the Blowdown Flash Tank at this pressure. The distillate is then normally directed to the feedwater heater shell side for reuse in the Feedwater System. The remaining liquid (bottoms) is then cooled in the Blowdown Flash Tank bottoms coolers and normally directed to the Steam Generator Blowdown Recovery sub-system and then to the main condenser for reuse in the Condensate System.

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When the Blowdown Flash Tank distillate's normal flowpath to the feedwater heater shell side is unavailable, the vapor can either be released to the atmosphere, if it is of acceptable quality, or directed to the flash steam condenser/cooler. This condensate is then transferred to either the Waste Test Tanks (Outfall 025D) for discharge or to the main condenser for reuse in the Condensate System.

When the Steam Generator Blowdown Flash Tank bottoms recovery flowpath through the blowdown recovery subsystem is unavailable, the liquid can be discharged via the Circulating Water System (Outfall 001), if the quality is acceptable, or if unacceptable it will be directed to either the Blowdown Evaporation sub-system or to the Floor Drain Tanks.

#### Steam Generator Blowdown System Recovery Subsystem:

This sub-system receives the cooled fluid from the Blowdown Flash Tank bottoms coolers. The liquid is further cooled (maximum temperature 110°F) prior to being processed through the blowdown demineralizer skid. The demineralizer skid removes suspended solids and contaminants from the blowdown liquid. After the fluid leaves the demineralizer it is (normally) returned to the main condenser for reuse in the Condensate System. Otherwise it is directed to the Waste Holdup Sump (Outfall 025C) for discharge if the main condenser is unavailable.

#### Steam Generator Blowdown System Evaporation Subsystem:

This sub-system may be used when there is a primary to secondary leak in the Steam Generator tubes. The evaporators separate the potentially reusable distillate and simultaneously concentrate any contaminants in the evaporator bottoms liquid. The distillate is directed to the distillate cooler, where non-condensable gases are transferred to the equipment vent system for disposal. The condensate is accumulated and, if the conductivity is acceptable, will be sent to the main condenser. Otherwise it will be sent to the Waste Test Tanks or recirculated back to the evaporator for further processing. The bottoms product is concentrated in the bottom of the evaporator by recirculating it back to the evaporator inlet after it has been through the bottoms cooler. The concentrated liquid is periodically discharged to the Waste Concentrate Tank for further processing. If the evaporators are out of service, a valve line up can be manually performed to transfer the blowdown liquid to the Liquid Waste System. The Liquid Waste System evaporator would then process the Steam Generator blowdown liquid for transfer to the Waste Test Tanks (Outfall 025D) for discharge.

#### Steam Generator Blowdown System Startup

The Steam Generator Blowdown subsystems are lined up for operation concurrently with the reactor plant startup. After the Steam Generator pressures have increased, flow to the Blowdown Flash Tank is commenced. During startup, all the system controls and valve manipulations are done manually. Initial blowdown rates are set at maximum to establish, as rapidly as possible, the Steam Generator secondary water chemistry requirements. This blowdown flow is normally aligned directly to the Circulating Water System (Outfall 001) during plant start up. Once steady state conditions are established, controls are placed in automatic operation. Typically, during plant startup, the Blowdown Flash Tank vapor is aligned to the secondary system for reuse. Steam Generator blowdown liquid bottoms typically stay aligned to the Circulating Water System until the plant is at full power. The recovery system is normally placed in service after reaching full power.

The Blowdown Flash Tank subsystem operates automatically after startup is completed. The startup of the Steam Generator Blowdown Recovery Subsystem is manually accomplished. Prior to placing a demineralizer in service it is subjected to a pre-service rinse. The pre-service rinse water is directed to the Turbine Building sump which is processed by Oil/Water Separator Vault #1 (Outfall 022) and ultimately discharged to the Circulating Water System (Outfall 001). The Steam Generator blowdown liquid flow is then admitted to the demineralizers in the Steam Generator Blowdown Recovery Subsystem, and the effluent is normally returned to the Main Condenser for reuse in the Condensate System. The Steam Generator Blowdown Evaporation Subsystem may be manually started if radioactivity has been detected in the Blowdown Flash Tank Subsystem and further liquid processing is desired.

#### Normal Operation

The Steam Generator Blowdown subsystems processes are automatically controlled after the manual startup requirements have been fulfilled. Although subsystem processes are continuously monitored for radiation and conductivity levels, periodic sampling for chemical analysis is also required. A small quantity of the blowdown from each steam generator is drawn off automatically into the sample system for monitoring of the radioactivity and chemical parameters in the blowdown. This action ensures the quality of the Steam Generator blowdown effluent will support its reuse; unsatisfactory quality will necessitate storage and subsequent discharge. Normal system operation requires minimal operator attention. The operator monitors local parameters and corrects any undesirable conditions as they develop.

#### Steam Generator Blowdown System Shutdown

Typically the Steam Generator Blowdown System is removed from service only for maintenance or during a plant outage in which the the reactor is shut down and the primary system temperature is reduced to 350 °F or below. The bottoms of the Blowdown Flash Tank are normally directed to the Circulating Water System (Outfall 001) when the plant power level has been decreased to approximately 30%. The Steam Generator Blowdown System is normally shutdown when steam pressure in the Steam Generators decreases to below 50 psig. The system is shutdown by isolating all flow paths into and out of all subsystems.

The Steam Generator Blowdown Flash Tank Subsystem is filled with water, vented, and isolated if shutdown is for an extended duration. The Steam Generator Blowdown Recovery Subsystem is shutdown by isolating the subsystem and aligning the controls to shutdown.

The Steam Generator Blowdown Evaporation Subsystem is isolated and shutdown after the components and the discharge piping have been flushed with evaporator distillate. Demineralized water is used to flush the subsystem, evaporator demister pad, and to fill components to capacity. The subsystem is vented to ensure that filling of system components is completed. The subsystem controls are aligned for shutdown, any residual heat from the components will be dissipated to the building environment.

During a prolonged shutdown period such as a refueling outage, a portion of the Steam Generator Blowdown System piping is utilized for Steam Generator wet lay-up and recirculation. When the system is aligned to recirculate a Steam Generator, the blowdown flow path is used, but is isolated from the Blowdown Flash Tank. This flow path functions as the supply path to the Steam Generator Wet Layup System. The return path from the Steam Generator Wet Layup System to the Steam Generator is through the Emergency Feedwater/Feedwater Systems. This alternate flow path can also be used during a refueling or maintenance outage to drain a Steam Generator. Steam Generator drainage can directed to the Turbine Building sump for processing by Oil/Water Separator Vault #1 (Outfall 022), the Storm Drain System, the Waste Holdup Sump (Outfall 025C) or the Waste Liquid processing system (Outfall 025D) prior to discharge to the Circulating Water System (Outfall 001).

#### Demineralizer Regeneration

Support equipment is needed to regenerate the resin beds in the demineralizers. The regeneration equipment consists of an Acid Skid, a Caustic Skid and the Waste Holdup Sump (Outfall 025C). The Acid Skid is used to reactivate the Cation (positive ion) resin beads within the mixed-bed demineralizers and the lead cation demineralizer. The Caustic Skid reactivates the Anion (negative ion) resin beads within the mixed-bed demineralizers. The regeneration waste water is directed to the Waste Holdup Sump. The Waste Holdup Sump liquid is discharged to the Waste Liquid System which is discharged to the Circulating Water System (Outfall 001). Manual startup of this process is needed to initiate the regeneration cycle. After the process is started the remainder is normally automatically sequenced. The entire regeneration process can be manually controlled. Interlocks ensure that only one mixed-bed demineralizer is regenerated at a time. Interlocks will also stop the regeneration cycle if there is not enough Acid or Caustic available to complete a cycle or if the level in the Waste Holdup Sump is above a setpoint level.

Upon completion of the regeneration the demineralizer resin beds are rinsed with Steam Generator blowdown water or demineralized water. The rinse water is sampled to ensure compliance with the NPDES Permit effluent limitations and monitoring requirements for Outfall 025B. The rinse water is ultimately directed to Outfall 001. Before the demineralizer beds are placed in service, a pre-service rinse of the beds is performed with the waste water being directed to the Turbine Building Sump. The pre-service rinse water is processed by Oil/Water Separator Vault #1 (Outfall 022). Upon completion of the pre-service rinse the demineralizer is placed in service with its discharge directed to the main condenser for reuse in the Condensate System.

#### Alternate paths for this discharge:

- Waste Holdup Sump (025C)
- Waste Test Tank (s) (025D)
- Turbine Building Sump
- Storm Drains (if no beta/gamma radioactivity detected)
- Auxiliary Turbine Building Sump (holding only not discharged)
- Unit II Circulating Water System forebay (holding only not discharged)

#### Potential chemicals in discharge:

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), Steam Generator drainage
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage
- Hydrazine Secondary chemical additive, Steam Generator drainage
- Suspended solids particulates from all inputs
- Ethanolamine Secondary chemical additive, Steam Generator drainage
- Morpholine Seocndary chemical additive, Steam Generator soak agent
- Acetaldehyde potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile potential breakdown product of methoxypropylamine, all sources of methoxypropylamine

#### Proposed chemicals for future discharge:

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- EDTA Steam Generator cleaning agent
- Diethylhydroxylamine Secondary chemical additive
- Carbohydrazide Secondary chemical additive
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

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#### Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylene diamine Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for Outfall 025 is 425,000 GPD.

The maximum capacity for the Steam Generator Blowdown flow rate is approximately 100 gpm from each of the four Steam Generators. This flowrate represents total flow from each Steam Generator. The Blowdown Flash Tank liquid bottoms are discharged at a rate of approximately 70 gpm to the Circulating Water System (Outfall 001). The Blowdown Flash Tank distillate is returned to the secondary system at a rate of approximately 30 gpm. These maximum flowrates would normally be used only during plant startups, shutdowns or chemical upsets.

The actual average flow from Outfall 025A for the period 2000 - 2004 is 81,075 GPD.

#### **Discharge frequency:**

Outfall 025A is a continuous discharge which is initiated on an intermittent basis. The Steam Generator Blowdown discharge is performed when the Steam Generator Blowdown System Recovery Subsystem is unavailable, also during plant startup and shutdown evolutions and when the quality of the Steam Generator Blowdown Flash Tank bottoms liquid is unacceptable for reuse in the Condensate System. The discharge duration may range from a very short duration to a week or more on a continuous basis.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Diethylamine Dimethylamine Monoethylamine Triethanolamine Triethylamine Acetaldehyde Acetic acid Acrylonitrile

### Outfall 025A, p. 6

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 025B**

## Steam Generator Blowdown Rinses

### Discharge Information for Outfall 025(B) (Steam Generator Blowdown Rinses)

EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Rinse water from Steam Generator Blowdown demineralizer rinses. Rinse water is directed from the effluent of the demineralizer(s) to either the Waste Holdup Sump (Outfall 025C), the Turbine Building sump or directly to the Circulating Water System (Outfall 001). These rinses are required following regenerations of the demineralizer beds or for pre-service rinses of the demineralizer beds. The rinse water source may either be Steam Generator Blowdown water or demineralized water.

#### **Discharge description:**

Outfall #025 is a combination of four discrete waste streams which are individually sampled to ensure compliance with NPDES Permit effluent limitations and monitoring requirements. The four outfall designations are as follows:

025A -Steam Generator Blowdown

025B -Steam Generator Blowdown Demineralizer Rinses

025C -Waste Holdup Sump

025D -Waste Test Tanks and Recovery Test Tanks

The following description is for 025B Steam Generator Blowdown Demineralizer Rinses only. Because portions of the other 025 outfalls interface with 025B, they are also briefly discussed.

This discharge consists of rinse water used to remove impurities from the demineralizers prior to their use for Steam Generator blowdown recovery. The demineralizer impurities result from the regeneration of the resins with sulfuric acid and sodium hydroxide. The acid is used to reactivate the cation (positive ion) resin beads within the mixed-bed and cation bed demineralizers. The caustic reactivates the anion (negative ion) resin beads in the mixed-bed demineralizers. Manual startup of this process is required to initiate the regeneration cycle. After the process is started, the remainder is normally automatically sequenced. The entire regeneration process can be manually controlled.

Upon completion of the regeneration the demineralizer resin beds are rinsed with Steam Generator Blowdown Flash Tank bottoms liquid water or demineralized water. The rinse water is sampled to ensure compliance with the NPDES Permit effluent limitations and monitoring requirements. The rinse water is normally directed to Outfall 001. Before the demineralizer beds are placed in service, a pre-service rinse of the beds is performed with the waste water being directed to the Turbine Building Sump. The pre-service rinse water is processed by Oil/Water Separator Vault #1 (Outfall 022). Upon completion of the preservice rinse the demineralizer is placed in service with its discharge directed to the main condenser for reuse in the Condensate System.

#### Alternate paths for this discharge:

Waste Holdup Sump (025C)

- Waste Test Tank(s) (025D)
- Turbine Building Sump
- Auxiliary Turbine Building Sump (holding only not discharged)
- Unit II Circulating Water forebay (holding only not discharged)

#### Potential chemicals in discharge:

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine) Steam Generator drainage
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage
- Hydrazine Secondary chemical additive, Steam Generator drainage
- Suspended solids particulates from all inputs
- Ethanolamine Secondary chemcical additive, Steam Generator drainage.
- Sulfuric Acid trace levels remaining form demineralizer regeneration process
- Sodium Hydroxide trace levels remaining form demineralizer regeneration process
- Morpholine Secondary chemical additive, Steam generator soak agent
- Acetaldehyde potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile potential breakdown product of methoxypropylamine, all sources of methoxypropylamine

#### Proposed chemicals for future discharge:

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- Diethylhydroxylamine Secondary chemical additive
- EDTA Steam Generator cleaning agent
- Carbohydrazide Secondary chemical additive, Primary Component Cooling Water sytem additive
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

#### Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylamine

#### Outfall 025B, p. 2

Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for Outfall 025B is 210,000 GPD. When the Steam Generators are used to supply demineralizer rinse water, the maximum demineralizer rinse flowrate is 140 gpm. When demineralized water is used to supply demineralizer rinse water the flowrate is lower.

The actual average flow from Outfall 025B for the period April 2002 – 2004 is 44,755 GPD.

#### **Discharge frequency:**

Outfall 025B is a continuous discharge which is initiated on an intermittent basis. The duration of the Steam Generator Blowdown rinses may range from a very short duration to a day or more on a continuous basis.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Diethylamine Dimethylamine Monoethylamine Triethanolamine Triethylamine Soduium Hydroxide Sulfuric Acid Acetaldehyde Acetic acid Acrylonitrile

Outfall 025B, p. 3

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 025C**

## Waste Holdup Sump

### <u>Discharge Information for Outfall 025(C)</u> (Waste Holdup Sump)

EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. SectionV, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

- Rinse water from demineralizer flushes. Rinse water is directed from the effluent of the demeralizer(s) to either the Waste Holdup Sump or directly to the Circulating Water System (Outfall 001). These rinses are required following regeneration of the demineralizer beds or pre-service rinses of the demineralizer beds. The rinse water source may be Steam Generator Blowdown water or demineralized water.
- Fluid used during the regeneration of the demineralizer beds. The fluid is directed into the Waste Holdup Sump and then discharged to the Waste Liquid System which discharges to the Circulating Water System (Outfall 001). This wastewater contains acid and caustic wastes from the regeneration process as well as ionic constituents present on the resin from loading.
- Drainage from the Steam Generator Blowdown System Recovery Subsystem room drains. This may include acid and caustic waste from system leakage and drainage for maintenance, eyewash drains from the room containing demineralized water and biocide, Steam Generator water from system component leakage, sample system drains, and floor wash water.
- Drainage from nearby systems for maintenance outages may also be directed to the Waste Holdup Sump. These include drainage from ocean water systems, the Primary Component Cooling Water System, the Potable Water System, and the Demineralized Water System.
- Drainage of the Steam Generators may also be directed to this sump if other paths are not available.
- Auxiliary Steam System relief valves

#### **Discharge description:**

Outfall #025 is a combination of four discrete waste streams which are individually sampled to ensure compliance with NPDES Permit effluent limitations and monitoring requirements. The four outfall designations are as follows:

025A - Steam Generator Blowdown
025B - Steam Generator Blowdown Demineralizer Rinses
025C - Waste Holdup Sump
025D - Waste Test Tanks and Recovery Test Tanks

The following description is for 025C Steam Generator Blowdown Waste Holdup Sump only. Because portions of the other 025 outfalls interface with 025C, they are also briefly discussed.

Outfall 025C, p. 1

Support equipment is needed to regenerate the resins in the Steam Generator Blowdown System recovery subsystem demineralizers. The basic regeneration equipment consists of an Acid Skid, a Caustic Skid and the Waste Holdup Sump.

Sulfuric acid is used to reactivate the Cation (positive ion) resin beads within the mixed-bed demineralizers and the lead cation bed demineralizer. Sodium hydroxide is used to reactivate the Anion (negative ion) resin beads within the mixed-bed demineralizers. Following a cation bed regeneration, the contents of the sump may be acidic with pH less than 2. The Waste Holdup Sump transfers liquids to the Waste Liquid System for direct discharge to the Circulating Water System (Outfall 001) or to either of the Chemical Drain Treatment Tanks which are directed to the Waste Test Tanks (Outfall 025D). Manual startup of this process is needed to initiate the regeneration cycle. After the process is started the remainder is automatically sequenced. The entire regenerated at a time. Interlocks will also stop the regeneration cycle if there is not enough acid or caustic available to complete a cycle, or if the level in the Waste Holdup Sump is above a setpoint level.

The Steam Generator Waste Holdup Sump is a 30,000 gallon sump designed to contain fluids from the regeneration of the demineralizer beds. It is a concrete sump lined with Plasite<sup>™</sup> liner. The sump also captures some of the floor drains from the demineralizer room. The sump is normally directed to the Waste Liquid System for direct discharge to the Circulating Water System. It is sampled once prior to or during batch discharge for oil and grease and total suspended solids. The relatively low flow volume of the discharge and the buffering action of the seawater ensures that all pH limits at Outfall 001 are met. The sump may also be discharged to the Chemical Drain Treatment Tanks which are directed to the Waste Test Tanks. There is a recirculation system on the sump which allows for mixing and sampling prior to discharge. This recirculation system also contains components which remove larger suspended solids. The maximum discharge rate for the Waste Holdup Sump is 75 gpm.

#### Alternate paths for this discharge:

- Waste Test Tank(s) (025D)
- Turbine Building Sump
- Storm Drains (if no beta/gamma radioactivity detected)
- Turbine Building Auxiliary Sump (holding only no discharge)

#### Potential chemicals in discharge:

 Any chemicals listed in outfalls Steam Generator Blowdown (025A) and Steam Generator Blowdown demineralizer Rinses (025B)

Note: Some of the chemicals listed below are also listed in outfalls 025A and 025B. They are listed below because they are also directly discharged into this outfall.

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), Primary Component Cooling water drainage, Steam Generator drainage, sample system waste, trace quantities from silica analyzer cleaning
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Hydrazine Secondary chemical additive, Steam Generator drainage, Primary Component Cooling Water System drainage, sample system waste
- Suspended solids particulates from all potential inputs
- Ethanolamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Total Residual Chlorine Ocean cooling water system leakage and drainage, fire protection water
- Diisopropylamine trace quantities from sodium analyzer drains

Outfall 025C, p. 2

- Sodium Hydroxide Regeneration of demineralizer beds, leakage from caustic skid, drainage of system components for maintenance
- Sufuric Acid Regeneration of demineralizer beds, leakage from acid skid, drainage of system components for maintenance
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Morpholine Secondary chemical additive, Steam Generator soak agent
- Acetaldehyde potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Cresol trace quantities from cleaning products
- Phenol trace quantities from cleaning products
- Sodium Hypochlorite Chemical additive to fire protection system, Circulating Water system, Service Water system, and cleaning solutions
- Morpholine Steam generator drainage, secondary system leakage and drainage
- Citric Acid trace quantities from silica analyzer drains
- Silica standard (500ppb) trace quantities from calibration of silica analyzers
- Ammonium Molybdate trace quantities from silica analyzer drains
- Amino Acid trace quantities from silica analyzers
- Styrene potential from resin degredation
- Epichlorohydrin very limited potential from rinses of new resins
- Sodium Fluoride trace quantities from sodium analyzer cleaning

#### Proposed chemicals for future discharge:

• Any chemicals listed in outfalls Steam Generator Blowdown (025A) and Steam Generator Blowdown demineralizer Rinses (025B)

Note: Some of the chemicals listed below are also listed in outfalls 025A and 025B. They are listed below because they are also directly discharged into this outfall.

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1.2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino.2-methylpropanol Secondary chemical additive
- (authorized for discharge in current NPDES Permit at .1 ppm)
- EDTA Steam Generator cleaning agent
- Carbohydrazide- Secondary chemical additive, Primary Component Cooling Water system additive
- Diethylhydroxylamine- Secondary chemical additive
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

Outfall 025C, p. 3

#### Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylene diamine Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

#### Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for Outfall 025C is 60,000 GPD. The actual average flow from Outfall 025C for the period April 2002 – 2004 is 14,107 GPD.

#### **Discharge frequency:**

Outfall 025C is a batch release which occurs on an intermittent basis. The Waste Holdup Sump is recirculated and discharged as a batch when necessary. Several batch discharges may occur during a week. More than one Waste Holdup Sump discharge per day is infrequent.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Monoethylamine Sulfuric acid Sodium Hydroxide Styrene Triethanolamine Triethylamine Phenol Sodium fluoride Epichlorohydrin Acetaldehyde Acetic acid Acrylonitrile

Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

### **Outfall 025D**

# Waste Test Tanks and Recovery Test Tanks

### Discharge Information for Outfall 025(D) (Waste Test Tanks and Recovery Test Tanks)

EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

- Distillate from the Blowdown Flash Tank that is directed to the Flash Steam Condenser/Cooler and then to the Waste Test Tanks (Outfall 025D). This path is only used when there is a primary to secondary system leak.
- Bottoms fluid from the Blowdown Flash Tank which is directed to the Evaporators. The distillate from the Evaporators is directed to the Distillate Condenser and then to the Waste Test Tanks. This flow path is used when the conductivity of the liquid is unacceptable for reuse.
- Chemical Drain Tank. This tank receives inputs from laboratory drains, some floor drains, decontamination sink drains, and machine shop decontamination area drains.
- Chemical Drain Treatment Tanks. These tanks receive inputs form the Chemical Drain Tanks.
- Floor Drains Tanks. These tanks receive inputs from most of the Radiologically Controlled Area floor drains and sumps, Chemical Drain Treatment Tanks, Boron Waste Storage Tanks and Recovery Test Tanks.
- Boron Waste Storage Tanks. These tanks receive inputs from the Primary Drain Tank, Primary Drain Tank Degassifier, Letdown System degassifier, and the Spent Fuel Pool Cooling System.
- Recovery Test Tanks. These tanks receive inputs from the Steam Generator Blowdown System Recovery Subsystem evaporators and Waste Liquid System evaporators.
- Bottoms fluid from the Blowdown Flash Tank is directed to the Flash Tank Distillate Pump and then to the Waste Test Tank during either startup or shutdown when the Steam Generator pressure is below 55 psig.

#### **Discharge description:**

Outfall #025 is a combination of four discrete waste streams which are individually sampled to ensure compliance with NPDES Permit effluent limitations and monitoring requirements. The four outfall designations are as follows:

025A -Steam Generator Blowdown 025B -Steam Generator Blowdown Demineralizer Rinses 025C -Waste Holdup Sump 025D -Waste Test Tanks and Recovery Test Tanks

The following description is for 025D Waste Test Tanks and Recovery Test Tanks only. Because portions of the other 025 outfalls interface with 025D, they are also briefly discussed.

The Waste Test Tanks (Outfall 025D) receive inputs from many sources. Floor drains that are located within the Radiologically Controlled Area are directed to the Waste Test Tanks (with a few exceptions). Most of the inputs to the tanks are normally processed through a vendor treatment system normally consisting of filtration and demineralization. Reverse Osmosis capability is also provided and operated intermittently when necessary. Other plant equipment for waste solidification and liquid waste treatment is not currently being used and there are no plans for use in the future. The Waste Test Tanks are discharged

through the Waste Liquid System to the Circulating Water System (Outfall 001). The tanks have recirculation capability and are limited to a discharge rate of 150 gpm by pump design capacity.

The Recovery Test Tanks may receive inputs from the same sources as the Waste Test Tanks as well as the Steam Generator Blowdown System Recovery Subsystem evaporators and Waste Liquid System evaporators. These tanks may also be discharged through the Waste Liquid System to Outfall 001. The Recovery Test Tanks also have recirculation capability and a maximum discharge rate of 150 gpm by pump design capacity.

#### Alternate paths for this discharge:

None planned

#### Potential chemicals in discharge:

 Any chemicals listed in outfalls Steam Generator Blowdown (025A), Steam Generator Blowdown demineralizer Rinses (025B), and Waste Holdup Sump (025C)

### Note: Some of the chemicals listed below are also listed in outfalls 025A, 025B, and 025C. They are listed below because they are also directly discharged into this outfall.

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), sample system drainage, Primary Component Cooling Water system leakage and drainage
- Methoxypropylamine Secondary chemical additive, sample system drainage
- Hydrazine Secondary chemical additive, sample system drainage, drainage and leakage from Primary Component Cooling Water System
- Ethanolamine Secondary chemical additive, sample system drainage
- Residual Chlorine Ocean cooling water system leakage and drainage, Fire Protection System water
- Diisopropylamine trace quantities from sodium analyzer drainage
- Potassium Chloride trace quantities used in calibration of conductivity instrumentation
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Groundwater constituents various vaults/plant areas where groundwater in-filtration occurs
- Rainwater constituents rainwater that collects in vault areas
- Ethylene Glycol potential leakage from building heating and cooling systems
- Suspended solids particulates from all potential inputs
- Lubricating oils oils used in many system pumps
- Sodium Fluoride trace quantities from sodium analyzer cleaning
- Laboratory chemicals and samples Samples and reagent chemicals used in analytical methods. A subset of these samples and chemicals is hazardous by pH characteristic and are discharged pursuant to a Hazardous Waste Limited Permit for Elementary Neutralization.
- Boric Acid chemical additive utilized in primary system to control the fission process
- Lithium Hydroxide chemical additive utilized in primary system for pH control
- Hydrogen Peroxide- chemical additive utilized in primary system, also used for Total Organic Carbon destruction in liquid waste systems and sumps
- Morpholine Secondary chemical additive, Steam Generator soak agent
- Acetaldehyde potential breakdown product of ethanolamine
- Acetic Acid potential breakdown product of ethanolamine
- Diethylamine potential breakdown product of ethanolamine
- Dimethylamine potential breakdown product of ethanolamine
- Monoethylamine potential breakdown product of ethanolamine
- Monomethylamine potential breakdown product of ethanolamine
- Triethanolamine potential breakdown product of ethanolamine
- Trimethylamine potential breakdown product of ethanolamine

Outfall 025D, p. 2

- Acrylonitrile potential breakdown product of methoxypropylamine
- Cresol trace quantities from cleaning products
- Phenol trace quantities from cleaning products
- Epichlorohydrin very limited potential from rinsing of new resins
- Cat Floc TL flocculant used in the radwaste system to facilitate removal of radioisotopes
- Cat Floc L flocculant used in the radwaste system to facilitate removal of radioisotopes
- Nalcolyte 7134 flocculant used in the radwaste system to facilitate removal of radioisotopes
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- DC-13 Cleaning product used in Radiologically Controlled Area

The following Bulk Chemicals, Process Chemicals and Lab Chemicals are proposed for addition to NPDES Permit, Attachment C. The Lab Chemicals identified below supercede those identified in FPL Energy Letter dated September 20, 2004.

#### Bulk Chemicals:

- GOSH NRC as a non EDTA containing alternative cleaner to DC-13 in the Radiologically Controlled Area, 25lbs/yr
- ECOgent as a non EDTA containing alternative cleaner to DC-13 in the Radiologically Controlled Area, 25lbs/yr
- Durasolution as a non EDTA containing alternative cleaner to DC-13 in the Radiologically Controlled Area, 25lbs/yr
- D-Bact as a non EDTA containing alternative respirator sanitizer to MSA Confidence Plus in the Radiologically Controlled Area, 25lbs/yr
- D-Lead as a non EDTA containing alternative respirator detergent to MSA Confidence Plus in the Radiologically Controlled Area, 25lbs/yr

#### **Process Chemicals:**

- Sulfuric Acid for Reverse Osmosis Membrane pH control, 50lbs/yr.
- Hydrogen Peroxide increase to 50lbs/yr and the frequency to batch 2/M for Total Organic Carbon destruction in Radiologically Controlled Area sumps.
- KLEEN MCT511 by GE Betz for Reverse Osmosis Membrane Cleaning, 10lbs/yr, batch 2/month
- KLEEN MCT103 by GE Betz for Reverse Osmosis Membrane Cleaning, 10lbs/yr, batch 2/month
- Sodium Metabisulfite Storage Solution for Reverse Osmosis Membrane Layup, 10lbs/yr, batch 2/month

#### Lab Chemicals:

The following HACH Reagents will be only used in deminimus quantities when optimizing or troubleshooting the radioactive liquid waste processing system. Actual quantities used on an annual basis will be less than a few hundred gms per Reagent.

- HACH Dissolved Oxygen Reagent (Cat ID 2515025)
- HACH Hydrazine Reagent (Cat ID 2524025)
- HACH Free Ammonia Reagent (Cat ID 2877336)
- HACH Monochlor F Reagent (Cat ID 2802299)
- HACH TPTZ Iron Reagent (Cat ID 2608799)
- HACH Acid Reagent (Cat ID 2107469)
- HACH Detergent Reagent (Cat ID 100868)
- HACH Benzene Reagent (Cat ID 1444017)
- HACH Buffer Solution, Sulfate Type (Cat ID 45249)

Outfall 025D, p. 3

#### **Proposed chemicals for future discharge:**

• Any chemicals listed in outfalls Steam Generator Blowdown (025A), Steam Generator Blowdown demineralizer Rinses (025B), and Waste Holdup Sump (025C)

Note: Some of the chemicals listed below are also listed in outfalls 025A, 025B, and 025C. They are listed below because they are also directly discharged into this outfall.

