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AUTHORIZATION TO DISCHARGE UNDER THE RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of Chapter 46-12 of the Rhode Island General Laws, as amended,

The Narragansett Electric Company Manchester Street Station

is authorized to discharge from a facility located at

496 Eddy Street Providence, RI 02903

to receiving waters named

Providence River

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective 30 days from the date of signature.

This permit and the authorization to discharge expire at midnight, five years after the date of signature.

The permit supersedes the permit issued on 16 February 1988.

This permit consists of 18 pages in Part I including effluent limitations, monitoring requirements, etc., and 13 pages in Part II including General Conditions.

___ day of _____ bar 1991 Signed this

James W. Fester, P.E., Assistant Director for Regulation Rhode Island Department of Environmental Management Providence, Rhode Island

PART I

DEEL

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A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 001A (condenser and non-contact cooling, evaporator and boiler blowdown).

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

Elliuent								
Characteristic	Discha.	rge Limitations				Monitoring Requireme		
			Concentrat	ion - specif	y units			
	Average <u>Monthly</u>	Maximum Daily	Average <u>Monthly</u> *(<u>Minimum</u>)	Average <u>Weekly</u> *(<u>Averaqe</u>)	Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type	
Flow ¹		259.2 MGD				Monthly	Estimate	
Temperature					(96°F)	Continuous	Hourly average	
Temperature difference (discharge - intake)					(17°F)	Continuous	Hourly average	
Total Residual Chlorine ²			200 ug/l		200 ug/l	When in use	Grab	
рн			(6.5 S.U.)		(8.5 S.U.)	2/week	Grab	

¹Flow shall be estimated from pump curves based on the number of circulating pumps operating

²A grab sample for total residual chlorine shall be taken 5 to 15 minutes after the start of the first 20 minute chlorination cycle of each generating unit, and prior to mixing with any other wastestream. The first chlorination cycle shall be used to establish a ratio between chlorine dosage and condenser cooling water flow. An additional grab sample is required each time the ratio exceeds that established during the first cycle.

*Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall DOIA.

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2. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 002A (condenser and non-contact cooling, evaporator and boiler blowdown).

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

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Characteristic	Dischar	<u>ge Limitations</u>				Monitoring Re	<u>muirement</u>
	Average <u>Monthly</u>	Maximum Daily	Concentrat Average <u>Monthly</u> *(<u>Minimum</u>)	ion - specif Average <u>Weekly</u> *(<u>Average</u>)	y unite Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type
Flow ¹		230.4 MGD				Monthly	Estimate
. Нд			(6.5 S.U.)		(8.5 S.U.)	2/week	Grab
Temperature					(96°F)	Continuous	Hourly average
Temperature difference (discharge - intake)			-		(17°F)	Continuous	Hourly average
Total Residual Chlorine ²			200 ug/l		200 ug/l	When in use	Grab

¹Flow shall be estimated from pump curves based on the number of circulating pumps operating

⁷A grab sample for total residual chlorine shall be taken 5 to 15 minutes after the start of the first 20 minute chlorination cycle of each generating unit, and prior to mixing with any other wastestream. The first chlorination cycle shall be used to establish a ratio between chlorine dosage and condenser cooling water flow. An additional grab sample is required each time the ratio exceeds that established during the first cycle.

*Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 002A.

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3. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number D10C (calculated total of outfalls 001A and 002A).

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

Effluent Characteristic	Discha	rge Limitation	3	Monitoring Requireme			
	Average Monthly	Maximum Daily	Concentra Average Monthly	ation - spe Average <u>Weekly</u>	cify units Maximum <u>Daily</u>	Measurement Frequency	Sample Type
Total flow ¹		345.5 MGD				Monthly	Estimate
Keat (Summer and Winter) ²					1081 MBTU/hr.	Continuous	Calculation

¹Flow shall be estimated from pump curves based on the number of circulating pumps operating

²Total heat rejection from the Station's Steam Turbines shall be calculated for the hour of maximum gross electrical generation from the steam turbine. The calculation shall be performed in accordance with the plan submitted as Attachment B to a letter submitted to the Department on July 23, 1991 by Joseph M. Kwasnik of The Narragansett Electric Company. The calculations must be revised to reflect the repowered station and submitted to the Department in writing six months prior to startup of the repowered station.

Samples taken in compliance with the monitoring requirements specified above shall be calculated at the following locations: outfall 010C.

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4. Upon installation of the oil water separators noted in Part I.A.9.j. until expiration date, the permittee is authorized to discharge from outfall serial number 003A (floor and equipment drains and tidal infiltration).

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

Effluent Characteristic	Discharge Limitations			Monitoring Requiremen				
	Average <u>Monthly</u>	Maximum Daily	Average <u>Monthly</u>	Average <u>Weekly</u>	Maximum Daily	Measurement Frequency	Sample Type	
Flow	150,000 GPD	864,000 GPD				1/week	Estimate	
TSS			30 mg/l		100 mg/l	1/week	24 hour composite	
Oil and Grease			10 mg/l		15 mg/l	1/week	Grab	

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 003A.

5. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 004A (intake screen backwash water).

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

Characteristic	Dischar	qe Limitatione	Monitoring Requirement					
	Average <u>Monthly</u>	Maximum Daily	Concentrat Average <u>Monthly</u> *(<u>Minimum</u>)	tion - specis Average <u>Weekly</u> *(<u>Average</u>)	fy unite Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type	
Flow	1.0 MGD	2.9 MGD ⁸				1/week	Estimate	
рН			(6.5 S.U.)		(8.5 S.U.)	1/week	Grab	
pH influent			(S.U.)		(S.V.)	1/week	Grab	
pH change ¹					(0.5 S.U.)	1/week	Calculate	

--- signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

*Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily,

Reporting is only required when the influent pH exceeds 8.5 S.U., in which case the effluent pH shall not exceed 0.5 S.U. above the intake water.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 004A.

^a Upon installation of the modified vertical traveling screens, the high pressure debris wash will be discharged through outfall 004A, replacing the current intake screen backwash discharge. The permittee must notify the Director in writing two (2) months prior to operation of the modified screens.

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6. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 005A (tank heater condensate and stormwater runoff).

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

Elliquenc							
Characteristic	Dischar	Monitoring Requirement					
	Average <u>Monthly</u>	Maximum Daily	Concentrat Average <u>Monthly</u> *(<u>Minimum</u>)	tion - specis Average <u>Weekly</u> *(<u>Average</u>)	fy units Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type
Flow	15,000 GPD	20,000 GPD				1/week	Estimate
TSS			30 mg/l		100 mg/l	1/week	Grab ¹
Oil and Grease			15 mg/l		20 mg/l	l/week	Grab
рН			(6.5 S.U.)		(8.5 S.U.)	1/week	Grab

¹ Sample type shall be grab due to discharge being intermittent.

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Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 005A.

*Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily.

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7. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 006A (tank heater condensate).

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

Characteristic	Dischar				Monitoring R	equirement	
	Average Monthly	Maximum Daily	Concentrat Average <u>Monthly</u> *(<u>Minimum</u>)	tion - specif Average <u>Weekly</u> *(<u>Average</u>)	fy units Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type
Flow	15,000 GPD	20,000 GPD				1/week	Estimate
TSS			30 mg/l		100 mg/l	1/week	Grab ¹
Oil and Grease			15 mg/1		20 mg/1	1/week	Grab
рн			(6.5 S.V.)		(8.5 S.U.)	1/week	Grab

¹ Sample type shall be grab due to discharge being intermittent.

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Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 006A.

*Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily.

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8. During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall serial number 007A (low pressure fish wash).

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

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Characteristic	Dischard	<u>ge Limitations</u>				Monitoring Re	equirement
	Average <u>Monthly</u>	Maximum Daily	Concentrat Average <u>Monthly</u> *(<u>Minimum</u>)	tion - specif Average <u>Weekly</u> *(<u>Average</u>)	fy units Maximum <u>Daily</u> *(<u>Maximum</u>)	Measurement Frequency	Sample Type
Flow		1.2MGD ^a				l/week	Estimate
рн			(6.5 S.U.)		(8.5 S.U.)	1/week	Grab
pH influent			(S.U.)		(S.U.)	1/week	Grab
pH change ¹					(0.5 8.0.)	1/week	Calculate

¹Reporting is only required when the influent pH exceeds 8.5 S.U., in which case the effluent pH shall not exceed 0.5 S.U. above the intake water.

--- signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

•Values in parentheses () are to be reported as Minimum/Average/Maximum for the reporting period rather than Average Monthly/Average Weekly/Maximum Daily.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: outfall 007A.

^aUpon installation of the modified vertical traveling screens, the low pressure fish wash will be discharged through outfall 007A. The permittee must notify the Director two (2) months prior to the operation of the modified screens.

- 9. a. The pH of the effluent shall not be less than 6.5 nor greater than 8.5 standard units (SU) at any time, unless these values are exceeded due to natural causes, in which case it shall not be greater than 0.5 SU above the influent pH.
 - b. The discharge shall not cause visible discoloration of the receiving waters.
 - c. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.
 - d. This permit serves as the State's Water Quality Certificate for the discharges described herein.
 - e. Chlorine may be used as biocide. No other biocide shall be used without explicit approval from the Director. The addition of chlorine shall not exceed six (6), twenty minute periods in any one day, for any one unit. Not more than one unit shall be chlorinated at any one time. There shall be a minimum of one hour between the end of each twenty minute chlorination cycle and the beginning of the next.
 - f. The permittee shall analyze its effluent annually for the EPA Priority Pollutants as listed in 40 CFR 122, Appendix D, Table II and III. The results of these analyses shall be submitted to the Department of Environmental Management. All sampling and analysis shall be done in accordance with EPA Regulations, including 40 CFR, Part 136; grab and composite samples shall be taken as appropriate.
 - g. The discharges shall not jeopardize any Class SC use of the Providence River. If the RIDEM, Division of Fish & Wildlife, develops plans to restore anadromous fish migration to the Woonasquatucket or Moshassuck Rivers, the permittee shall conduct further studies (as approved by the Director) to support the current conclusion that the thermal discharge will not block fish migration. This conclusion was based on the prediction that the times when the thermal discharge has the potential to block fish passage, do not coincide with the times migration is likely to occur. If the discharge is found to block fish migration, the permittee shall reduce its thermal discharge, or take other appropriate actions to allow migration.
 - h. All live fish, shellfish, and other aquatic organisms collected or trapped on the intake screens shall be returned to their natural habitat.
 - This permit shall be modified, or alternatively, revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b) (2) (C) and (D), 304(b) (2), and 307(a) (2) of the Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
 - (2) controls any pollutant not limited by this permit.

