PACIFIC GAS & ELECTRIC COMPANY

NUCLEAR PLANT OPERATIONS

REPORT ON

DISCHARGE MONITORING AT

DIABLO CANYON POWER PLANT

DURING THE MONTH OF

DECEMBER 1988

TABLE OF CONTENTS

OVERVIEW

A. During the month of December, discharges occurred from Discharge Paths 001 (once through cooling water), 001B, 001D, 001E, 001F, 001G, 001H, 001J, 001L, 001M, 001N, 001P, and 002 through 013. No discharges occurred from Discharge Paths 001A, 001C, 001I, and 001K.

B. In all cases, chemical, radiochemical, and toxicity analyses were performed in accordance with chemical analysis procedures contained in the Diablo Canyon Power Plant, Units 1 and 2 Plant Manual, Volume 8, by State approved laboratories, or laboratories meeting the requirements specified in the California Regional Water Quality Control Board Central Coast Region "Standard Provisions and Reporting Requirements" dated January 25, 1985. Receiving water monitoring was performed in accordance with approved biological and oceanographic procedures.

SUMMARY OF MONITORING PROGRAM

A. Monitoring of Plant Influent and Effluent

1. The results of the December plant influent and effluent monitoring are reported in Appendix 1.

2. A static bioassay of Discharge 001 is performed quarterly in January, April, July, and October.

B. Monitoring of Receiving Waters

1. Ecological Studies at Diablo Canyon

Ecological studies in the vicinity of Diablo Cove, referred to as the Diablo Canyon Marine Environmental Monitoring Program (MEM), continue.

2. Sediment Analysis

Sediments samples were collected and analysis reported in September.

3. Aerial Photography of Kelp Beds

Aerial photography (infrared film type 2443) of kelp beds in the vicinity of Diablo Canyon is required in February, June, and October.

4. Surface Water Temperature

Surface water temperatures are reported in Appendix 2.

5. Stratified Water Temperatures

Stratified water temperatures are measured in February, June, and October.

6. pH and Dissolved Oxygen of Receiving Waters

Sampling of pH and dissolved oxygen is scheduled in February, June, and October.

7. Incident Light Measurements

Incident light measurements for the fourth quarter of 1988 are reported in Appendix 3.

8. In situ Bioassay

Results of the Mussel Watch program will be reported to the Board directly from the California Department of Fish and Game in their periodic report for this program.

APPENDIX 1

Influent and Effluent Monitoring
December 1988

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
1102A LAUREL LANE
SAN LUIS OBISPO,CA 93401

DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 1

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING 88/12/01	ENDING	88/12/31	06	CA0003751

STATION	INFLUENT	EFFLUENT 001	EFFLUENT 001	INFLUENT	EFFLUENT 001	EFF 001P=>003	EFFLUENT 002	EFFLUENT 003
ANALYSIS	TEMPERATURE	TEMPERATURE	FLOW	pH	pH	pH	pH	pH
UNITS	DEGREES F	DEGREES F	MGD	pH UNITS	pH UNITS	pH UNITS	pH UNITS	pH UNITS
SMPL TYPE	METERED	METERED	RECORDED	GRAB	GRAB	GRAB	GRAB	GRAB
FREQ.	CONTINUOUS	CONTINUOUS	DAILY	MONTHLY	MONTHLY	WEEKLY	MONTHLY	MONTHLY
DECEMBER	#	#	#	#	#	#	#	#
1	51.2	65.4	2194					
2	52.4	66.6	1863					
3	53.7	67.1	1863					
4	53.6	67.1	1863					
5	52	66.5	1865	7.88	7.79			
6	51.3	66.7	1863					
7	51.4	65.8	1863					7.6
8	51.5	64.6	2487					
9	51.3	63.1	2487					
10	52	65.6	2487					
11	52.5	65.8	2487					
12	52.4	67	2487					
[illegible]	53	65.9	2403					
[illegible]	52	68.2	2493				8.05	
[illegible]	52	68.2	2493					
16	52	68.6	2487					
17	52.4	69.1	2412					
18	53	69.8	2335					
19	53.6	71.8	2487					
20	54	72	2487					
21	54	70.5	2487					
22	54	70.5	2487					
23	53.8	70.7	2198					
24	54	72.2	2487					
25	53	72	2487					
26	52.6	71.8	2487					
27	52	71.7	2488					
28	52.3	72	2487					
29	51.9	71.5	2487					
30	51.7	71.2	2487					
31	52.5	70.6	2487					
MONTHLY AVG	52.5	68.6	2337.9			NO DISCHARGE		
MONTHLY HIGH	54.0	72.2	2493.0					
MONTHLY LOW	51.2	63.1	1863.0					
TIMES EXCEEDED	NO LIMIT	MAXIMUM = 0	MAX 2760 = 0	NO LIMIT	MIN 6.0 =0	MIN 6.0 =0	MIN 6.0 =0	MIN 6.0 =0
TIMES EXCEEDED		INTAKE PLUS			MAX 9.0 =0	MAX 9.0 =0	MAX 9.0 =0	MAX 9.0 =0
[illegible] EXCEEDED		22 DEGREES(##)						