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- EDTA Steam Generator cleaning agent
- Diethylhydroxylamine Secondary chemical additive
- Zinc Acetate Primary chemical additive
- Carbohydrazide Secondary chemical additive and Primary Component Cooling Water System additive
- Steam Generator scale conditioning agents containing one, or more, lower alkyl amines and/or lower alkanol amines, combined with one, or more cyclic imines. These Steam Generator scale conditioning agents may be used during outages. The scale removal process employs the use of a vendor demineralizer skid which is expected to remove all but trace quantities of these chemicals.

#### Potential alkyl amines and alkanol amines:

1,2- Diamino ethane Diamino propane Diethylamine Dimethylamine Ethanolamine Ethylamine Ethylene diamine Methoxy propylamine Methylamine 2-methyl-2-amino-1-propanol

Potential cyclic imines:

Bis-terpyridine 2,9-Dimethyl-1,10-phenanthroline 4,7-Dimethyl-1,10-phenanthroline 2,2'-Dipyridyl 4,4'-Dipyridyl Iso-nicoteine 1,10-phenanthroline Terpyridine

#### Maximum daily flow:

The current NPDES Permit maximum daily flow limit for Outfall 025D is 100,000 GPD. The actual average flow from Outfall 025D for the period April 2002 – 2004 is 16,424 GPD.

#### **Discharge frequency:**

Outfall 025D is a batch discharge which occurs on an intermittent basis. The Waste Test Tank or Recovery Test Tank is recirculated and discharged as a batch when necessary. Several batch discharges may occur during a week. More than one Waste Test Tank or Recovery Test Tank discharge per day is occasionally performed.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Acetic Acid \* Ammonia Ammonium chloride \* Ammonium fluoride \* Ammonium hydroxide \* Antimony trioxide \* Cresol Diethylamine Dimethylamine Epichlorohydrin Monoethylamine Phenol Phosphoric Acid \* Potassium Permanganate \* Sodium bifluoride \* Sodium bisulfite \* Sodium fluoride \* Sodium hydroxide \* Sodium phosphate Sulfuric acid \* Toluene \* Triethanolamine Triethylamine Acetaldehyde Acrylonitrile

\* laboratory products used in deminimus quantities

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## Outfall 026

## **Chemical Cleaning Waste**

### Discharge Information for Outfall 026 (Chemical Cleaning Wastes)

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies

Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V. Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Treated chemical cleaning wastes from either stationary or portable treatment facilities. These facilities may be used to facilitate cleaning of plant systems or components. Chemical cleaning may be performed on non-metallic as well as metallic systems.

#### **Discharge description:**

A specific chemical cleaning waste discharge description is not provided in this NPDES Permit renewal application as there are no specific plans to perform a chemical cleaning operation at this time. The current NPDES Permit requires that the EPA Regional Administrator and the Director of the New Hampshire Department of Environmental Services be notified at least 72 hours prior to the discharge of chemical cleaning wastes from stationary or portable facilities. This notification must identify the chemicals to be used, an estimate of the duration of the operation and the point or location of wastewater release into the discharge tunnel.

The types of chemical cleaning activities vary widely with application. The chemicals used in the processes will depend upon a number of variables including: environmental impact, system materials, fouling characteristics, availability of materials, residual affects on materials, operational considerations, and other factors. The discharge is from equipment that is designed to perform a chemical cleaning operation on plant components and systems. This discharge is not applicable to the use of janitorial cleaning products used in maintaining general plant cleanliness.

The discharge of wastes from chemical cleaning equipment is ultimately discharged to Outfall 001. Sampling and monitoring requirements may vary dependent on the application and chemicals that are used.

#### Alternate paths for this discharge:

• No alternate paths anticipated

#### Potential chemicals in discharge:

• Varies with application

#### Maximum daily flow:

The current NPDES Permit flow limit for Outfall 026 is 450,000 GPD. No change in the current NPDES Permit is proposed.

### **Discharge frequency:**

Outfall 026 is normally a batch discharge which occurs on an intermittent basis. A discrete batch of the wastewater would be discharged after applicable monitoring requirements and effluent limitations had been met.

#### **Proposed chemicals for future discharge:**

• Varies with application

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Varies with application

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

### Outfall 027

## **Cooling Tower Discharge**

### <u>Discharge Information for Outfall 027</u> (Cooling Tower Discharge)

EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

Cooling Tower discharges include the following evolutions. Each of the following discharges are sampled to ensure compliance with the effluent limitations and monitoring requirements of the NPDES Permit.

- Cooling Tower blowdown primarily potable water with some seawater present. Chemicals introduced include sodium hypochlorite for biological fouling control and sodium silicate as a scale inhibitor. Blowdown may be performed to reduce the salinity and/or total dissolved solids in the Cooling Tower to maintain heat transfer capabilities.
- Cooling Tower discharges other discharges of Cooling Tower water occur when Service Water System cooling is swapped from the ocean water supply to the Cooling Tower, and upon return to the ocean water supply.

#### **Discharge description:**

The Cooling Tower (part of the Service Water System) is designed to provide cooling water to plant systems. During normal operating conditions, extended use of the Cooling Tower is infrequent. Normally, the cooling water for plant systems is supplied by the ocean Service Water pumps, however on occasion the Cooling Tower is placed in service providing the cooling water supply. The Seabrook Station Operating License requires the Cooling Tower be placed in service on a quarterly basis to verify that the cooling water supply can be aligned to the safety-related source of cooling water provided by the Cooling Tower. This evolution occurs approximately every six weeks because each of the two Cooling Tower water trains must be tested each quarter. The Cooling Tower may also be operated to allow maintenance to be performed on the ocean cooling water pumps or during winter months to warm the fresh water supply in the tower basin. The Cooling Tower provides a safety-related source of cooling water supply is unavailable due to collapse and blockage of the cooling water tunnels. During accident conditions involving the unavailability of the ocean cooling water supply, the Cooling Tower would supply cooling water to plant systems that are required for safe shutdown. The entire Cooling Tower is constructed over a storage basin that contains 3,900,000 gallons of fresh water (primarily). This volume of water is sufficient to dissipate the design heat loads for seven days without the addition of makeup to the basin

The Cooling Tower is comprised of a storage basin, two centrifugal pumps, three fans, a spray header and associated piping and components. The system pumps provide flow through the plant heat exchangers to remove heat. Heated water is returned to the Cooling Tower and is discharged through a spray header. The spray headers form a horizontal grid and are situated directly above the ceramic fill in the Cooling Tower. The ceramic fill is composed of brick-like clay tiles built up in layers supported by cast iron lintels. Each tile has vertically oriented, square holes which, when the tiles are layered, form thousands of offset, cascade water paths through the fill. The cascade water paths provide even distribution and increased fill surface area, which enhances the cooling process. As the heated water passes downward through the fill, an induced flow of cooling air passes upward through the fill. The heat in the service water is transferred to the air flowing in the opposite direction. The cooled service water falls into the storage basin and is ready to repeat the cycle. The heated air is expelled via the Cooling Tower fan velocity stacks on top of the structure. Some water droplets are entrained into this air flow, but are significantly removed by a series of mist eliminators limit carryover to 0.03%.



Normal makeup water is supplied from the Potable Water System. Water may also be supplied from other sources if potable water is not available or a more rapid makeup is desired. Some other sources include: seawater from the forebays, fire protection main water, water from the Brown's river, seawater from Hampton Harbor, or any other onsite water that may be available for use in an emergency.

Although the Cooling Tower can operate on seawater, it is prudent to maintain the salinity and total dissolved solids of the basin water as low as possible during normal operation. The normal total dissolved solids level of the Cooling Tower water is 3000 - 5000 ppm (compared to seawater at 35,000 ppm). This is accomplished by aligning the Cooling Tower water discharge path to Outfall 001 for a period of time when first placing the system in operation. This action flushes seawater from the system piping before returning the discharge to the Cooling Tower. When the Cooling Tower is removed from service, the Cooling Tower water that is trapped in the Service Water System piping is displaced by seawater and discharged to Outfall 001. The evolution of placing the tower in service, and removing it from service, typically results in a discharge of between 50,000 to 200,000 gallons of Cooling Tower water.

Cooling Tower blowdown is a discharge of a volume of the Cooling Tower water inventory to Outfall 001, specifically intended on reducing water level in the basin. This blowdown is typically performed to reduce tower salinity and/or total dissolved solids following extended operation. The reduction in these parameters occurs due to the makeup of fresh water to the system. Blowdown may also be performed to prevent overflow of the basin if the Cooling Tower water level reaches a high level such as the result of a series of rainfall events.

Cooling Tower water is treated to minimize biofouling and scaling of the system components. Sodium hypochlorite is normally added to the Cooling Tower during summer months to inhibit biological growth. A silica based antiscalant is also added to minimize scaling in the Cooling Tower. The anti-scalant is added on an as-needed basis as determined by basin water sampling.

#### Alternate paths for this discharge:

• No alternate paths anticipated

#### Potential chemicals in discharge:

- Total Residual Chlorine ocean water system input, Fire Protection System water from fill
- Sodium Hypochlorite added to inhibit biological growth, seawater input, Fire Protection System water input
- Domestic water constituents primary fill media, fire protection, washing, hydrolazing
- Rainwater constituents rainwater that collects in open basin
- Suspended solids- all potential inputs to the cooling tower
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Sodium Silicate- scale inhibitor additive

#### **Proposed chemicals for future discharge:**

None anticipated

#### **Maximum daily flow:**

The current NPDES Permit does not contain a flow limit for Outfall 027. Average flows for Outfall 027 during the period April 2002 thru 2004 are 85,276 GPD. When placing the Cooling Tower in service and when removing the Cooling Tower from service approximately 50,000 to 200,000 gallons of Cooling Tower water is discharged to Outfall 001. In the event that the Cooling Tower is operated for an extended period, necessitating a blowdown evolution it is estimated that approximately 500,000 gallons of Cooling Tower may be discharged.

#### **Discharge frequency:**

Outfall 027 is considered a continuous discharge which occurs on an intermittent basis. Cooling Tower discharges may occur for a short period of time such as during swapover or a significant period of time during a blowdown following extended Cooling Tower operation.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Sodium Hypochlorite

Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

### **Outfall 28A**

# Condensate Polishing System (CPS) Neutralization Tank

### Discharge Information for Outfall 028A CPS Neutralization Tank

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

- Fluid used during the regeneration of the Condensate Polisher demineralizer beds. The fluid is directed into the neutralization tank and then discharged to the Circulating Water System (Outfall 001). This wastewater contains acid and caustic wastes from the regeneration process as well as ionic constituents present on the resin from loading.
- Rinse water from the Condensate Polisher demineralizers. Rinse water may be directed from the effluent of the demeralizer(s) to the neutralization tank. These rinses are required following regeneration of the demineralizer beds or pre-service rinses of the demineralizer beds. The rinse water source is demineralized water.
- System drainage for maintenance activities. Regeneration system components may be drained for maintenance activities. System drain water could contain acid and caustic as well as low levels of amines from vessels and piping. If maintenance needs to be performed on the Sodium Hydroxide or Sulfuric Acid tanks, their fluids may also be drained to this neutralization tank. Acid and caustic waste is neutralized to a pH of between 2 and 12.5 prior to discharge.
- The Leased Makeup Water Treatment System (LMWTS) cleaning wastes are also directed into the neutralization tank. Cleaning is typically performed using Sodium Hydroxide and Sulfuric Acid and the wastes are generally neutralized in the water treatment system prior to discharge into the neutralization tank. Other infrequently used cleaning agents include Hydrogen Peroxide, Sodium Hypochlorite, and Sodium Chloride.

#### **Discharge description:**

The CPS was completed and initially operated in 2005 during the term of the current NPDES Permit as documented in the renewal application for the current NPDES Permit submitted in April 1998. It is an integral part of the Condensate System. The CPS is designed to remove dissolved and suspended impurities from the Condensate System that can cause corrosion and fouling of secondary components. The system is normally maintained in a standby condition and is placed in operation to remove secondary system contaminants to support plant start up or to remove impurities introduced by a condenser tube leak.

The basic system design consists of cation resin vessels, mixed bed resin vessels, pumps and associated equipment, and an external resin regeneration and waste processing system. The CPS is designed to accommodate approximately one third of the total condensate flow. The resin vessels remove the ionic constituents from the condensate system including the amines used for secondary chemistry control. The auxiliary regeneration and waste system is used to regenerate the resin for re-use and to discharge the regeneration and rinsate wastes. Sodium Hydroxide and Sulfuric Acid are used as regenerant chemicals.

The discharges from the CPS System include: rinses of the system in support of plant start-up, periodic rinses during standby conditions, rinses of the resin vessels following regenerations, regeneration wastewater, sampling system and grab sample waste, system leakage, and system drainage for maintenance.

The CPS regenerant waste is collected in the neutralization tank and sampled prior to discharge. The tank volume is 32,000 gallons. The neutralization tank is recirculated via pumps installed in the tank and an eductor system to facilitate mixing. The tank is discharged at a maximum rate of 300gpm.

#### Alternate paths for this discharge:

None anticipated.

#### Potential chemicals in discharge:

• Any chemicals identified in CPS Low Conductivity Tank (028B).

### Note: Some of the chemicals listed below are also listed in outfalls 028B. They are listed below because they are also directly discharged into this outfall.

The potential chemicals in this are very similar to those in Outfall 025C. The CPS system process is similar to the Steam Generator Blowdown Reclaim System in that it removes unwanted Secondary Plant impurities by demineralization. The regeneration process to regenerate the demineralizers is also like that of the Steam Generator Blowdown Reclaim System.

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), Primary Component Cooling water drainage, Steam Generator drainage, sample system waste, trace quantities from silica analyzer cleaning, and potential CPS regeneration chemical.
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Hydrazine Secondary chemical additive, Steam Generator drainage, Primary Component Cooling Water System drainage, sample system waste
- Suspended solids particulates from all potential inputs
- Ethanolamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Total Residual Chlorine Ocean cooling water system leakage and drainage, fire protection water, LMWTS cleaning waste
- Sodium Hydroxide Regeneration of demineralizer beds, leakage from caustic skid, drainage of system components for maintenance
- Sufuric acid Regeneration of demineralizer beds, leakage from acid skid, drainage of system components for maintenance
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Sodium Chloride- LMWTS cleaning waste
- Chlorhexidine Di-Gluconate (Hydrosep) emergency eyewash station biological growth inhibitor
- Morpholine Secondary chemical additive, Steam Generator soak agent
- Acetaldehyde- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic acid- potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile- potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Cresol- trace quantities from cleaning products

Outfall 028A, p. 2

- Phenol- trace quantities from cleaning products
- Sodium hypochlorite- Chemical additive to fire protection system, Circulating Water system, Service Water system, LMWTS cleaning agent, and cleaning solutions.
- Morpholine- Steam generator drainage, secondary system leakage and drainage
- Styrene- potential from resin degredation
- Epichlorohydrin- very limited potential from rinses of new resins
- Hydrogen Peroxide- LMWTS cleaning

#### **Proposed chemicals for future discharge:**

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- (authorized for discharge in current NPDES Permit at .1 ppm)
- EDTA Steam Generator cleaning agent
- Carbohydrazide- Secondary chemical additive, Primary Component Cooling Water system additive
- Diethylhydroxylamine- Secondary chemical additive
- Polyacrylic Acid- Secondary chemical additive that aids in maintaining Iron in solution
- Ammonium Sulfate- potential future CPS regeneration chemical
- Sodium Bicarbonate- potential future CPS regeneration chemical

#### Maximum daily flow:

The proposed NPDES Permit maximum daily flow limit for Outfall 028A is 96,000 GPD. The maximum daily flow is based on an expected maximum of three batch discharges per day.

#### **Discharge frequency:**

Outfall 028A is a batch release that occurs on an intermittent basis. The CPS Neutralization Tank is recirculated and discharged as a batch when necessary. Several batch discharges may occur during a week. More than one Neutralization Tank discharge per day is infrequent.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Monoethylamine Sulfuric acid Sodium Hydroxide Styrene Triethanolamine Triethylamine Phenol Sodium fluoride Epichlorohydrin Acetaldehyde Acetic acid Acrylonitrile

Outfall 028A, p. 3

## Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 28B**

# Condensate Polishing System (CPS) Low Conductivity Tank

### Discharge Information for Outfall 028B CPS Low Conductivity Tank

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

- Fluids used during the backwash and transfer of the Condensate Polisher demineralizer beds. The fluid is directed into the Low Conductivity tank and then discharged to the Circulating Water System (Outfall 001). This wastewater contains low concentrations of acid and caustic wastes from the regeneration process as well as trace levels of ionic constituents present on the resin following regeneration. Backwash waste contains particulate matter that has been trapped in the demineralizers during system operation.
- Drain water from Condensate Polisher demineralizers and Low Conductivity system piping contents that may be drained for maintenance.

#### **Discharge description:**

The CPS was completed and initially operated in 2005 during the term of the current NPDES Permit as documented in the renewal application for the current NPDES Permit submitted in April 1998. It is an integral part of the Condensate System. The CPS is designed to remove dissolved and suspended impurities from the Condensate System that can cause corrosion and fouling of secondary components. The system is normally maintained in a standby condition and is placed in operation to remove secondary system contaminants to support plant start up or to remove impurities introduced by a condenser tube leak.

The basic system design consists of cation resin vessels, mixed bed resin vessels, pumps and associated equipment, and an external resin regeneration and waste processing system. The CPS is designed to accommodate approximately one third of the total condensate flow. The resin vessels remove the ionic constituents from the condensate system including the amines used for secondary chemistry control. The auxiliary regeneration and waste system is used to regenerate the resin for re-use and to discharge the regeneration and rinsate wastes. Sodium Hydroxide and Sulfuric Acid are used as regenerant chemicals.

The discharges from the CPS System include: rinses of the system in support of plant start-up, periodic rinses during standby conditions, rinses of the resin vessels following regenerations, regeneration wastewater, sampling system and grab sample waste, system leakage, and system drainage for maintenance.

The Low Conductivity Tank receives fluids from backwashes of the demineralizers and from activities involving transfer of the resin from various resin vessels in the system. The conductivity of the water in this tank is generally low as concentrated regeneration chemicals and concentrated amines are not present in the wastes.

The CPS low conductivity waste is collected in the Low Conductivity Tank and sampled prior to discharge. The tank volume is 32,000 gallons. The Low Conductivity Tank is recirculated via pumps installed in the tank to facilitate mixing and sampling. The tank is discharged at a maximum rate of 300gpm.

Outfall 028B, p. 1

#### Alternate paths for this discharge:

• CPS Neutralization Tank (Outfall 028A)

#### Potential chemicals in discharge:

The potential chemicals in this are very similar to those in Outfall 028A. Although the chemical list below is extensive, most of the chemicals listed would only be present in very low concentrations. The waste stream is expected to have only low concentrations of Secondary System and regeneration chemicals.

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), Primary Component Cooling water drainage, Steam Generator drainage, sample system waste, trace quantities from silica analyzer cleaning, and CPS regeneration chemical (potential).
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Hydrazine Secondary chemical additive, Steam Generator drainage, Primary Component Cooling Water System drainage, sample system waste
- Suspended solids particulates from all potential inputs
- Ethanolamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Sodium Hydroxide Regeneration of demineralizer beds, leakage from caustic skid, drainage of system components for maintenance
- Sufuric acid Regeneration of demineralizer beds, leakage from acid skid, drainage of system components for maintenance
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Morpholine Secondary chemical additive, Steam Generator soak agent
- Acetaldehyde- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic acid- potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile- potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Morpholine- Steam generator drainage, secondary system leakage and drainage
- Styrene- potential from resin degredation
- Epichlorohydrin- very limited potential from rinses of new resins

#### Proposed chemicals for future discharge:

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- (authorized for discharge in current NPDES Permit at .1 ppm)
- EDTA Steam Generator cleaning agent
- Carbohydrazide- Secondary chemical additive, Primary Component Cooling Water system additive
- Diethylhydroxylamine- Secondary chemical additive
- Polyacrylic Acid- Secondary chemical additive that aids in maintaining Iron in solution
- Ammonium Sulfate- potential future CPS regeneration chemical
- Sodium Bicarbonate- potential future CPS regeneration chemical

Outfall 028B, p. 2
#### Maximum daily flow:

The proposed NPDES Permit maximum daily flow limit for Outfall 028B is 96,000 GPD. The maximum daily flow is based on an expected maximum of three batch discharges per day.

#### **Discharge frequency:**

Outfall 028B is a batch release that occurs on an intermittent basis. The CPS Low Conductivity Tank is recirculated and discharged as a batch when necessary. Several batch discharges may occur during a week. More than one Low Conductivity Tank discharge per day is infrequent.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Monoethylamine Monomethylamine Sulfuric acid Sodium Hydroxide Styrene Triethanolamine Triethylamine Phenol Sodium fluoride Epichlorohydrin Acetaldehyde Acetic acid Acrylonitrile

## **EPA Form 2C**

# Section II, Part B (Descriptions)

### and

# Section V, Part D (List of Pollutants)

## **Outfall 28C**

# Condensate Polishing System (CPS) Rinses

### Discharge Information for Outfall 028C CPS Rinses

#### EPA Form 2C

Section II, Flows, Sources of Pollution and Treatment Technologies Part B, Description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Section V, Intake and Effluent Characteristics Part V, D, List of Pollutaria from Form 2C. Tables 2C 2 and 2C 4

Part V.D, List of Pollutants from Form 2C, Tables 2C-3 and 2C-4

#### Discharge includes wastewater from the following sources:

• Fluids used during rinses of the Condensate Polisher demineralizer beds after regeneration. The CPS resin is rinsed prior to placing the resin into the service vessels. The resin is rinsed to remove residual concentrations of Sodium Hydroxide and Sulfuric Acid remaining on the resin following regeneration. Rinse water is directed from the effluent of the resin vessels to Circulating Water System. The rinse water source is demineralized water.

#### **Discharge description:**

The CPS was completed and initially operated in 2005 during the term of the current NPDES Permit as documented in the renewal application for the current NPDES Permit submitted in April 1998. It is an integral part of the Condensate System. The CPS is designed to remove dissolved and suspended impurities from the Condensate System that can cause corrosion and fouling of secondary components. The system is normally maintained in a standby condition and is placed in operation to remove secondary system contaminants to support plant start up or to remove impurities introduced by a condenser tube leak.

The basic system design consists of cation resin vessels, mixed bed resin vessels, pumps and associated equipment, and an external resin regeneration and waste processing system. The CPS is designed to accommodate approximately one third of the total condensate flow. The resin vessels remove the ionic constituents from the condensate system including the amines used for secondary chemistry control. The auxiliary regeneration and waste system is used to regenerate the resin for re-use and to discharge the regeneration and rinsate wastes. Sodium Hydroxide and Sulfuric Acid are used as regenerant chemicals.

The discharges from the CPS System include: rinses of the system in support of plant start-up, periodic rinses during standby conditions, rinses of the resin vessels following regenerations, regeneration wastewater, sampling system and grab sample waste, system leakage, and system drainage for maintenance.

The CPS rinse discharge consists of water used to remove impurities from the demineralizers prior to their use for Condensate System clean up. The demineralizer impurities result from the regeneration of the resins with Sulfuric Acid and Sodium Hydroxide. The acid is used to reactivate the cation (positive ion) resin beads within the mixedbed and cation bed demineralizers. The caustic reactivates the anion (negative ion) resin beads in the mixedbed demineralizers. The regeneration process is started manually.

Upon completion of the regeneration, the demineralizer resin beds are rinsed with demineralized water. The rinse water is sampled to ensure compliance with the NPDES Permit effluent limitations and monitoring requirements. The rinse water is directed to Outfall 001.

#### Alternate paths for this discharge:

• None anticipated

#### Potential chemicals in discharge:

The potential chemicals in this are very similar to those in Outfall 028A. Although the chemical list below is extensive, most of the chemicals listed would only be present in very low concentrations. The waste stream is expected to have only low concentrations of Secondary System and regeneration chemicals.

- Ammonia/Ammonium hydroxide Secondary chemical additive (from thermal decomposition of hydrazine), Primary Component Cooling water drainage, Steam Generator drainage, sample system waste, trace quantities from silica analyzer cleaning, and CPS regeneration chemical.
- Methoxypropylamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Hydrazine Secondary chemical additive, Steam Generator drainage, Primary Component Cooling Water System drainage, sample system waste
- Suspended solids particulates from all potential inputs
- Ethanolamine Secondary chemical additive, Steam Generator drainage, sample system waste
- Sodium Hydroxide Regeneration of demineralizer beds, leakage from caustic skid, drainage of system components for maintenance
- Sufuric acid Regeneration of demineralizer beds, leakage from acid skid, drainage of system components for maintenance
- Domestic water constituents (washing, hydrolazing, cooling water, fire protection, potable)
- Morpholine Secondary chemical additive, Steam Generator soak agent
- Acetaldehyde- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acetic acid- potential breakdown product of ethanolamine, all sources of ethanolamine
- Diethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Dimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monoethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Monomethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Triethanolamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Trimethylamine- potential breakdown product of ethanolamine, all sources of ethanolamine
- Acrylonitrile- potential breakdown product of methoxypropylamine, all sources of methoxypropylamine
- Morpholine- Steam generator drainage, secondary system leakage and drainage
- Styrene- potential from resin degredation
- Epichlorohydrin- very limited potential from rinses of new resins

#### Proposed chemicals for future discharge:

- Pyrolidine Secondary chemical additive
- Dimethylamine Secondary chemical additive
- 5-aminopentanol Secondary chemical additive
- 1,2 diaminoethane Secondary chemical additive
- 3-hydroxyquinuclidine Secondary chemical additive
- 2-amino,2-methylpropanol Secondary chemical additive
- (authorized for discharge in current NPDES Permit at .1 ppm)
- Carbohydrazide- Secondary chemical additive, Primary Component Cooling Water system additive
- Diethylhydroxylamine- Secondary chemical additive
- Polyacrylic Acid- Secondary chemical that aids in maintaining Iron in solution
- Ammonium Sulfate- potential future CPS regeneration chemical
- Sodium Bicarbonate- potential future CPS regeneration chemical

Outfall 028C, p. 2

#### Maximum daily flow:

The proposed NPDES Permit maximum daily flow limit for Outfall 028C is 500,000 GPD. The maximum daily flow is based upon the highest system flow rate occurring over the entire 24 hour period. System rinse flow rates vary from approximately 200gpm to 340gpm.

#### **Discharge frequency:**

Outfall 028C is a continuous is initiated on an intermittent basis. The duration of the CPS rinses may range from a very short duration to a day or more on a continuous basis.

