

SHOREHAM AQUATIC ECOLOGY MONITORING PROGRAM -
OPERATIONAL PHASE

I. Introduction

The following study plan presents the operational phase aquatic ecology monitoring program proposed for the Shoreham Nuclear Power Station, Unit 1. The study is designed to satisfy requirements (No. 5, Part I) of the State Pollutant Discharge Elimination System (SPDES) Permit issued by New York State Department of Environmental Conservation (NYSDEC). The study plan is also intended to be responsive to requirements of the Environmental Protection Plan (EPP) submitted to the Nuclear Regulatory Commission (NRC).

There are three components to the aquatic ecology study: offshore aquatic monitoring program (OSAMP), impingement monitoring program (IMP), entrainment monitoring program (EMP). Impingement and entrainment monitoring will include abundance and survival measurements.

The study is designed to provide data to identify and assess any impacts of plant operation on the marine environment. Specifically, the offshore work seeks to evaluate thermal effects while the impingement and entrainment studies measure cooling water intake effects.

The proposed schedule of program implementation is summarized in Figure 1. This schedule is based on information available as of April 1982 and is subject to revision due to any future changes in the plant's operating schedule.

Details of each of the sampling programs and schedules follow.

II. Offshore Aquatic Monitoring Program (OSAMP)

Continuous monitoring of the aquatic environment in the vicinity of SNPS has been underway since January 1977. This preoperational OSAMP study routinely collects and evaluates the parameters presented in Table 1. When the plant becomes operational, the OSAMP will be continued so that comparisons may be made between operational and preoperational data. Table 2 provides details of the proposed offshore monitoring program; the study area is shown in Figure 2.

Within 120 days following the end of each year's operational OSAMP sampling a report will be prepared comparing operational data with preoperational data. Various statistical techniques will be employed to assess any impacts resulting from plant operation. Reference to and correlation with other pertinent contemporary or historical aquatic studies will be made as appropriate. Modifications to the scope of work will also be considered at this time; the program will be evaluated and

modified as necessary to eliminate or reduce sampling of those parameters for which no significant observable differences in abundance occurred from those noted during the preoperational study. Copies of reports will be submitted to the NRC per requirements of the EPP.

Table 1 PROPOSED OFFSHORE AQUATIC MONITORING PROGRAM,
OPERATIONAL STAGE
SHOREHAM NUCLEAR POWER STATION - UNIT 1

Parameters	Number of Stations	Frequency of sampling
Phytoplankton	5	Quarterly
Zooplankton		
Macrozooplankton	1	Biweekly (April-November)
Macrozooplankton	5	Quarterly
Microzooplankton	2	Biweekly (April-November)
		March and December
Benthos		
Lobster pots	40 pots	Monthly
Whelk pots	20 pots	Monthly
Smith-McInyre	5 stations	Quarterly
Ichthyoplankton	6	Weekly (mid February-mid May)
		Biweekly (mid May-mid July)
		Monthly (August-January)
		Quarterly-Diurnal
Fisheries		
Gill Net	1	• Biweekly (April-June,
Fish trap	2	September, October)
Otter trawl	6	Monthly (January-March,
Beach seine	3	July, August, November,
		December)
		Quarterly-Diurnal (trawl
		and seine)

Table 2 DETAILS OF OFFSHORE AQUATIC MONITORING PROGRAM, SHOREHAM
OPERATIONAL STUDY

	Identification and Enumeration	Length	Weight	Sex	Feeding Habits	Tagging
Phytoplankton	x					
Zooplankton						
Macrozooplankton	x					
Microzooplankton	x					
Benthos						
Lobster Pots	x	x	x	x		x
Whelk Pots	x	x	x			x
Smith-McIntyre Grab	x					
Ichthyoplankton	x	x				
Fisheries						
Gill Net	x	x	x	x	x	
Fish Traps	x	x	x	x	x	
Otter Trawl	x	x	x	x	x	x
Beach Seine	x	x	x	x	x	
Water Chemistry	<u>Parameters Measured</u> Oil and grease, Suspended solids, pH, Chlorine demand Copper, Iron, Boron Nitrate, Ammonia, Orthophosphate, Chlorophyll <u>a</u>					
Water Quality	Temperature, Salinity, Dissolved Oxygen, Turbidity					

III. Entrainment Monitoring Program (EMP)

This program is designed to measure the effects of through plant entrainment on the ichthyoplankton community. Eggs and larvae collected at the intake will be identified and enumerated to monitor entrainment abundance. Survival rates of entrained larvae will be determined by sampling simultaneously at the intake and discharge.