REMARKS:_(#)_Number_of_Samples_taken_during_the_day._(##)_Except During Demusseling._____

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	John R. Knemeyer	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
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SAN LUIS OBISPO,CA 93401

DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 2

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING 88/12/01	ENDING	88/12/31	06	CA0003751

STATION	EFFLUENT 004		INFLUENT		EFFLUENT 001		EFFLUENT 001		EFFLUENT 001F		EFFLUENT 001N		EFF001P=>003		EFFLUENT 001N	
ANALYSIS	pH		TURBIDITY		TURBIDITY		OIL & GREASE		OIL & GREASE		OIL & GREASE		OIL & GREASE		SETTL SOLIDS	
UNITS	pH UNITS		NTU		NTU		mg/l		mg/l		mg/l		mg/l		mg/l	
SMPL TYPE	GRAB		GRAB		GRAB		GRAB		GRAB		GRAB		GRAB		GRAB	
FREQ.	MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY		WEEKLY		WEEKLY	
DECEMBER	#		#		#		#		#		#		#		#	
1																
2												<3				<.1
3																
4																
5				.36		.39		<3								
6										<3						
7		7.82														
8																
9																
10																<.1
11																
12																
13																
14																
15																
16																<.1
17																
18																
19																
20												<3				<.1
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																<.1
31																
MONTHLY AVG												<3		NO DISCHARGE		<.1
MONTHLY HIGH												<3				<.1
MONTHLY LOW												<3				<.1
TIMES EXCEEDED	MIN 6.0 =0		NO LIMIT		NO LIMIT		NO LIMIT		MO AVG 15	=0	MO AVG 15	=0	MO AVG 15	=0	MO AVG 1.0	=0
TIMES EXCEEDED	MAX 9.0 =0								D MAX 20	=0	D MAX 20	=0	D MAX 20	=0	D MAX 3.0	=0
TIMES EXCEEDED																

REMARKS: (#) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	John R. Kreneger	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
1102A LAUREL LANE
SAN LUIS OBISPO,CA 93401

DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 3

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING	88/12/01	ENDING 88/12/31	06	CA0003751

STATION	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001I	EFFLUENT 001I	EFFLUENT 001I	EFFLUENT 001C	EFFLUENT 001D
ANALYSIS	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE
UNITS	mg/l 1st FLTR	mg/l 2nd FLTR	mg/l NET	mg/l 1st FLTR	mg/l 2nd FLTR	mg/l NET	mg/l	mg/l
SMPL TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
FREQ.	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY

DECEMBER	#		#		#		#		#		#		#		#	
1																
2																
3																
4																
5		9		8		1										
6																
7																
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11																
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16																
17																
18																
19																
20																
21																
22																1
23																
24																
25																
26																
27																
28																
29																
30																
31																

MONTHLY AVG				NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
MONTHLY HIGH								
MONTHLY LOW								
TIMES EXCEEDED	NO LIMIT	NO LIMIT	NO LIMIT	NO LIMIT	NO LIMIT	MO AVG 30 =0	MO AVG 30 =0	MO AVG 30 =0
TIMES EXCEEDED						D MAX 100 =0	D MAX 100 =0	D MAX 100 =0
TIMES EXCEEDED								