#### Pollutants from Form 2C, Tables 2C-3 and 2C-4:

Ammonia Ammonium hydroxide Cresol Diethylamine Dimethylamine Monoethylamine Monomethylamine Sulfuric acid Sodium Hydroxide Styrene Triethanolamine Triethylamine Phenol Sodium fluoride Epichlorohydrin Acetaldehyde Acetic acid Acrylonitrile

AREVA

EPA Application Form 2C -Wastewater Discharge Information Consolidated Permits Program

Laboratory Analysis of Wastewater Samples at the Seabrook Nuclear Power Station

> September 6, 2006 EL 116/06

### **AREVA NP INC.**

ENVIRONMENTAL LABORATORY 29 Research Drive Westborough, MA 01581-3913 Tel: 508-573-6650 Fax: 508-573-6680





EPA I.D. NUMBER (copy from Item 1 of Form 1)

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PART AYou m	ust provi	de the results	of at least one ana	lysis for every p	ollutant in this table	e. Complete on	e table for each ou	ıtfall. See instr	uctions for add	litional details.				
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f. Flow	VALUE 663			VALUE		VALUE	<u> </u>		1	MGPD		VALUE		
g. Temperature (winter)	w 663 Imperature VALUE er)			VALUE		VALUE				•c	· · · · · · · · · · · · · · · ·	VALUE		
h. Temperature (summer)		VALUE		VALUE		VALUE			1	•c	;	VALUE		
i. pH		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM				1	STANDAR	D UNITS			
PART B Mari direc	k "X" in c ctly, or in	olumn 2-a for e idirectly but explanation	each pollutant you pressly, in an effli	know or have re uent limitations	ason to believe is guideline, you mu	present. Mark " est provide the	'X" in column 2-b t results of at least	or each polluta one analysis	ant you believe for that pollut	to be absent. I ant. For other p	f you mark co collutants for	lumn 2a for any pol which you mark co	utant which is umn 2a, you	limited either must provide
quu	2. N	ARK "X"			3 3	EFFLUENT				4.	UNITS	5. IN	ITAKE (option	aľ)
. POLLUTANT AND CAS NO	8.	b	a. MAXIMUM D	AILY VALUE	b. MAXIMUM 30 (if avail	DAY VALUE able)	c. LONG TERM (if avai	AVRG. VALUI lable)			N-	a. LONG TERM VALU	AVERAGE	h NO OF
(if available)	PRESEN	IT ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSE	S TRATIO	N b. MAS	S CONCENTRATIO	N (2) MASS	ANALYSES
a. Bromide 24959-67-9)	Х		82	453,687					1	mg/L	lbs/o	a		
o. Chlorine, Total Residual	X		0.10*	553.3					1	ppm	lbs/o	a		
c. Color		X												
d. Fecal Coliform		X												
e. Fluoride (16984-48-8)		X												
f. Nitrate-Nitrite (as N)	$\mid X$		ND											

EPA Form 3510-2C (8-90)

CONTINUE ON REVERS

\*as Total Residual Oxidant (TRO)



#### ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"			3.	EFFLUENT				4. UNIT	rs	5. INT.	AKE (optiond	ıl)
1. POLLUTANT AND	a.	b.	a. MAXIMUM DA		b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A (if availa	VRG. VALUE ble)				a. LONG TE AVERAGE V	ERM ALUE	
CAS NO. (if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	$\times$		ND						1					
h. Oil and Greas <del>e</del>	$\times$		ND						1				-	
i. Phosphorus (as P), Total (7723-14-0)	$\times$		ND						1					
j. Radioactivity														
(1) Alpha, Total	X	i	ND -						1	pCi/kg				
(2) Beta, Total	X		461						1	pCi/kg				
(3) Radium, Total		X												
(4) Radium 226, Total		X			-									
k. Sulfate (as SO <sub>4</sub> ) (14808-79-8)	$\times$		2500	13831910					1	mg/l	lbs/d			
I. Sulfide (as S)	$\times$		ND						1					
m. Sulfite (as SO <sub>J</sub> ) (14265-45-3)	X		ND											
n. Surfactants	$\times$		ND						1					
o. Aluminum, Total (7429-90-5)		$\times$												
p. Barium, Total (7440-39-3)		X								<u></u>				
q. Boron, Total (7440-42-8)	$\times$		ND						1					
r. Cobail, Totai (7440-48-4)	$\times$		ND						1					
s. iron, Total (7439-89-6)	$\times$		0.02	110.7					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	$\times$		1200	6369317					1	mg/L	lbs/d			
u. Molybdenum, Total (7439-98-7)	X		ND						1					
v. Manganese, Total (7439-96-5)	$\times$		0.01	55.3					· 1	mg/L	ls/d			
w. Tin, Total (7440-31-5)		$\times$								·				
x. Titanium, Total (7440-32-6)		X										· · · · ·		

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CONTINUE ON PAGE V-3

#### Outfall #001-1



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				E	PA I.D. NUM	BER (copy from Iten	n 1 of Form 1)	OUTFALL NUME	BER						
CONTINUED FROM	PAGE 3 O	F FORM 2-0	C	NF	ID081257	446		001-1							
PART C - If you ar fractions fractions provide discharg pollutant briefly d addition	e a primary that apply ), mark "X" the results ged in conce ts which yo escribe the al details ar	r industry an to your indu- in column 2 of at least of entrations of u know or h reasons the d requirement	d this outfa ustry and for 2-b for eac ne analysis 10 ppb or ave reason e pollutant	all contains process or ALL toxic metal h pollutant you kno for that pollutant. greater. If you man to believe that yo is expected to be	s wastewate s, cyanides, ow or have r If you mark k column 2b u discharge discharged.	r, refer to Table 2c- and total phenois. eason to believe is column 2b for any p for acrolein, acrylo in concentrations o Note that there ar	2 in the instr If you are no present. Ma bollutant, you unitrile, 2,4 dii f 100 ppb or e 7 pages to	uctions to determin to required to mark rk "X" in column 2- must provide the re nitrophenol, or 2-mo greater. Otherwise, this part; please r	e which of column 2- c for each esults of at athyl-4, 6 d , for polluta eview eac	the GC/MS fr a (secondary pollutant you least one an initrophenol, nts for which h carefully. C	actions you mu industries, non, believe is abse alysis for that pr you must provid you mark colur complete one ta	ist test for. M process was ent. If you m ollutant if yo le the results nn 2b, you r ble ( <i>all</i> 7 pa	Mark "X" in column stewater outfalls, au ark column 2a for a u know or have rea s of at least one an must either submit ages) for each outfa	2-a for all si and nonrequi any pollutan ison to belie alysis for ea at least one all. See inst	uch GC/MS red GC/MS t, you mus ve it will be ich of these analysis or tructions for
		2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	(f)
1. POLLUTANT AND	a.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. ulable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANIDE	E, AND TOT	AL PHENO	ĻS												
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$\times$			ND						1					
3M. Berytlium, Total (7440-41-7)	$\times$			ND						1					
4M. Cadmium, Total (7440-43-9)	$\times$			ND					-	1					
5M. Chromium, Total (7440-47-3)	$\times$			ND						1					
6M. Copper, Total (7440-50-8)	$\times$			ND						1					
7M. Lead, Total (7439-92-1)	$\times$			ND						1					
8M. Mercury, Total (7439-97-6)	$\times$			ND						1					
9M. Nickel, Total (7440-02-0)	$\times$			ND						1					
10M. Selenium, Total (7782-49-2)	$\times$			ND						1					
11M. Silver, Total (7440-22-4)	$\times$			ND						1					
12M. Thallium, Total (7440-28-0)	$\times$			ND						1					
13M. Zinc, Total (7440-66-6)	X			0.04	221.3					1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	$\times$			ND						, 1					
15M. Phenols, Total	$\times$			ND						1					
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			X	DESCRIBE RESU	JLTS										

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CONTINUE ON REVERSE





#### CONTINUED FROM THE FRONT

	2	2. MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optional	')
1. POLLUTANT AND	<b>a</b> .	b.	c.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE ble)	c. LONG TERM VALUE ( <i>if ava</i>	AVRG. ilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	REQUIRED	BELIEVED PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS					······································		·					
1V. Accrolein (107-02-8)	Х			ND						1					
2V. Acrytonitrile (107-13-1)	X			ND						1					
3V. Benzene (71-43-2)	$\mathbf{X}$			ND						1					
4V. Bis ( <i>Chloro- methyl</i> ) Ether (542-88-1)	$\times$			ND				•	_	1					
5V. Bromoform (75-25-2)	$\times$			26	143852					1	mg/L	lbs/d			
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND						1					
7V. Chlorobenzene (108-90-7)	$\times$			ND						1	·				
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V, Chloroform (67-66-3) -	$\times$			ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	$\times$			ND						1					
15V. 1,2-Dichloro- ethane (107-06-2)	X			ND						1					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)			s.	ND .						1			Х ;		
19V. Ethylbenzene (100-41-4)	$\mathbf{X}$			ND						1				<u>, , , , , , , , , , , , , , , , , , , </u>	
20V. Methyl Bromide (74-83-9)	X			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND						. 1					

EPA Form 3510-2C (8-90)



	2	2. MARK "X"	•			3. E	FFLUENT				4. UN	ITS	5. INT/	AKE (optiona	/)
	8.	b.	с.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE ble)	c. LONG TERM VALUE (if ava	AVRG: nilable)				a. LONG T AVERAGE	ERM /ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPO	JNDS (cont	inued)								•	•		
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	X			ND	,					1					
24V. Tetrachloro- ethylene (127-18-4)	$\mathbf{X}$			ND						1					
25V. Toluene (108-88-3)	$\times$			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	X			ND						1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\times$			ND						1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	$\times$			ND						1					
29V Trichloro- ethylene (79-01-6)	$\times$			ND						1					
30V. Trichloro- fluoromethane (75-69-4)	X			ND						1				·	
31V. Vinyl Chloride (75-01-4)	$\mathbf{X}$			ND						1		· · ·			
GC/MS FRACTION	- ACID CC	MPOUNDS	;			r									
1A. 2-Chlorophenol (95-57-8).	$\mathbf{X}$			ND						1			·		
2A. 2,4-Dichloro- phenol (120-83-2)	X			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	X			ND						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	X			ND	_					1					
5A. 2,4-Dinitro- phenol (51-28-5)	Х			ND						1					
6A. 2-Nitrophenol (88-75-5)	X			ND						1					
7A. 4-Nitrophenol (100-02-7)	Х			ND						1					
8A. P-Chioro-M- Cresol (59-50-7)	Х			ND						1					
9A. Pentachloro- phenol (87-86-5)	X			ND						1					
10A. Phenol (108-95-2)	X			ND						1					
11A. 2,4,6-Trichloro- phenol (88-05-2)	X			ND						1					
EPA Form 3510-20	(8-90)					· · · · · · · · · · · · · · · · · · ·	PAG	E V-5					co	NTINUE ON	REVERSE





#### CONTINUED FROM THE FRONT

	2	2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INT#	KE (optiona	()
1. POLLUTANT AND	8.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30   (if availal	DAY VALUE blej	c. LONG TERM VALUE (if ava	AVRG. ailable)		0.0110511		a. LONG T AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	D. NO. OF
GC/MS FRACTION	- BASE/NE	EUTRAL CO	MPOUND	s							·····				
1B. Acenaphthene (83-32-9)	X			ND					,	1					
2B. Acenaphtylene (208-96-8)	X			ND						1					
3B. Anthracene (120-12-7)	X			ND						1					
4B. Benzidine (92-87-5)	X			ND						1					
5B. Benzo ( <i>a</i> ) Anthracene (56-55-3)	X			ND						1					
6B. Benzo (a) Pyrene (50-32-8)				ND						1					
78. 3,4-Benzo- fluoranthene (205-99-2)	X			ND						1					
8B. Benzo (ghi) Perylene (191-24-2)	X			ND						1				_	
9B. Benzo (k) Fluoranthene (207-08-9)	×			ND						1					
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	X			ND						1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			ND						1			-		
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1					
13B. Bis ( <i>2-Ethyl- hexyl</i> ) Phthaiate (117-81-7)	$\times$			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND						1		-			
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND				· ·		1					
16B. 2-Chloro- naphthalene (91-58-7)	$\times$			ND					_	1					
178. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	X			ND						1		1			
18B. Chrysene (218-01-9)	X			ND						1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND					,	1					
208. 1,2-Dichloro- benzene (95-50-1)				ND						1			· .		
21B. 1,3-Di-chloro- benzene (541-73-1)	$\mathbf{X}$			ND						1					

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CONTINUED FROM PAGE V-6

		2. MARK "X'				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND CAS NUMBER	8.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE ble)	c. LONG TERM VALUE (if ava	AVRG. ailable)				a. LONG T AVERAGE V	erm 'Alue	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/N	EUTRAL CO	OMPOUND	S (continued)		<b>.</b>			<u> </u>						
22B. 1,4-Dichloro- benzene (106-46-7)	Х			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	Х			ND			in 51-i-m			1					
24B. Diethyl Phthalate (84-66-2)	Х			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	X			ND	· -					1					
26B. Di-N-Butyl Phthalate (84-74-2)	X			ND						. 1					
27B. 2,4-Dinitro- toluene (121-14-2)	$\times$			ND						1					
28B. 2,6-Dinitro- toluene (606-20-2)	X			ND			•			1					
298. Di-N-Octyl Phthalate (117-84-0)	$\mathbf{X}$			ND				-		1					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						1					
32B. Fluorene (86-73-7)	$\times$			ND						1					
33B. Hexachloro- benzene (118-74-1)	$\mathbf{X}$			ND						1					
348. Hexachloro- butadiene (87-68-3)	X			ND						1					
35B. Hexachloro- cyclopentadiene (77-47-4)	$\times$			ND		( 				1				•	
36B Hexachloro- ethane (67-72-1)	X			ND						1				·	
37B. Indeno (1,2,3-cd) Pyrens (193-39-5)	X			ND						1					
38B. Isophorone (78-59-1)	$\mathbf{X}$			ND						1					
39B. Naphthalene (91-20-3)	X			ND						1		1			
40B. Nitrobenzene (98-95-3)	X	-		ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	Х			ND						1		-			
42B. N-Nitrosodi- N-Propytamine (621-64-7)	$\times$			ND						1					

EPA Form 3510-2C (8-90)

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CONTINUE ON REVERSE





CONTINUED FROM THE FRONT

	2	. MARK "X				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optional	n)
1. POLLUTANT AND	8.	b.	c.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 [ (if availab	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S (continued)								•			
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND					·	1					
44B. Phenanthrene (85-01-8)	$\sim$			ND						1					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chiorobenzene (120-82-1)	X			ND						1			1		
GC/MS FRACTION	I - PESTICI	DES													
1P, Aldrin (309-00-2)			$\times$												
2P. α-BHC (319-84-6)			$\times$												
3P. β-BHC (319-85-7)			X					·							,
4P. γ-BHC (58-89-9)			$\times$										-		
5P. δ-BHC (319-86-8)		-	$\times$												
6P. Chlordane (57-74-9)			X												
7P. 4,4'-DDT (50-29-3)			$\times$												
8P. 4,4'-DDE (72-55-9)			$\times$										·.		
9P. 4,4'-DDD (72-54-8)			X												
10P. Dieldrin (60-57-1)			X									<b></b>			
11P. α-Enosulfan (115-29-7)			X												
12P. β-Endosulfan (115-29-7)			Х												
13P. Endosulfan Sulfate (1031-07-8)			Х												
14P. Endrin (72-20-8) :			$\times$	<i>,</i>											
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			$\times$									. <u>.</u> .	•		

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CONTINUE ON PAGE V-9

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				[	EPA	I.D. NUMBE	R (copy from Item I	of Form 1)	OUTFALL NUM	BER						
CONTINUED FRO	M PAGE V-{	3				NHE	081257446		001	-1					•	
[	2	. MÁRK "X	•	[]			3. 1	EFFLUENT				4. UN	ITS	5. INTA	KE (optiona	1
1. POLLUTANT AND	а.	b.	с.	a. MAX		ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE able)	c. LONG TERM VALUE (if ava	AVRG. ailable)			1	a. LONG TI AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	CONCE	1) ITRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- PESTICI	DES (contin	ued)													
17P. Heptachlor Epoxide (1024-57-3)		• .	Х													
18P. PCB-1242 (53469-21-9)			X								-					
19P. PCB-1254 (11097-69-1)			X										-			
20P. PCB-1221 (11104-28-2)			Х													
21P. PCB-1232 (11141-16-5)			Х													
22P. PCB-1248 (12672-29-6)			X													
23P. PCB-1260 (11096-82-5)	-		X													x
24P. PC8-1016 (12674-11-2)			X													
25P. Toxaphene (8001-35-2)			$\times$													

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Outfall #001-1

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PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS EPA I.D. NUMBER (copy from Item 1 of Form 1)

SEE INSTRUCTI	ONS.	000			•		NHD081	257446						
V. INTAKE AND	EFFLUEN	T CHARAC	TERISTICS (contin	ued from page 3 d	of Form 2-C)							C	UTFALL NO. 022	
PART AYou m	nust provide	the results	of at least one ana	lysis for every pol	lutant in this table	e. Complete on	e table for each o	outfall. See instr	ructions for add	litional details.				
										3. UN	ITS	4	. INTAKE	
. •		a. MAXIMU	M DAILY VALUE	b. MAXIMUM 3 (if ava	0 DAY VALUE ilable)	c. LON	G TERM AVRG. (if available)	VALUE	1 110 05	(specify if		a. LONG T AVERAGE \	ERM ALUE	
1. POLLUTA		(1) ONCENTRAT	TION (2) MASS	(1) CONCENTRATIO	N (2) MASS	(1) CONCE		(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
a. Biochemical ( Demand (BOD)	Dxygen	12	2.1						1	mg/L	lbs/d			
b. Chemical Oxy Demand (COD)	/gen	24	4.1					· .	1	mg/L	lbs/d			
c. Total Organic (TOC)	Carbon	9.2	1.6						1	mg/L	lbs/d			
d. Total Suspen Solids (TSS)	ded	ND							1					
e. Ammonia ( <i>as</i>	M	130	22.4						1	mg/L	lbs/d			
f. Flow	Flow VALUE 20,610		0,610	VALUE		VALUE			1	GPD		VALUE		
g. Temperature (winter)	Flow 20,610 Temperature VALUE inter)			VALUE		VALUE				•0		VALUE		
h. Temperature (summer)	v	ALUE	27	VALUE		VALUE			1	•0		VALUE		
i. pH	N	IINIMUM 9.9	MAXIMUM 9 , 9	MINIMUM	MAXIMUM				1	STANDAR	D UNITS			
PART B – Mar dire qua	k "X" in col ctly, or ind ntitative da	umn 2-a for irectly but e ta or an exp	each pollutant you xpressly, in an effi lanation of their pre	know or have rea uent limitations g sence in your dis	son to believe is uideline, you mu charge. Complete	present. Mark st provide the one table for	"X" in column 2-b results of at lea each outfall. See	o for each pollut st one analysis the instructions	ant you believe for that pollut for additional	to be absent. It ant. For other p details and requ	f you mark co ollutants for irements.	lumn 2a for any poll which you mark col	utant which is umn 2a, you	limited either must provide
	2. MA	RK "X"			3	. EFFLUENT				4.1	UNITS	5. IN	TAKE (option	al)
1. POLLUTANT AND	a.	b.	a. MAXIMUM D	AILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERI	M AVRG. VALU vailable)	E	_		a, LONG TERM VALU	I AVERAGE JE	
CAS NO. (if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATIO	ON (2) MASS	d. NO. O ANALYSE	F a. CONCE S TRATION	N- N b. MAS	(1) S CONCENTRATION	N (2) MASS	ANALYSES
a. Bromide (24959-67-9)	X		ND						1					
b. Chlorine, Total Residual		X												
c. Color		X					· · · ·							
d. Fecal Coliform	·	X									•	•		
e. Fluoride (16984-48-8)		X												
f. Nitrate-Nitrite (as N)			ND						1					

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CONTINUE ON REVERS







#### ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"			3.	EFFLUENT				4. UNIT	S	5. INT/	AKE (optiona	1)
1. POLLUTANT AND	a.	b.	a. MAXIMUM DA	NLY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A' (if availa	VRG. VALUE ble)				a. LONG TE AVERAGE V	ERM ALUE	
(if available)	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	$\times$		ND						1					
h. Oil and Grease	X		ND						1					
i. Phosphorus (as P), Total (7723-14-0)	$\times$		ND				, ,		1					
j. Radioactivity														
(1) Alpha, Total	$\times$		ND						1	pCi/kg				
(2) Beta, Total	$\times$		ND						l	pCi/kg				
(3) Radium, Total		X												
(4) Radium 226, Total		X												
k. Sulfate (as SO.) (14808-79-8)	$\times$		460	79.1				4	1	mg/l	lbs/d	· · ·		
I. Sulfide (as S)	$\times$		ND						1					
m. Sulfite (as SO <sub>1</sub> ) (14265-45-3)		$\times$												
n. Surfactants	$\times$		0.062	0.01					1	mg/l	lbs/d			
o. Aluminum, Total (7429-90-5)		$\times$		•									-	
p. Barium, Total (7440-39-3)		$\mathbf{X}$												
q. Boron, Total (7440-42-8)		X											-	
r. Cobalt, Total (7440-48-4)		X			`	, í	,							
s. Iron, Total (7439-89-6)	$\times$		0.02	<0.01					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	$\times$		ND			 		• .	1					
u. Molybdenum, Total (7439-98-7)		X							1					
v. Manganese, Total (7439-96-5)	X		ND		•							•		
w. Tin, Total (7440-31-5)		X												
x. Titanium, Total (7440-32-6)		Х												

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EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NHD081257446	022

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you mark column 2 for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for that you discharge in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for that you discharge in concentrations of 10 ppb or greater. If you discharge in concentrations of 10 ppb or greater. If you discharge in concentrations of 10 ppb or greater. If you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (*all 7 pages*) for each outfall. See instructions for additional details and requirements.

	2	2. MARK "X'	•			3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	<i>il</i> )
1. POLLUTANT AND	a.	b.	c.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE ble)	c. LONG TERN VALUE (if ava	l AVRG. nilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	B. NO. OF
METALS, CYANIDI	E, AND TOT	TAL PHENO	LS												
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	X			ND						1			·		
3M. Beryllium, Total (7440-41-7)	X			ND						1					
4M. Cadmium, Total (7440-43-9)	$\times$			ND						1			· ·		
5M. Chromium, Total (7440-47-3)	$\mathbf{X}^{\mathbf{r}}$			ND						1		-			-
6M. Copper, Total (7440-50-8)	$\times$			ND						1					
7M. Lead, Total (7439-92-1)	$\times$			0.004	<0.01					1	mg/L	lbs/d			
8M. Mercury, Total (7439-97-6)	$\times$	-		ND						1					
9M. Nickel, Total (7440-02-0)	$\times$			ND						1	<u>}</u>				
10M. Selenium, Total (7782-49-2)	$\times$			ND						1					
11M. Silver, Total (7440-22-4)	X			ND						1					
12M. Thallium, Total (7440-28-0)	$\times$			ND						1					
13M. Zinc, Total (7440-66-6)	$\times$			0.03	0.01			-		1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	$\times$			ND						1					
15M. Phenols, Total	$\times$			ND						1					
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			X	DESCRIBE RESU	ILTS										

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CONTINUED FROM PAGE 3 OF FORM 2-C

CONTINUE ON REVERSE



	2	2. MARK "X"	•			3. E	FFLUENT				4. UN	15	5. IN I A	KE (optiona	<u>n</u>
1. POLLUTANT AND	8.	b.	с.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF
GC/MS FRACTION	I – VOLATIL	E COMPOL	JND\$	Condention	(1) 100		(2) 10 00	CONCLUTION ON	(2) 11/100						·
1V. Accrolein (107-02-8)	$\mathbf{X}^{\dagger}$			ND						1					
2V. Acrylonitrile (107-13-1)	X			0.230	0.04					1	mg/L	lbs/d			
3V. Benzene (71-43-2)	X			ND						1				,	
4V. Bis (Chloro- methyl) Ether (542-88-1)	$\times$			ND						1					
5V. Bromoform (75-25-2)	$\times$	F		ND						1					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND						1					
7V. Chlorobenzene (108-90-7)	$\times$			ND						1					
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	$\times$			ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	$\mathbf{X}$			ND						1					
15V. 1,2-Dichloro- ethane (107-06-2)	X			ND			-			1					
16V. 1,1-Dichloro- ethylene (75-35-4)	X			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)	X			ND						1					
19V. Ethylbenzene (100-41-4)	X			ND						1					
20V. Methyl Bromide (74-83-9)	X			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND						1					







#### CONTINUED FROM PAGE V-4

	2	2. MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	0
1. POLLUTANT AND	а.	b.	с.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availa	DAY VALUE ble)	c. LONG TERM VALUE (if ava	AVRG. nilable)	1.110.05	001051		a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (cont	inued)			ليستنقصكك			4 <u></u>		······		(_)	
22V. Methylene Chloride (75-09-2)	X			ND						1		• •			
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	$\times$			ND	_					1					
24V. Tetrachloro- ethylene (127-18-4)	$\times$			ND						1.					
25V. Toluene (108-88-3)	X			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	$\times$			ND		-				1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\times$			ND						1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	Х			ND						1					
29V Trichloro- ethylene (79-01-6)	$\times$			ND			:			1					
30V. Trichloro- fluoromethane (75-69-4)	X			ND		· · · ·				1	'				
31V. Vinyl Chloride (75-01-4)	X			ND						1					
GC/MS FRACTION	- ACID CC	MPOUNDS													· · · · · · · · · · · · · · · · · · ·
1A. 2-Chiorophenol (95-57-8)	X			ND						1					
2A. 2,4-Dichloro- phenol (120-83-2)	$\times$			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	$\times$			ND						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	$\times$			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	X			ND						1					
6A. 2-Nitrophenol (88-75-5)	X			ND						1					
7A. 4-Nitrophenol (100-02-7)	Х			ND						1	•				
8A. P-Chloro-M- Cresol (59-50-7)	Х			ND						1					
9A. Pentachloro- phenol (87-86-5)	Х			ND	:					1					
10A. Phenol (108-95-2)	X			ND						1		•			
11A. 2,4,6-Trichloro- phenol (88-05-2)	Х			ND						1	•				

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#### CONTINUED FROM THE FRONT

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	2	2. MARK "X"				3. E	FFLUENT				4. UN	TS	5, INT/	KE (optiona	0
1. POLLUTANT AND	8.	b.	с.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE ble)	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE \	ERM /ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN-	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	s		······································			(-)	<u>ا</u> ـــــــ			1	(0)	<u>}</u> ,
1B. Acenaphthene (83-32-9)	Х			ND						. 1					
2B. Acenaphtylene (208-96-8)	$\mathbf{X}$			ND		·				1					
3B. Anthracene (120-12-7)	X			ND						1					
4B. Benzidine (92-87-5)	$\times$			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$			ND						1	•				
6B. Benzo (a) Pyrene (50-32-8)	$\times$			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						1					
8B. Benzo (ghi) Perylene (191-24-2)	X			ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	$\times$			ND						1					
10B. Bis (2- <i>Chloro- ethoxy</i> ) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2-Chloro- ethyl) Elher (111-44-4)	$\times$			ND						1					
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	Х			ND						1					
13B. Bis ( <i>2-Ethyl- hexyl</i> ) Phthalate (117-81-7)	X			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	×			ND						1					
15B. Butyl Benzyl Phthalate (85-68-7)	$\mathbf{X}$			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	$\times$			ND						1					
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1					
18B. Chrysene (218-01-9)	Х			ND						1					<u>х</u>
19B. Dibenzo (a,k) Anthracene (53-70-3)	X			ND						1					
20B. 1,2-Dichloro- benzene (95-50-1)	Х			ND						1					
218. 1,3-Di-chloro- benzene (541-73-1)	Х			ND						1					

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#### CONTINUED FROM PAGE V-6

	2	2. MARK "X				. 3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. ilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN-	b. MASS	(1) CONCENTRATION	(2) MASS	D. NO. OF
GC/MS FRACTION	I BASE/N	EUTRAL CO	MPOUND	S (continued)		· · · · · · · · · · · · · · · · · · ·			<u> </u>	J					
22B. 1,4-Dichloro- benzene (106-46-7)	X			ND						1					
23B. 3.3-Dichloro- benzidine (91-94-1)	X			ND						1					
24B. Diethyl Phthalate (84-66-2)	X			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	$\times$			ND <sub>.</sub>						1					
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						1	-				
27B. 2,4-Dinitro- toluene (121-14-2)	$\times$			ND						1					
28B. 2,6-Dinitro- toluene (606-20-2)	X			ND						1					•
29B. Di-N-Octyl Phthalate (117-84-0)	Х			ND						1		•		<u></u>	
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X			ND						1					
31B. Fluoranthene (206-44-0)	$\times$	×		ND	:					1					
32B. Fluorene (86-73-7)	X			ND						1		•			
33B. Hexachloro- benzene (118-74-1)	$\mathbf{X}$			ND						1					
34B. Hexachloro- butadiene (87-68-3)	X			ND						1					
35B. Hexachioro- cyclopentadiene (77-47-4)	X			ND						1					
36B Hexachloro- ethane (67-72-1)	$\times$			ND						1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	$\times$			ND						1					
38B. Isophorone (78-59-1)	$\times$			ND						1					
39B. Naphthalene (91-20-3)	$\times$			ND						1					
40B. Nitrobenzene (98-95-3)	X			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND					•	1	•				
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND						1					

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#### CONTINUED FROM THE FRONT

,	2	. MARK "X'				· 3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	1)
1. POLLUTANT AND	8.	b.	С.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 [ (if availab	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG TE AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d, NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S (continued)											
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND						1					
44B. Phenanthrene (85-01-8)	$\times$			ND						1					
45B. Pyrene (129-00-0)	X			NĎ						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	X			ND						1		· · · · · · ·			
GC/MS FRACTION	I – PESTICI	DES													
1P. Aldrin (309-00-2)			$\times$												
2P. α-BHC (319-84-6)			X												
3P. β-BHC (319-85-7)			X												
4P. γ-BHC (58-89-9)			X												
5P. δ-BHC (319-86-8)			X												
6P. Chlordane (57-74-9)			X												
7P. 4,4'-DDT (50-29-3)			$\times$												
8P. 4,4'-DDE (72-55-9)			X	-			. '								
9P. 4,4'-DDD (72-54-8)			X												
10P. Dieldrin (60-57-1)			X											_	
11P. α-Enosulfan (115-29-7)			$\times$												
12P. β-Endosulfan (115-29-7)			X		-										
13P. Endosulfan Sulfate (1031-07-8)			Х		-		- <u></u> _								
14P. Endrin (72-20-8)			X												
15P. Endrin Aldehyde (7421-93-4)			Х						-		-				· · ·
16P. Heptachior (76-44-8)			X												

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CONTINUE ON PAGE V-9



,				EPA	I.D. NUMBE	R (copy from Item 1	of Form 1)	OUTFALL NUME	BER						
CONTINUED FROM	M PAGE V-8	3			NHE	081257446		02	2						
	2	2. MARK "X				3. E	FFLUENT	· · · · · · · · · · · · · · · · · · ·			4. UN	ITS	5. INTA	KE (optiona	0
1. POLLUTANT AND	a.	b	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE	c. LONG TERN VALUE (if ava	AVRG. ailable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- PESTICI	DES (contin	ued)												
17P. Heptachlor Epoxide (1024-57-3)			X				-		-						
18P. PCB-1242 (53469-21-9)			$\times$												
19P. PCB-1254 (11097-69-1)			X												
20P. PCB-1221 (11104-28-2)			$\mathbf{X}$		· · · · · · · · · · · · · · · · · · ·										
21P. PCB-1232 (11141-16-5)			X												
22P. PCB-1248 (12672-29-6)			X									_			
23P. PCB-1260 (11096-82-5)			X												
24P. PCB-1016 (12674-11-2)			$\times$												
25P. Toxaphene (8001-35-2)			X	· · · · · · · · · · · · · · · · · · ·											

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PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

#### EPA I.D. NUMBER (copy from liem 1 of Form 1) NHD081257446

			· · · · · · · · · · · · · · · · · · ·								DUTFALL NO.
V. INTAKE AND EFFLUI	ENT CHARACTERI	STICS (contin	ued from page 3 of	Form 2-C)							023
PART A -You must prov	ide the results of at	least one ana	lysis for every pollut	ant in this table	e. Complete one table for eac	h outfall. See ins	structions for add	ditional details.	•		
		"		2. EFFLU	ENT			3. UN (specify if	ITS [blank]	4	, INTAKE (optional)
	a. MAXIMUM DA		b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM AVR (if available	G. VALUE )	1.110.05	001051		a. LONG T AVERAGE	'ERM VALUE
1. POLLUTANT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS
a. Biochemical Oxygen Demand (BOD)	2.1	0.02					1	mg/L	lbs/d		
b. Chemical Oxygen Demand (COD)	ND							-			
c. Total Organic Carbon (TOC)	ND						1			· .	
d. Total Suspended Solids (TSS)	1.0						1	mg/L	lbs/d		
e. Ammonia (as N)	ND						1				
f. Flow	VALUE 109	6	VALUE		VALUE		1	GPD		VALUE	
g. Temperature (winter)	VALUE		VALUE		VALUE			•0		VALUE	
h. Temperature (summer)	VALUE 23	:	VALUE		VALUE		1	•0		VALUE	
i. pH	MINIMUM 9.1	MAXIMUM 9.1	MINIMUM	MAXIMUM			1	STANDAR	DUNITS		
PART B _ Mark "X" in (	column 2-a for each	nollutant you	know or have reaso	n to helieve is	present Mark "X" in column	2-h for each poll	utant you believe	e to be absent. I	vou mark co	olumn 2a for any pol	lutant which is

ART B – Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

	2. MA	RK "X"			3.	EFFLUENT				4. UNI	rs	5. INT.	AKE (option	a()
1. POLLUTANT AND	a,	b.	a. MAXIMUM DA	ALLY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERM A (if availa	VRG. VALUE ble)	1 110 05			a. LONG TERM A VALUE	VERAGE	
CAS NO. (if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
a. Bromide (24959-67-9)		X												
b. Chlorine, Total Residual		X								х 				
c. Color		X												
d. Fecal Coliform		$\mathbf{X}$												
e. Fluoride (16984-48-8)		X									×			
f. Nitrate-Nitrite (as N)	X		ND	-					1					