If the permit is modified or reissued, it shall be revised to reflect all currently applicable requirements of the Act.

- j. The permittee shall submit a Best Management Practices(BMP) plan to the Director within three (3) months from the effective date of the permit to minimize oil and solids contamination in the floor and equipment drains as permitted in outfall 003A. The permittee shall install two 300 gpm oil water separators as described in correspondence to the Director dated February 19, 1991, prior to activation of outfall 003A. The permittee shall notify the Director in writing that the installation is complete, 7 days prior to commencement of the discharge.
- It has been determined based on engineering judgement that the k. conventional vertical traveling screens currently in operation at the Manchester Street Station circulating water intake structure provide adequate protection for minimizing adverse environmental impact. Modified vertical traveling screens which have the potential for increased postimpingment survival for certain species will be installed and operated continuously as part of the repowering of the Manchester Street Station. Installation of the modified vertical traveling screens must be completed and the screens must be operational with startup of the repowered station. The Director shall be notified in writing upon completion of the installation. Review of the proposed modified vertical traveling screen design and operational schedule in conjunction with a separate fish return system under regulations pursuant to Section 316(b) of the Clean Water Act (PL 92-500) reflects that the modified screens are the best available technology for minimizing adverse environmental impact.
- 1. In the Providence River below the Fox Point hurricane barrier, the combined thermal discharge plumes from the Station shall; (a) not block the zone of fish passage, (b) not interfere with spawning of the indigenous populations in the receiving water, (c) not change the balanced indigenous population in the receiving water, and (d) have minimal contact with surrounding shorelines.
- m. There will be no discharge of any tubeside chemical cleaning wastes, fireside cleaning wastes, or air preheater cleaning wastes into the Providence River.
- n. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
- The limitations on discharge temperature may be exceeded during ο. periods when pump breakdown reduces the ability to supply full cooling water flow to one or more condensers. In the event of such breakdown, the permittee shall take corrective action as soon as possible. For those periods when the temperature limits are exceeded due to pump breakdown, the permittee shall notify the Director immediately by phone and send a written report within seven (7) calendar days containing the following information: (1)which circulating water pumps were not operating; (2) the dates and times such pumps were not operating; (3) the reasons the pumps were not operating and backup pumping capacity was not available; (4) the periods (dates and times) during which the temperature limits were exceeded; and (5) the corrective actions taken to return the pumps to service. In no case shall the time during which the temperature limits are exceeded due to pump breakdown total more than 5% of the operating year. Routine pump

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maintenance resulting in these limitations being exceeded should be avoided from June through September.

The limitations on discharge temperature shall be increased to an hourly average of 98 degrees Fahrenheit during any period declared by the New England Power Pool to be an "Operation Procedure 4 (OP-4) Emergency" which requires increased output at the Manchester Street Station. If during any such emergency period the discharge temperature exceeds 96°F, the permittee shall notify the Director immediately by phone and send a written report within seven (7) calendar days containing the following: (1) date and time of beginning and end of each such emergency during the reporting period; (2) discharge flows during the emergency (estimated from pump operation data and nominal pump capacities); and (3) hourly average discharge temperatures during the emergency. An annual report shall be submitted to the Department by April 1 of each year, beginning with 1992. The report shall list the dates, duration and operating conditions of the Station during all OP-4 declarations of the previous calendar year.

- 10. All existing manufacturing, commercial mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:
 - 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":
 - One hundred micrograms per liter (100 ug/l); (1)
 - Two hundred micrograms per liter (200 ug/1) for acrolein and (2) acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitro-phenol; and one milligram per liter 1 mg/l) for antimony;
 - Five (5) times the maximum concentration value reported for (3) that pollutant in the permit application in accordance with 40 CFR §122.21 (g) (7); or
 - Any other notification level established by the Director in (4) accordance with 40 CFR §122.44 (f) and Rhode Island Regulations.
 - b. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - Five hundred micrograms per liter (500 ug/l); (1)
 - One milligram per liter (1 mg/l) for antimony; (2)
 - Ten (10) times the maximum concentration value reported for (3)that pollutant in the permit application in accordance with 40 CFR §122.21 (g) (7); or
 - Any other notification level established by the Director in (4) accordance with 40 CFR §122.44 (f) and Rhode Island Regulations.