REMARKS: (#) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER
JAMES D. SHIFFER

SIGNATURE OF AUTHORIZED AGENT	DATE
John R. Kremayer	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
1102A LAUREL LANE
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DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 4

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING	88/12/01	ENDING 88/12/31	06	CA0003751

STATION	EFFLUENT 001F		EFFLUENT 001G		EFFLUENT 001H		EFFLUENT 001J		EFFLUENT 001K		EFFLUENT 001L		EFFLUENT 001M		EFFLUENT 001N	
ANALYSIS	T NF RESIDUE		T NF RESIDUE		T NF RESIDUE		T NF RESIDUE		T NF RESIDUE		T NF RESIDUE		T NF RESIDUE		T NF RESIDUE	
UNITS	mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		ug/l	
SMPL TYPE	GRAB		GRAB		GRAB		GRAB		GRAB		GRAB		GRAB		GRAB	
FREQ.	MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY		MONTHLY	
DECEMBER	#		#		#		#		#		#		#		#	
1						9		<1								
2																20
3																
4																
5																
6		12		1												
7																
8																
9												<1				
10																
11																
12																
[redacted]														17		
[redacted]																
16																14
17																
18																
19																
20																16
21														13		
22																
23														15		
24																
25																
26																
27																
28																
29																
30																
31																
MONTHLY AVG								NO DISCHARGE						15		16.7
MONTHLY HIGH														17		20
MONTHLY LOW														13		14
TIMES EXCEEDED	MO AVG 30 =0		MO AVG 30 =0		MO AVG 30 =		MO AVG 30 =0		MO AVG 30 =0		MO AVG 30 =0		MO AVG 30 =0		MO AVG 60 =0	
TIMES EXCEEDED	D MAX 100 =0		D MAX 100 =0		D MAX 100 =		D MAX 100 =0		D MAX 100 =0		D MAX 100 =0		D MAX 100 =0			
[redacted]S EXCEEDED																

REMARKS: (#) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	J. R. Knemeyer	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
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1102A LAUREL LANE
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DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 5

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING	88/12/01	ENDING 88/12/31	06	CA0003751

STATION	EFFLUENT 001P	EFFLUENT 002	EFF 001P=>003	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001
ANALYSIS	T NF RESIDUE	T NF RESIDUE	T NF RESIDUE	T CHROMIUM	COPPER	NICKEL	ZINC
UNITS	ug/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l
SMPL TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
FREQ.	MONTHLY	MONTHLY	WEEKLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY

DECEMBER	*		*		*		*		*		*		*		*	
1																
2																
3																
4																
5																
6																
7		4														
8																
9																
10																
11																
12																
13																
				<1				2		<1		<9		<1		
16																
17																
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19																
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25																
26																
27																
28																
29																
30																
31																

MONTHLY AVG MONTHLY HIGH MONTHLY LOW	NO DISCHARGE
TIMES EXCEEDED	MO AVG 30 =0 MO AVG 30 =0 MO AVG 30 =0 6M-MEAN 15 =0 6M-MEAN 24 =0 6M-MEAN 148 =0 6M-MEAN 97 =0
TIMES EXCEEDED	D MAX 100 =0 D MAX 100 =0 D MAX 100 =0 D MAX 59 =0 D MAX 135 =0 D MAX 592 =0 D MAX 541 =0
TIMES EXCEEDED	I MAX 148 =0 I MAX 357 =0 I MAX 1480 =0 I MAX 1430 =0

REMARKS: (*) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	John R. Kreuzer	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
1102A LAUREL LANE
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DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 6

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING 88/12/01	ENDING	88/12/31	06	CA0003751

STATION	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001	EFFLUENT 001D	EFFLUENT 001D	EFFLUENT 001D
ANALYSIS	T CHLOR RES	FREE AVL CHL	CHLORINE USED	AMMONIA (N)	TITANIUM	LITHIUM	BORON	HYDRAZINE
UNITS	ug/l	ug/l	lbs/day	mg/l	ug/l	ug/l	ug/l	ug/l
SMPL TYPE	GRAB	GRAB	RECORDED	GRAB	GRAB	MONTHLY COMP.	MONTHLY COMP.	GRAB
FREQ.	2 per CYCLE	2 per CYCLE	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY