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CONTINUE ON REVERS

b. NO. OF ANALYSES





	2. MA	<u>RK "X"</u>			3.	EFFLUENT				4. UNIT	rs	5. INT/	AKE (optiond	ı/)
1. POLLUTANT AND	а.	b.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A' (if availa	VRG. VALUE ble)				a, LONG TE AVERAGE V	ERM ALUE	
(if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	Х		ND						1					
h. Oil and Grease	X		ND						1					
i. Phosphorus (as P), Total (7723-14-0)	$\times$		0.067	<0.01					1	mg/L	lbs/d			
j. Radioactivity											:			
(1) Alpha, Total			ND						1	pCi/kg				
(2) Beta, Total	X		43.80	<u>.</u>					1	pCi/kg	1			
(3) Radium, Total		$ \times$												
(4) Radium 226, Total		X												,
k. Suifate (as SO <sub>4</sub> ) (14808-79-8)	$\times$		15	0.14					1	mġ∕l	lbs/d			
1. Sulfide (as S)	X		ND						1 .					
m. Sulfite (as SO3) (14265-45-3)		X												
n. Surfactants		$\left  \right\rangle$							-					
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		$\mathbf{X}$												
q. Boron, Total (7440-42-8)		X							-					
r. Cobait, Totai (7440-48-4)		X												
s. Iron, Total (7439-89-6)	X		0.11	<0.01					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	X		2.3	0.02					. 1	mg/L	lbs/d			
u. Molybdenum, Total (7439-98-7)		X							1					
v. Manganese, Total (7439-96-5)	X		ND											
w. Tin, Total (7440-31-5)		X						•						
x. Titanium, Total (7440-32-6)		X												
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		•			PA I.D. NUM	BER (copy from Iten	n I of Form 1)	OUTFALL NUM	BER						
	A PAGE 3 O	F FORM 2-0	C	N	HD081257	7446		023			:				
PART C - If you an fractions fractions provide discharg pollutan briefly d addition	re a primary s that apply s), mark "X" the results of ged in conce ts which you lescribe the al details an	industry ar to your induin column a of at least or intrations of a know or h reasons the d requirement	d this outfaustry and for 2-b for eacher analysis 10 ppb or ave reason e pollutant	all contains proce or ALL toxic met h pollutant you k for that pollutant greater. If you m to believe that y is expected to b	ss wastewate als, cyanides, now or have . If you mark ark column 2t ou discharged e discharged	er, refer to Table 2c, and total phenols. reason to believe is column 2b for any p o for acrolein, acrylo in concentrations o . Note that there ar	-2 in the instr If you are no present. Ma oollutant, you onitrile, 2,4 dii f 100 ppb or e 7 pages to	uctions to determin of required to mark rk "X" in column 2- must provide the r nitrophenol, or 2-m greater. Otherwise o this part; please r	the which of column 2- -c for each results of at ethyl-4, 6 d for polluta review each	the GC/MS fi a (secondary pollutant you least one an initrophenol, y inits for which h carefully. C	ractions you mu industries, non believe is abse alysis for that p you must provid you mark colur omplete one ta	ist test for. M process was ent. If you m ollutant if yo le the results nn 2b, you r ble (all 7 pa	Mark "X" in column stewater outfalls, ar ark column 2a for a u know or have rea s of at least one an nust either submit a ges) for each outfa	2-a for all sund nonrequi any pollutan son to belie alysis for ea at least one all. See inst	Ich GC/MS red GC/MS t, you mus ve it will be ch of these analysis or ructions for
	2	MARK "X				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	Ŋ
1. POLLUTANT AND	8.	b.	с.	a. MAXIMUM D	AILY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ave	I AVRG. zilable)		001051		a. LONG TI AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANIDI	E, AND TOT	AL PHENO	LS												
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$\times$			ND						1					
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1					
4M. Cadmium, Total (7440-43-9)	X			ND						1					
5M. Chromium, Total (7440-47-3)	X			ND						1					
6M. Copper, Total (7440-50-8)	X			0.004	<0.01					1	mg/L	lbs/d			
7M. Lead, Total (7439-92-1)	X			ND						1					
8M. Mercury, Total (7439-97-6)	$\left[ \times \right]$			ND						1					
9M. Nickel, Total (7440-02-0)	$\times$			ND						1					
10M. Selenium, Total (7782-49-2)	$ \times $			ND						1					
11M. Silver, Total (7440-22-4)	X			ND						1					
12M. Thallium, Total (7440-28-0)	$\times$			ND						1	·				
13M. Zinc, Total (7440-66-6)	$\times$			0.02	<0.01					1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	×			ND						1			-		
15M. Phenols, Total	X			0.025	<0.01				·	1	mg/L	lbs/d		. •	
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			Х	DESCRIBE RES	SULTS		,								



CONTINUE ON REVERSE

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	2	2. MARK "X'				3. E	FFLUENT				4. UN	ITS	5. INT/	KE (optional	1)
1. POLLUTANT AND	8.	b.	. <b>C.</b>	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE ble)	c. LONG TERM VALUE (if ava	I AVRG. iilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS												
1V. Accrolein (107-02-8)	X			ND						1					
2V. Acrylonitrile (107-13-1)	$\times$			ND						1					
3V. Benzene (71-43-2)	$\times$			ND						1					
4V. Bis (Chloro- inethyl) Ether (542-88-1)	$\times$			ND					~	' 1				-	
5V. Bromoform (75-25-2)	$\times$			ND		·				1					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND	-				•	1					
7V. Chlorobenzene (108-90-7)	X			ND						1					
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl.Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	$\times$			ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1.					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	$  \times$			ND						1		·			
15V. 1,2-Dichloro- ethane (107-06-2)	$\times$			ND						1					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND						1.					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND						1					. *
18V. 1,3-Dichloro- propylene (542-75-6)	$\times$			ND						1					
19V. Ethylbenzene (100-41-4)	X	,		ND						1					
20V. Methyl Bromide (74-83-9)	X			ND						1				<u> </u>	
21V. Methyl Chloride (74-87-3)	X			ND						1					

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CONTINUED FROM PAGE V-4

	2	2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	а,	b.	c.	a. MAXIMUM DAI		b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (con	inued)								、 、		(	· · · · · · · · · · · · · · · · · · ·
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	$\times$			ND						1					
24V. Tetrachloro- ethylene (127-18-4)	X			ND						1					
25V. Toluene (108-88-3)	X			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	X			ND						1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\times$			ND				,		1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	$\times$			ND					_	. 1					
29V Trichloro- ethylene (79-01-6)	X			ND						1					·
30V. Trichloro- fluoromethane (75-69-4)	$\times$			ND						1					
31V. Vinyl Chloride (75-01-4)	Х			ND						1					
GC/MS FRACTION	- ACID CC	MPOUNDS	3								-				·
1A. 2-Chlorophenol (95-57-8)	X			ND						l					
2A. 2,4-Dichloro- phenol (120-83-2)	X			ND		L.		•		1					
3A. 2,4-Dimethyl- phenol (105-67-9)	$\times$			ND						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	$\times$			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	X			ND				· .		<u> </u>					
6A. 2-Nitrophenol (88-75-5)	X	•		ND						1					
7A. 4-Nitrophenol (100-02-7)	Х			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	Х			ND						1	-				
9A. Pentachloro- phenol (87-86-5)	Х			ND						1					
10A. Phenol (108-95-2)	X			ND						1					
11A. 2.4,6-Trichloro- phenol (88-05-2)	Х			ND						1					

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE





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#### CONTINUED FROM THE FRONT

*	2	. MARK "X"	,			3. E	FFLUENT	_			4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	8.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 [ (if availab	DAY VALUE	c. LONG TERM VALUE ( <i>if ava</i>	l AVRG. rilable)	1.00.05	001051		a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S					<u> </u>	L					
1B. Acenaphthene (83-32-9)	Х			ND					,, , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1					
2B. Acenaphtylene (208-96-8)	Х			ND						1					
3B. Anthracene (120-12-7)	Х			ND						1					
4B. Benzidine (92-87-5)	$\mathbf{X}_{\mathbf{i}}$			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	X			ND						1					
6B. Benzo (a) Pyrene (50-32-8)	X			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND					-	1					
8B. Benzo (ghi) Perylene (191-24-2)	Х			ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	X			ND						1		-			
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2-Chloro- e(hyl) Ether (111-44-4)	X			ND						1					
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	X			ND						1					
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	X			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X			ND						1					
15B. Butyl Benzyl Phthalate (85-68-7)	Х			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	X			ND						1				<u> </u>	
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1	-	•			
18B. Chrysene (218-01-9)	Х			ND						1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	Х			ND						1					
20B. 1,2-Dichloro- benzene (95-50-1)	Х			ND						1					
21B. 1,3-Di-chloro- benzene (541-73-1)	X			ND						1					

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Outfall #023



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#### CONTINUED FROM PAGE V-6

	2	2. MARK "X"					FFLUENT				4. UNI	TS	5. INTA	KE (optional	/)
1. POLLUTANT AND CAS NUMBER	a.	b.	С.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 ( (if availat	DAY VALUE	c. LONG TERN VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	.(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I – BASE/N	EUTRAL CO	DMPOUND	S (continued)				·		·			· · · · · · · · · · · · · · · · · · ·		<u> </u>
22B. 1,4-Dichloro- benzene (106-46-7)	$\times$			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	X			ND			1			1					
24B. Diethyl Phthalate (84-66-2)	Х			ND						1		:			
25B. Dimethyl Phthalate (131 -11-3)	$\times$			ND						1					
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						. 1					
27B. 2,4-Dinitro- toluen <del>e</del> (121-14-2)	$\times$			ND						1					
288. 2,6-Dinitro- toluene (606-20-2)	X			ND						1					
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND						1					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X			ND						1					
31B. Fluoranthene (206-44-0)	X			ND	1					1		_			
32B. Fluorene (86-73-7)	$\mathbf{X}$			ND	_					1					
33B. Hexachloro- benzene (118-74-1)	$\times$			ND						1					
34B. Hexachloro- butadiene (87-68-3)	$\times$			ND	-					1					
35B. Hexachloro- cyclopentadiene (77-47-4)	X			ND						1			· .		
36B Hexachloro- ethane (67-72-1)	$\times$			ND					•	1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	X			ND						1					
38B. Isophorone (78-59-1)	$\times$			ND						1					
39B. Naphthaiene (91-20-3)	$\times$			ND						1					
40B. Nitrobenzene (98-95-3)	$\times$			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND						1					
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$		-	ND						1					

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CONTINUE ON REVERSE





	2. MARK *X*					3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
	a.	b.	c.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE ble)	c. LONG TERN VALUE (if ava	I AVRG. ailable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I - BASE/N	EUTRAL CO	MPOUND	S (continued)									· · · · · · · · · · · · · · · · · · ·		
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$	-		ND						1					
44B. Phenanthrene (85-01-8)	X			ND						1				····	
45B. Pyrene (129-00-0)	$\times$			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	$\times$			ND						1			*		
GC/MS FRACTION	N - PESTIC	IDES											•		
1P. Aldrin (309-00-2)			$\times$												
2P. α-BHC (319-84-6)			$\times$												
3P. β-BHC (319-85-7)			X												
4P. γ-BHC (58-89-9)			$\times$												
5P. δ-BHC (319-86-8)			X												
6P. Chlordane (57-74-9)			$\times$												
7P. 4,4'-DDT (50-29-3)			X												
8P. 4,4 -DDE (72-55-9)			X												
9P. 4,4'-DDD (72-54-8)			$ \times $												
10P. Dieldrin (60-57-1)															
11P. α-Enosulfan (115-29-7)			<u> </u>											#+++=	
12P. β-Endosulfan (115-29-7)			X												
13P. Endosulfan Sulfate (1031-07-8)			$\times$		-			-				•			
14P. Endrin (72-20-8)			X										· ·		
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			$\times$										·		
EPA Form 3510-20	C (8-90)			•			PAGE	E V-8					co	NTINUE ON	VPAGE V-9



				EPA	I.D. NUMBE	R (copy from Item I	of Form 1)	OUTFALL NUM	BER						
CONTINUED FRO		Q.			NHE	081257446		02	:3						
J	] 2	2. MARK "X	n	· · · · · · · · · · · · · · · · · · ·		3. E	FFLUENT	-1			4. UN	ITS	5. INT/	KE (optiona	λ)
1. POLLUTANT AND	a.	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availat	DAY VALUE ble)	c. LONG TERM VALUE (if ave	AVRG. ailable)				a. LONG T AVERAGE V	ERM ALUE	Í
(if available)	TESTING REQUIRED	BELIEVED PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	N - PESTICI	DES (contin	ued)							÷					
17P. Heptachlor Epoxide (1024-57-3)			X												
18P. PCB-1242 (53469-21-9)			X												
19P. PCB-1254 (11097-69-1)			X												
20P. PCB-1221 (11104-28-2)			X												
21P. PCB-1232 (11141-16-5)			X												
22P. PCB-1248 (12672-29-6)			$\times$												
23P. PCB-1260 (11096-82-5)			X												
24P. PCB-1016 (12674-11-2)			$\times$												
25P. Toxaphene (8001-35-2)			$\times$												

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EPAI.D. NUMBER (copy from Item 1 of Form 1)

SEE INSTRUCTION	ons.						NHD081	257446		1				
V. INTAKE AND	EFFLUE	NT CHARACI	TERISTICS (contin	ued from page 3	of Form 2-C)							. C	024	
PART A -You m	iust provid	e the results	of at least one ana	lysis for every po	llutant in this table	. Complete on	e table for each	outfall. See inst	ructions for add	litional details.	,			
					2 EEE118	-NT				3. UNI	TS hlank)	4	. INTAKE	
		a. MAXIMUI	M DAILY VALUE	b. MAXIMUM (if av	30 DAY VALUE ailable)	c. LON	G TERM AVRG. (if available)	VALUE				a. LONG T AVERAGE \	ERM /ALUE	
1. POLLUTA	NT	(1) CONCENTRAT	ION (2) MASS	(1) CONCENTRATIC	IN (2) MASS	(1) CONCE		(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
a. Biochemical C Demand (BOD)	Dxygen	77	0.11						1	mg/L	lbs/d			
b. Chemical Oxy Demand (COD)	gen	21	0.03				· [		1	mg/L	lbs/d			
c. Total Organic (TOC)	Carbon	6.6	0.01						1	mg/L	lbs/d			,
d. Total Suspend Solids (755)	ded	2.4	<0.01						1	_mg/L	lbs/d			
e. Ammonia (as	M)	1.3	<0.01						1	mg/L	lbs/d			
f. Flow	ľ	ALUE	164	VALUE		VALUE			1	GPD		VALUE		
g. Temperature (winter)	ľ	ALUE	· · · · · · · · · · · · · · · · · · ·	VALUE		VALUE				•C		VALUE		
h. Temperature (summer)	Ň	ALUE	20	VALUE		VALUE			1	°C		VALUE		
i. pH		MINIMUM 7.4	MAXIMUM 7.4	MINIMUM	MAXIMUM				1	STANDARI	O UNITS			
PART B ~ Mari direc	k "X" in co ctly, or inc	lumn 2-a for o directly but ex	each pollutant you xpressly, in an effi	know or have reau uent limitations of	ason to believe is guideline, you mu	present. Mark ' st provide the	"X" in column 2-t results of at lea	) for each pollut st one analysis the instruction	tant you believe for that pollut	to be absent. If ant. For other p	you mark col ollutants for y	lumn 2a for any poll which you mark col	utant which is umn 2a, you	limited either must provide
400	2. M	ARK "X"		Sonoo in your uic	3	EFFLUENT				4, (	JNITS	5. IN	TAKE (option	al)
1. POLLUTANT AND	8.	b.	a. MAXIMUM D		b. MAXIMUM 30 (if availe	DAY VALUE	c. LONG TERI	M AVRG. VALL ailable)	JE .	_		a. LONG TERM VALU	I AVERAGE JE	
CAS NO. (if available)	PRESENT	D BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATIO	ON (2) MASS	d. NO. O ANALYSE	S TRATION	N- J b. MAS	(1) CONCENTRATION	N (2) MASS	ANALYSES
a. Bromide (24959-67-9)		X												
b. Chlorine, Total Residual	X	ND							1					
c. Color		X												
d. Fecal Coliform		X				4								
e. Fluoride (16984-48-8)		X												
f. Nitrate-Nitrite ( <i>as N</i> )		$ \times $					<u> </u>							

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CONTINUE ON REVERS







ITEM V-B CONTINUED FROM FRONT

	2. MA	₹K *X*				EFFLUENT				4. UNIT	s	5. INT/	AKE (optiona	<i>i</i> )
1. POLLUTANT AND	a.	b.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A (if availa	VRG. VALUE ble)				a. LONG TE AVERAGE V	ERM ALUE	
CAS NO. (if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	$\times$		ND						1					
h. Oil and Grease	X		ND						1					-
i. Phosphorus (as P), Total (7723-14-0)	$\times$		0.094	<0.01					1	mg/L	lbs/d			
j. Radioactivity										-				
(1) Alpha, Total		Х												
(2) Beta, Total		X												
(3) Radium, Total		Х												
(4) Radium 226, Total		X												
k. Sulfate (as SO <sub>4</sub> ) (14808-79-8)	$\times$		10	0.01					1	mg/l	lbs/d			
l. Sulfide (as S)	$\times$		ND				4		1					
m. Sulfite (as SO;) (14265-45-3)		X												
n. Surfactants		$\times$												
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		X												
q. Boron, Total (7440-42-8)		$\times$												
r. Cobalt, Total (7440-48-4)		$\mathbf{X}_{\mathbf{x}}$												
s. Iron, Total (7439-89-6)	X		1.3	<0.01					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	$\times$		1.1	<0.01					1	mg/L	lbs/d			
u. Molybdenum, Total (7439-98-7)		Х										<u>.</u>		
v. Manganese, Total (7439-96-5)	X		0.19	<0.01				<u>_</u>	1	mg/L	lbs/d			
w. Tin, Total (7440-31-5)		X												
x. Titanium, Total (7440-32-6)		X												

EPA Form 3510-2C (8-90)

1

CONTINUED FROM	I PAGE 3 O	F FORM 2-0	0	NH	D081257	446		024							
PART C - If you a fraction fraction provide	re a primary s that apply s), mark "X" the results	/ industry an to your indu ' in column : of at least o	id this outfa ustry and f 2-b for eac ne analysis	all contains process for ALL toxic metals th pollutant you kno s for that pollutant.	s wastewate s, cyanides, ow or have r If you mark	r, refer to Table 2c and total phenols. eason to believe is column 2b for any	-2 in the insti- If you are no present. Ma pollutant, you	ructions to determin of required to mark irk "X" in column 2- i must provide the i	ne which of column 2- c for each results of at	the GC/MS fr a (secondary pollutant you least one and	actions you mu <i>industries, non</i> believe is abse alysis for that p	ist test for. M process was ant. If you m ollutant if yo	Mark "X" in column stewater outfalls, and ark column 2a for u know or have rea	2-a for all sund nonrequiation of the second	ICh GC/MS red GC/MS t, you mus ve it will be
discharg pollutan briefly o	ged in conce ts which yo lescribe the	entrations of u know or h reasons th	10 ppb or ave reasor e pollutant	greater. If you man to believe that you is expected to be	k column 2b u discharge discharged.	for acrolein, acrylo in concentrations c Note that there a	onitrile, 2,4 di of 100 ppb or re 7 pages to	nitrophenol, or 2-m greater. Otherwise this part; please	ethyl-4, 6 d , for polluta review eac	initrophenol, y ints for which h carefully. C	you must provid you mark coluit complete one ta	fe the result mn 2b, you i ble ( <i>all 7 pa</i>	s of at least one an must either submit ages) for each outf	alysis for ea at least one all. See inst	ch of these analysis or ructions for
addition	ai detalls ar	2 MARK "X"	ents.	r		3 6						ITS	5 INT/	KE (ontiona	
1. POLLUTANT AND	a.	b.	c.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM VALUE (if ave	AVRG. ailable)		4. 011		a. LONG T AVERAGE V	ERM ALUE	/
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSE
METALS, CYANID	E, AND TOT	TAL PHENO	LS												
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$\times$			ND						1					
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1		· · · ·	`		
4M. Cadmium, Total (7440-43-9)	$\times$			ND						1					
5M. Chromium, Total (7440-47-3)	$\times$			ND						1					
6M. Copper, Total (7440-50-8)	$\times$			ND						1					
7M. Lead, Total (7439-92-1)	$\times$			0.005	0.01					1	mg/L	lbs/d			
8M. Mercury, Total (7439-97-6)	$\times$			ND						1					
9M. Nickel, Total (7440-02-0)	$\times$			ND						1					
10M. Selenium, Total (7782-49-2)	$\times$			ND						1					
11M. Silver, Total (7440-22-4)	$\times$			ND						1					
12M. Thallium, Total (7440-28-0)	$\times$			ND						1					
13M. Zinc, Total (7440-66-6)	$\times$			0.05	<0.01					1	mg/L	lbs/d	· · · · · · · · · · · · · · · · · · ·		
14M. Cyanide, Total (57-12-5)	$\times$			ND						1					<u> </u>
15M. Phenols, Total	$ \times$			0.20	<0.01			·		1	mg/L	lbs/d		<u> </u>	
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			X	DESCRIBE RESU	JLTS										

EPA I.D. NUMBER (copy from Item 1 of Form 1) OUTFALL NUMBER

024

NHD081257446

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CONTINUE ON REVERSE

Outfall #024

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	2	2. MARK "X"	•			3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	()
1. POLLUTANT AND	a.	b.	C.	a. MAXIMUM DAI		b. MAXIMUM 30 ( (if availa	DAY VALUE	c. LONG TERN VALUE (if ava	1 AVRG. ailable)			····	a. LONG T AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN-	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	– VOLATIL	E COMPOL	JNDS												
1V. Accrotein (107-02-8)	$\cdot \times$			ND						1					
2V. Acrylonitrile (107-13-1)	$\times$			ND						1					
3V. Benzene (71-43-2)	$\times$			ND						1					
4V. Bis ( <i>Chloro-</i> <i>methyl</i> ) Ether (542-88-1)	$\times$			ND						1					
5V. Bromoform (75-25-2)	X			ND						1					
6V. Carbon Tetrachloride (56-23-5)	×			ND						1	1				
7V. Chlorobenzene (108-90-7)	X			ND						1					
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\mathbf{X}$			ND	-					1					
11V. Chloroform (67-66-3)	X			5.9	0.01			,		1	mg/L	lbs/d			
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	$\times$			ND						1					
15V. 1,2-Dichloro- ethane (107-06-2)	X			ND						1.					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND		,				1					
17V. 1,2-Dichloro- propane (78-87-5)	$\mathbf{X}$			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)	X			ND						1					
19V. Ethylbenzene (100-41-4)	$\times$			ND						1					
20V. Methyl Bromide (74-83-9)	$\times$			ND	-					1					
21V. Methyl Chloride (74-87-3)	X			ND						1					

EPA Form 3510-2C (8-90)









CONTINUED FROM PAGE V-4

	2	. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optional	n -
	8,	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble}	c. LONG TERN VALUE (if ava	I AVRG. nilable)	4 NO OF			a, LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (cont	inued)			· · · · · · · · · · · · · · · · · · ·		<u></u>	1					·
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	X			ND						1			· ·		
24V. Tetrachloro- ethylene (127-18-4)	$\times$			ND						1					
25V. Toluene (108-88-3)	$\times$			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	X			ND						1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	X			ND		• •				1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	X			ND						1					
29V Trichloro- ethylene (79-01-6)	X			ND						1					
30V. Trichloro- fluoromethane (75-69-4)	Х		•	ND						1				····	
31V. Vinyl Chloride (75-01-4)	$\times$			ND						1					
GC/MS FRACTION	- ACID CC	MPOUNDS													
1A. 2-Chlorophenol (95-57-8)	X			ND						1					
2A. 2,4-Dichloro- phenol (120-83-2)	X			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	X			ND					,	1			L.		
4A. 4,6-Dinitro-O- Cresol (534-52-1)	Х			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	X			ND						1					
6A. 2-Nitrophenol (88-75-5)	X			ND						1					
7A. 4-Nitrophenol (100-02-7)	Х			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	X			ND						1					
9A. Pentachloro- phenol (87-86-5)	Х			ND						1					
10A. Phenol (108-95-2)	X			0.084	<0.01					1	mg/L	lbs/d			,
11A. 2,4,6-Trichloro- phenol (88-05-2)	Х			ND						1					

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CONTINUE ON REVERSE

Outfall #024







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# CONTINUED FROM THE FRONT

	2	. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	AKE (optiona	1)
1. POLLUTANT AND	8.	b.	С.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. vilable)				a LONG T AVERAGE V	ERM /ALUE	
(if available)	TESTING REQUIRED	BELIEVED PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S						L			4 <u> </u>		
1B. Acenaphthene (83-32-9)	X			ND						1					
2B. Acenaphtylene (208-96-8)	$\times$			ND						1					
3B. Anthracene (120-12-7)	$\times$			ND						1					
4B. Benzidine (92-87-5)	$\times$			ND .						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$			ND						1					
6B. Benzo (a) Pyrene (50-32-8)	X			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						<u></u> 1	•				
8B. Benzo (ghi) Perylene (191-24-2)	$\times$			ND	٠ •					1					
9B. Benzo (k) Fluoranthene (207-08-9)	$\times$			ND						1					
10B. Bis (2-Chloro- ethaxy) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2- <i>Chloro- ethyl</i> ) Ether (111-44-4)	$\times$			ND						1	-				
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1					
13B. Bis (2- <i>Ethyl- hexyl</i> ) Phthalate (117-81-7)	$\times$			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND						. 1					
15B. Butyl Benzyl Phthalate (85-68-7)	$\times$			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	$\times$			ND						1					
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1					
18B. Chrysene (218-01-9)	X			• ND						1	,				
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1					
20B. 1,2-Dichloro- benzene (95-50-1)	X			ND						1					
21B. 1,3-Di-chloro- benzene (541-73-1)	X			ND						1					

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#### CONTINUED FROM PAGE V-6

	2	2. MARK "X				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	0
1. POLLUTANT AND	<b>a</b> .	b.	с.	a. MAXIMUM DA		b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG, iilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I - BASE/N	EUTRAL CO	MPOUND	S (continued)											•
22B. 1,4-Dichloro- benzene (106-46-7)	X			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	$\times$			ND						1					
24B. Diethyl Phthalate (84-66-2)	Х			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	$\times$			ND						1					
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						1					
27B. 2,4-Dinitro- toluene (121-14-2)	X			ND ·						1					·
288. 2,6-Dinitro- toluene (606-20-2)	X			ND					,	1					
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND						1 ·					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X		· .	ND						1			-		
31B. Fluoranthene (206-44-0)	$\times$			ND						1					
32B. Fluorene (86-73-7)	$\times$			ND						1					
33B. Hexachloro- benzene (118-74-1)	$\times$			ND						1					
34B. Hexachloro- butadiene (87-68-3)	X			ND						1					
35B. Hexachloro- cyclopentadiene (77-47-4)	$\times$			ND						٦·					
36B Hexachloro- ethane (67-72-1)	$\times$			ND	• •					1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	$\times$			ND						1					
38B. Isophorone (78-59-1)	$\times$			ND						1		_			
39B. Naphthalene (91-20-3)	$\times$			ND			•			1					
408. Nitrobenzene (98-95-3)	X			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	Х			ND						1		_			
428. N-Nitrosodi- N-Propylamine (621-64-7)	$\mathbf{X}$			ND						1					

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE

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Outfall #024





	2	2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S (continued)											
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND						ı					
44B. Phenanthrene (85-01-8)	X			ND						1					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	X			ND						1					
GC/MS FRACTION	I – PESTICI	DES													
1P. Aldrin (309-00-2)			X								•				
2P. α-BHC (319-84-6)			X												
3P. β-BHC (319-85-7)			X		-										
4P. γ-BHC (58-89-9)			X												
5Ρ. δ-BHC (31 <del>9</del> -86-8)			Х												
6P. Chlordane (57-74-9)			X												
7P. 4,4'-DDT (50-29-3)			$\times$										•		
8P. 4,4'-DDE (72-55-9)			X												
9P. 4,4'-DDD (72-54-8)			$\times$												
10P. Dieldrin (60-57-1)			X								-				
11P. α-Enosulfan (115-29-7)			$\times$								. ر				
12P. β-Endosulfan (115-29-7)		•	X												
13P. Endosulfan Sulfate (1031-07-8)	-		X								-				
14P. Endrin (72-20-8)			$\times$												
15P. Endrin Aldehyde (7421-93-4)			Х												
16P. Heptachlor (76-44-8)			$\times$												

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CONTINUE ON PAGE V-9

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Outfall #024

CONTINUED FROM	M PAGE V-	8		E	PA I.D. NUMBE NHI	R (copy from Item 1 0081257446	of Form 1)	OUTFALL NUM	BER						
		2. MARK "X				3. E	FFLUENT	······································			4. UN	ITS	5. INT/	KE (optiona	<u>^</u>
AND	а.	b.	C.	a. MAXIMUM	DAILY VALUE	b. MAXIMUM 30 ( (if availa	DAY VALUE ble)	c. LONG TERM VALUE (if ava	I AVRG. ailable)		001051	2.	a. LONG T AVERAGE \	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	8ELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATI	ON (2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- PESTICI	DES (contin	ued)					-							
17P. Heptachlor Epoxide (1024-57-3)			Х												
18P. PCB-1242 (53469-21-9)			X												
19P. PCB-1254 (11097-69-1)			Х												

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EPA Form 3510-2C (8-90)

17P. Heptachlor Epoxide (1024-57-3) 18P. PCB-1242 (53469-21-9) 19P. PCB-1254 (11097-69-1) 20P. PCB-1221 (11104-28-2)

21P. PCB-1232 (11141-16-5)

22P. PCB-1248 (12672-29-6) 23P. PCB-1260 (11096-82-5) 24P. PCB-1016 (12674-11-2) 25P. Toxaphene (8001-35-2)

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Outfall #024

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.