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c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or by-product any toxic pollutant which was not reported in the permit application.

B. BIOLOGICAL MONITORING - PLANT PROGRAMS

B.1 INTAKE DEBRIS SCREEN IMPINGEMENT ABUNDANCE MONITORING STUDY

- B.1.a. General Requirements During one 24-hour period each week the permittee shall collect, identify and enumerate all fish and invertebrates impinged on the intake traveling screens. The impingement rate shall be calculated for total and major species based on time (fish per hour) and on flow (fish per million gallons). The impingement rate based on flow shall include flow related to all circulating cooling water pumps and service water pumps operating during the 24-hour sample period. The major species include, alewife, Atlantic herring, Atlantic menhaden, Atlantic silverside, bay anchovy, blueback herring, mummichog, rainbow smelt, silver hake, striped bass, tautog, weakfish and winter flounder. Water temperature, dissolved oxygen and specific conductance shall be recorded at the intake at the beginning and end of each 24-hour survey period. Estimated impingement rates and abundance shall be submitted to the Director along with the monthly Discharge Monitoring Report (DMR).
 - ь. Conventional Vertical Traveling Screen Operational Period. The normal traveling screen wash cycle is once every eight (8) hours. When the impingement rate for select fish species (combined) is equal to or greater than three (3) per hour averaged over the 24hour sample period, the screen wash frequency shall be increased to once every four (4) hours. The four (4) hour wash cycle is to continue until the impingement rate for the select species falls below three (3) fish per hour at which time the screen wash frequency shall return to the normal eight (8) hour wash cycle. The select species are those that have demonstrated or postulated elevated postimpingment survival and include Atlantic silverside, silver hake, mummichog, winter flounder, weakfish, and striped killifish. The Director shall be notified immediately by telephone whenever the screen wash cycle frequency is increased to once every four (4) hours as a result of this permit condition.

A written confirmation report shall be submitted to the Director separately for each event. The report shall detail the reasons for the modified screen wash cycle; the plant operating mode; the dates and times for the higher frequency of screen wash operations; and the numbers, sizes and kinds of fish involved in the incident. The confirmation report shall be submitted within 30 days after the termination of the four hour screen wash schedule.

c. Modified Vertical Traveling Screen Operation Period. As part of the Manchester Street Station repowering project, the conventional vertical traveling screens will be replaced with modified vertical traveling screens designed for continuous operation. The modified screens will have water retaining screen basket lip troughs, a low pressure fish wash system including a separate sluiceway, and a high pressure debris wash system. Impingement rates and abundance estimates for the modified screens shall be based on simultaneous samples from both the low and high pressure screen wash systems.

> Determination will be made following evaluation of the modified vertical traveling screen impingement data on the potential for reducing the time of continuous screen operation to seasonally high impingement periods. Comparison of impingement data from the low and high pressure wash systems shall be used to determine the efficiency of the low pressure wash system for fish removal.

- d. Reporting of Traveling Screen Impingement Monitoring Study. Results of the intake traveling screen impingement monitoring study shall be summarized and submitted to the Director in an annual report. The annual report shall be submitted within three (3) months from the end of the calendar year of collection. The following information for the sample collection period should be detailed in the annual report:
 - Generating station operational parameters; circulating water pump operation, flow, intake and discharge water temperature.
 - Water quality data.
 - Length information on a representative sample of each major species.
 - Monthly and annual impingement estimates for total and major species.
- e. Notification of Righ Impingement Rates. Any incidence of fish impingement exceeding 200 fish per 24-hour collection period for total fish or 100 fish per 24-hour collection period for one of the major species, shall be reported to the Director immediately by telephone. The verbal report shall include the species, sizes, and approximate numbers of fish impinged; the time of the occurrence; the operating mode of the plant at the time of the occurrence; and any observations related to biological or environmental conditions, that may have caused the incident.

B.2 MODIFIED VERTICAL TRAVELING SCREEN POSTIMPINGMENT SURVIVAL STUDY

B.2.a. A one (1) year postimpingment survival evaluation study shall be required following installation of the modified vertical traveling screens and fish return system. A study plan to evaluate postimpingment survival shall be submitted to the Director for acceptance three (3) months prior to the operation of the modified vertical traveling screens and fish return system.

> The study plan shall discuss, in detail, the engineering design of the screens, the method(s) of operation, the method for fish removal and conveyance to the test apparatus, the test conditions, including frequency of testing and organisms utilized and other pertinent information that is relevant to organism survival. The tests shall be conducted, as near as practically possible, in such a manner as to test the survival of organisms from the traveling screens rather than structures appurtenant to the screeens or testing procedures. Physiochemical and mechanical stresses, such as changes in temperature and pressure and abrasion not related to screen operation, shall be avoided in the test procedures. In addition an equal number of samples should be collected at the end of the low pressure screen wash return pipe to assist in determining any associated stress.