DECEMBER	#		#		#		#		#		#		#		#	
1																
2	6	<20	6	<20		188										
3																
4																
5	2	<20	2	<20		63										
6																
7											‡‡	34	‡‡	401000		
8																
9																
10																
11																
12										<50						
13																
14																
15																
16																
17																
18																
19																
20																
21																
22								.152								650
23																
24																
25																
26																
27																
28																
29	2	<20	2	<20		7										
30	8	<20	8	<20		333										
31																

MONTHLY AVG	<20	<20	147.8					
MONTHLY HIGH	<20	<20	188					
MONTHLY LOW	<20	<20	7					
TIMES EXCEEDED	D MAX 200 =0	30 DAY AV 200	NO.LIMIT	6M-MEAN 4.44=0	NO LIMIT	NO LIMIT	NO LIMIT	NO LIMIT
TIMES EXCEEDED	1 MAX 200 =0	=0		D MAX 17.8 =0				
TIMES EXCEEDED		D MAX 500 =0		1 MAX 44.4 =0				

REMARKS: (#) Number of Samples taken during the day. ‡‡Boron and Lithium analyzed on December; 1988 monthly composite.

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	John R. Kremaya	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
1102A LAUREL LANE
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DISCHARGE SELF MONITORING REPORT

PACIFIC GAS AND ELECTRIC CO.
DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (M) 7

FACILITY I.D.	YEAR/ MO / DAY		YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING	88/12/01	ENDING 88/12/31	06	CA0003751

STATION	EFF 001N=>003	EFF 001N=>003	EFF 001N=>INTK	EFF 001N=>INTK
ANALYSIS	TOTL COLIFORM	FECAL COLIFORM	TOTL COLIFORM	FECAL COLIFORM
UNITS	MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
SMPL TYPE	GRAB	GRAB	GRAB	GRAB
FREQ.	4 TIMES/WEEK	4 TIMES/WEEK	4 TIMES/WEEK	4 TIMES/WEEK

DECEMBER	#		#		#		#		#		#		#		#	
1																
2																
3																
4																
5																
6																
7																
8																
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21																
22																
23																
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25																
26																
27																
28																
29																
30																
31																

MONTHLY AVG	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE
MONTHLY HIGH				
MONTHLY LOW				

TIMES EXCEEDED	80% SMPLS>1K	MEAN>200=	80% SMPLS>1K	MEAN>200=
TIMES EXCEEDED	=	90% SMPLS>400	=	90% SMPLS>400
TIMES EXCEEDED	I MAX >10K=	=	I MAX >10K=	=

REMARKS: (#) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER
JAMES D. SHIFFER

SIGNATURE OF AUTHORIZED AGENT	DATE
J. R. Kuenzig	1/16/89

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
[redacted]A LAUREL LANE
[redacted]LUIS OBISPO,CA 93401

DISCHARGE SELF MONITORING REPORT

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DIABLO CANYON NUCLEAR POWER PLANT
PO BOX 56
AVILA BEACH,CALIF 93424
PAGE (Q) 2

FACILITY I.D.	YEAR/ MO / DAY	YEAR/ MO /DAY	STATE CODE	NPDES PERMIT #
3 402003001	BEGINNING 88/12/01	ENDING 88/12/31	06	CA0003751

STATION	EFFLUENT 001L	EFFLUENT 001M	EFFLUENT 001P	EFFLUENT 002	EFFLUENT 003	EFFLUENT 004	INFLUENT	INFLUENT
ANALYSIS	OIL & GREASE	OIL & GREASE	OIL & GREASE	OIL & GREASE	OIL & GREASE	OIL & GREASE	T NF RESIDUE	T NF RESIDUE
UNITS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l 1st FLTR	mg/l 2nd FLTR
SMPL TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
FREQ.	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT	JA/AP/JUL/OCT

DECEMBER	#		#		#		#		#		#		#		#	
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
[redacted]				<3												
15																
16																
17																
18																
19																
20																
21				<3												
22																
23				<3												
24																
25																
26																
27																
28																
29																
30																
31																

MONTHLY AVG		<3						
MONTHLY HIGH		<3						
MONTHLY LOW		<3						

TIMES EXCEEDED	MO AVG 15=0	MO AVG 15=0	MO AVG 15=0	MO AVG 15=0	MO AVG 15=0	MO AVG 15=0	NO LIMIT	NO LIMIT
[redacted] EXCEEDED	D MAX 20 =0	D MAX 20 =0	D MAX 20 =0	D MAX 20 =0	D MAX 20 =0	D MAX 20 =0		
[redacted]S EXCEEDED								

REMARKS: (#) Number of Samples taken during the day.

PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF AUTHORIZED AGENT	DATE
JAMES D. SHIFFER	John R. Kreneyer	4/16/89

APPENDIX 2

Surface Water Temperatures
December 13, 1988

Surface Water Temperatures
December 13, 1988

Surface water temperatures were measured on December 13, 1988 between 0730 and 0900 PST. The thermal discharge plume was mapped using a TSK American towable electronic bathythermograph (TOWED-BT) and a Minolta/Land infra-red radiometer. The TOWED-BT is a self contained underwater unit which uses a platinum resistance, pressure independent sensor to measure temperature. The sensor has a response time of 0.25 seconds and an accuracy of ±0.1 degrees Fahrenheit (±0.05 degrees Celsius). An oil-filled strain gauge pressure transducer accurate to 0.3% (full scale) was used to measure the instrument's depth. Temperature and depth data were recorded every five seconds. During sampling the data was stored in an internal integrated circuit memory. The data were retrieved after the survey using a photomagnetic coupler and Compaq computer. The infra-red radiometer was used as an aid in navigation during the plume mapping.

On December 13 the sky was overcast with winds from the northwest at approximately 15 to 20 miles per hour. The sea was rough with 5 to 7 foot swell from the northwest and 3 foot confused wind chop.

A continuous record of the vessels position during the plume mapping was recorded using a Motorola Miniranger III range-range navigation system with an accuracy of ±0.5 meters.

Intake and discharge temperatures were measured using three 4TR Sea-Data units with an accuracy of ±0.2 degrees Fahrenheit (±0.1 degrees Celsius) and a response time of 2 seconds. The intake recorder was located 100 feet from the intake structure in 14 feet of water (MLLW). The discharge recorders were located on the side walls of the discharge structure near the end weir. Offshore ambient water temperature was defined as the lowest surface temperature measured by the TOWED-BT during the survey.

Discharge water volumes for Unit 1 and 2 are the actual circulating water pump flow volumes. During the survey all the pumps for Unit 1 and 2 were operational producing 4000 cfs of flow in the discharge structure.

Position and temperature data were merged and surface water isotherms, in degrees Fahrenheit above ambient temperature (delta T), were generated. The area covered by each two degree isotherm was measured and is presented in Table 1. A small portion of the discharge plume extended beyond the southern edge of the sampling area. If an isotherm is not completely enclosed within the boundary of the sampling area then the boundary is used as the limit in determining the area covered by the isotherm (White 1986). The area covered by the isotherms during the survey was well within the range of isotherm areas reported from 1985 through 1987 in "The Surface Buoyant Jet Characteristics of the Thermal discharge Plume at Diablo Canyon", (Tu et. al.;1986) and in the "Discharge Monitoring and Reporting Program, Diablo Canyon Power Plant" monthly reports.