EPA I.D. NUMBER (copy from Item 1 of Form 1)

NHD081257446 SEE INSTRUCTIONS. OUTFALL NO. V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C) 025A PART A -You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details. 3. UNITS 4. INTAKE 2. EFFLUENT (specify if blank) (optional) b. MAXIMUM 30 DAY VALUE C. LONG TERM AVRG. VALUE a. LONG TERM AVERAGE VALUE a. MAXIMUM DAILY VALUE (if available) (if available) a. CONCENd. NO. OF b. NO. OF (1) (1) CONCENTRATION (1) CONCENTRATION ANALYSES 1. POLLUTANT ANALYSES TRATION b. MASS CONCENTRATION (1) CONCENTRATION (2) MASS (2) MASS (2) MASS (2) MASS a. Biochemical Oxygen ND 1 Demand (BOD) b. Chemical Oxygen mq/L lbs/d 15.7 1 10 Demand (COD) c. Total Organic Carbon 3.2 5:0 1 mq/L lbs/d (TOC)d. Total Suspended ND 1 Solids (TSS) e. Ammonia (as M) ND 1 VALUE VALUE VALUE VALUE f. Flow 187,801 1 GPD VALUE VALUE VALUE VALUE g. Temperature °C (winter) VALUE VALUE VALUE VALUE h. Temperature °C 27 1 (summer) MAXIMUM 9.5 MINIMUM MINIMUM MAXIMUM i, pH STANDARD UNITS 1 9.5 PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements. 5. INTAKE (optional) 2. MARK "X" 3. EFFLUENT 4. UNITS a. LONG TERM AVERAGE 1. POLLUTANT b. MAXIMUM 30 DAY VALUE c. LONG TERM AVRG. VALUE AND VALUE a. MAXIMUM DAILY VALUE (if available) (if available) d. NO. OF a. CONCENb. NO. OF CAS NO. BELIEVED BELIEVED (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION ANALYSES ANALYSES TRATION b. MASS (if available) PRESENT ABSENT (2) MASS (2) MASS (2) MASS (2) MASS a. Bromide (24959-67-9) Х b. Chlorine, Total Residual c. Color d. Fecal Coliform e. Fluoride (16984-48-8) . Nitrate-Nitrite (as N)

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CONTINUE ON REVERS





# ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"				EFFLUENT				4. UNI	S	5. INT/	AKE (optiona	ı/)
1. POLLUTANT AND	a.	b.	a. MAXIMUM DA		b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A (if availa	VRG. VALUE		001051		a. LONG TE AVERAGE V	ERM ALUE	
CAS NO. (if available)	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	D. NO. OF ANALYSES
g. Nitrogen, Total Organic (as N)	$\times$		ND						1					
h. Oil and Grease	$\times$		ND						1					
i. Phosphorus (as P), Total (7723-14-0)		$\times$												
j. Radioactivity	•													
(1) Alpha, Total	X		ND						1	pCi/kg				
(2) Beta, Total	X		ND						1	pCi/kg				
(3) Radium, Total		X												
(4) Radium 226, Total		$\times$												
k. Sulfate (as SO <sub>4</sub> ) (14808-79-8)	X		ND						. 1			·		
I. Sulfide (as S)	X		. ND						1					
m. Sulfite (as SO <sub>3</sub> ) (14265-45-3)		$\times$												
n. Surfactants	$ \times$		ND						1		,			
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		X												
g. Boron, Total (7440-42-8)	X		ND						1					
r. Cobalt, Total (7440-48-4)	X		ND						1					
s. Iron, Total (7439-89-6)	X		ND						1					
t. Magnesium, Total (7439-95-4)	X		ND						1					
u. Molybdenum, Total (7439-98-7)		X							 					
v. Manganese, Total (7439-96-5)	X		ND						1					
w. Tin, Total (7440-31-5)		X												
x. Titanium, Total (7440-32-6)		X											]	

EPA Form 3510-2C (8-90)

		· .		E	PA I.D. NUM	IBER (copy from Iter	n 1 of Form 1)	OUTFALL NUM	BER						
CONTINUED FROM	A PAGE 3 C	F FORM 2-	с	N	HD081257	446		025A							
PART C - If you a fractions fractions provide discharg pollutan briefly c addition	re a primary s that apply s), mark "X" the results ged in conce ts which yo lescribe the al details ar	v industry ar to your ind in column of at least o antrations of u know or h reasons th ad requirement	nd this outfa ustry and f 2-b for eac ne analysis f 10 ppb or ave reasor e pollutant ents.	all contains proces or ALL toxic metal h pollutant you kno s for that pollutant. greater. If you ma h to believe that yo is expected to be	s wastewate ls, cyanides, ow or have t If you mark rk column 2t u discharge discharged	r, refer to Table 2c and total phenols. eason to believe is column 2b for any b for acrolein, acryle in concentrations c Note that there as	-2 in the instr If you are no s present. Ma pollutant, you ponitrile, 2,4 di of 100 ppb or re 7 pages to	uctions to determin to required to mark rk "X" in column 2- must provide the in introphenol, or 2-m greater. Otherwise o this part; please	the which of column 2- c for each results of at ethyl-4, 6 d for polluta review each	the GC/MS fit a (secondary pollutant you least one an. initrophenol, j inits for which h carefully. C	actions you mu industries, non believe is abse alysis for that p you must provic you mark colu omplete one ta	ast test for. M process was ent. If you m ollutant if yo de the result mn 2b, you bble (all 7 pa	Mark "X" in column stewater outfalls, a ark column 2a for u know or have rea s of at least one an must either submit ages) for each outf	2-a for all si nd nonrequi any pollutan ason to belie alysis for ea at least one all. See inst	uch GC/MS ired GC/MS it, you mus ive it will be ach of these analysis o tructions fo
	i	2. MARK *X	•			<u>3. E</u>	FFLUENT			· · · · ·	4. UN	ITS	5. INT/	AKE (optiona	ıl)
AND	a.	ъ.	c.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERN VALUE (if av	AVRG. ailable)				a. LONG T AVERAGE	ERM /ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANID	E, AND TOT	AL PHENO	LS			•							· · · ·		
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$\times$			ND						1					
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1					
4M. Cadmium, Total (7440-43-9)	$\mathbf{X}$			ND						1					
5M. Chromium, Total (7440-47-3)	$\times$			ND						1		,			
6M. Copper, Total (7440-50-8)	X			ND						1					
7M. Lead, Total (7439-92-1)	$ \times $			ND						1					
8M. Mercury, Total (7439-97-6)	$\times$			ND				·		1					,
9M. Nickel, Totał (7440-02-0)	$ \times $			ND						1					
10M. Selenium, Total (7782-49-2)	$\times$			ND						1	-				
11M. Silver, Total (7440-22-4)	$\times$			ND					]	1					
12M. Thallium, Total (7440-28-0)	$ \times $			ND						1					
13M. Zinc, Total (7440-66-6)		$\times$		0.02	0.03					1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	$\times$			ND						1					
15M. Phenois, Total	$ \times$			ND	<u> </u>				L	1		l			
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			X	DESCRIBE RES	JLTS										

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CONTINUE ON REVERSE





		2. MARK "X"	•	[		3. E	FFLUENT				4. UN	ITS	5. INT/	AKE (optiona	1)
1. POLLUTANT AND	8.	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERN VALUE (if ave	1 AVRG. ailable)		001051		a. LONG T AVERAGE \	ERM /ALUE	
(if available)	REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN- TRATION	b. MASS		(2) MASS	ANALYSE
GC/MS FRACTION	I – VOLATIL	E COMPOL	JNDS							•			•·		
1V. Accrolein (107-02-8)	$\times$			ND						1					
2V. Acrylonitrile (107-13-1)	$\times$			ND						1					
3V. Benzene (71-43-2)	X			ND						1					
4V. Bis (Chloro- methyl) Ether (542-88-1)	$\times$			ND						1					
5V. Bromoform (75-25-2)	$\times$			ND						1				-	
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND						1					
7V. Chlorobenzene (108-90-7)			-	ND						1					
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	X			ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	X			ND						1			<del>_</del>		
15V. 1,2-Dichloro- ethane (107-06-2)	$\times$			ND						1					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	$\times$			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)	$\times$			ND						1					
19V. Ethylbenzene (100-41-4)	$\times$			ND						1					
20V. Methyl Bromide (74-83-9)	$\times$			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND			•			1					

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	2. MARK "X"					3. E	FFLUENT				<u>4. UN</u>	ITS	5. IN 1 A	KE (optiona	/)
1. POLLUTANT AND	a. ·	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1)- CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (coni	inued)						·			· · · · · · · · · · · · · · · · · · ·		
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	$\times$			ND						1					
24V. Tetrachloro- ethylene (127-18-4)	$\times$			ND						1					
25V. Toluene (108-88-3)	X			ND			_			1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	X	-		ND						. 1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\times$			ND						. 1				_	
28V. 1,1,2-Trichloro- ethane (79-00-5)	X		•	ND						1					
29V Trichloro- ethylene (79-01-6)	X			ND						1				_	
30V. Trichloro- fluoromethane (75-69-4)	$\times$			ND					<u>ر</u>	1					
31V. Vinyl Chloride (75-01-4)	X			ND					_	1					
GC/MS FRACTION	- ACID CC	MPOUNDS													
1A. 2-Chlorophenol (95-57-8)	Х			ND					-	1					
2A. 2,4-Dichloro- phenol (120-83-2)	X			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	$\times$			ND					ų.	1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	X		.1	ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	$\times$			ND						1					
6A. 2-Nitrophenol (88-75-5)	X			ND						1					、 
7A. 4-Nitrophenol (100-02-7)	X			ND						1				- <b></b>	
8A. P-Chloro-M- Cresol (59-50-7)	$\times$			ND			•			1					
9A. Pentachloro- phenol (87-86-5)	X			ND						1	<u>.</u>				
10A. Phenol (108-95-2)	$\times$			ND						· 1					
11A. 2,4,6-Trichloro- phenol (88-05-2)	X			ND						1					
EPA Form 3510-20	C (8-90)						PAG	E V-5					CO	NTINUE ON	I REVERSE

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	2	. MARK "X				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	0
1. POLLUTANT AND	8.	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	l AVRG. vilable)				a. LONG T AVERAGE V	ERM	
CAS NUMBER (if available)	TESTING REQUIRED	PRESENT	BELIEVED	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S		<u></u>				·					
1B. Acenaphthene (83-32-9)	X			ND		·				1.					
2B. Acenaphtylene (208-96-8)	X			ND						1					
3B. Anthracene (120-12-7)	X		*.	ND						1					
4B. Benzidine (92-87-5)	X			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$	,		ND						1					
6B. Benzo (a) Pyrene (50-32-8)	$\times$			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						1					
8B. Benzo ( <i>ghi</i> ) Perviene (191-24-2)	X			ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	X			ND			:			1					
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			ND .						1	·				
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1					
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	$\times$		-	ND						1		· .			
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND			-			1					
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND						1					
16B. 2-Chioro- naphthalene (91-58-7)	X			ND						1					
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1					
18B. Chrysene (218-01-9)	Х			ND						1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1					
20B. 1,2-Dichloro- benzene (95-50-1)	X			ND						1					
21B. 1,3-Di-chloro- benzene (541-73-1)	Х			ND						1					

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CONTINUE ON PAGE V-7

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CONTINUED FROM PAGE V-6

	2	2. MARK "X"	,			3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	n)
1. POLLUTANT AND	а.	b.	С.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERN VALUE (if ava	I AVRG. vilable)	4 NO OF			a. LONG T AVERAGE V	ERM	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I – BASE/N	EUTRAL CO	MPOUND	S (continued)					· · · ·		······································		· · · · · · · · · · · · · · · · · · ·		
22B. 1,4-Dichloro- benzene (106-46-7)	X			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	X		· .	ND						1					
24B. Diethyl Phthalate (84-66-2)	$\times$			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	$\times$			ND						1		-			
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						1					
27B. 2,4-Dinitro- toluene (121-14-2)	X			ND						1					
28B. 2,6-Dinitro- toiuene (606-20-2)	$\mathbf{X}$			ND						1					
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND						1			÷		
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						1					
32B. Fluorene (86-73-7)	X			ND			_			1					
33B. Hexachloro- benzene (118-74-1)	$\times$			ND						1					
348. Hexachloro- butadiene (87-68-3)	$\times$			ND						1					12.1
358. Hexachloro- cyclopentadiene (77-47-4)	X			ND						1 .			-		
36B Hexachloro- ethane (67-72-1)	X			ND						1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	$\times$			ND						1			· · · · · · · · · · · · · · · · · · ·		
38B. Isophorone (78-59-1)	$\times$			ND						1					
39B. Naphthalene (91-20-3)	X			ND						1					
40B. Nitrobenzene (98-95-3)	$  \times$			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND						1					
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND						1		-			

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE







	2	. MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optional	Ŋ
1. POLLUTANT AND	8.	b.	С.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)			,	a. LONG T AVERAGE V	ERM ALUE	
. CAS NUMBER (if available)	TESTING RÉQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S (continued)											
43B. N-Nitro- sodiphenylamine (86-30-6)	X			ND						1					
44B. Phenanthrene (85-01-8)	$\times$			ND						1.					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	X			ND						1					
GC/MS FRACTION	I - PESTICI	DES													
1P. Aldrin (309-00-2)			$\times$												
2P. α-BHC (319-84-6)			$\times$												
3Ρ. β-ΒΗϹ (319-85-7)			X												
4P. γ-BHC (58-89-9)			X			_									
5P. δ-BHC (319-86-8)			X												
6P. Chlordane (57-74-9)			$\times$						ï						
7P. 4,4'-DDT (50-29-3)			$\times$												
8P. 4,4'-DDE (72-55-9)			$\times$			-									
9P. 4.4'-DDD (72-54-8)			$\times$												
10P. Dieldrin (60-57-1)			X												
11P. α-Enosulfan (115-29-7)			$\times$												
12P. β-Endosulfan (115-29-7)			X	·											
13P. Endosulfan Sulfate (1031-07-8)	· .		X			·									
14P. Endrin (72-20-8)			X			<u></u>									ļ
15P. Endrin Aldehyde (7421-93-4)			X					-							
16P. Heptachlor (76-44-8)			$  \times$												

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-9



				EPAI	EPA I.D. NUMBER (copy from Item 1 of Form 1)				BER						
CONTINUED FROM	M PAGE V-8	3			NHD	081257446		025	5A						
	2	. MARK "X				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	<i>al</i> )
1. POLLUTANT AND CAS NUMBER	8.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availa	DAY VALUE ble)	c. LONG TERM VALUE (if ava	I AVRG. vilable)				a. LONG T AVERAGE V		
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I - PESTICI	DES (contin	ued)												
17P. Heptachlor Epoxide (1024-57-3)			X												
18P. PCB-1242 (53469-21-9)			Х												
19P. PCB-1254 (11097-69-1)			X												
20P. PCB-1221 (11104-28-2)			X												
21P. PCB-1232 (11141-16-5)			X												
22P. PCB-1248 (12672-29-6)			X												
23P. PCB-1260 (11096-82-5)			X							-					
24P. PCB-1016 (12674-11-2)		,	X								,				
25P. Toxaphene (8001-35-2)			X												

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PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEF INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1) NHD081257446

SEE INSTRUCT	UNS.													
V. INTAKE AND	EFFLUE	NT CHARAC	TERISTICS (contin	nued from page 3 c	of Form 2-C)							ſ	OUTFALL NO	
PART AYou m	nust provi	de the results	of at least one ana	lysis for every poli	iutant in this table	e. Complete or	ie table for each o	utfall. See inst	ructions for ad	ditional details.	,			
					2. EFFLU	ENT				3. UN (specify ij	ITS (blank)		4. INTAKE (optional)	
		a. MAXIMU	M DAILY VALUE	b. MAXIMUM 3 (if ava	0 DAY VALUE ilable)	c. LON	IG TERM AVRG. \ (if available)	ALUE				a. LONG AVERAGE	TERM VALUE	
1. POLLUTA		(1) CONCENTRA	TION (2) MASS	(1) CONCENTRATION	N (2) MASS	(1) CONCE	NTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
a. Biochemical ( Demand (BOD)	Oxygen	ND				_			1					
b. Chemical Oxy Demand (COD)	/gen	ND							1					
c. Total Organic (TOC)	Carbon	ND							1					
d. Total Suspend Solids (TSS)	ded	ND							1					
e. Ammonia (as	M)∙	1.6	1.1						1	mg/L	lbs/d			
f. Flow	VALUE 85,019 VALUE					VALUE			1	GPD		VALUE -	· · ·	
g. Temperature (winter)	perature VALUE VALUE				VALUE	· · · · ·			•0		VALUE			
h. Temperature (summer)		VALUE	28	VALUE		VALUE			1	•0	· · ·	VALUE		
i. pH		MINIMUM 5.9	MAXIMUM 5.9	MINIMUM	MAXIMUM				1	STANDAR				
PART B – Mar dire qua	k "X" in co ctly, or in ntitative d	olumn 2-a for directly but e ata or an exp	each pollutant you xpressly, in an effi lanation of their pre	know or have reas luent limitations gu sence in your disc	son to believe is uideline, you mu charge. Complete	present. Mark ist provide the e one table for	"X" in column 2-b results of at least each outfall. See t	for each pollut t one analysis he instructions	ant you believe for that pollut for additional	e to be absent. I ant. For other p details and requ	f you mark co collutants for irements.	lumn 2a for any pol which you mark co	llutant which is llumn 2a, you	s limited either must provide
	2. N	ARK "X"			3	B. EFFLUENT				4.	UNITS	5. 11	NTAKE (option	ual)
1. POLLUTANT AND	a.	ь.	a. MAXIMUM D		b. MAXIMUM 30 (if avail	DAY VALUE	c. LONG TERM (if ava	AVRG. VALU ilable)	E	-		a. LONG TER	M AVERAGE UE	
(if available)	PRESEN	D BELIEVED T ABSENT	(1) CONCENTRATION	(2) MASS C	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATIO	N (2) MASS	d. NO. O ANALYSE	ES TRATIO	N- b. MAS	S CONCENTRATIO	N (2) MASS	D. NO. OF
a. Bromide (24959-67-9)														
b. Chlorine, Total Residual		X												
c. Color														
d. Fecal Coliform		X	4 .											
e. Fluoride (16984-48-8)		X										•		
f. Nitrate-Nitrite (as N)		$ \times$												

CONTINUE ON REVERS





#### ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"		·····		EFFLUENT				4. UNI	rs	5. INT/	AKE (optiona	1)
1. POLLUTANT AND	а.	b.	a. MAXIMUM DA		b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERM A	VRG. VALUE				a. LONG TE AVERAGE V		
CAS NO. (if available)	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	$\times$		ND						1					
h. Oil and Grease	$\times$		ND						1					•
I. Phosphorus (as P), Total (7723-14-0)		$\times$								-				
j. Radioactivity									_					
(1) Alpha, Total	X		ND						1	pCi/kg				
(2) Beta, Total	X		ND						1	pCi/kg				
(3) Radium, Total		Х									-			
(4) Radium 226, Total		X												
k. Sulfate (as SO <sub>2</sub> ) (14808-79-8)	$\times$		ND						l					
1. Sulfide (as S)	$\times$		ND						1	•				
m. Sulfite (as SO)) (14265-45-3)		X										L.		х. 
n. Surfactants	$\times$		ND						.1					
o. Aluminum, Total (7429-90-5)		$\times$								:			-	
p. Barium, Total (7440-39-3)	· · ·	X						-						
q. Boron, Total (7440-42-8)	$\times$		ND						1					
r. Cobalt, Total (7440-48-4)	$\times$		ND						1					
s. iron, Total. (7439-89-6)	$\times$		ND			· ·			1					
t. Magnesium, Total (7439-95-4)	$\times$		ND						1					
u. Molybdenum, Total (7439-98-7)		X												
v. Manganese, Total (7439-96-5)	X		ND						1					
w. Tin, Total (7440-31-5)		X												
x. Titanium, Total (7440-32-6)		$\times$												

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				[ EI		BER (conv from Ite	m L of Form 1		BER						
				NH	081257	1446	<i>a i oj i orm i j</i>	0258	DER						
CONTINUED FROM	I PAGE 3 C	F FORM 2-	<u>c</u>		0001237			dez0							
PART C - If you a fraction provide dischar pollutar briefly o additior	re a primary s that apply s), mark "X" the results ged in conce tts which yo describe the nal details ar	v industry ar to your ind in column of at least o entrations of u know or h reasons th d requirem	nd this outfa ustry and f 2-b for eac ne analysis f 10 ppb or ave reasor e pollutant ents.	all contains process for ALL toxic metals the pollutant you knot s for that pollutant. greater. If you man to believe that you is expected to be	s wastewate s, cyanides, ow or have r lf you mark k column 2b u discharge discharged.	r, refer to Table 2c and total phenols. eason to believe is column 2b for any for acrolein, acryle in concentrations c Note that there a	-2 in the instr If you are no present. Ma pollutant, you politrile, 2,4 di of 100 ppb or re 7 pages to	uctions to determin t required to mark rk "X" in column 2- must provide the nitrophenol, or 2-m greater. Otherwise b this part; please	ne which of column 2- -c for each results of at lethyl-4, 6 d a, for polluta review eac	the GC/MS fi a (secondary pollutant you least one an initrophenol, ' ints for which h carefully. C	actions you mi industries, nor believe is abso alysis for that p you must provid you mark colu omplete one ta	ust test for, f aprocess wa ent. If you m collutant if you de the result mn 2b, you uble (all 7 pa	Mark "X" in column stewater outfalls, a ark column 2a for u know or have rea s of at least one an must either submit ages) for each outf	2-a for all si nd nonrequi any pollutan ason to belie alysis for ea at least one all. See inst	th GC/MS red GC/MS it, you mus we it will be the of these analysis o tructions fo
		2. MARK "X	•			3. E	FFLUENT				4. UN	ITS	5. INT/	AKE (optiona	il)
1. POLLUTANT AND	a.	<u>.</u> b.	С.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERN VALUE ( <i>if av</i> e	AVRG. ailable)				a. LONG T AVERAGE \	ERM /ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANID	E, AND TOT	TAL PHENO	LS												
1M. Antimony, Total (7440-36-0)	$  \times$			ND						1					
2M. Arsenic, Total (7440-38-2)	X			ND						1					
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1			•		
4M. Cadmium, Total (7440-43-9)	$\times$			ND						1					
5M. Chromium, Total (7440-47-3)	$\times$			ND						1					
6M. Copper, Total (7440-50-8)	$ \times $			0.01	0.01					1	mg/L	lbs/d			
7M. Lead, Total (7439-92-1)	$\times$			ND						1					
8M. Mercury, Total (7439-97-6)	$\times$			ND						1					
9M. Nickel, Total (7440-02-0)	$ \times $			ND						1		·			
10M. Selenium, Total (7782-49-2)	$ \times$			ND						1					
11M. Silver, Total (7440-22-4)	$  \times$			ND						1					
12M. Thallium, Total (7440-28-0)	$ \times $			ND						1				L	
13M. Zinc, Total (7440-66-6)	X			ND						1					
14M. Cyanide, Total (57-12-5)	$\times$			ND						1					
15M. Phenols, Total	X			ND						1	<u> </u>				
DIOXIN															
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			X	DESCRIBE RESU	JLTS			•							

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE







	2	. MARK "X"				3. E	FFLUENT				4. UNI	TS	5. INTA	KE (optiona	/)
	a.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30   (if availa	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS												
1V. Accrolein (107-02-8)	$\mathbf{X}$			ND						1	·				
2V. Acrylonitrile (107-13-1)	$\times$			. ND	:					1					
3V. Benzene (71-43-2)	$\times$			ND						1					
4V. Bis ( <i>Chloro- methyl</i> ) Ether (542-88-1)	$\mathbf{X}$			ND						1					
5V. Bromoform (75-25-2)	$\times$			ND						1					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND	-					1					
7V. Chlorobenzene (108-90-7)	X			ND						1					
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND	-					. 1	-				
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	$\times$			ND						1					
12V. Dichloro- bromornethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	X			ND						1					
15V. 1,2-Dichloro- ethane (107-06-2)	$\times$			ND						1					
16V. 1,1-Dichloro- ethylene (75-35-4)	X			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND.						1					
18V. 1,3-Dichloro- propylene (542-75-6)	$\times$			ND						1			·		
19V. Ethylbenzene (100-41-4)	X			ND						1					
20V. Methyl Bromide (74-83-9)	X			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND						1					

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CONTINUED FROM PAGE V-4

	2	2. MARK "X	*			3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	8.	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERN VALUE (if ave	AVRG. ailable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (conf	inued)	(4).00	0011021110111011	(1) 111100	<b>CONCENTION</b>	(2) 110 0				·	(2) 10000	1
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	X			ND						1					
24V. Tetrachloro- ethylene (127-18-4)	X			ND						1					
25V. Toluene (108-88-3)	X			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	$\times$			ND						1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\mathbf{X}$			ND						1			,		
28V. 1,1,2-Trichloro- ethane (79-00-5)	X			ND						1					
29V Trichloro- ethylene (79-01-6)	$\times$			ND	÷.					1			· ·		
30V. Trichloro- fluoromethane (75-69-4)	$\times$			ND						1				•	
31V. Vinyl Chloride (75-01-4)	$\mathbf{X}$			ND			-			1					
GC/MS FRACTION	- ACID CC	MPOUNDS	3			-									
1A. 2-Chlorophenol (95-57-8)	X			ND						1					
2A. 2,4-Dichloro- phenol (120-83-2)	$\times$			ND	· .					1					
3A. 2,4-Dimethyl- phenol (105-67-9)	X			ND						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	$\times$			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	$\times$			ND						1					
6A. 2-Nitrophenol (88-75-5)	$\mathbf{X}^{\mathbf{r}}$			ND						1					
7A. 4-Nitrophenol (100-02-7)	$\times$			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	X			ND						1					
9A. Pentachloro- phenol (87-86-5)	Х			ND						1					
10A. Phenai (108-95-2)	$\mathbf{X}$			ND						1					
11A. 2,4,6-Trichtoro- phenol (88-05-2)	X			ND						1					

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CONTINUE ON REVERSE





	2	. MARK "X"			•	3. E	FFLUENT				4. UNI	TS	5. INTA	KE (optional	0
1. POLLUTANT AND	8.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. iilable)	1 10 05			a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S	(-,				(2)					(1)	
1B. Acenaphthene (83-32-9)	X		,	ND						1					
2B. Acenaphtylene (208-96-8)	Х		_	ND						1					
3B. Anthracene (120-12-7)	X			ND						1					
4B. Benzidine (92-87-5)	X			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$			ND ·						1					
6B. Benzo (a) Pyrene (50-32-8)	$\times$			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND			-			1				-	
8B. Benzo (ghi) Perylene (191-24-2)	X			ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	$\times$			ND						1					``
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$	:		ND				,		1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			. ND						1					
12B. Bis (2- Chloraisopropyl) Ether (102-80-1)	$\times$			ND						ı			· ·		
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	$\times$			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND						1				.=-	
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	$\times$			ND						1			· .	_,	
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1			an tanàn amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o Amin' amin'		
18B. Chrysene (218-01-9)	X			ND						1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1					
208. 1,2-Dichloro- benzene (95-50-1)	X			ND						.1					
21B. 1,3-Di-chloro- benzene (541-73-1)	Х			ND						1					

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CONTINUED FROM PAGE V-6

	2	2. MARK "X"	,			3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	C	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 I (if availat	DAY VALUE ble)	c. LONG TERM VALUE (if ava	AVRG. ilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/N	EUTRAL CO	MPOUND	S (continued)			<u>,</u> -7			I	,				····
22B. 1,4-Dichloro- benzene (106-46-7)	Х			ND						1					
238. 3,3-Dichloro- benzidine (91-94-1)	Х			ND						1					
24B. Diethyl Phthalate (84-66-2)	Х			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	X			ND						1				· · ·	
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						1					
27B. 2,4-Dinitro- toluene (121-14-2)	$\times$			ND						1					
28B. 2,6-Dinitro- toluene (606-20-2)	X			ND						1			,		
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND						1					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	X			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						1				-	
32B. Fluorene (86-73-7)	$\times$			ND						1					
33B. Hexachloro- benzene (118-74-1)	X			ND						1					
34B. Hexachloro- butadiene (87-68-3)	X			ND						1		-			
35B. Hexachloro- cyclopentadiene (77-47-4)	$\times$			ND						1					
36B Hexachloro- ethane (67-72-1)	$\times$			ND						1					
37B. Indeno ( <i>1,2,3-cd</i> ) Pyrene (193-39-5)	$\times$			ND						1		•			
38B. Isophorone (78-59-1)	X			ND						1					
39B. Naphthalene (91-20-3)	Х			ND						1					
40B. Nitrobenzene (98-95-3)	Х			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND						1		1			
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND			-			1					

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE



		MARK X				3. E	FFLUENI	•			4. UN	15	5. IN I A	KE (optional	)
1. POLLUTANT AND	а.	b.	c.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	l AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/N	EUTRAL CO	MPOUND	S (continued)	(1) 10 10 0	<b>BOILDEITHEITHEIT</b>	(1) 111 100		(2) 11# 100	· ·				(-)	· {
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND				-		1					
44B. Phenanthrene (85-01-8)	X			ND			-			1					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	$\times$			ND			-			1		<u>.    .                               </u>			
GC/MS FRACTION	I - PESTIC	IDES												<u>.</u>	
1P. Aldrin (309-00-2)			X												
2P. α-BHC (319-84-6)			X												
3Ρ. β-BHC (319-85-7)			$\times$										۰.		
4P. y-BHC (58-89-9)			X												
5P. 8-BHC (319-86-8)			X											r	
6P. Chlordane (57-74-9)			$\times$												
7P. 4,4'-DDT (50-29-3)			X												
8P. 4,4'-DDE (72-55-9)			X												
9P. 4,4'-DDD (72-54-8)			$\times$									· .			
10P. Dieldrin (60-57-1)			$\times$											-	
11P. α-Enosulfan (115-29-7)			$\times$												
12P. β-Endosulfan (115-29-7)			X												
13P. Endosulfan Sulfate (1031-07-8)			X												
14P. Endrin (72-20-8)			X												
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			$\times$												
EPA Form 3510-20	C (8-90)						PAG	E V-8					co	NTINUE ON	NPAGE V-9



					EPA I.D. NUMBER (copy from Item 1 of Form 1)			OUTFALL NUME	BER			:				
CONTINUED FRO	M PAGE V-	3				NHE	081257446		025	5B						
	2	2. MARK "X"					3.	EFFLUENT				4. UN	ITS	5. INTA	KE (optiona	al)
1. POLLUTANT AND	<b>a</b> .	ь.	С.	a. MAXIMI		ILY VALUE	b. MAXIMUM 30 (if availe	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	ABSENT	(1) CONCENTR	ATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I – PESTICI	DES (contin	ued)									· · · ·				
17P. Heptachlor Epoxide (1024-57-3)			Х													
18P. PCB-1242 (53469-21-9)			X							<u>.</u>						
19P. PCB-1254 (11097-69-1)			X													
20P. PCB-1221 (11104-28-2)			X													
21P. PCB-1232 (11141-16-5)			X													
22P. PCB-1248 (12672-29-6)			X													
23P. PCB-1260 (11096-82-5)			X							·.						
24P. PCB-1016 (12674-11-2)			X													
25P. Toxaphene (8001-35-2)			$\times$											•		

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PAGE V-9



PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS. EPAI.D. NUMBER (copy from Item 1 of Form 1) NHD081257446

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

PART A -You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

4. INTAKE 3. UNITS 2. EFFLUENT (specify if blank) (optional) a. LONG TERM b. MAXIMUM 30 DAY VALUE c. LONG TERM AVRG. VALUE AVERAGE VALUE a. MAXIMUM DAILY VALUE (if available) (if available) d. NO. OF a. CONCENb. NO. OF (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION 1. POLLUTANT ANALYSES TRATION b. MASS ANALYSES (1) CONCENTRATION (2) MASS (2) MASS (2) MASS (2) MASS a. Biochemical Oxygen 1 mg/L lbs/d 10 1.6 Demand (BOD) b. Chemical Oxygen mg/L lbs/d 34 5.3 1 Demand (COD) c. Total Organic Carbon 1 mg/L lbs/d 10 1.6 (TOC) d. Total Suspended 0.2 1 mg/L lbs/d 1.4 Solids (TSS) mq/L lbs/d e. Ammonia (as N) 2.3 0.4 1 VALUE VALUE VALUE VALUE f. Flow 18,616 1 GPD VALUE VALUE VALUE VALUE g. Temperature °C (winter) VALUE VALUE VALUE VALUE h. Temperature "C 28 1 (summer) MINIMUM 7.0 MAXIMUM MINIMUM MAXIMUM STANDARD UNITS i, pH 1 Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either PART B directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements. 4. UNITS 5. INTAKE (optional) 3. EFFLUENT 2. MARK "X" 1. POLLUTANT a. LONG TERM AVERAGE b. MAXIMUM 30 DAY VALUE c. LONG TERM AVRG. VALUE (if available) AND (if available) VALUE a. MAXIMUM DAILY VALUE a. h. b. NO. OF CAS NO. d. NO. OF a. CONCEN-BELIEVED BELIEVED (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION ANALYSES ANALYSES TRATION b. MASS (if available) ABSENT (2) MASS PRESENT (2) MASS (2) MASS (2) MASS a. Bromide (24959-67-9)b. Chlorine, Total Residual c. Color d. Fecal Coliform e. Fluoride (16984-48-8) f. Nitrate-Nitrite

EPA Form 3510-2C (8-90)

(as N)

CONTINUE ON REVERS

OUTFALL NO.



# ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"			3.	EFFLUENT				4. UNI	S	5. INT.	AKE (optiona	<i>x/</i> )
1. POLLUTANT	a.	Ь.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A (if availa	VRG. VALUE ble)				a. LONG TE AVERAGE V		
(if available)	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	Х		5.1	0.79					1	mg/L	lbs/d			
h. Oil and Grease	X		ND						1			· · · · · · · · · · · · · · · · · · ·		
i. Phosphorus (as P), Total (7723-14-0)		$\times$												
j. Radioactivity									····					
(1) Alpha, Total	$\times$		ND						1	pCi/kg				
(2) Beta, Total	X		5.20						1	pCi/kg				
(3) Radium, Total		$\times$												
(4) Radium 226, Total		$\times$												
k. Sulfate (as SO <sub>1</sub> ) (14808-79-8)	X		240	38.3					1	mg/L	lbs/d			
I. Sulfide (as S)	X		ND						1					
m. Sulfite (as SO <sub>3</sub> ) (14265-45-3)		X												
n. Surfactants	$\times$		ND						1					
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		$\times$						-	-					
q. Boron, Total (7440-42-8)	X		ND						1			•		
r. Cobalt, Total (7440-48-4)	$\times$		ND						1					
s. Iron, Total (7439-89-6)	$\mathbf{X}$		0.12	0.02			<u>.</u>		1	mg/L	lbs/d		ı	
t. Magnesium, Total (7439-95-4)	X		2.5	0.39					1	mg/L	lbs/d			
u. Molybdenum, Total (7439-98-7)		X												
v. Manganese, Total (7439-96-5)	$\times$		0.02	<0.01					1	mg/L	lbs/d			
w. Tin, Total (7440-31-5)		X		-										
x. Titanium, Total (7440-32-6)		X							÷ .					

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									250						
				Cr	-A I.D. NUN	IDER (Copy from Her	n i oj rorm i j	OUTFALL NOM	BER				•		
CONTINUED FROM	PAGE 3 O	F FORM 2-	с	NH	D081257	7446		025C							
fractions fractions provide discharg pollutan briefly d addition	s that apply s), mark "X" the results ged in conce ts which you lescribe the al details ar	to your ind in column of at least o entrations of u know or h reasons th nd requirement	ustry and 1 2-b for eac ine analysis f 10 ppb or ave reasor e pollutant ents.	or ALL toxic metals th pollutant you kno s for that pollutant, greater. If you man to believe that you is expected to be	s, cyanides, w or have i lf you mark k column 2b u discharge discharged.	and total phenols. reason to believe is column 2b for any jo for acrolein, acrylo in concentrations o . Note that there an	If you are no present. Ma pollutant, you politrile, 2,4 di of 100 ppb or re 7 pages to	ot required to mark ink "X" in column 2: in must provide the initrophenol, or 2-m greater. Otherwise o this part; please	c column 2- -c for each results of at ethyl-4, 6 d , for polluta review each	a (secondary pollutant you least one an linitrophenol, ants for which h carefully. C	industries, nor believe is abso alysis for that p you must provid you mark colu omplete one ta	nprocess wa ent. If you m pollutant if yo de the result mn 2b, you uble (all 7 pa	istewater outfalls, a nark column 2a for ou know or have rea ts of at least one an must either submit ages) for each outf	nd nonrequi any pollutar ison to belie alysis for ea at least one all. See ins	ired GC/MS of, you mus eve it will be ach of these analysis or tructions for
	1	2. MARK "X	•			3. E	FFLUENT				4. UN	ITS	5. INT/	AKE (optiona	u/)
1. POLLUTANT AND	э.	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30   (if availa	DAY VALUE ble)	c. LONG TERN VALUE (if ave	A AVRG. ailable)				a. LONG T AVERAGE	ERM /ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANIDI	E, AND TOT	TAL PHENO	ols									<u></u>			• • • • • • • • • • • • • • • • • • •
1M. Antimony, Total (7440-36-0)	X			ND						1					
2M. Arsenic, Total	X			ND						1					

ŝ 5. INTAKE (optional) 1. POLLI a. LONG TERM AN AVERAGE VALUE CAS NU b. NO. OF b. MASS (1) CONCENTRATION (2) MASS ANALYSE (if avail METALS, 1M. Antimo (7440-36-0 2M. Arsenia (7440-38-2) / ` 3M. Beryllium, Total 1 ND (7440-41-7) 4M. Cadmium, Total (7440-43-9) . 1 ND 5M. Chromium, Total (7440-47-3) ND 1 6M. Copper, Total (7440-50-8) 1 ND 7M. Lead, Total 1 ND (7439-92-1) 8M. Mercury, Total 1 ND (7439-97-6) 9M. Nickel, Total ND 1 . (7440-02-0) 10M. Selenium, 1 ND Total (7782-49-2) 11M. Silver, Total 1 ND (7440-22-4) 12M. Thallium, 1 ND Total (7440-28-0) ヘ 13M. Zinc, Total ND 1 (7440-66-6) 14M. Cyanide, 1 ND Total (57-12-5) 15M. Phenois, 1 ND Total DIOXIN DESCRIBE RESULTS 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6)

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CONTINUE ON REVERSE





	2	MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optional	/}
1. POLLUTANT AND	8.	b.	с.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. iilable)				a. LONG TI AVERAGE V	ERM ALUE	h NO. 05
(if available)	REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS												
1V. Accrolein (107-02-8)	X			ND			•			1					
2V. Acrylonitrile (107-13-1)	$\times$			ND				:		1					
3V. Benzene (71-43-2)	$\mathbf{X}$			ND						1				×	
4V. Bls ( <i>Chloro-</i> <i>methyl</i> ) Ether (542-88-1)	$\times$			ND	\$					1					
5V. Bromoform (75-25-2)	X			ND		н				1.					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND			· ·			1					
7V. Chlorobenzene (108-90-7)	X			ND					_	1					
8V. Chlorodi- bromornethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	Х		•	ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1	-				
14V. 1,1-Dichloro- ethane (75-34-3)	$\times$			ND					<u>.</u>	1					
15V. 1,2-Dichloro- ethane (107-06-2)	X			ND					,	1					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)	$\times$			ND						1					
19V. Ethylbenzene (100-41-4)	X			ND						1					
20V. Methyl Bromide (74-83-9)	X			ND	-					1.					
21V. Methyl Chloride (74-87-3)	Х			ND						1					

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CONTINUED FROM PAGE V-4

	2	. MARK "X				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	.b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 I (if availa	DAY VALUE ble)	c. LONG TERM VALUE (if ava	I AVRG. ulable)	4 10 00			a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	8ELIEVED PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPO	JNDS (cont	'inued')	<u>```</u>	•	<u> </u>	•					· · · · · · · ·	_ <u>``</u>	
22V. Methylene Chloride (75-09-2)	X			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	X			ND						1			,	•	
24V. Tetrachloro- ethylene (127-18-4)	Х			ND						1.					
25V. Toluene (108-88-3)	$\times$			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	$\times$			ND						1					
27V. 1,1,1-Trichloro- ethane (71-55-6)	X			. ND						_1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	$\times$			ND						1					
29V Trichloro- ethylene (79-01-6)	X			ND						1					
30V. Trichloro- fluoromethane (75-69-4)	$\times$			ND						1					
31V. Vinyl Chloride (75-01-4)	X			ND						1					
GC/MS FRACTION	- ACID CC	MPOUNDS	5			-									
1A. 2-Chlorophenol (95-57-8)	$\mathbf{X}$			ND						1					
2A. 2,4-Dichloro- phenol (120-83-2)	$\times$			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	$\times$			NĐ						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	$\mathbf{X}$			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	X			ND						1					
6A. 2-Nitrophenal (88-75-5)	X			ND						1					
7A. 4-Nitrophenol (100-02-7)	X			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	X			ND						1					
9A. Pentachloro- phenol (87-86-5)	X			ND						1					
10A. Phenol (108-95-2)	X			ND						1					
11A. 2,4,6-Trichloro- phenol (88-05-2)	$\mathbf{X}$			ND						1		·			

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE



	2	MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	а.	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE V		
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S						······					
1B. Acenaphthene (83-32-9)	X			ND						1					
2B. Acenaphtylene (208-96-8)	X			ND						1					
3B. Anthracene (120-12-7)	X			ND						1					
48. Benzidine (92-87-5)	X			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$			ND				•		1					
6B. Benzo (a) Pyrene (50-32-8)	$\times$			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						1			L.		
8B. Benzo (ghi) Perylene (191-24-2)	X			ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	X			ND						1					
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$			ND					_	_ 1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			ND .						1					
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1					
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	$\times$			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND						1					
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	X			ND						1					
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1					
18B. Chrysene (218-01-9)	X	·		ND						1				) 	
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1	<u> </u>				
20B. 1,2-Dichloro- benzene (95-50-1)	$\times$			ND						1					L
21B. 1,3-Di-chloro- benzene (541-73-1)	X			ND		)				1					

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- - -

CONTINUED FROM PAGE V-6

	2	2. MARK "X				3. E	FFLUENT				4. UNI	TS	5. INTA	KE (optional	0
1. POLLUTANT AND CAS NUMBER	8.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30   (if availat	DAY VALUE ble)	c. LONG TERN VALUE (if ava	I AVRG. nilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- BASE/N	EUTRAL CO	OMPOUND	S (continued)									L		
22B. 1,4-Dichloro- benzene (106-46-7)	Х			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	X			ND		-				1					
248, Disthyl Phthalate (84-66-2)	X			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	X			ND						1					
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						. 1					
27B. 2,4-Dinitro- toluene (121-14-2)	$\times$			ND						1					
28B. 2,6-Dinitro- toluene (606-20-2)	X			ND						1					
29B. Di-N-Octyl Phthalate (117-84-0)	$\times$			ND						1					
30B. 1,2-Diphenyl- hydrazine ( <i>as Azo-</i> <i>benzene</i> ) (122-66-7)	$\times$			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						1					
32B. Fluorene (86-73-7)	$\times$			ND						1					
33B. Hexachloro- benzene (118-74-1)	$\times$			ND						1 ·					
34B. Hexachloro- butadiene (87-68-3)	$\times$			ND						1					
35B. Hexachloro- cyclopentadiene (77-47-4)	$\times$			ND						1					
36B Hexachloro- ethane (67-72-1)	$\times$			ND						1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	X			ND						1					
388. Isophorone (78-59-1)	$\times$			ND						1					
39B. Naphthalene (91-20-3)	$\times$			ND						1					
408. Nitrobenzene (98-95-3)	$\times$	•		ND						1			-		
41B. N-Nitro- sodimethylamine (62-75-9)	Х			ND						1					
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND						1					

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE



	2	MARK "X"	· · · · · · · · · · · · · · · · · · ·			3. E	FFLUENT				4. UN	ITS	5. INT/	AKE (optiona	<i>ſ</i> )
1. POLLUTANT AND	a.	b.	С.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE \	ERM /ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSE
GC/MS FRACTION	I - BASE/NE	UTRAL CO	MPOUND	S (continued)						_					
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND			_			1					
44B. Phenanthrene (85-01-8)	X			ND				1		1					
45B. Pyrene (129-00-0)	X			ND						1.					
46B. 1,2,4-Tri- chiorobenzene (120-82-1)	X			ND						1					
GC/MS FRACTION	V - PESTICI	DES								· · · · · · · · · · · · · · · · · · ·					
1P. Aldrin (309-00-2)			Х												
2Ρ. α-BHC (319-84-6)			Х										·		
3P. β-BHC (319-85-7)			X					-		· · ·					
4P. γ-BHC (58-89-9)			X												
5P. 8-BHC (319-86-8)			$\times$												
6P. Chlordane (57-74-9)			X								· ·				
7P. 4,4'-DDT (50-29-3)		:	$\times$				· · ·	1							
8P. 4,4'-DDE (72-55-9)		•	X					-							
9P. 4,4'-DDD (72-54-8)		1	$\times$												
10P. Dieldrin (60-57-1)			X												
11P. α-Enosulfan (115-29-7)			Χ.												
12P. β-Endosulfan (115-29-7)			X			-									
13P. Endosulfan Sulfate (1031-07-8)			X											-	
14P. Endrin (72-20-8)			$\times$												
15P. Endrin Aldehyde (7421-93-4)			X								1		·		
16P. Heptachlor (76-44-8)			X												
EPA Form 3510-20	C (8-90)						PAGE	E V-8	•				cc	NTINUE ON	PAGE V-9

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				:	EPA	I.D. NUMBE	R (copy from liem 1	of Form 1)	OUTFALL NUM	BER				•		
CONTINUED FROM	M PAGE V-8	3	·····													
4 0000	2	. MARK "X	, 				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	d)
AND	а.	b.	C.	a. MAX		ILY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERN VALUE (if ava	1 AVRG. ulable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	ABSENT	CONCE	(1) NTRATION	1) TRATION (2) MASS CON		(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	a. CONCEN-	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I – PESTICI	DES (contin	ued)		NTRATION (2) MASS CO			,				.2				
17P. Heptachlor Epoxide (1024-57-3)			Х													
18P. PCB-1242 (53469-21-9)			X													
19P. PCB-1254 (11097-69-1)			X					· · · · · · · · · · · · · · · · · · ·							· · · · ·	
20P. PCB-1221 (11104-28-2)			X													
21P. PCB-1232 (11141-16-5)			X		£ 1 <b>818</b> 1 − 1											
22P. PCB-1248 (12672-29-6)			X							l					,	·
23P. PCB-1260 (11096-82-5)			X													
24P. PCB-1016 (12674-11-2)			X													
25P. Toxaphene (8001-35-2)			X													

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Outfall 025C



PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.



EPA I.D. NUMBER (copy from item 1 of Form 1) NHD081257446

SEE INSTRUCTIO	DNS.													
V. INTAKE AND I	EFFLUE	NT CHARAC	TERISTICS (contin	ued from page 3 o	f Form 2-C)							G	UTFALL NO. 025D	
PART A -You mu	ust provi	de the results	of at least one ana	lysis for every poll	utant in this table	e. Complete on	e table for each o	outfall. See inst	ructions for add	litional details.	1 -			
					2. EFFLUI	ENT				3. UNI (specify if	TS blank)	4	INTAKE optional)	
<i>.</i> .		a. MAXIMU	M DAILY VALUE	b. MAXIMUM 3 (if avai	0 DAY VALUE lable)	c. LON	G TERM AVRG. (if available)	VALUE				a. LONG T AVERAGE V	ERM ALUE	
1. POLLUTAN	NT	(1) CONCENTRAT	ION (2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCE	NTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSES
a. Biochemical O: Demand (BOD)	xygen	ND							1					
b. Chemical Oxyg Demand (COD)	gen	ND							1	•				
c. Total Organic ( ( <i>TOC</i> )	Carbon	1.1	0.11						1	mg/L	lbs/d			
d. Total Suspende Solids (TSS)	ed	ND												
e. Ammonia ( <i>as N</i>	0	0.72	0.72 0.07 VALUE VALUE VALUE					· · ·	1	mg/L	lbs/d			
f. Flow		VALUE 12	2,307	VALUE		VALUE			1	GPD		VALUE		
g. Temperature (winter)		VALUE		VALUE		VALUE	· <u>···-t-</u> · · · ·			•C		VALUE		
h. Temperature (summer)		VALUE	32	VALUE		VALUE			1	•c		VALUE		
i. pH		MINIMUM 7.5	MAXIMUM 7.5	MINIMUM	MAXIMUM				1	STANDARI	UNITS			
PART B - Mark direct	"X" in c tly, or in	olumn 2-a for directly but ex	each pollutant you xpressly, in an effi	know or have reas	son to believe is ideline, you mu	present. Mark " st provide the	'X" in column 2-b results of at lease	for each pollut st one analysis	ant you believe for that pollut	e to be absent. If ant. For other p	you mark col ollutants for v	umn 2a for any polli vhich you mark col	utant which is umn 2a, you	limited either must provide
quan	2. N	IARK "X"	anadorr or their pre	sence in your disc	arge. Complete	. EFFLUENT	Saur Outlan. Obe	The manuchure		4. L	INITS	5. IN	TAKE (optiona	ı/)
1. POLLUTANT	_				D. MAXIMUM 30		c. LONG TERM	AVRG. VALU	E			a. LONG TERM	AVERAGE	
CAS NO. (if available)	a. BELIEVE PRESEN	D BELIEVED T ABSENT	(1) CONCENTRATION	(2) MASS O	(1) ONCENTRATION	(2) MASS	(1) CONCENTRATIC	DN (2) MASS	d. NO. O ANALYSE	F a. CONCE S TRATION	h. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Bromide (24959-67-9)		X												
b. Chlorine, Total Residual		X		,										
c. Color		X										·	_	
d. Fecal Coliform		$\times$												
e. Fluoride (16984-48-8)		X												
f. Nitrate-Nitrite (as N)		$ \times $									·			

EPA Form 3510-2C (8-90)

CONTINUE ON REVERS





# ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"			3.	EFFLUENT				4. UNIT	S	5. INT/	<b>AKE</b> (optiona	()
1. POLLUTANT AND	a	b	a. MAXIMUM DA	VILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM A (if availa	VRG. VALUE ble)				a. LONG TE AVERAGE V	ERM ALUE	1 110 05
CAS NO. (if available)	BELIEVED	BELIEVED	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN-	b, MASS	(1) CONCENTRATION	(2) MASS	b. NO, OF ANALYSES
g. Nitrogen, Total Organic (as N)	X		ND						1					
h. Oil and Grease	$\left  \times \right $		ND						1					
i. Phosphorus (as P), Total (7723-14-0)		X						-						
j. Radioactivity														
(1) Alpha, Total	$\times$		ND						1	pCi/kg				
(2) Beta, Total	$\times$		1199						1	pCi/kg				
(3) Radium, Total		X				-								
(4) Radium 226, Total		X												
k. Sulfale (as SO4) (14808-79-8)	$\times$		ND						1					
I. Sulfide (as S)	$\times$		ND						1					
m. Sulfite (as SO <sub>1</sub> ) (14265-45-3)		X												
n. Surfactants	$ \times $		ND	ļ					1					
o. Aluminum, Total (7429-90-5)		X												
p. Barium, Total (7440-39-3)		X												
q. Boron, Total (7440-42-8)	X		220	22.6					1	mg/L	lbs/d			
r. Cobalt, Total (7440-48-4)	X		ND						1					
s. Iron, Total (7439-89-6)	X		0.05	0.01					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	X								1					
u. Molybdenum, Total (7439-98-7)		X												
v. Manganese, Total (7439-96-5)	$\times$		ND					L	1					
w. Tin, Total (7440-31-5)		$  \times$							<u> </u>					
x. Titanium, Total (7440-32-6)		X												

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				E	PA I.D. NUM	BER (copy from Ite	m 1 of Form 1)	OUTFALL NUM	BER						
CONTINUED FROM	A PAGE 3 C	F FORM 2-	с	NI	HD081257	446		025D							
PART C - If you a fraction fraction provide dischar pollutar briefly o addition	ire a primary s that apply s), mark "X" the results ged in conc the which yo describe the nal details ar	y industry an to your ind in column of at least o entrations of u know or h reasons th nd requirement	nd this outf lustry and 1 2-b for eac one analysis f 10 ppb or lave reasor e pollutant ents.	all contains proces for ALL toxic meta ch pollutant you kn s for that pollutant. greater. If you ma n to believe that you is expected to be	s wastewale ls, cyanides, ow or have r If you mark <i>rk column 2t</i> u discharge discharged.	r, refer to Table 2c and total phenols. reason to believe is column 2b for any o for acrolein, acryl in concentrations of Note that there a	-2 in the inst If you are n s present. Ma pollutant, you onitrile, 2,4 di of 100 ppb or re 7 pages to	nuctions to determin ot required to mark ink "X" in column 2 must provide the <i>nitrophenol, or 2-rr</i> greater. Otherwise o this part; please	ne which of c column 2- -c for each results of al hethyl-4, 6 d a, for polluta review each	the GC/MS fi a (secondary pollutant you least one an initrophenol, nts for which n carefully. C	ractions you min industries, nor believe is abso alysis for that p you must provik you mark colu omplete one ta	ust test for. I pprocess wa- ent. If you m pollutant if yo de the result mn 2b, you n ble (all 7 pa	Mark "X" in column stewater outfalls, a lark column 2a for ou know or have rea s of al least one an must either submit ages) for each outf	2-a for all s nd nonrequi any pollutar ason to belie alysis for ea at least one all. See inst	uch GC/M3 ired GC/M3 it, you mus ave it will b ich of these analysis o tructions fo
		2. MARK "X				3. (	EFFLUENT				4. UN	ITS	5. INTA	KE (optiona	ıl)
	8.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERM VALUE (if av	AVRG. ailable)				a. LONG T AVERAGE V	ERM /ALUE	
(if available)	REQUIRED	BELIEVED	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANID	E, AND TO	TAL PHENC	LS												
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$\mathbf{X}$			ND						1					•
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1					
4M. Cadmium, Total (7440-43-9)	X			ND						1					
5M. Chromium, Total (7440-47-3)	X			ND						1					
6M. Copper, Total (7440-50-8)	$\times$			ND						1					
7M. Lead, Total (7439-92-1)	$\times$			ND						· 1					
8M. Mercury, Total (7439-97-6)	$\times$			ND						1					
9M. Nickel, Total (7440-02-0)	X			ND						1	5				
10M. Selenium, Total (7782-49-2)	X			ND						1					
11M. Silver, Total (7440-22-4)	$\times$			ND						1					
12M. Thailium, Total (7440-28-0)	$\times$		1	ND						1					
13M. Zinc, Total (7440-66-6)	X			0.04	<0.01					1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	X			ND						1					
15M. Phenols, Total	X			ND						1					
DIOXIN													· · ·		
2,3,7,8-Tetra- chlorodibenzo-P- Diovin (1764 01 6)			$ \times $	DESCRIBE RES	JLTS										



CONTINUE ON REVERSE




	2	. MARK "X"				<u>3. E</u>	FFLUENT				4. UNI	TS	5. INTA	KE (optiona	<u>n</u>
1. POLLUTANT AND	a.	b.	c.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 [ (if availat	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. vilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) . CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPO	JNDS	· _ · · ·				•······			· · · · · · · · · · · · · · · · · · ·		·		
1V. Accrolein (107-02-8)	$\times$			ND						1					
2V. Acrylonitrile (107-13-1)	$\times$			ND						1					
3V. Benzene (71-43-2)	$\times$			ND						1					
4V. Bis (Chloro- methyl) Ether (542-88-1)	$\times$			ND						1					
5V. Bromoform (75-25-2)	$\mathbf{X}$			ND						1					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND						1					
7V. Chlorobenzene (108-90-7)	$\times$			ND						1			· · ·		
8V. Chlorodi- bromomethane (124-48-1)	$\times$			ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND						1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	$\times$			ND			_			1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND						1					
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1					
14V. 1,1-Dichloro- ethane (75-34-3)	X			ND						1		-			
15V. 1,2-Dichloro- ethane (107-06-2)	$\times$			ND					-	1					
16V. 1,1-Dichloro- ethylene (75-35-4)	$\times$			ND						1			: 		
17V. 1,2-Dichloro- propane (78-87-5)	$\mathbf{X}$			ND						1		· .			
18V. 1,3-Dichloro- propylene (542-75-6)	Х			ND						1					
19V. Ethylbenzene (100-41-4)	$\times$			ND						1					
20V. Methyl Bromide (74-83-9)	Х			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND						1					



Outfall #25D





CONTINUED FROM PAGE V-4

	2. MARK *X*					3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	0
1. POLLUTANT AND	а.	b.	с.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE ble)	c. LONG TERM VALUE (if ava	AVRG. ilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	~ VOLATIL	E COMPOL	JNDS (cont	inued)											
22V. Methylene Chloride (75-09-2)	$\times$			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	$\mathbf{X}^{\mathbf{r}}$			ND						1					
24V. Tetrachloro- ethylene (127-18-4)	$\times$			ND						1					
25V. Toluene (108-88-3)	$\times$			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	$\times$			ND						1		<u>.</u>			
27V. 1,1,1-Trichloro- ethane (71-55-6)	$\times$			ND						1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	$\mathbf{X}$			ND						1 ·				_	
29V Trichloro- ethylene (79-01-6)	X			ND						1					
30V. Trichloro- fluoromethane (75-69-4)	X			ND						1					
31V. Vinyl Chloride (75-01-4)	$\mathbf{X}$			ND						1					
GC/MS FRACTION	- ACID CC	MPOUNDS	;												
1A. 2-Chlorophenol (95-57-8)	$\times$			ND						1				<u> </u>	
2A. 2,4-Dichloro- phenol (120-83-2)	$\times$			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)	$\times$			ND						1					
4A. 4,6-Dinitro-O- Cresol (534-52-1)	$\times$			ND						1			-		
5A. 2,4-Dinitro- phenol (51-28-5)	$\times$			ND						1					
6A. 2-Nitrophenol (88-75-5)	$\times$			ND						1					
7A. 4-Nitrophenol (100-02-7)	$\times$			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	Х			ND						1					
9A. Pentachloro- phenol (87-86-5)	Х			ND						1					
10A. Phenot (108-95-2)	Х			ND						1					
11A. 2,4,6-Trichloro- phenol (88-05-2)	Х			ND						1					

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CONTINUE ON REVERSE

Outfall #025D



	, i	2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	C.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 [ (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. nilable)				a. LONG T AVERAGE V	ERM	
CAS NUMBER (if available)	TESTING	BELIEVED	BELIEVED		(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	1 d. NO. OF	a. CONCEN- TRATION	b. MASS		(2) MARR	b. NO. OF
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S.	(2) MASS	CONCENTION	(2) MA33	CONCENTION	(2) 14A33	1			CONCENTRATION	(2) 10435	<u></u>
1B. Acenaphthene (83-32-9)	Х	-		ND						1					
2B. Acenaphtylene (208-96-8)	X			ND						1					
3B. Anthracene (120-12-7)	X			ND						1					
4B. Benzidine (92-87-5)				ND						1					
5B. Benzo (a) Anthracene (56-55-3)	X			ND			-			. 1					
6B. Benzo (a) Pyrene (50-32-8)	$\times$			ND						1					
78. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						1					
8B. Benzo (ghi) Perylene (191-24-2)				ND						1					
9B. Benzo (k) Fluoranthene (207-08-9)	$\times$			ND						1					
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			ND						1					
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1					
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	$\times$			ND						1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND					•	1					
15B. Butyl Benzyl Phthalate (85-68-7)	X			ND						1					
16B. 2-Chloro- naphthalene (91-58-7)	$\times$			ND					-	1					
178. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1			2 2		
18B. Chrysene (218-01-9)	X			ND			L			1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1	ı	·			•
20B. 1,2-Dichloro- benzene (95-50-1)	X			ND						1					
21B. 1,3-Di-chloro- benzene (541-73-1)	$\times$			ND			· · · ·			1					

2

EPA Form 3510-2C (8-90)

CONTINUE ON PAGE V-7





CONTINUED FROM PAGE V-6

	2	. MARK "X				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	а.	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	l AVRG. iilable)	1 10 05			a. LONG T AVERAGE V	ERM ALUE	L NO. 05
(if available)	REQUIRED	PRESENT	ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I - BASE/N	EUTRAL CO	DMPOUND	S (continued)					<u> </u>				·		
22B. 1,4-Dichloro- benzene (106-46-7)	X			ND						1					
23B. 3,3-Dichloro- benzidine (91-94-1)	X			ND						1					
24B. Diethyl Phthalate (84-66-2)	$\times$			ND						1					
25B. Dimethyl Phthalate (131 -11-3)	$\times$			ND						1					
26B. Di-N-Butyl Phthalate (84-74-2)	$\times$			ND						1					
27B. 2,4-Dinitro- toluene (121-14-2)	$\times$			ND						1	-				
28B. 2,6-Dinitro- toluene (606-20-2)	X			ND						1					
29B. Di-N-Octyl Phthalate (117-84-0)	$\times$			ND						1					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	$\times$			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						1					
32B. Fluorene (86-73-7)	$\times$			ND						1					
33B. Hexachloro- benzene (118-74-1)	$\times$			ND						_ 1					
34B. Hexachloro- butadiene (87-68-3)	$\times$			ND						1					
35B. Hexachloro- cyclopentadiene (77-47-4)	$\times$			ND						1					
36B Hexachloro- ethane (67-72-1)	$\times$			ND						1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	$\times$			ND						1					
38B. Isophorone (78-59-1)	$\times$			ND						1					
39B. Naphthalene (91-20-3)	X		-	ND				_		1					
40B. Nitrobenzene (98-95-3)	X			ND						1					
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND .						1	<u></u>				
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND						1					

EPA Form 3510-2C (8-90)

CONTINUE ON REVERSE





#### CONTINUED FROM THE FRONT

	2	. MARK "X	•			3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	1)
1. POLLUTANT AND	а.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	AVRG. nilable)				a. LONG TE AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF
GC/MS FRACTION	I - BASE/NE	UTRAL CO	MPOUND	S (continued)				· · · · · ·							
43B. N-Nitro- sodiphenylamine (86-30-6)	X			ND						1					
44B. Phenanthrene (85-01-8)	$\times$			ND		(				1					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	X			ND						1					
GC/MS FRACTION	N - PESTICI	DES													
1P. Aldrin (309-00-2)			X											,	
2P. α-BHC (319-84-6)			X												
3Р. β-ВНС (319-85-7)			X								·				
4P. γ-BHC (58-89-9)			X											×	
5P. δ-BHC (319-86-8)			$\times$									-	N.		
6P. Chlordane (57-74-9)			$\times$											-	
7P. 4,4'-DDT (50-29-3)	. *		$\times$												
8P. 4,4'-DDE (72-55-9)			$\times$												
9P. 4,4'-DDD (72-54-8)			$\mathbf{X}$												
10P. Dieldrin (60-57-1)			$\times$												
11Ρ. α-Enosulfan (115-29-7)			X												
12P. β-Endosulfan (115-29-7)			X												
13P. Endosulfan Sulfate (1031-07-8)			$\mathbf{X}$	-						-		4			
14P. Endrin (72-20-8)			X												
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			X				-								

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CONTINUE ON PAGE V-9

Outfall #025D



				EPA	EPA I.D. NUMBER (copy from Item 1 of Form 1) OU				BER						
CONTINUED FRO	M PAGE V-	8			NHE	081257446		025	5D						
	2	2. MARK "X		·		3. E	FFLUENT	1			4. UN	ITS	5. INTA	KE (optiona	i)
1. POLLUTANT AND	а.	b.	с.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	1 AVRG. zilable)	1 110 05			a. LONG T AVERAGE V		
(if available)	REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. UF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	I – PESTICI	DES (contin	ued)												·
17P. Heptachlor Epoxide (1024-57-3)			Х												
18P. PCB-1242 (53469-21-9)			X												
19P. PCB-1254 (11097-69-1)			X												
20P. PCB-1221 (11104-28-2)			X												
21P. PCB-1232 (11141-16-5)			$\times$												
22P. PCB-1248 (12672-29-6)			X												
23P, PCB-1260 (11096-82-5)			X												
24P. PCB-1016 (12674-11-2)			X	······································											
25P. Toxaphene (8001-35-2)			X						•						

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Outfall #025D







OUTFALL NO.