> Both seasonal and diel stratification in sampling should be considered to concentrate collections during periods when different life stages of the major species are present in impingement. The sampling effort during each seasonal period shall be sufficient to yield statistically valid results for those species and life stages present.

The study plan shall also address debris that is trapped on the screens. The study shall monitor, debris from the high pressure wash. All material must be quantified and characterized. A determination shall be made as to the feasibility of removal of the debris for subsequent land disposal.

b. The results of the postimpingment survival study, which shall include a description of collection methods and test procedures, shall be submitted to the Director as a separate report within three (3) months from the end of sampling.

B.3 ENTRAINMENT ABUNDANCE MONITORING

- The permittee shall submit a study plan to the Director for а. acceptance no later than three (3) months after the effective date of the permit to conduct a program to determine the numbers by species and life stage of ichthyoplankton entrained into the condensers under present and repowered conditions. A The plan must be implemented prior to startup of the repowered facility. Entrainment sampling periods shall be scheduled to correspond to the presence (based on historic data) of ichthyoplankton in the study area. Replicate pump samples shall be collected during midday and mid-night at the cooling water intake structure on a schedule corresponding to near field and far-field ichthyoplankton sampling. At the conclusion of the second year of the entrainment sampling program, under repowered conditions, the permittee may submit to the Director for review and approval a proposal for a reduced entrainment monitoring program.
- b. The results of the annual entrainment abundance monitoring program shall be submitted to the Director. The reporting period shall be January through December with reports due by April 1st. The first report shall be due April 1, 1993. The report shall contain a section indicating the pertinent plant operating data on the days that biological monitoring collections were conducted and should include, but are not necessarily limited to, the units operating, intake and discharge temperatures, quantity of circulating water, number of pumps operating, amount of recirculation, generation, and number of traveling screens operational.

Entrainment estimates shall be calculated based on a rate determined from the number of eggs and larvae identified in each sample, the sample volume and the intake flow, considering both cooling water and service water pumps.

B.4 FISH KILL ACTION PLAN

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The permittee is required to have a RIDEM accepted Fish Kill Action Plan in affect during the effective period of the RIPDES permit. The purpose of the plan is to document any unusual occurrence of dead or stressed fish in the Providence River north of the Fox Point hurricane barrier and south of the Interstate 195 Bridge, and to collect physical, chemical and biological samples to determine, if possible, the cause of the incident.

The plan shall describe the responsibility of the permittee for reporting fish kill incidents to the Department and the requirements for cleanup activities, specimen collection, biological assessment, fish disposal and conditions for return to normal operation.

C. BIOLOGICAL MONITORING: RIVER MONITORING PROGRAM

C.1. Within three (3) months of the effective date of the permit, the permittee shall submit a study plan for acceptance by the Director, to conduct seasonally stratified sampling programs for phytoplankton, periphyton, sessile macroinvertebrates, meroplankton and ichthyoplankton. In general, the sampling programs shall include a nearfield station (station directly influenced by Manchester Street Station thermal discharges), an upriver station, a station south of the Fox Point hurricane barrier and a Seekonk River control station. Each study plan should detail the sampling program including collection methodology, laboratory analysis methods, and analytical procedures. Comparisons shall be made of community parameters, abundance estimates and/or blomass among stations and at the same stations for pre-and postrepowering of the Manchester Street Station.

A report detailing the results of the sampling programs shall be submitted to the Director annually by May 1st. Sampling shall commence April 1, 1992 and the first report is due May 1, 1993. The results will be reviewed with the potential of modifying each component of the sampling program.

- C.1.a. **Phytoplankton.** Whole water samples shall be collected during each quarter to determine species composition, abundance and biomass. Replicate samples shall be collected at each station. One (1) sample - the winter sample - shall be collected during February and the summer sample shall be collected during August.
- C.1.b. **Periphyton.** Periphyton colonization rates shall be monitored at three (3) locations in the study area, monthly from February through October. Artificial substrate samplers will be deployed in triplicate, for one month colonization periods at each location.
- C.1.c. Sessile Macroinvertebrates. Hester-Dendy artificial substrate samplers shall be deployed in triplicate at each of three (3) locations for one month colonization periods. Samplers will be deployed during February through October.
- C.1.d. Meroplankton and Ichthyoplankton. The planktonic stages of benthic macroinvertebrates, zooplankton and ichthyoplankton shall be monitored in the study area during March through October and during February. The samples shall be conducted on a bi-weekly (once every two weeks) schedule during the periods March through mid-May and mid-August through October, weekly during the period mid May through mid-August and once during February. All samples shall be analyzed for ichthyoplankton and one series of samples per month for meroplankton and zooplankton. Replicate samples shall be collected at each station using conical plankton nets equipped with velocity meters to calculate organism densities. The density estimates shall be used to calculate estimated abundance in the various water body segments sampled.

