

CONSUMERS POWER COMPANY

PALISADES PLANT

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

JANUARY THROUGH DECEMBER, 1982

8304210407 830329
PDR ADOCK 05000255
R PDR

14 Pages

OC0383-0027B-NL02

A. RADIOLOGICAL

1. INTRODUCTION

The data obtained by an analysis of samples taken during 1982 was statistically analyzed at the 95% confidence level by the method described in Consumers Power Company internal procedures RSD-E-03. The data was statically evaluated against two criteria. The first is the critical level which indicates the analysis of samples taken from near sites are higher than those taken from remote control sites but the difference is not significant. The second is the detection level (two times the critical level) which indicates the minimum detectable difference has been exceeded. Doses to the public will be calculated if the detection level is exceeded.

2. DISCUSSION AND INTERPRETATION OF RESULTS

a. Air Samples

Statistical analysis of the airborne particulate sampling results between near site and control sites did not exceed the critical level. Control sites were often higher than the near plant sites.

No I-131 activity was reported above the minimum detectable level.

Analysis was done on 622 of the 636 required samples. Two samples had no flow and were not analyzed and 12 samples were deleted because of sampling malfunctions where sample flow was estimated. These missing analysis do not indicate a substantial reduction in the air sample program. The Technical Specification sensitivities requirements were met and no action levels were exceeded.

These results are consistent with expected results based on actual plant effluents and site meteorology.

b. Lake Water

Statistical analysis between the site lake inlet and the South Haven treated drinking water showed the critical level was not exceeded for Gross Beta or tritium analysis results. In addition, the South Haven analysis was compared with the Charlevoix drinking water and showed no difference above the critical level. The lake water outlet sample had tritium levels above the detection limit. This is consistent with reported site effluents as tritium releases were made every month during 1982. These measured releases account for the observed concentrations within 25%.

These observations are consistent with expected results based upon the site effluent data. Technical Specification sampling and sensitivity requirements were met and no action levels were exceeded.

c. Drinking Water

See lake water and well water discussion.

d. Well Water

Statistical analysis between the site well supply and two off site locations showed the critical level was not exceeded. Two analysis at the State Park well location met or exceeded action level requirements of 10 pCi/l gross beta and the required gamma analysis was run. No detectable gamma activity was found in either sample. Location SP has been historically higher than the other two well locations.

Technical Specification sampling and sensitivities were met.

e. Milk

Problems with the milk sampling program indicated a special report was required by Technical Specification 6.9.3.2. This was submitted on 2-28-83. Eight (8) near site samples and nine (9) control site samples were missed in 1982 until the program was corrected. The problems with missing samples are detailed in the special report and will not be repeated except as they affect statistical analysis. The missing control samples were not considered crucial as the Big Rock Point control sample could reasonably be used for our statistical analyses. At least two near site samples were analyzed each month except August when procedure inadequacies caused by the transfer of the analytical lab from Chicago, Illinois to Albuquerque, New Mexico, allowed the samples to spoil and analyses could not be run.

Statistical analyses between near sites and control sites (including the Big Rock Point control) showed the critical level was not exceeded for Sr-90 and Cs-137 analysis. I-131 was less than detectable for all samples. Sensitivities were greater than our procedural requirements but did not exceed Technical Specification requirements. Samples data for Sr-90 and Cs-137 is consistent with 1981 analysis. Notwithstanding the missing samples, the sampling program analysis gives reasonable assurance that effluents did not result in exposure to the public in excess of 5% of 10 CFR 20 limits.

f. Sediment

Statistical analyses for gross beta between near sites and the control site off South Haven Municipal Beach showed the critical level was not exceeded. No detectable Sr-90 was reported and only one of six near sites showed a Cs-137 reading above the minimum detectable limit. This is consistent with historical data and published environmental reports showing levels of Sr-90 and Cs-137 in Lake Michigan remaining from weapons testing.

g. Organic - Fish and Crops

The action limit for organic samples in Technical Specification 4.11.2 (50 pCi) is not appropriate for organic type samples, so the listed analysis requirements to Technical Specification Table 4.11.2 are followed.