027

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

#### EPA I.D. NUMBER (copy from Item 1 of Form 1)

NHD081257446

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

PART A -You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

3. UNITS 4. INTAKE 2. EFFLUENT (specify if blank) (optional) c. LONG TERM AVRG, VALUE b. MAXIMUM 30 DAY VALUE a. LONG TERM a. MAXIMUM DAILY VALUE AVERAGE VALUE (if available) (if available) a. CONCENd. NO. OF b. NO. OF (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION 1. POLLUTANT ANALYSES TRATION b. MASS ANALYSES (2) MASS (1) CONCENTRATION (2) MASS (2) MASS (2) MASS a. Biochemical Oxygen ND 1 Demand (BOD) b. Chemical Oxygen 14 10.0 1 mq/L lbs/d Demand (COD) c. Total Organic Carbon lbs/d 1.1 0.78 1 mg/L (TOC) d. Total Suspended lbs/d 1.6 1.14 1 mq/L Solids (TSS) e. Ammonia (as M) ND 1 VALUE VALUE VALUE VALUE f. Flow 85,276\* 1 GPD VALUE VALUE VALUE VALUE g. Temperature °C (winter) VALUE VALUE VALUE VALUE h. Temperature °C 22 1 (summer) MINIMUM MAXIMUM 8.2 MINIMUM MAXIMUM STANDARD UNITS i. pH 1 8.2 PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements. 5. INTAKE (optional) 2. MARK "X" 3. EFFLUENT 4. UNITS 1. POLLUTANT a. LONG TERM AVERAGE b. MAXIMUM 30 DAY VALUE c. LONG TERM AVRG. VALUE AND VALUE a. MAXIMUM DAILY VALUE (if available) (if available) a. CONCENb. NO. OF CAS NO. d. NO. OF BELIEVED BELIEVED (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION (1) CONCENTRATION TRATION ANALYSES ANALYSES b. MASS (if available) (2) MASS PRESENT ABSENT (2) MASS (2) MASS (2) MASS a. Bromide lbs/d 5.0 3.6 1 mq/L Х (24959-67-9) b. Chlorine, Total ND 1 Residual c. Color d. Fecal Coliform e. Fluoride (16984-48-8) . Nitrate-Nitrite 1 mq/L lbs/d 0.61 0.43 (as N)

EPA Form 3510-2C (8-90)

CONTINUE ON REVERS



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#### ITEM V-B CONTINUED FROM FRONT

	2. MA	RK "X"			3.	EFFLUENT				4. UNI	ſS	5. INT/	AKE (optiona	al)
1. POLLUTANT AND	a.	ь.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE ble)	c. LONG TERM A (if availat	VRG. VALUE ble)				a. LONG TE AVERAGE V	ERM ALUE	
CAS NO. (if available)	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic ( <i>as</i> <i>N</i> )	$\times$		ND						1					
h. Oil and Grease	$\mathbf{X}$		1.0	0.71					1	mg/L	lbs/d			
i. Phosphorus (as P), Total (7723-14-0)	$\times$		0.22	0.16					1	mg/L	lbs/d			
). Radioactivity														
(1) Alpha, Total		$\times$							1					
(2) Beta, <sup>T</sup> otal		$\mathbf{X}$							1					
(3) Radium, Total		X												
(4) Radium 226, Total		X												
k. Sulfate ( <i>as SO</i> .) (14808-79-8)	$\times$		170	121					1	mg/	lbs/d			
I. Sulfide (as S)	$\mathbf{X}$		ND						1					
m. Sulfite ( <i>as SO</i> 1) (14265-45-3)		$\times$										-		
n. Surfactants		$\times$												
o. Aluminum, Total (7429-90-5)		X						-					•.	
p. Barium, Total (7440-39-3)		X												
q. Boron, Total (7440-42-8)		X												
r. Cobalt, Total (7440-48-4)		X												
s. Iron, Total (7439-89-6)	X		0.05	0.04					1	mg/L	lbs/d			
t. Magnesium, Total (7439-95-4)	X		120	85.4					1	mg/L	lbs/d			
u. Molybdenum, Total (7439-98-7)		X	:											
v. Manganese, Total (7439-96-5)	$\times$		0.01	0.01					1	mg/	lbs/d			
w. Tin, Total (7440-31-5)		$\times$					· ·							
x. Titanium, Total (7440-32-6)		$ \times $												

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CONTINUE ON PAGE V-3

				L E		BFR (copy from Iten	n Lof Form 1)		BER						
				NI	1081257	446		027	our						
CONTINUED FROM	1 PAGE 3 O	F FORM 2-	C ad this outf			· ···	2 in the inel		a which of				And #Y* in actions f	0 - f11 -	unt COMP
fraction: fraction: fraction: provide discharg pollutan briefly c addition	s that apply s, mark "X" the results ged in conce ts which yo lescribe the al details ar	to your ind in column of at least o antrations of u know or h reasons th d requirement	ustry and f 2-b for eac one analysis f 10 ppb or lave reasor le poilutant ents.	for ALL toxic metal for ALL toxic metal sh pollutant you kno s for that pollutant. greater. If you man to believe that you is expected to be	s wastewate s, cyanides, pw or have r If you mark rk column 2b u discharge discharged.	r, refer to Yable 20 and total phenols. eason to believe is column 2b for any to for acrolein, acrylo in concentrations o Note that there an	If you are no present. Ma pollutant, you pollutant,	trequired to mark rk "X" in column 2- must provide the r nitrophenol, or 2-m greater. Otherwise o this part; please r	column 2- c for each results of at ethyl-4, 6 d , for polluta review each	inte GC/MS fr a (secondary pollutant you least one and initrophenol, y ints for which a carefully. Co	industries, non believe is abse alysis for that p you must provid you mark colum complete one ta	ist test for, was process was ent. If you m ollutant if yo te the results nn 2b, you r ble (all 7 pa	stewater outfalls, ar ark column 2a for a u know or have rea s of at least one ana nust either submit a gges) for each outfa	2-a for all si ind nonrequi iny pollutan son to belie alysis for ea at least one all. See inst	red GC/MS it, you mus we it will be ich of these analysis or tructions for
		2. MARK "X	•			3. E	FFLUENT				'4. UN	ITS	5. INTA	KE (optiona	ıl)
1. POLLUTANT AND	a.	b.	c.	a. MAXIMUM DA	ILY VALUE	b. MAXIMUM 30 (if availa	DAY VALUE	c. LONG TERM VALUE (if ava	1 AVRG. ailable)		· ·		a. LONG TA AVERAGE V	ERM ALUE	
CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
METALS, CYANID	E, AND TOT	AL PHENC	S	>											·
1M. Antimony, Total (7440-36-0)	$\times$			ND						1					
2M. Arsenic, Total (7440-38-2)	$ $ $\times$			0.006	<0.01					1	mg/L	lbs/d			
3M. Beryllium, Total (7440-41-7)	$\times$			ND						1					
4M. Cadmium, Total (7440-43-9)	$\times$			ND						1					
5M. Chromium, Total (7440-47-3)	$\times$			ND						1					
6M. Copper, Total (7440-50-8)	X			ND						1					
7M. Lead, Total (7439-92-1)	$\times$			ND						1				<u> </u>	
8M. Mercury, Total (7439-97-6)	$\times$			ND						1					
9M. Nickel, Total (7440-02-0)	$\times$			ND						1					
10M. Selenium, Total (7782-49-2)	$\times$			ND						1				<b>.</b>	
11M. Silver, Total (7440-22-4)	$\times$			ND						1					
12M. Thallium, Total (7440-28-0)	$\times$			ND						1					
13M. Zinc, Total (7440-66-6)	$\times$			0.02	0.01					1	mg/L	lbs/d			
14M. Cyanide, Total (57-12-5)	$\times$			ND						1					
15M. Phenois, Total	$\times$			0.028	0.02			[		1	mg/L	lbs/d			
DIOXIN							·								<u></u>
2,3,7,8-Tetra- chlorodibenzo-P- Dioxin (1764-01-6)			$ \times $	DESCRIBE RES	JLTS										





#### CONTINUED FROM THE FRONT

	2	. MARK "X"	•			3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	1)
1. POLLUTANT AND	<b>a</b> .	b.	C.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 (if availat	DAY VALUE	c. LONG TERM VALUE (if ava	I AVRG. ilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	BELIEVED	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS												
1V. Accrolein (107-02-8)	X			ND						1					
2V. Acrylonitrile (107-13-1)	X			ND						1					
3V. Benzene (71-43-2)	$\times$			ND						1					
4V. Bis ( <i>Chloro- methyl</i> ) Ether (542-88-1)	$\times$			ND		-				1					
5V. Bromoform (75-25-2)	$\times$			ND						1					
6V. Carbon Tetrachloride (56-23-5)	$\times$			ND						1				x	
7V. Chiorobenzene (108-90-7)	X			ND						1					
8V. Chlorodi- bromornethane (124-48-1)	$\times$	×		ND						1					
9V. Chloroethane (75-00-3)	$\times$			ND					•	1					
10V. 2-Chloro- ethylvinyl Ether (110-75-8)	$\times$			ND						1					
11V. Chloroform (67-66-3)	X			ND						1					
12V. Dichloro- bromomethane (75-27-4)	$\times$			ND					•	1	•				
13V. Dichloro- difluoromethane (75-71-8)	$\times$			ND						1			,		
14V. 1,1-Dichioro- ethane (75-34-3)	$\times$			ND						1					
15V. 1,2-Dichloro- ethane (107-06-2)	$\times$			ND						1					
16V. 1,1-Dichloro- ethylene (75-35-4)	X			ND						1					
17V. 1,2-Dichloro- propane (78-87-5)	X			ND						1					
18V. 1,3-Dichloro- propylene (542-75-6)	Х			ND						1					
19V. Ethylbenzene (100-41-4)	X			ND						1					
20V. Methyl Bromide (74-83-9)	X			ND						1					
21V. Methyl Chloride (74-87-3)	X			ND					-	1					

EPA Form 3510-2C (8-90)

CONTINUE ON PAGE V-5





	2	2. MARK "X"				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	0
1. POLLUTANT AND	8.	b. '	c.	a. MAXIMUM DAI	LY VALUE	b. MAXIMUM 30 ( (if availa)	DAY VALUE ble)	c. LONG TERN VALUE (if ava	1 AVRG. nilable)				a. LONG TI AVERAGE V	ERM ALUE	
(if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF	a. CONCEN-	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSE
GC/MS FRACTION	- VOLATIL	E COMPOL	JNDS (cont	inued)						·			• • • •		
22V. Methylene Chloride (75-09-2)	$\times$			ND						1					
23V. 1,1,2,2- Tetrachloroethane (79-34-5)	×			ND						1					
24V. Tetrachioro- ethylene (127-18-4)	$\times$			ND						1				·	
25V. Toluene (108-88-3)	$\times$			ND						1					
26V. 1,2-Trans- Dichloroethylene (156-60-5)	X			ND						1	· · · · · · · · · · · · · · · · · · ·				
27V. 1,1,1-Trichloro- ethane (71-55-6)	X			ND						1					
28V. 1,1,2-Trichloro- ethane (79-00-5)	$\times$			ND						1					
29V Trichloro- ethylene (79-01-6)	X			ND		•				1		-			
30V. Trichloro- fluoromethane (75-69-4)	$\times$			ND						1					
31V. Vinyl Chloride (75-01-4)	$\times$			ND						1					
GC/MS FRACTION	– ACID CC	MPOUNDS				-									
1A. 2-Chlorophenol (95-57-8)	$\mathbf{X}$			ND						1	. ;				
2A. 2,4-Dichloro- phenol (120-83-2)	$\times$			ND						1					
3A. 2,4-Dimethyl- phenol (105-67-9)				ND						1				• *	
4A. 4,6-Dinitro-O- Cresol (534-52-1)	Х			ND						1					
5A. 2,4-Dinitro- phenol (51-28-5)	Х			ND						1					
6A. 2-Nitrophenol (88-75-5)	X			ND						1					
7A. 4-Nitrophenol (100-02-7)	Х			ND						1					
8A. P-Chloro-M- Cresol (59-50-7)	Х			ND						1					
9A. Pentachloro- phenol (87-86-5)	X			ND						1 .					
10A. Phenol (108-95-2)	X			ND						1					
11A. 2,4,6-Trichloro- phenol (88-05-2)	Х			ND						1					
EPA Form 3510-20	; (8-90)				<b></b>		PAGE	E V-5	<u> </u>	· · · · · · · · · · · · · · · · · · ·			COL		REVERSE







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	2	MARK "X"				3. E	FFLUENT	··			4. UNI	TS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 ( (if availal	DAY VALUE ble)	c. LONG TERM VALUE ( <i>if ava</i>	AVRG. ilable)				a. LONG T AVERAGE V	ERM ALUE	
(if available)	TESTING	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
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1B. Acenaphthene (83-32-9)	Х			ND						1			j.		
2B. Acenaphtylene (208-96-8)	Х			ND						1					
3B. Anthracen <del>e</del> (120-12-7)	X			ND						1					
4B. Benzidine (92-87-5)	Х			ND						1					
5B. Benzo (a) Anthracene (56-55-3)	$\times$			ND						1					
6B. Benzo (a) Pyrene (50-32-8)	Х			ND						1					
7B. 3,4-Benzo- fluoranthene (205-99-2)	$\times$			ND						1					
8B. Benzo (ghi) Perylene (191-24-2)	X			ND	-					1		_			
9B. Benzo (k) Fluoranthene (207-08-9)	X			ND						1					
10B. Bis (2-Chloro- ethoxy) Methane (111-91-1)	$\times$			ND						1					
11B. Bis (2-Chloro- ethyl) Ether (111-44-4)	$\times$			ND						1					
12B. Bis (2- Chloroisopropyl) Ether (102-80-1)	$\times$			ND						1	· .				
13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7)	$\times$			ND			•			1					
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	$\times$			ND						l				-	
15B. Butyl Benzyl Phthalate (85-68-7)	$\times$			ND .						1					
16B. 2-Chloro- naphthalene (91-58-7)	Х			ND					- <u>-</u>	1					
17B. 4-Chloro- phenyl Phenyl Ether (7005-72-3)	$\times$			ND						1					
18B. Chrysene (218-01-9)	X			ND						1					
19B. Dibenzo (a,h) Anthracene (53-70-3)	X			ND						1					
20B. 1,2-Dichloro- benzene (95-50-1)	X			ND						1					
21B. 1,3-Di-chloro- benzene (541-73-1)	Х			ND						1					

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	2	2. MARK "X"				3. E	FFLUENT				4. UN	TS	5. INTA	KE (optiona	0
1. POLLUTANT AND CAS NUMBER	a.	b.	C.	a. MAXIMUM DA	LY VALUE	b. MAXIMUM 30 [ (if availab	DAY VALUE	c. LONG TERN VALUE (if ava	l AVRG. nilable)				a. LONG T AVERAGE V	ERM ALUE	
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GC/MS FRACTION	I - BASE/N	EUTRAL CO	OMPOUND	S (continued)		·····		·	<u> </u>	•				(1) ///	·{
22B. 1.4-Dichloro- benzene (106-46-7)	X			ND						1		,			
23B. 3,3-Dichlaro- benzidine (91-94-1)	$\times$			ND						1					
24B. Diethyl Phthalate (84-66-2)	$\times$			ND						- 1				-	
25B. Dimethyl . Phthalate (131 -11-3)	X			ND						1				- <u> </u>	
26B. Di-N-Bulyl Phthalate (84-74-2)	$\mathbf{X}$			ND						1	-				
27B, 2,4-Dinitro- toluene (121-14-2)	$\mathbf{X}$			ND						1					
288. 2,6-Dinitro- toluene (606-20-2)	$\mathbf{X}$			ND						1					
29B. Di-N-Octyl Phthalate (117-84-0)	X			ND						1					
30B. 1,2-Diphenyl- hydrazine (as Azo- benzene) (122-66-7)	$\times$			ND						1					
31B. Fluoranthene (206-44-0)	$\times$			ND						.1					
328. Fluorene (86-73-7)	$\mathbf{X}$			ND						1					
33B. Hexachloro- benzene (118-74-1)	Х			ND						1					
34B. Hexachloro- butadiene (87-68-3)	$\times$			NĎ			_			1			÷		
35B. Hexachloro- cyclopentadiene (77-47-4)	$\mathbf{X}^{\dagger}$			ND						1					
36B Hexachioro- ethane (67-72-1)	$\mathbf{X}$			ND						1					
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	X			ND						1					
38B. Isophorone (78-59-1)	X			ND						1					
39B. Naphthalene (91-20-3)	$\times$			ND						1					
40B. Nitrobenzene (98-95-3)	$\times$			ND						1			_		
41B. N-Nitro- sodimethylamine (62-75-9)	X			ND						1					
42B. N-Nitrosodi- N-Propylamine (621-64-7)	$\times$			ND			1			l					

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	2	. MARK "X			3. EFFLUENT			4. UNITS		5. INTAKE (optional)		l)			
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CAS NUMBER (if available)	TESTING REQUIRED	BELIEVED PRESENT	BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	b. NO. OF
GC/MS FRACTION	- BASE/NE	UTRAL CO	MPOUND	S (continued)											
43B. N-Nitro- sodiphenylamine (86-30-6)	$\times$			ND						1					
44B. Phenanthrene (85-01-8)	X			ND						1					
45B. Pyrene (129-00-0)	X			ND						1					
46B. 1,2,4-Tri- chlorobenzene (120-82-1)	X			ND						1					
GC/MS FRACTION	N - PESTICI	DES													
1P. Aldrin (309-00-2)			X												
2P. α-BHC (319-84-6)			X												
3P. β-BHC (319-85-7)			X												
4P. γ-BHC (58-89-9)			X												
5P. δ-BHC (319-86-8)			X												
6P. Chlordane (57-74-9)			$\times$												
7P. 4,4'-DDT (50-29-3)			X												
8P. 4,4'-DDE (72-55-9)			$\times$												
9P. 4,4'-DDD (72-54-8)			X												
10P. Dieldrin (60-57-1)			X												
11P. α-Enosulfan (115-29-7)			X												
12P. β-Endosulfan (115-29-7)			X												
13P. Endosulfan Sulfate (1031-07-8)			Х												
14P. Endrin (72-20-8)			X								· · · · · · · · · · · · · · · · · · ·				
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			X									_ <u></u>			

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Outfall #027



					EPA I.D. NUMBER (copy from liem 1 of Form 1)		OUTFALL NUM	OUTFALL NUMBER								
CONTINUED FROM PAGE V-8						NHD	081257446		02	27						
	2	2. MARK "X	,				3. E	FFLUENT				4. UN	ITS	5. INTA	KE (optiona	/)
1. POLLUTANT AND	a.	b.	C.	a. MAXIMU	M DAII	LY VALUE	b. MAXIMUM 30 I (if availal	DAY VALUE	c. LONG TERM VALUE (if ava	c. LONG TERM AVRG. VALUE ( <i>if available</i> )				a. LONG TI AVERAGE V		
(if available)	REQUIRED	PRESENT	BELIEVED ABSENT	(1) CONCENTRA	TION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	ANALYSES	TRATION	b. MASS	(1) CONCENTRATION	(2) MASS	ANALYSE
GC/MS FRACTION	N – PESTICI	DES (contin	ued)													
17P. Heptachlor Epoxide (1024-57-3)			X													
18P. PCB-1242 (53469-21-9)			$\mathbf{X}$				×									
19P. PCB-1254 (11097-69-1)			X													
20P. PCB-1221 (11104-28-2)			X													
21P. PCB-1232 (11141-16-5)			X													
22P. PCB-1248 (12672-29-6)			X													
23P. PCB-1260 (11096-82-5)			X													
24P. PCB-1016 (12674-11-2)			X													
25P. Toxaphene (8001-35-2)			$ \times $						·		ŀ	<u> </u>				

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Outfall #027

FPL Energy Seabrook proposes the following changes to the current NPDES Permit requirements. Annotated NPDES Permit pages reflecting the proposed changes are attached following the change descriptions:

## • Condensate Polishing System Outfalls 028A, 028B and 028C (Proposed new addition to Permit)

FPL Energy Seabrook proposes to add three new outfalls to the NPDES Permit to establish Monitoring Requirements and Effluent Limitations for the Condensate Polishing System (CPS). The CPS was completed and initially operated in 2005 during the term of the current NPDES Permit as documented in the renewal application for the current NPDES Permit submitted in April 1998. It is an integral part of the Condensate System. The CPS is designed to remove dissolved and suspended impurities from the Condensate System that can cause corrosion and fouling of secondary components. The system is normally maintained in a standby condition and is placed in operation to remove secondary system contaminants to support plant start up or to remove impurities introduced by a condenser tube leak.

The CPS and the three proposed outfalls (028A, 028B and 028C) are described comprehensively in Tab 2 with the Form 2C information. The proposed Monitoring Requirements and Effluent Limitations for the Condensate Polishing System (CPS) are attached with the annotated NPDES Permit pages.

## • Toxicity Testing Frequency Adjustment (Ref. Permit pages 19, 20, 21, 29)

FPL Energy Seabrook has performed quarterly Whole Effluent Toxicity testing since the effective date of the current NPDES Permit. Toxicity test results have been submitted each quarter with the Discharge Monitoring Reports. A table summarizing the results of toxicity testing 2002 - 2006 is attached. It is requested that the frequency of toxicity testing be adjusted from the current quarterly frequency to a semiannual frequency in accordance with Permit Part I. E.1 "Special Conditions, Whole Effluent Toxicity Test Frequency Adjustment" which states the following:

The permittee may submit a written request to the EPA requesting a reduction in the frequency (to not less than twice per year) of required toxicity testing, after completion of a minimum of eight (8) successive toxicity tests of effluent all of which must be valid tests and must demonstrate acceptable toxicity. Until written notice is received by certified mail from the EPA indicating that the Whole Effluent Testing requirement has been changed, the permittee is required to continue testing at the frequency specified in the respective permit.

Seabrook Station believes that the required condition for a frequency adjustment has been satisfied: "eight (8) successive toxicity tests of effluent all of which must be valid tests and must demonstrate acceptable toxicity". The attached table summarizes the results of 17 consecutive quarterly Whole Effluent Toxicity Tests, including 168 chronic and acute assays. Approximately 95% of the reported assays (159/168) exhibit no toxicity in either acute or chronic tests, while 9 assays or approximately 5% indicate some degree of toxicity to the test species. The permit does not establish the threshold for acceptable toxicity; those values requiring reporting are "Report" only. While there have not been eight successive tests with no observed toxicity the data in total supports a general conclusion that the effluent is not toxic.

Seabrook Station proposes that the Whole Effluent Toxicity test frequency be adjusted to semiannual. The four quarterly discharge scenarios for Outfalls 025 A, B, C and D are proposed to be applied to the semiannual tests thus each of the four specified discharge scenarios will be tested every two years versus every year.

## • Chlorine Transit Study (Ref. Permit page 21)

FPL Energy Seabrook performed six Chlorine Transit Studies during the term of the current NPDES Permit ("a minimum of twice per year for the first three years of the permit"). It is proposed that the current NPDES Permit requirement to perform Chlorine Transit Studies be removed based on the satisfactory completion and results of the six studies performed.

The results of each of the six studies were reported individually and were summarized in a final report submitted on May 16, 2005. The final report concluded: "the overall results of six chlorine transit studies demonstrates that the NPDES Permit Total Residual Oxidant (chlorine) limits, as measured at the Circulating Water System Discharge Transition Structure (Outfall 001), are sufficiently stringent to ensure that the New Hampshire chronic and acute water-quality standards for chlorine are met in the receiving waters. The six studies demonstrated that the residual chlorine concentration at a distance of ten feet from the diffuser nozzle was below the minimum detection level (0.05 mg/L) with one exception at 0.06 mg/L. At a distance beyond ten feet further significant reduction in chlorine concentration can be expected in the buoyant rapid mixing conditions of the thermal plume."

The six Chlorine Transit Study dates were:

November 12, 2002 March 26, 2003 October 9, 2003 April 19, 2004 October 14, 2004 March 17, 2005

## **Evaluation of Screen Wash Efficiency (Ref. Permit page 22)**

FPL Energy Seabrook conducted a screen wash efficiency study on May 18, 2006 using dead fish as required by the current NPDES Permit. The results of the Screen Collection Efficiency Study are provided below. The study results indicate that the collection efficiency of the travelling screens and impingement sample collection process is very high consistent with impingement monitoring program assumptions. It is proposed that the current NPDES Permit requirement to perform screen wash efficiency studies be removed based on the results of this study.

## • Outfalls 025C and 025D Oil and Grease Monitoring Requirement (Ref. Permit pages 13, 14)

FPL Energy Seabrook proposes to revise the current NPDES Permit Monitoring requirement for Outfalls 025C and 025D oil and grease from the current "1/Batch" to "1/Quarter". The proposed change to quarterly oil and grease monitoring will make the oil and grease monitoring frequency for Outfalls 025C and 025D consistent with Outfalls 025A and 025B, currently monitored on a quarterly frequency. Outfalls 025C and 025D are consistently below the detection level for oil and grease as documented in the Discharge Monitoring Reports. During the term of the current permit all but three oil and grease analyses for Outfalls 025C and 025D have been below the detection level. The three oil and grease analyses that were above the detection level were less than one half of the NPDES Permit limit.

2006 025C and 025D oil and grease below detection level

- 2005 November 025D monthly average 2.0 mg/L (15 mg/L permit limit), daily maximum 9.6 mg/L (20 mg/L permit limit)
- 2004 025C and 025D oil and grease below detection level
- 2003 025C and 025D oil and grease below detection level
- 2002 July 025C monthly average 5.6 mg/L (15 mg/L permit limit), daily maximum 6.0 mg/L (20 mg/L permit limit)
- 2002 August 025C monthly average 1.3 mg/L (15 mg/L permit limit), daily maximum 3.1 mg/L (20 mg/L permit limit)

The performance of oil and grease analyses on Outfalls 025C and 025D by EPA Method 1664 results in the generation of radioactively contaminated hexane, a mixed waste. The oil and grease sample waste from these outfalls contains very low levels of radioactivity due to its presence in the outfall discharge at levels well within the effluent limits prescribed by the Nuclear Regulatory Commission. Hexane is present in the sample waste as it is used as a solvent in the analytical method. It is estimated that four gallons of mixed waste are generated annually. In the interest of minimizing the generation of waste and the associated storage/incineration environmental risk it is suggested that the quarterly frequency of analyses is appropriate commensurate with the very low risk of an oil & grease discharge from the outfalls.