D. THERMAL AND DISSOLVED OXYGEN STUDIES

The permittee shall implement thermal and dissolved oxygen studies in accordance with a Study Plan accepted by the Director. The studies shall include two elements: Continuous Receiving Water Monitoring and Thermal Surveys. The purpose of the studies shall be quantification of differences in thermal and dissolved oxygen characteristics of the Providence and lower Seekonk (*i.e.*, below the I-195 bridge) rivers before and after repowering of the Manchester Street Station.

D.1. The Continuous Receiving Water Monitoring shall take place in the Providence River at one site upstream of the Fox Point hurricane barrier judged to be representative of the intermediate field (as defined in Appendix I of the 316 (a) and (b) Demonstration Report). The near surface and near bottom waters shall be monitored continuously for temperature. The Continuous Receiving Water Monitoring shall commence not later than March 1, 1992. An Annual Report shall be submitted by the permittee within 90 days of the end of each year of monitoring. The reporting period shall be March through October with reports due by February 1⁴. The first report shall be due by February 1, 1993. The Annual Report shall include tabulations of all data collected during the reporting period, an analysis of the data relative to operations at the Manchester Street and South Street stations, river flows, weather and other pertinent

variables, and, after the first year, comparisons with previously collected data. During February and November of each year, a single measurement of temperature will be made in the vicinity of the device in order to provide temperature data coincident with the biological studies. The continuous temperature recorder will not be deployed during the February and November biological studies.

The Annual Report may also incorporate any other presentations the permittee may deem appropriate to interpretation of the data, including recommendations for modifications of the Study Plan.

D.2. The Thermal Surveys shall be conducted during the critical period of July, August and September. Three (3) surveys shall be conducted before repowering and three surveys afterward. The surveys are to be completed during the permit period. The pre-repowering surveys shall be made at the time of maximum expected river temperatures in combination with maximum expected average capacity factor. For the post-repowering surveys, the average Capacity Factor for the Manchester Street Station shall be approximately 80% on the day of each survey and shall have been not less than 50% during the 7 days preceding each survey.

Observations of the temperature, salinity and dissolved oxygen shall be made during periods bracketing as closely as practical high tide, and low tide. The observations shall be made at a sufficient number of locations and depths in the Providence and lower Seekonk rivers to permit preparation of vertical and horizontal plots of isopleths to the same level of detail shown in Appendices I, J and K of the 316 (a) and (b) Demonstration Report. Observations shall also be made at one station each in the Providence River upstream of the Fox Point hurricane barrier, the Providence River south of Sassafras Point and the Seekonk River upstream of the I-195 bridge sufficiently remote to establish ambient temperatures, salinities and dissolved oxygen levels in these waterways.

In addition, dissolved oxygen, temperature and salinity measurements shall be taken at a minimum of five (5) locations north of the Hurricane Barrier, one location south of the barrier, and one (1) location in the Seekonk River, in conjunction with the ichthyoplankton sampling as described in item C.1.d.

An Interim Report shall be submitted to the Director not later than 90 days after completion of the first three field surveys. The Interim Report shall include tabulations of all data collected during the surveys and such other presentations as the permittee may deem appropriate to interpretation of the data. It may also include recommendations for modification of the Study Plan deemed appropriate by the permittee to meet the purpose of the Thermal and Dissolved Oxygen Studies.

A Final Report shall be submitted to the Director not later than 90 days after completion of the last Comprehensive Thermal Survey. The Final Report shall include tabulations of all data collected during the surveys, analysis of the data to describe any differences among the surveys and relate these differences to variables such as station operation, river flows, weather and other driving factors. The report may contain any other presentations or data that the permittee may consider relevant to the interpretation of the data.

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E. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during the previous one (1) month shall be summarized and reported on Discharge Monitoring Report (DMR) Form(s) postmarked no later than the 15th day of the month following the completed reporting period. The first report is due on December 15, 1991.

Signed copies of these, and all other reports required herein, shall be submitted to:

Chief, Division of Water Resources Rhode Island Department of Environmental Management 291 Promenade Street Providence, Rhode Island 02908

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MAN. JEMENT DIVISION OF WATER RESOURCES 291 PROMENADE STREET PROVIDENCE, RHODE ISLAND 02908-5767

FACT SHEET

DRAFT RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES) PERMIT TO DISCHARGE TO WATERS OF THE STATE

RIPDES PERMIT No. RI0000434

NAME AND ADDRESS OF APPLICANT:

The Narragansett Electric Company P.O. Box 1438 Providence, RI 02901

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Manchester Street Station 496 Eddy Street Providence, RI 02903

RECEIVING WATER: Providence River

CLASSIFICATION: SC

I. Proposed Action, Type of Facility, and Discharge Location

The above-named applicant has applied to the Rhode Island Department of Environmental Management for reissuance of a RIPDES Permit to discharge into the designated receiving water. The facility is engaged in electric power generation. The generating station is currently operating under a five (5) year RIPDES permit with an effective date of 16 February 1988. The request for a new permit is based on a proposed station repowering that will increase station generating capacity from 132 MWe to 455 MWe. The repowered station will operate as a base load facility maintaining the same circulating cooling water flow, but with an additional water temperature increase across the condensers of 2°F, going from nominal 10°F to 12°F. The plant discharges are from condenser cooling, noncontact cooling, boiler blowdown, evaporator blowdown, floor drains, equipment drains, intake screen backwash, tank heater condensate, and stormwater runoff.