It is expected that some operating experience at the site will be required before final sampling methodology can be developed. The program presented below, therefore, will be modified as necessary to provide meaningful abundance and survival data.

Abundance sampling will commence when the intake flows reach representative operating levels (estimated to occur approximately 9 months after fuel loading). Since it is expected that appropriate sampling methodology will require some time to develop, survival sampling will commence at a later date, probably within six months (or one ichthyoplankton season) of initial full load operation. Survival will probably be determined instantaneously (within one hour of sampling) since studies have shown that long-term holding does not increase the accuracy of, or confidence in, the survival determination. Entrainment survival rates will be determined by comparing intake (control) with discharge samples.

Entrainment sampling will be conducted generally according to the schedule presented in Table 3. Intensive sampling will be undertaken in early spring during the winter flounder spawn weather permitting.

A report will be issued within 120 days following the end of one year's sampling. This report will include all the abundance and survival data collected. Evaluation of the survival data will be made at the end of one year to assess the need to continue this portion of the EMP or to determine the level at which it should be continued. Copies of reports will be submitted to the NRC per requirements of the EPP.

Table 3 PROPOSED ENTRAINMENT MONITORING PROGRAM (EMP)
SHOREHAM NUCLEAR POWER STATION

	<u>Sampling Location</u>	<u>Frequency of sampling</u>
Abundance	Intake	Weekly (mid February-mid May) Biweekly (mid May-mid July) Monthly (August-January) Quarterly diurnal sampling
Survival	Intake and Discharge	Biweekly (mid February-mid July) Monthly (August and September) No samples (October-January)

IV. Impingement Monitoring Program (IMP)

The impingement monitoring program will measure the impact of the plant's intake screening system on fish and lobsters. Organisms removed from the screens will be diverted to a collection basket for abundance measurements; organisms will also be diverted to a holding pond for survival measurements. During periods when sampling shows that significant impingement is occurring, organisms will be gently removed from the screens and returned to Long Island Sound (outside the jettied intake canal) via the fish return system.

It is expected that some operating experience at the site will be required before final sampling methodology can be developed. The program presented below, therefore, will be modified as necessary to provide meaningful abundance and survival data.

The number of organisms impinged will be measured twice each day (generally comprising 1 day and 1 night sample) three times weekly for a total of six samples per week. Organisms will be washed off the screens, diverted to a collection basket, identified, enumerated, weighed and measured. If an unmanageably large number of specimens are collected an appropriate subsampling regime will be employed. All data, including plant operating data and water quality data, will be recorded and later entered into a computer data base.

Survival rates of impinged organisms will be measured twice monthly. (This schedule may change should an insufficient number of fish be collected, e.g. summer months.) During survival testing, fish will be washed from the screens and diverted to the fish holding pond. Since predation in this pond may be heavy holding and observation time may have to be limited. Species identification, enumeration, survival data and length and weight will be recorded and later entered into a computer data base.

Within 120 days of the end of each year's sampling an annual summary impingement report will be issued, including abundance and survival data. Additionally, routine monthly reports would be supplied to NYSDEC, if specifically requested. These reports would summarize abundance sampling data and plant operating information only. A non-routine report could be made to NYSDEC when any significant unusual events are observed in the impingement study, if specifically requested. Copies of reports will be submitted to the NRC per requirements of the EPP.