# • Dynacool 1383 Antiscalant Concentration (Ref. EPA Letter dated January 27, 2004 and NHDES Letter dated January 30, 2004, NPDES Permit Attachment C, Bulk Chemicals)

FPL Energy Seabrook proposes to revise the current NPDES Permit concentration limit for the antiscalant product Dynacool 1383. The referenced EPA and NHDES letters approved the discharge of this product at a concentration of .1 mg/L at Outfall 001. The product is currently used to control scale formation in the Circulating Water Chlorination System and in groundwater removal systems designed to control groundwater infiltration in site buildings. To further

enhance scale formation control, FPL Energy Seabrook proposes to increase the allowed concentration of Dynacool 1383 from .1 mg/L to 5.0 mg/L. The referenced letters document the very low aquatic toxicity of this "essentially non-toxic" product (96 hour LC-50 for mysid shrimp > 5,000 mg/L). The recommended concentration (5.0 mg/L) is 0.1 percent of the mysid shrimp LC-50.

## • Biological and Water Quality Monitoring Program (Ref. Permit Pages 22, 25)

FPL Energy Seabrook proposes to revise the current NPDES Permit requirement to submit a description of the Biological and Water Quality Monitoring Program. A written description of the program was previously submitted on May 1, 2002. No changes to the monitoring program have been requested thus it is proposed that the NPDES Permit be revised to reference the current description of the monitoring program.

FPL Energy Seabrook proposes to revise the current NPDES Permit description of the report submittal requirements for the ongoing biological, hydrological and chlorination programs. The proposed change is for clarity and consistency with the requirement to submit the annual Environmental Monitoring Report by September 1.





	Jul 02	Nov 02	Jan 03	Apr 03	Aug 03	Dec 03	Feb 04	Jun 04	Jul 04	Oct 04	Feb 05	Jun 05	Aug 05	Nov 05	Feb 06	May 06	July 06
Americamysis bahia nysid shrimp)	· .																
LC-50	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%
A-NOEC	12.5%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Menida beryilina (inland silverside)																	
LC-50	>100%	>100%	>100%	>100%	>100%	>97.5%	>100%	>100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%
A-NOEC	100%	100%	100%	100%	100%	97.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<i>Menida beryilina</i> (inland silverside)																	
Survival C-NOEC	100%	100%	100%	100%	100%	97.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Survival LOEC	>100%	>100%	>100%	>100%	>100%	>97.5%	>100%	>100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%	> 100%
Growth C-NOEC	100%	100%	100%	100%	100%	97.5%	100%	12.5% <sup>2</sup>	100%	100%	100%	100%	100%	12.5%	100%	100%	100%
Growth LOEC	>100%	>100%	>100%	>100%	>100%	>97.5%	>100%	25%²	> 100%	> 100%	> 100%	> 100%	> 100%	25%	> 100%	> 100%	> 100%
Arbacia punctulata (purple sea urchin)																	
C-NOEC	100%	100%	100%	100%	100%	100%	100%	12.5%	100%	100%	100%	100%	100%	ND3	100%	< 6.25%	100%
LOEC	>100%	>100%	>100%	>100%	>100%	>100%	>100%	25%	> 100%	> 100%	> 100%	> 100%	> 100%	ND	> 100%	6.25%	> 100%

#### efinitions

LC-50 Effluent concentration that kills 50% of the test organisms

A-NOEC Acute No Observed Effect Concentration or the highest tested effluent concentration that causes no significant mortality.

C-NOEC No Observed Effect Concentration or the highest concentration where no effect was observed.

LOEC Lowest Observed Effect Concentration or the lowest tested effluent concentration that had an effect.

<sup>1</sup> No toxicity was observed in any of the December 2003 Whole Effluent Toxicity Tests. The first and second renewal samples for the Menidia beryllina assay were satinity adjusted per EPA protocol. As a result of the satinity adjustment, the highest actual lest concentration used for the Menidia beryllina assay was 97.5%. Therefore, the actual LC50 and chronic NOEL (No Observed Effect Level) for Menidia beryllina were reported as 97.5%.

to toxicity was observed in any of the December 2003 Whole Effluent Toxicity Tests. The first and second renewal samples for the Menidia berylina assay were satinity adjusted per EPA protocol. As a result of the satinity adjustment, the highest actual test concentration used for the Menidia berylina assay was 97.5%. Therefore, the acute LC50 and chronic NOEL (No Observed Effect Level) for Menidia berylina were reported as 97.5%.

<sup>2</sup> The validity of these results is in question because the higher effluent concentrations tested (50% and 100%) did not exhibit toxicity

<sup>3</sup> Arbacia assays were not performed in Nov 05 due to inadequate supply of viable test organisms <sup>3</sup> Arbacia assays were not performed in Nov 05 due to inadequate supply of viable test organisms

## SCREEN COLLECTION EFFICIENCY STUDIES SEABROOK STATION MAY 2006

## Introduction:

The efficiency of the traveling screens and impingement sample collection process in retaining fish impinged on the traveling screens was estimated through a directed study on 18 May 2006 as a requirement of Seabrook Station's NPDES Permit. The purpose of this study was to estimate the percentage recovery of fish impinged on the traveling screens at Seabrook Station.

Seabrook Station makes use of a once-through circulating water system with an offshore cooling water intake for both the condenser cooling water and the plant service water. There are three offshore submerged intake structures which are located approximately 1.3 miles offshore and draw water from the western Gulf of Maine. The 19-ft ID intake tunnel conveys the water approximately 3.22 miles to an inland termination point which consists of a 19-ft ID vertical shaft and the transition structure. Adjacent to the transition structure is the circulating water pumphouse where the collection efficiency studies took place.

The water from transition structure enters the circulating water pumphouse and separates into three screenwells (Figure 1). Each screenwell contains stop log guides, a flow-through traveling screen and a 130,000 gpm circulating water pump that supplies circulating water to the condensers. The three screens are designated as 1-CW-SR-1A, 1B, and 1C. Each screen is 14ft. wide and has <sup>3</sup>/<sub>8</sub>-in. mesh baskets. The water depth at the screens is approximately 43-ft. below MSL. The screens have two operating speeds which are 5 feet per minute (fpm) and 20 fpm. Debris and fish are removed from the upstream (ascending) side of the screens with water sprays and are sluiced via a trough to a metal collection basket, where the debris is removed and the water drains into the intake transition structure. Fish impinged on the traveling screens are retained in the collection basket, which has the same mesh size as the traveling screens. Impingement samples are collected twice per week to estimate the number of fish impinged annually.

All fish impinged on the traveling screens are assumed to be enumerated as part of the impingement enumeration process. However, there are several locations and processes where fish could be lost to the collection process. Although the nominal mesh size in the traveling screens is 3/8-in. it is possible that holes exist in the mesh that would allow fish to pass through into the cooling water system of the plant. Fish can also be lost to the system through "carryover" of fish over the top of the traveling screens. Fish also can become stuck in the trough that leads from the traveling screen to the collection basket. Finally, fish can be missed in the sorting process where the fisheries technician removes fish from debris in the collection basket.

## **Methods and Materials**

At 0650 hrs on 18 May, 100 fish were dropped through the stop log slots in the floor of the circulating water pumphouse to the surface of the water approximately 10 feet in front of traveling screen 1-CW-SR-1B (the middle screen). These fish were collected from previous impingement samples to ensure that they would be representative of the species composition and size of fish currently being impinged. Each fish was marked with a caudal fin clip to distinguish it from fish that were being collected as part of the concurrent impingement sample. Lengths ranged from 66-348 mm and species used were: alewife, cunner, grubby, rainbow smelt, sea raven, and winter flounder. The screens were washed at 0825 hrs and fish with caudal fin clips were removed from the impingement sample and counted.

### **Results and Discussion**

Of the 100 fish released, 98 were recovered yielding a screen collection efficiency of 98%. Screen collection efficiency is often assumed to be near 100% and this study quantitatively evaluated this assumption. Screen collection efficiency is usually high at nuclear power plants where the traveling screens and associated troughs are well maintained and inspected as part of the cooling water system. The very good condition of the traveling screens and sluices at Seabrook Station contributed to the high screen collection efficiency. Furthermore, the relatively short distance and straight run of the sluice connecting the traveling screens and the collection basket also contributed to the high screen collection efficiency.



Figure 1. Seabrook Nuclear Power Station intake transition structure and pumphouse.

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## PART I

A. Effluent Limitations, Conditions, and Monitoring Requirements (Continued)

20. Je. During the period beginning on the Effective Date and lasting through the Expiration Date, the permittee is authorized to discharge from outfall number serial 025D, Waste Test or Recovery Test Tanks. OZBA, Condewsaire Bush Ge Neutracization JANK

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limita	tions	Monitoring Requirements		
	<u>Avg. Monthly</u>	<u>Max. Daily</u>	Measurement <u>Frequency</u>	Sample <u>Type</u>	
Flow, gpd Oil and Grease, mg/l Total Suspended Solids, mg/l	Report 15 30	<del>100,000</del> <b>96,000</b> 20 100	1/Batch <del>-1/Batch</del> 1/Batch ₹	Estimate Grab Grab	

b. Samples taken in compliance with the monitoring requirements specified above shall be taken at a representative point prior to mixing with any other waste stream.

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## PART I

Effluent Limitations, Conditions, and Monitoring Requirements (Continued) :**'A.** 

During the period beginning on the Effective Date and lasting through the Expiration Date, the permittee is authorized 21. 18. to discharge from outfall number serial 025D, Waste Test or Receivery Test Tanks. OZBB, Condensate Polisher Low Conductivity TANK

Such discharges shall be limited and monitored by the permittee as specified below: a.

Effluent Characteristic	Discharge Limita	tions	Monitoring Re	equirements	••
X	<u>Avg. Monthly</u>	Max. Daily	Measurement Frequency	Sample <u>Type</u>	•
Flow, gpd Oil and Grease, mg/1 Total Suspended Solids, mg/1	Report 15 30	- <del>100,000</del> <b>96,000</b> 20 100	1/Batch <del>1/Batch</del> 1/Batch	Estimate Grab Grab	2

Samples taken in compliance with the monitoring requirements specified above shall be taken at a representative point b. prior to mixing with any other waste stream.



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## PART I

## A. Effluent Limitations, Conditions, and Monitoring Requirements (Continued)

22. JA: During the period beginning on the Effective Date and lasting through the Expiration Date, the permittee is authorized to discharge from outfall serial number <del>025B, Steam Generator Blowdown</del> Demineralizer Rinse.

## 028C, CONDENSATE POLISHER

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations	Monitoring Requirements			
	<u>Avg, Monthly</u>	<u>Max. Daily</u>	Measurement Frequency	Sample Type	
Flow, gpd Oil and Grease, mg/1	Report 15	<del>-210,000-</del> 500,000 20	Continuous <sup>1</sup> 1/Quarter <sup>1</sup>	Estimate Grab	
Total Suspended Solids, mg/1	<b>30</b> ·	100	1/Week <sup>1</sup>	Grab	

<sup>1</sup>This discharge is considered continuous, although the frequency and duration may vary depending on plant operation. Therefore the frequency of measurement for flow is continuous when in use. The measurement frequency for TSS is once per discharge, and weekly if the discharge continues for more than seven days. The discharge may be interrupted and restarted but will still be considered continuous, as long as the discharge is reinitiated within four hours of interruption.

Samples taken in compliance with the monitoring requirements specified above shall be taken at a representative point prior to mixing with any other waste stream.

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Quarter

## PART I

## A. Effluent Limitations, Conditions, and Monitoring Requirements (Continued)

15. During the period beginning on the Effective Date and lasting through the Expiration Date, the permittee is authorized to discharge from outfall serial number 025C, Waste Holdup Sump.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitatio	<u>200</u>	Monitoring Re	Monitoring Requirements		
	<u>Avg. Monthly</u>	<u>Max. Daily</u>	Measurement Frequency	Sample <u>Type</u>		
Flow, gpd Oil and Grease, mg/1 Total Suspended Solids, mg/1	Report 15 «30	60,000 20 100	1/Batch 1/ <del>Batch</del> 1/Batch	Estimate Grab		

b. Samples taken in compliance with the monitoring requirements specified above shall be taken at a representative point prior to mixing with any other stream.

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## PARTI

## A. Effluent Limitations, Conditions, and Monitoring Requirements (Continued)

16. During the period beginning on the Effective Date and lasting through the Expiration Date, the permittee is authorized to discharge from outfall number serial 025D, Waste Test or Recovery Test Tanks.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limita	<u>tions</u>	Monitoring Re	·• .		
	<u>Avg. Monthly</u>	<u>Max. Daily</u>	Measurement <u>Frequency</u>	Sample <u>Type</u>		
Flow, gpd Oil and Grease, mg/1 Total Suspended Solids, mg/1	Report 15 30	100,000 20 100	1/Batch 1/ <del>Batch</del> 1/Batch	Estimate Grab Grab	Quarter	. •

b. Samples taken in compliance with the monitoring requirements specified above shall be taken at a representative point prior to mixing with any other waste stream.

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The chemicals listed in Attachment C are approved, with limits, for water discharge. The permittee may propose to conduct feasibility studies involving new chemicals not currently approved for water discharge. The permittee shall gain approval from the Regional Administrator and the Director before any such studies take place. A report summarizing the results of any such studies shall be submitted to the Regional Administrator and the Director regarding discharge frequency, concentration, and the impact, if any, on the indigenous populations of the receiving water. The Regional Administrator or the Director may require Whole Effluent Toxicity testing as part of feasibility studies.

The permittee may substitute or add laboratory chemicals that are discharged in de minimis amounts without conducting feasibility studies. The permittee shall submit, to the Regional Administrator and the Director, relevant information on the proposed addition/substitution regarding toxicity, frequency of discharge, concentration, and anticipated impacts. This submittal shall include a certification that the proposed chemical(s) is not carcinogenic, mutagenic, teratogenic or will bioaccumulate..

Prior approval from the Regional Administrator and the Director is not necessary before any such addition/substitution of laboratory chemicals takes place. The permittee will continue to employ its Best Management Practice procedures entitled "Disposal of Laboratory Chemicals and Reagents" for laboratory chemicals. The permittee may not use any laboratory chemicals that are carcinogenic, mutagenic, teratogenic or that will bioaccumulate.

No increase in chemical discharge concentrations, chemical substitution, or the use of additional chemicals is allowed without written approval by the Regional Administrator and the Director or their designees. Laboratory chemical use is excluded from this requirement.

No use of chemicals that bioaccumulate is allowed.

21. There shall be no visible discharge of oil sheen, foam, or floating solids in the vicinity of the diffuser ports. Naturally occurring sea foam in the discharge transition structure is allowed. Except in cases of condenser leak seeking and sealing, use of a reasonable amount of biodegradable and non-toxic material may be used to the extent necessary to locate and/or seal any condenser leak. The permittee shall report in the appropriate monthly DMR the occasions wherein this material was used giving the date(s) of the incident, the type of materials used and the amount of materials discharged.

22. The permittee is required to report the results of chronic (and modified acute) WET tests using Inland Silverside (<u>Menidia beryllina</u>), acute WET tests using Mysid Shrimp (<u>Mysidopsis bahia</u>) and chronic Sea Urchin (<u>Arbacia punctulata</u>) WET tests on a quarterly basis. A 24-Hour composite sample is the required "sample type" for WET testing. If after eight consecutive sampling periods (two

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20.

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years), no toxicity is found, the permittee may request a reduction in toxicitytesting to twice per year. The permittee shall use the procedures and protocols contained in Attachement D to this permit when conducting the WET testing.

The toxicity tests shall be performed at times when various chemicals and waste tanks are discharged at the facility. The permittee shall document and submit to EPA the various scenarios under which the toxicity test has been performed. The permittee shall conduct quarterly toxicity testing as outlined below:

Administrative controls shall be in-place to control these discharges according to the following restrictions:

- NPDES Permit Outfalls 025 (A, B, C & D) will not be discharged during (a) EVAC, mollusicide applications (expected frequency to be twice per year with a duration of up to about two days).
- When Outfall 025B (Steam Generator Blowdown rinses) is being • (Ъ)• discharged, none of the other Outfall 025 can be discharged.

#### Year 1 January - June Testing (January - March)

. Day 1	Day 3	Day 5
(Acute and sample #1 for chronic)	(sample #2 for chronic)	(sample #3 for chronic)
Outfalls 025A and 025C and 025D	Outfalls 025A and 025B	Outfalls 025A and 025B
·· or ·	TO .	• or
• EVAC	Outfalls 025C and 025D	Outfalls 025C and 025D

Note: If EVAC is not applied during the quarter, then 025A, 025C, and 025D shall be discharged and sampled. Day 3 and Day 5 cover both "or" conditions. For example: if Day 3 samples were obtained with 025A and 025B being discharged, then Day 5 samples should be obtained with 025C and 025D being discharged.

July - December Year 1

Day 1

Day 3

Day 5

(Acute and sample #1 for chronic) (sample #2 for chronic)

Outfalls 025C or 025D

(sample #3 for chronic) Outfalls 025C or 025D

Outfalls 025A and 025B (These discharges shall not be concurrent)

OT

EVAC

Note: If EVAC is not applied during the quarter, then 025A and 025B shall be discharged and sampled. Day 3 and Day 5 cover both "or" conditions. For example: if Day 3 samples were obtained with 025C being discharged, then Day 5 samples shall be obtained with 025D being discharged.

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Year 2 January -June (July - September)

Day 1	Day 3	Day 5		
(Acute and sample #1 for chronic)	(sample #2 for chronic)	(sample #3 for chronic)		
Outfalls 025A and 025C and 025D	Outfalls 025A and 025B	Outfalls 025A and 025B		
or	or	, OT		
EVAC	Outfalls 025C and 025D	Outfails 025C and 025D		

Note: If EVAC is not applied during the quarter, then 025A, 025C, and 025D shall be discharged and sampled. Day 3 and Day 5 cover both "or" conditions. For example: if Day 3 samples were obtained with 025A and 025B being discharged, then Day 5 samples should be obtained with 025C and 025D being discharged.

Year 2 July - December Ouarter #4 WET Testing (October - December)

23.

Day 1	Day 3	Day 5		
(Acute and samplé #1 for chronic)	, (sample #2 for chronic)	(sample #3 for chronic)		
Outfalls 025A and 025C and 025D	Outfalls 025B and 025C	Outfails 025C and 025D		
or	or			
EVAC	Outfalls 025B and 025D (These discharges shall			
. •	not be concurrent)	•		

Note: \* If EVAC is not applied during the quarter, then 025A, 025C, and 025D shall be discharged and sampled.

Chlorine Transit Study. The permittee shall conduct a "chlorine transit endy" a minimum of twice per year for the first three years of the permit. This study shall be based on the 1993 Chlorine Transit Study performed at Seabrook Station. The study(s) shall measure the TRO concentration at the Discharge Transition Structure and the corresponding (taking into account the transit time) TRO at the Discharge Diffuser Nozzles (DDN). The study shall be conducted during periods of low chlorine demand of the cooling water. At least one of these studies shall be conducted when the plant is shut down and the effluent is pot heated.

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The permittee shall submit a study proposal to the Regional Administrator and the Director 30 days after the effective date of this permit and yearly thereafter. The study shall, to the maximum extent possible, represent "worst case" situations. That is, the facility shall be discharging TRO, as measured at the Discharge Transition Structure (DT8), as close to the permitted daily maximum as possible and the cooling water shall be exerting its lowest chlorine demand. Upon approval from the Regional Administrator and the Director, the permittee shall implement the study and submit the results to the Regional Administrator and the Director.

Should any of the Chlorine Transit Study results indicate that the permitted TRO concentration, as measured at the DTS, is not sufficiently stringent to ensure that the chronic and acate water-quality standards for chlorine are met at the DDN, this permit may be reopened to incorporate stricter limits.

Biological and Water Quality Monitoring Program

23.

On May 1, 2002

The Biological and Water Quality Monitoring Program (BP) shall be submitted to EPA for approval within 30 days of the effective date of this permit. Upon approval from EPA, the BP is an enforceable element of this permit. This BP shall be based on the 1996 Biological and Water Quality Monitoring Program, except for the following alternative regimes which will replace those previously employed:

 Intertidal Monitoring only will be implemented if Seabrook Station decides to employ back flushing of the Cooling Water System to control macrofouling. Any such Intertidal Monitoring Program will begin at least one year prior to back flushing.

(2) The Impingement Monitoring Program will be enhanced to include: collecting two 24-hour impingement samples each week, the evaluation of screen wash officiencies using dead fish, and a sampling protocol for high impingement events.

(3) Ichthyoplankton Entrainment Sampling Program will allow greater understanding of diel variability in ichthyoplankton densities and will include more definitive day-night sampling (4 x 2-hour samplings/week: morning, day, evening, night), increased sample volume, and decreased net mesh size.

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Within 30 days of authorization of biological program improvements, the permittee shall update and resubmit the Biological and Water Quality Monitoring Program to include any such improvements.

. Examples of BP improvements include, but are not limited to:

Additional sampling stations,

2. Increased sampling frequency,

The annual BP report summarizing the previous year's information and conclusions shall be submitted by September f.

Changes demonstrated to reduce data variability or increased analysis sensitivity,

4. Changes demonstrated to increase the power to detect statistical significance,

Collection of additional data demonstrated to more definitively determine Seabrook Station impacts,

Additional predictive models such as species-specific population, community, and/or trophic level risk.

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Biological, hydrological, and chlorination study reports shall be submitted on a semi-annual basis with the annual report summarizing the previous year's information and conclusions. The report is due in February.

The semi-annual mid-year report shall be a letter report providing the status of the on-going programs, the expected effort in the ensuing six months, and a synopsis of the data and information obtained since the last annual report. This report shall be submitted in July.

Fish Mortality Monitoring and Reporting.

Any incidence of fish mortality associated with the discharge plume or of unusual number of fish impinged on the Intake Traveling Screens shall be reported to the Regional Administrator and the Director within 24-Hours by telephone report as required in Paragraph II.D.1.e of this permit. A written confirmation report is to be provided within five (5) days. This report should include the following:

The species, sizes, and approximate number of fish involved in the incident.

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Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and one signed copy to the State at the following addresses:

Environmental Protection Agency NPDES Program Operation Section P. O. Box 8127 Boston, MA 02114

The State Agency is:

New Hampshire DES Water Division Permits and Compliance Section **29** - Hazen Drive, P.O. Box 95 Concord, New Hampshire 03302-0095

## NOTIFICATION

C.

1.

a.

All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe (40 CFR §122.42):

That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

(1) One hundred micrograms per liter (100  $\mu$ g/l);

- (2) Two hundred micrograms per liter (200 μg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 μg/l) for 2,4dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (mg/l) for antimony;
- (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
- (4) Any other notification level established by the Director in accordance with 40 CFR §122.44(f) and New Hampshire regulations.

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This NPDES Discharge Permit is issued by the U.S. Environmental Protection Agency (EPA) under Federal and State law. Upon final issuance by the federal EPA, the New Hampshire Department of Environmental Services, Water Division, may adopt this permit, including all terms and conditions, as a State discharge permit pursuant to RSA 485-A:13.

Each agency shall have the independent right to enforce the terms and conditions of this Permit. Any modification, suspension or revocation of this Permit shall be effective only with respect to the Agency taking such action, and shall not effect the validity or status of this Permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this Permit is declared invalid, illegal or otherwise issued in violation of State law, such permit shall remain in full force and effect under Federal law as an NPDES permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of Federal law, this Permit, if adopted as a state permit, shall remain in full force and effect under State law as a Permit issued by the State of New Hampshire.

#### E. Special Conditions

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Whole Effluent Toxicity Test Frequency Adjustment

The permittee may submit a written request to the EPA requesting a reduction in the frequency (to not less than twice per year) of required toxicity testing, after completion of a minimum of eight (8) successive toxicity tests of efficient all of which must be valid tests and must demonstrate acceptable toxicity. Until written notice is received by certified mail from the EPA indicating that the Whole Effluent Testing requirement has been changed, the permittee is required to continue testing at the frequency specified in the respective permit.

### pH Range Adjustment

The permittee may submit a written request to the EPA requesting a change in the permitted pH limit range to no more than 6.0 to 9.0 Standard Units. The permittee's written request must include the State's approval letter containing an original signature (no copies). The State's letter shall state that the permittee has demonstrated to the State's satisfaction that as long as discharges to the receiving water from a specific outfall are within a specific numeric pH range the naturally occurring receiving water pH will be unaltered. That letter must specify for each outfall the associated numeric pH limit range.

## Clean Water Act Section 316 (a) and (b) Certification

FPL Energy Seabrook LLC has been authorized by the Environmental Protection Agency and the State of New Hampshire Department of Environmental Services (NHDES) to discharge from the facility, Seabrook Station, under the National Pollutant Discharge Elimination System, Permit No. NH0020338. The Seabrook Station NPDES Permit became effective on April 1, 2002, with an expiration date five years from the effective date. The Seabrook Station NPDES Permit and Fact Sheet documented the amended determinations regarding the thermal component of the discharge and the location, design, construction and capacity of the cooling water system intake structures made pursuant to the Clean Water Act Sections 316 (a) and (b). The Fact Sheet specifies the following requirement for amended determinations regarding Sections 316 (a) and (b) for permits being reissued.

> Each time the permit is reissued (not to exceed 5 years), the 316(a) and (b) determinations are reviewed. The permittee must certify any changes in: (1) the facility discharge characteristics; (2) the waterway characteristics, and (3) resident or transient aquatic community. The permittee must then explain any differences identified and their impact on the local ecological community.

FPL Energy Seabrook LLC has submitted an application to renew NPDES Permit NH0020338. In support of an amended determination of compliance with Clean Water Act Sections 316 (a) and (b) FPL Energy Seabrook LLC certifies the following relative to the thermal component of the discharge and the location, design, construction and capacity of the cooling water system intake structures:

## 1) <u>Clean Water Act Section 316 (a):</u>

The thermal component of the discharge from Seabrook Station has not changed nor does the NPDES Permit renewal application propose any change in the current thermal limits as specified in the permit. Compliance with the NPDES Permit thermal limits and monitoring requirements is documented and reported on an ongoing basis as required by the permit in the monthly Discharge Monitoring Reports and in the annual Hydrological Monitoring Reports. A thermal plume comparative evaluation was submitted to the EPA and NHDES in June 1991, concluding that there was satisfactory agreement between plume model predictions and field data in terms of surface temperature rise isotherms, thermocline depths and plume pattern.

The impact of the thermal component of the discharge is rigorously assessed on an ongoing basis through implementation of the biological monitoring program required by the Seabrook Station NPDES Permit. The preoperational phase of this program was initiated in 1976 followed by the operational phase of the program initiated at the time of

commercial operation of Seabrook Station in 1990. Annual reports documenting the biological monitoring program data, analyses and conclusions are submitted to the EPA, New Hampshire Department of Environmental Services and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service. The annual reports continue to demonstrate that the operation of Seabrook Station has not adversely impacted the balanced indigenous populations of aquatic biota in the vicinity of the cooling water system intake and discharge structures.

Seabrook Station increased its electrical generating capacity in May 2005 by approximately 60 megawatts electric to its current capacity of 1221 megawatts electric resulting in an incremental increase in the heat rejected through the station's condensers. The thermal component of the discharge is monitored on an ongoing basis by temperature instruments in the discharge area and continues to remain in compliance with the NPDES Permit receiving water temperature rise limit (ref: 2005 Hydrological Monitoring Report, SBK-L-06015, January 26, 2006). An additional increase in electrical generating capacity of about 40 megawatts electric will commence in November 2006. The ongoing monitoring program for the thermal component of the discharge will ensure continued compliance with the NPDES Permit receiving water temperature receiving water temperature in November 2006.

### 2) <u>Clean Water Act Section 316 (b):</u>

The location, design, construction and capacity of the Seabrook Station cooling water system intake structures has not changed nor does the NPDES Permit renewal application propose any change to these features of the cooling water system. Seabrook Station cooling water system flow is reported on an ongoing basis as required by the permit in the monthly Discharge Monitoring Reports.

The impact of the operation of the cooling water system intake structures is rigorously assessed on an ongoing basis through implementation of the biological monitoring program required by the Seabrook Station NPDES Permit. The preoperational phase of this program was initiated in 1976 followed by the operational phase of the program initiated at the time of commercial operation of Seabrook Station in 1990. Annual reports documenting the biological monitoring program data, analyses and conclusions are submitted to the EPA, New Hampshire Department of Environmental Services and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service. The annual reports continue to demonstrate that the operation of Seabrook Station has not adversely impacted the balanced indigenous populations of aquatic biota in the vicinity of the cooling water system intake and discharge structures.

Consultations with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service were initiated in 1997 after a number of seals were taken in the Seabrook Station cooling water system. A Limited Take Permit application was filed by Seabrook Station in June 1997. Subsequently a Limited Take Permit and Letter of Authorization were issued by NMFS in July 1999. The provisions of the Limited Take Permit and LOA included enhanced monitoring, reporting and the requirement to design
and install a mitigation device to minimize or eliminate seal takes. Design and installation of a mitigation device was completed in August 1999. Additional vertical bars were installed on the intake velocity caps to reduce the bar spacing from approximately fourteen inches to five inches. The reduced bar spacing mitigation design has been completely successful in eliminating seal takes. In light of the proven effectiveness of the mitigation device design the Limited Take Permit was allowed to expire in June 2004.

FPL Energy Seabrook submitted on May 4, 2006, a Proposal for Information Collection (PIC) as required by CWA § 316 (b) Phase II Regulation, 40 CFR § 125.95 (b)(1). The Seabrook Station PIC is integral to this NPDES Permit renewal application. The PIC demonstrates that Seabrook Station's Cooling Water Intake Structure design is "best technology available" and meets the National Performance Standards of 40 CFR § 125.94 (b). The PIC also includes the information required by 40 CFR §§ 122.21(r)(2), (3) and (5) describing the source water body, cooling water system intake structures and cooling water system operation respectively. FPL Energy Seabrook intends to submit a Comprehensive Demonstration Study (CDS) subsequent to receiving EPA review comments on the PIC but not later than January 7, 2008. The CDS will supplement this NPDES Permit renewal application.

## Certification pursuant to 40 CFR 122.22(d)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

It Re

Gene St. Pierre Site Vice President

Sworn and Subscribed

Before me this

25<sup>th</sup> day of 2006

9/25/06 Date



Shirley A. Sweeney, Notary Public

My Commission Expires: October 6, 2009