II. Permit Basis and Explanation of Effluent Limitation Derivation

Narragansett Electric Company owns and operates the Manchester Street Station, which generates and transmits electric power. The facility discharges wastewater to the Providence River from five (5) outfalls.

The discharge from outfalls 001 and 002 consists of condenser cooling and noncontact cooling water, as well as waste streams generated from boiler and evaporator blowdown. Under normal operating conditions circulating cooling-water flow based on nominal pump capacities is approximately 180,000 gpm (259.2 MGD) with the discharge split between outfalls 001A and 002A, depending on generating units operating. The facility is capable of operating in a variety of combinations of generating units, but the rate of heat rejection will not exceed 1081 MBtu/hr in any case.

A review of the repowered facility's projected operation results in a 96°F maximum limit on the discharge temperature and a 17° maximum limit on the difference between intake and discharge temperatures in either outfall, based on averaging the continuously recorded data every hour.

The 17° difference limit is based on the maximum he. rejection rate of 1081 MBtu/hr and adjustment of the nominal pumping capacity downward to 127,000 gpm (182.9 MGD) to account for condenser head losses, pump inefficiencies and other facility inefficiencies, such as excessive build-up at the trash racks. The 96° temperature limit is based on the 17° difference limit and an evaluation of historical intake temperature data.

The use of hourly averaging is judged adequate to protect the receiving waters, given that, at maximum nominal pumping rate of approximately 180,000 gpm (680 m³ /minute), it would take the plant approximately 12 hours to replace the estimated 137.4 x 10^{6} gallons (5.2 x 10^{5} m³) of water upstream of the Hurricane Barrier (see the 316 Demonstration Document, Appendix I for the basis of the volume estimate).

Although both the existing and repowered discharge are within the limits of the existing Rhode Island Pollutant Discharge Elimination System (RIPDES) permit for the station, studies performed in support of the proposed repowering revealed that the existing, and thus the repowered, plant discharges caused the thermal water quality standards in the upper Providence River to be exceeded. Narragansett Electric Company submitted an evaluation of the impact of the existing and proposed intake and thermal discharges in accordance with Section 316 of the proposed Clean Water Act.

It was predicted that currently the Manchester Street discharge temperature is 10°F greater than the intake water temperature, and that the repowering will increase this to 12°F under nominal operating conditions (total station flow of 259.2 MGD) and 17°F when total station flow is reduced to 182.9 MGD by condenser fouling and pump inefficiencies. In the area north of the Hurricane Barrier and under typical summer conditions, the existing station is predicted to raise the weekly average temperature approximately 4.0°F above the ambient of 75°F to 79°F and the weekly maximum temperature approximately 7.4°F above ambient to 82.4°F. At the nominal pumping rate of 259.2 MGD and condenser rise of 12°F, the repowered discharge is predicted to result in approximately 7.3°F above ambient for the weekly average and approximately 10.0°F above ambient for the weekly maximum, under the same typical summer conditions. Extrapolation of the latter results to the extreme 7-day, 10-year low flow condition (7010) in the Blackstone River yields values of 7.4°F and 10.2°F, respectively, resulting in forecast area average temperatures in the area north of the Hurricane Barrier of 82.4°F for the weekly average and 85.2°F for the weekly maximum. Finally, if this extreme condition is further extrapolated to consider the reduced pumping rate of 182.9 MGD and correspondingly increased condenser rise 17°F, the repowered discharge is predicted to result in approximately 8.7°F above ambient for the weekly average and 11.5°F above ambient for the weekly maximum. Thus, under worst-case conditions when 7010 in the Blackstone occurs simultaneously with a 17°F condenser differential (i.e., minimum cooling water flow and maximum heat rejection) the weekly average temperature in the area north of the Hurricane Barrier is forecast to be 83.7°F and the weekly maximum temperature is forecast to be 86.5°F.

RIDEM has accepted the applicant's 316 Demonstration dated September 1989 and revised May 1990 pursuant to Section 316(a) of the Clean Water Act, addressing alternate thermal effluent limitations. RIDEM's review of these documents is summarized in a document entitled: Determination Regarding Issuance of Ripdes Permit No. RI0000434 for the Manchester Street Station, Providence, RI. July 1991, which is available upon request. The applicant has demonstrated that operation of the facility will not cause harm to the aquatic community in the receiving water. The applicant has also demonstrated pursuant to Section 316(b) of the Clean Water Act that the cooling water intake structure reflects the best available technology available for minimizing adverse environmental impact. Given the difficulties associated with defining the ambient conditions which would occur without a thermal discharge to the area, and predicting the post-repowering thermal and biological impacts, physical and biological studies are being required in order to validate previous studies and to

assure that the bal inced indigenous population contributes to thrive. Based upon the results of these studies, the study protocols and/or permit limitations and conditions, may be modified, as appropriate.