Fish sampling was added to the program this year. Sr-90 analysis ranged from .02 to .17 pCi/g (wet). Only one of six samples show Cs-137 above minimum detectable level (0.11 pCi/g wet). This is consistent with levels published in environmental reports (Argonne Ecology Reports and Environmental Technology).

h. Gamma Dose - TLD

Both onsite and near site TLD analyses were evaluated against the control sites. No monthly, quarterly or the annual analyses exceeded the critical limit. On site annual TLDs had a critical level of 3.7 mR/year and near site annual TLDs had a critical level of 5.2 mR/year. This is consistent with expected results based on reported effluents and meteorology and indicates that effluents did not exceed 5% of 10 CFR 20 limits. Five of 216 on or near site monthly TLDs were missing and one of the 36 control sites samples was missing. Six of 73 on or near site quarterly TLDs and four of 18 on or near site annual TLDs were also missing. These missing samples do not indicate a substantial reduction in the gamma dose analysis program. Technical specification analysis sensitivities were met.

TABLE RSD-E-03A

Environmental Radiological Monitoring Program Summary
Palisades Nuclear Plant, Docket DPR-20
 Van Buren County, Michigan, January 1, 1982 to December 31, 1982

Medium or Pathway Sampled Unit of Measurement	Analysis and Total Number of Analyses Performed		Lower Limit of Detection(a) LLD	All Indicator Locations Mean(b) Range(b)	Location with Highest Annual Mean		All Control Locations Mean(b) Range(b)	Nonroutine Reported Measurements(c)
					Name Distance & Direction	Mean(b) Range(b)		
Air (pCi/m ³)	Gross Beta	622	0.01	(454/463) 3.3 (<1-25)	KZ 35 mi SE	3.8 (1-7)	(156/159) 3.7 (<1-10)	None
	I-131	622	0.02	LLD all	N/A			None
Lake Water (pCi/l)	Gross Alpha	24	1.0	(1/24) 1.2 (<1-5)	Discharge	1.3 (<1-5)	None	None
	Gross Beta	36	1.0	(24/24) 3.8 (1-7)	Discharge	4.2 (2-7)	(11/12) 3.6(<1-8)	None
	Tritium	36	100.0	(17/24) 1202 (<100-5900)	Discharge	2200 (<100-5900)	(7/12) 158 (<100-290)	None None
Drinking Water (pCi/l)	Gross Beta		1.0	Control lake water and well water are drinking water supplies.				
	Tritium		100.0					
Well Water (pCi/l)	Gross Beta	36	1.0	(9/12) 3.5 (<1-9)	State Park (1 mi N)	5.3 (<1-16)	(18/24) 4.0 (<1-16)	None

a. Nominal Lower Limit of Detection (LLD) as defined in HASL-300 (Rev 8/73), pages D-08-01, 02, and 03.

b. Mean and range include nondetectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis.

c. Nonroutine reported measurements are defined in the Palisades Technical Specifications, Section 6.9.3.2.

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					Name Distance & Direction	Mean(b) Range(b)		
Milk (pCi/l)	I-131	43	.5	(0/28)			0/15	Yes
	Sr-89	43	5.0	(0/28)			0/15	2/28/83
	Sr-90	43	1.0	(42/43) 5.5 (<1-23)	GM (5 mi SE)	7.5 (3-23)	(15/15) 4.7 (1-14)	2/28/83
	Cs-137	43	2-5	(15/43) 5.8 (<2-36)	GM (5 mi-SE)	8.5 (<2-36)	(9/16) 4.5 (<2-9)	2/28/83
	Ba-La 140	43	1-5	(0/28)	NA		(0/15)	2/28/83
Gamma Exposure (mR/Month) (mR/Quarter)	1.0 (Monthly)	247	1.0	(211/211) 11.0 (7.6-17.1)	P-04-JS (3.5 mi ESE)	12.4 (8.9-17.1)	(35/35) 11.2 (7.9-15.1)	None
	TLD (Quarterly)	78		(66/66) 18.0 (13.4-23.2)	P-05 PR (3 mi E)	20.3 (16.7-23.2)	(12/12) 18.5 (16.6-20.6)	None
	TLD (Annually)	17		(14/14) 48.5 (42.2-57.2)	P-04-JS (3.5 mi ESE)	57.2	(3/3) 49.3 (45.0-52.2)	None
Crops (pCi/g Wet)	Gross Beta	15	1.0	(13/15) 1.8 (0.5-3.1)	JS (3.5 mi ESE) Grapes	3.1 N/A	None	None
	Sr-89	15	0.025	(0/15) MDL	NA		None	None