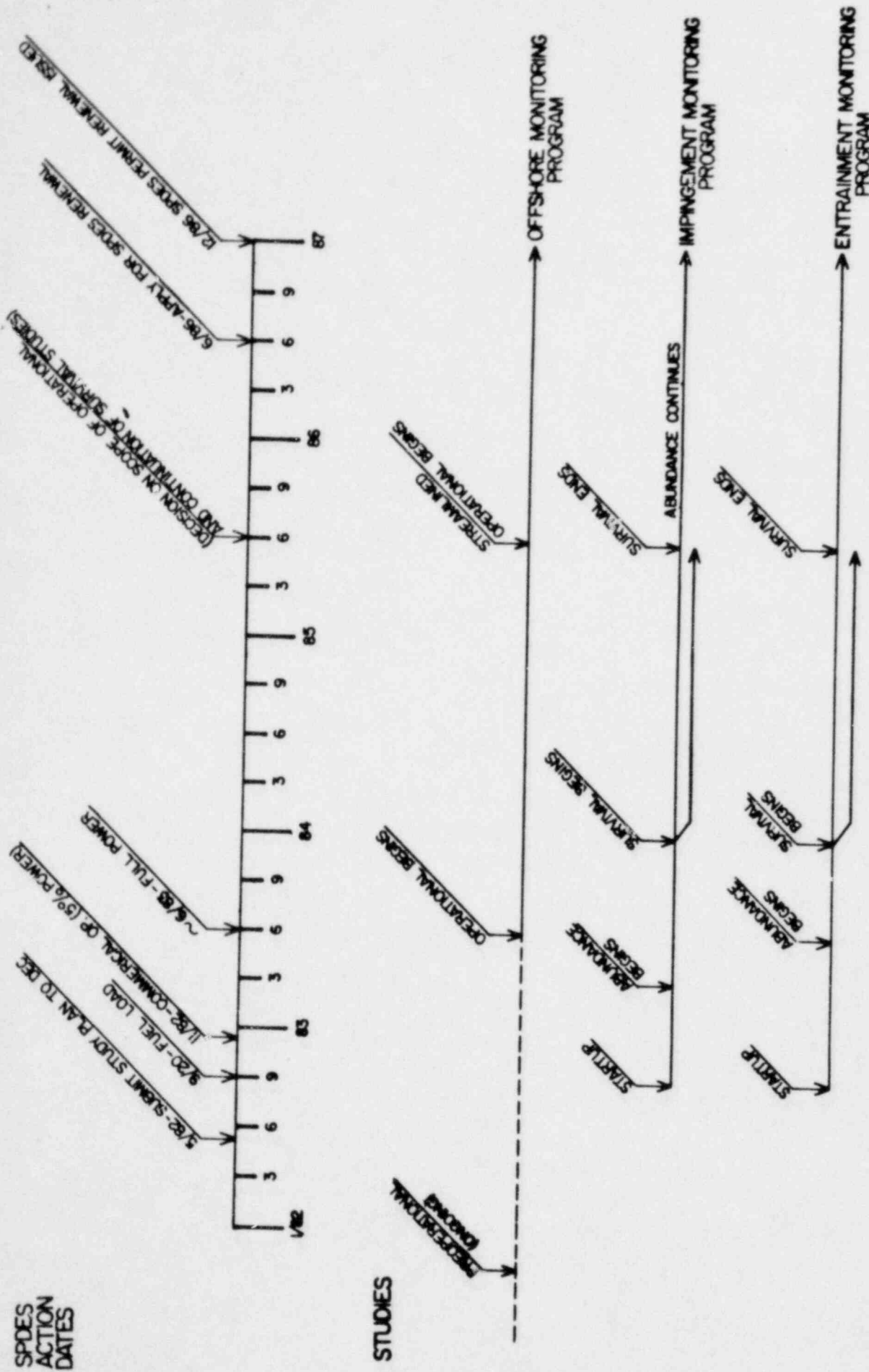


Figure 1 - Shoreham Aquatic Ecology Monitoring Program
 Operational Plan Schedule (April 1982)