As part of the 316 demonstration, the following discharge alternatives were considered:

- · Relocating the discharge south of the hurricane barrier
- Submerged multiple diffusers discharging both north and south of the hurricane barrier
- The use of wet and dry cooling towers
- District heating supplying steam to nearby users of large quantities of steam

This draft permit requires that the addition of chlorine be limited to a maximum of six (6), twenty (20) minute application periods per generating unit at a maximum effluent concentration of 200 ug/l. In addition, there must be a minimum of 60 minutes between each 20 minute chlorine application period. Model predictions indicate that if chlorine is applied in this manner, the monthly average instream aquatic life criteria of 7.5 ug/l shall be attained.

The current RIPDES permit requires monitoring for total suspended solids (TSS) on both influent and effluent. Review of that monitoring data shows no significant increase of TSS from the influent to the effluent. Therefore there is no longer a need to monitor for TSS. This draft permit reflects that decision.

Intake screen backwash water is currently discharged from outfall 004A. The maximum discharge volume from the five conventional vertical traveling screens is approximately 1400 gpm. The backwash water volume from five modified vertical traveling screens will be approximately 2800 gpm with the flow split into a fish return component that will discharge near the eastern opening in the hurricane barrier (designated outfall 007A) and a debris wash component that will discharge through the existing outfall (outfall 004A).

The tank heater condensate and stormwater runoff are treated by two different oil/water separators and discharged from outfall 005A. Tank heater condensate is discharged from outfall 006A. Any changes in active outfalls, requirement for new discharges or reactivation of currently non-active outfalls as a result of the station repowering will be addressed in a permit modification to be completed at the conclusion of the repowering project.

Narragansett Electric conducted a floor and equipment drains dye test study to identify the discharge locations of all drains. Two leaks were confirmed which resulted in these drains being discharged to the Providence River via the upper circulating water tunnel. This was corrected by piping the drains directly to a nearby trench with ultimate discharge to the Narragansett Bay Commission (NBC) WWTF. With this modification, all floor and equipment drains were directed to NBC.

The dye study also identified cracks in the basement floor that connected with the upper discharge tunnel and allowed infiltration of River water during high tide causing flooding of the basement floor. Some of the flood waters enter a sump which also collects the water from all floor and equipment drains and then discharges to NBC. Narragansett Electric's attempts to reduce infiltration have been successful, however, further reductions below the current rate of 600 gpm have proven elusive. This permit allows the discharge of floor and equipment drains to return to the Providence River via outfall 003A, upon installation of two additional 300 gpm oil water separators.

This discharge was removed from the NBC sewer syste, and returned to the River for the following reasons.

- Two oil water separators have already been installed on the equipment most likely to contaminate the wastestream.
- Additional pollutant removal will be achieved after installation of the new oil water separators.
- · Infiltration of river water has been reduced as much as possible.
- The discharge of river water to NBC is inconsistent with NBC's efforts to reduce infiltration to the sewer system.

The requirements set forth in the permit are from the State's Water Quality Regulations and the State's Permit Regulations, both filed pursuant to Rhode Island General Law Chapter 46-12 as Amended. The State Department of Environmental Management's authority over this permit comes from the Environmental Protection Agency's delegation of the program in September 1984 under the Federal Clean Water Act. The effluent monitoring requirements have been specified in accordance with Federal effluent guidelines for the steam electric power generating industry, as outlined in the 40 CFR Chapter 1 Part 423. The general and specific conditions of the permit are based on the RIPDES Regulations as well as on 40 CFR Chapter 1 Part 423. They consist primarily of management requirements common to all permits.

III. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to the Rhode Island Department of Environmental Management, Division of Water Resources, 291 Promenade Street, Providence, Rhode Island, 02908-5767. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to the Rhode Island Department of Environmental Management. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty (30) days public notice, whenever the Director finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit, the Director will respond to all significant comments and make these responses available to the public at DEM's Providence Office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Director will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within thirty (30) days following the notice of the final permit decision, any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of Rule 49 of the Regulations for the Rhode Island Pollutant Discharge Elimination System (16 July 1984).

IV. DEM Contact

Additional information concerning the draft permit may be obtained between the hours of 8:30 a.m. and 4:00 p.m., Monday through Friday, excluding holidays from:

Angelo S. Liberti Interim Associate Supervising Sanitary Engineer 291 Promenade Streat Providence, Rhode Island 02908-5767 Telephone: (401) 277-6519 9/19/91 Cugeta Angelo S. Liberti

Interim Associate Supervising Sanitary Engineer Permits and Planning Section Division of Water Resources

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Figure 1-1 . Location of Manchester Street and South Street Stations

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