TABLE RSD-E-03A

Environmental Radiological Monitoring Program Summary
Palisades Nuclear Plant, Docket DPR-20
Van Buren County, Michigan, January 1, 1982 to December 31, 1982

Medium or Pathway Sampled Unit of Measurement	Analysis and Total Number of Analyses Performed		Lower Limit of Detection(a) LLD	All Indicator Locations Mean(b) Range(b)	Location with Highest Annual Mean		All Control Locations Mean(b) Range(b)	Nonroutine Reported Measurements
					Name Distance & Direction	Mean(b) Range(b)		
Crops	Sr-90	15	0.005	(0/15) MDL	NA		None	None
	Cs-137	15	0.08	(0/15) MDL	NA		None	None
	I-131	15	.05	(0/15) MDL	NA		None	None
Sediment (pCi/g Dry)	Gross Beta	8	1.0	(6/6) 12 (3-23)	South Haven (5 mi N)	15 (4-25)	(2/2) 15 (4-25)	None
	Sr-89	8	0.025	(0/6)	NA		(0/2)	None
	Sr-90	8	0.005-0.11	(0/6)	NA		(0/2)	None
	Cs-137	8	0.08	(3/6) .88 (<.08-.13)	Discharge	0.11 (0.9-.13)	(0/2)	None
	Other Gamma	8	0.1	<LLD				
Aquatic (fish) (pCi/g Wet)	Gross Beta	6	1.0	(5/6) 1.1 (0.5-2.2)	Vicinity of plant discharge		None	None
	Sr-89	6	0.025-.05	(0/6)	Vicinity of plant discharge		None	None
	Sr-90	6	0.005	(6/6) .09 (.02-.17)	Vicinity of plant discharge		None	None
	Cs-137	6	.08	(1/6) .085 (.08-.11)	Vicinity of plant discharge		None	None

TABLE RSD-E-03A

Environmental Radiological Monitoring Program Summary
 Palisades Nuclear Plant, Docket DPR-20
 Van Buren County, Michigan, January 1, 1982 to December 31, 1982

<u>Medium or Pathway Sampled</u> Unit of Measurement	<u>Analysis and Total Number of Analyses Performed</u>	<u>Lower Limit of Detection(a)</u> LLD	<u>All Indicator Locations</u> Mean(b) Range(b)	<u>Location with Highest Annual Mean</u>		<u>All Control Locations</u> Mean(b) Range(b)	<u>Nonroutine Reported Measurements</u>
				Name	Mean(b) Distance & Direction	Range(b)	

All other Analyses
 Performed During
 Year (specify)

Gamma analysis run on two state park well samples over 10 pCi/l gross beta.

April sample @ 10 pCi/l showed no gamma (<5 pCi/l MDL)

September @ 16 pCi/l showed no gamma (<10 pCi/l MDL)