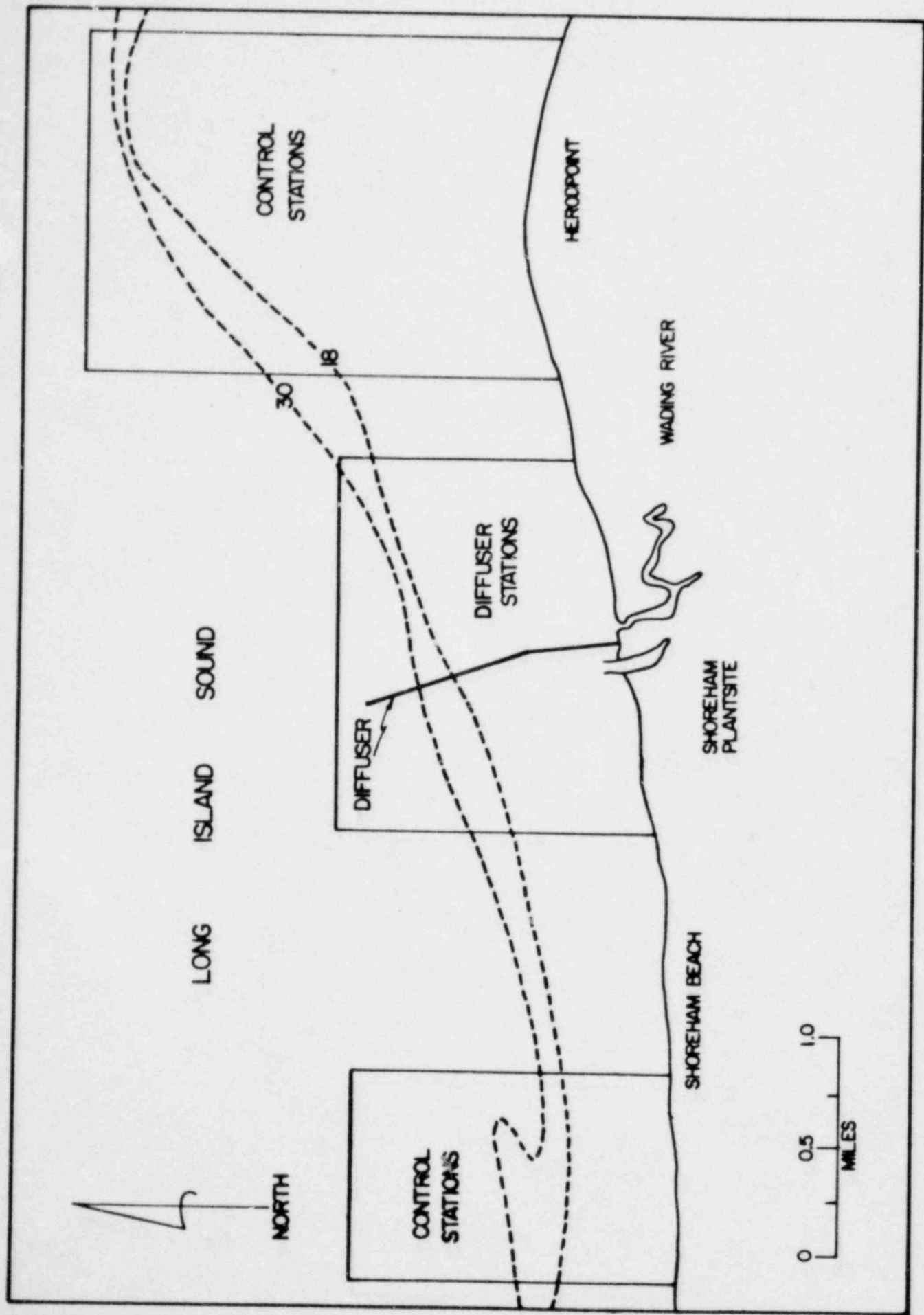


Figure 2 Study Area , Operational Study Shoreham Nuclear Power Station