TABLE 1

CUMULATIVE ISOTHERMS AREAS
(IN ACRES)
December 13,1988

2° ISOTHERMS

2°	4°	6°	8°	10°	12°
407.8	265.0	57.6	26.9	8.3	1.3

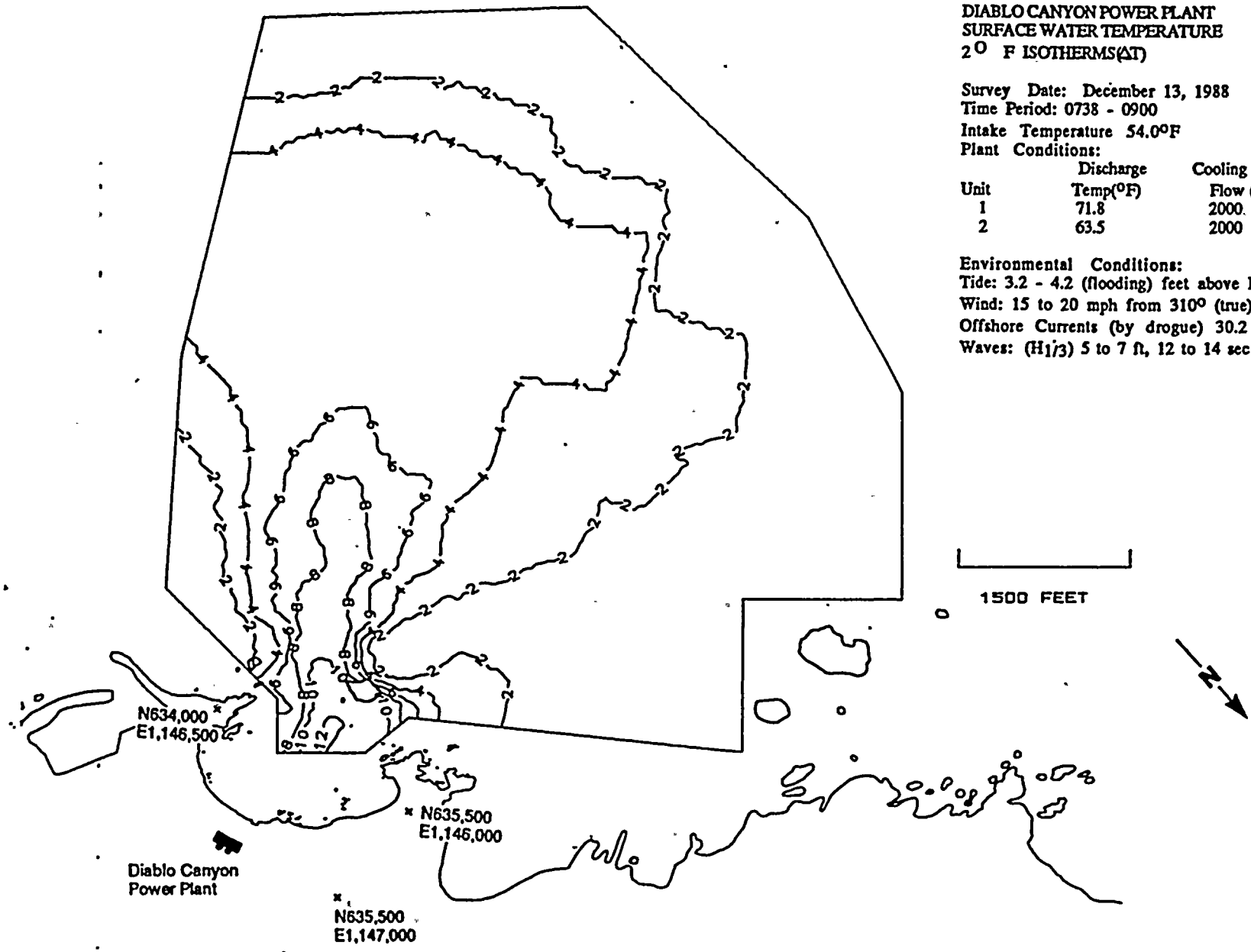
FIGURE 1

DIABLO CANYON POWER PLANT
SURFACE WATER TEMPERATURE
2^{O} F ISOTHERMS(ΔT)

Survey Date: December 13, 1988
Time Period: 0738 - 0900
Intake Temperature 54.0°F
Plant Conditions:

Unit	Discharge Temp(°F)	Cooling Water Flow (cfs)	Reactor Power(%)
1	71.8	2000	100
2	63.5	2000	50.6

Environmental Conditions:
Tide: 3.2 - 4.2 (flooding) feet above MLLW
Wind: 15 to 20 mph from 310° (true)
Offshore Currents (by drogue) 30.2 ft/min 316.5° (true)
Waves: ($H_{1/3}$) 5 to 7 ft, 12 to 14 sec from 330° (true)



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APPENDIX 3

Incident Light Measurements
Fourth Quarter, 1988