Sampling Locations
Palisades Nuclear Plant

TABLE RSD-E-03B

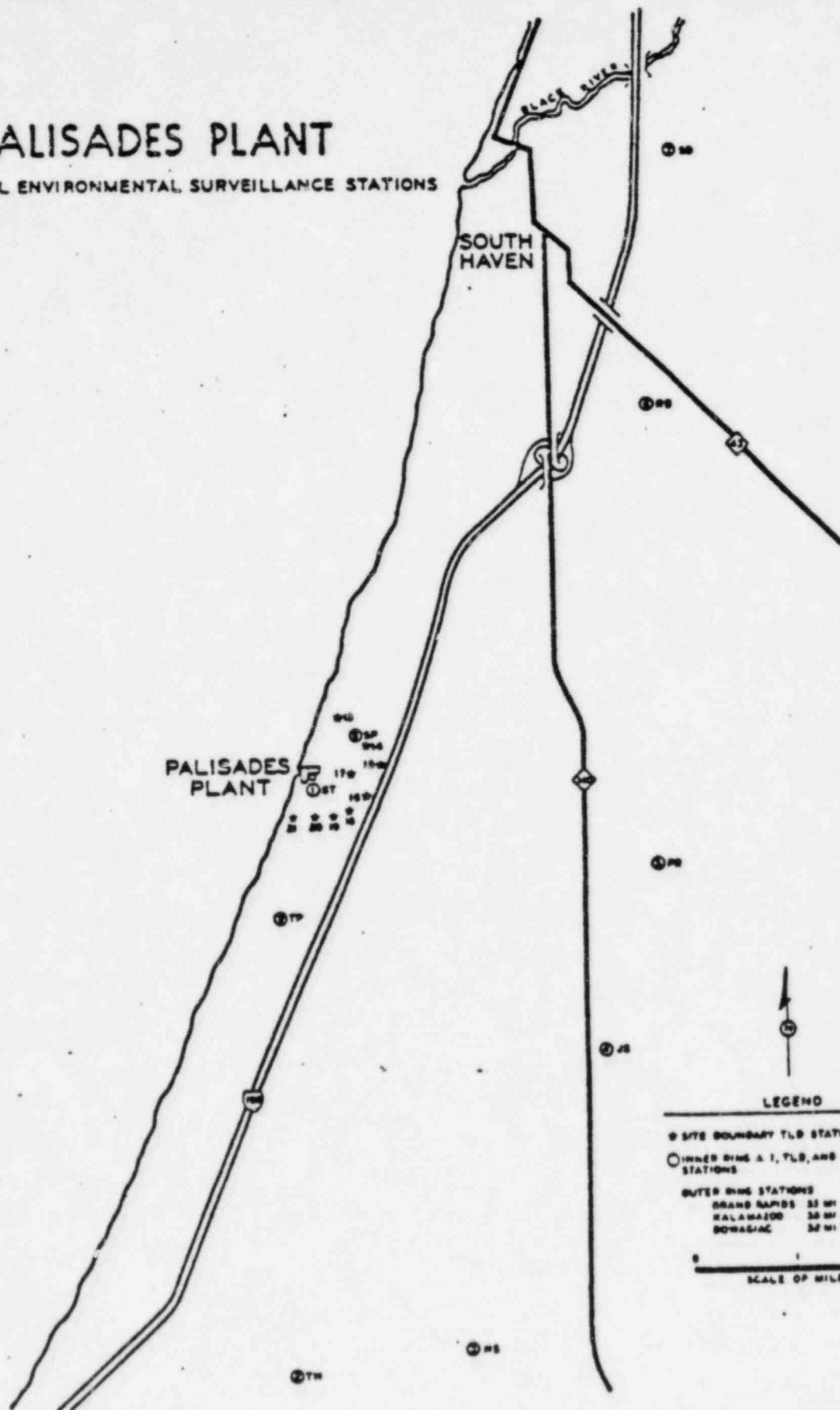
Station	Code	Location	Sample								
			Air Particulates	Air Iodine	Lake Water	Well Water	Milk	Crops	Sediment	TLD	Fish
1	ST	Palisades Nuclear Plant	X	X	X	X			X	X	X
2	TH	Tower Hill Farms RR 3, Coloma, Michigan 5 Miles SSE	X	X				X		X	
3	HS	Herbert Soderberg RR1, Covert, Michigan 5 Miles SE	X	X						X	
4	JS	Jerry Sarno RR1, Covert, Michigan 3½ Miles ESE	X	X				X		X	
5	PR	Paul Rude RR1, Covert, Michigan 3 Miles E	X	X				X		X	
6	RB	Richard Bus RR3, South Haven, MI 4-3/4 Miles NE	X	X				X		X	
7	SD F	Sherman Dairy Farm South Haven, Michigan 7½ Miles NNE	X	X			X			X	
8	SP	State Park 1 Mile N	X	X		X				X	
9	TP	Covert Township Park 1½ Miles S	X	X		X				X	
10	GR	Grand Rapids, Michigan 55 Miles NNE	X	X						X	
11	KZ	Kalamazoo, Michigan 35 Miles SSE	X	X						X	
12	DG	Dowagiac, Michigan 30 Miles SSE	X	X						X	
	SH	South Haven, Michigan 5 Miles N			X				X		
	GM	Glenn Miller Rt 1 Box 20 Covert, MI					X				
	KK	Kenneth Kemp Rt 4 Box 32 South Haven, MI					X				

TABLE RSD-E-03B

Station	Code	Location	Sample								
			Air Particulates	Air Iodine	Lake Water	Well Water	Milk	Crops	Sediment	TLD	Fish
	GH	Glen Hessey Rt 2 Box 94 Bangor, MI					X				
	MC	Constantine Dairy Constantine, MI (45 miles SE) ½ Mile N of Site					X		X		
	SD	½ Mile S of Site Hudsonville Dairy Burnips, MI (35 miles NE)					X		X		

PALISADES PLANT

RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE STATIONS



LEGEND

● SITE BOUNDARY TLD STATIONS

○ INNER RING A, TLD, AND CONSUMABLES STATIONS

OUTER RING STATIONS

GRAND RAPIDS 35 MI NE OF REACTOR

PALAMATOR 35 MI E OF REACTOR

BOWDITCH 35 MI SE OF REACTOR

0 1 2
SCALE OF MILES

TABLE RSD-E-03C

PALISADES NUCLEAR PLANT
JANUARY 1, 1982 TO DECEMBER 31, 1982
SAMPLING AND ANALYSIS SUMMARY

<u>Medium</u>	<u>Description</u>	<u>Location</u>	<u>Number of Samples Collected</u>	<u>Type of Analysis</u>	<u>Frequency of Analysis</u>
Air	Continuous at Approx 1 CFM	As identified on Table RSD-E-03B	622	Gross Beta, I-131	Weekly/12
Lake Water	1 Gallon Composite	Intake, Discharge	24	Gross Beta, Gross Alpha, Tritium	Monthly/1
Drinking Water-Lake	1 Gallon Composite	South Haven	12	Gross Beta, Tritium	Monthly/1
Well Water	1 Gallon Grab	Site, TP, SP	36	Gross Beta	Monthly/3
Milk	1 Gallon Grab	*SDF, GM, AK, KK GH, MC, SD	31	I-131, Sr-89 and Sr-90, Cs-137 BaLa-140	Monthly/4
Gamma Dose	Continuous	As identified on Table RSD-E-03B	247 78 17	TLD Dose	Monthly/21 Quarterly/21 Annually/21
Crops	Grab	JS, PR, RB, TH	17	Gross Beta, Sr-89 and Sr-90, Cs-137, I-131	When Available
Sediment	Grab	Discharge, N & S Site Boundary, 5 miles N	8	Gross Beta, Sr-89 and Sr-90, Cs-137	Semi- Annually/4
Fish	Grab	Discharge, Intake	6	Gross Beta, Sr-89 and Sr-90, Cs-137	Semi- Annually

*AK replaced by GH in October, SDF replaced by KK in May, MC and SD were used alternately as control locations.

TABLE RSD-E-03D

HIGH, LOW AND AVERAGE CONCENTRATIONS FOR HIGHEST AVERAGE SAMPLING LOCATION

PALISADES NUCLEAR PLANT

JANUARY 1, 1982 to December 31, 1982

Medium	Type of Analysis(1)	Location	High	Low	Average
Air	Gross Beta	KZ Kalamazoo 35 mi E	7.0 pCi/m ³	1 pCi/m ³	3.80 pCi/m ³
	I-131	LLD	-	-	-
Lake Water	Gross Beta	Discharge	7 pCi/l	2 pCi/l	4.2 pCi/l
	Gross Alpha	Discharge	5 pCi/l	1 pCi/l	1.3 pCi/l
	Tritium	Discharge	5900 pCi/l	100 pCi/l	2200 pCi/c
Drinking Water	Gross Beta	See note on Table RSD-E-03A			
	Tritium	See note on Table RSD-E-03A			
Well Water	Gross Beta	State Park (1 mi n)	16 pCi/l	1 pCi/l	5.3 pCi/l

(1) Minimum detectable level (MDL) = air, gross beta 0.01 pCi/m, I-131 0.02 pCi/m; water, gross beta 1.0 pCi/l, gross alpha 1.0 pCi/l, H-3 100 pCi/l; milk, I-131 0.5 pCi/l, Sr-89 5.0 pCi/l, gamma isotopic 1.0 pCi/l; crops and sediment, gross beta 1.0 pCi/g, Sr-89 0.025 pCi/g, Sr-90 0.005 pCi/g, gamma isotopic 0.05 pCi/g; some samples may have higher MDLs due to sample size.

(2) Samples collected monthly in season.

(3) Two samples per location.

(4) Includes transit dose which averages approximately 6.4 mR/round trip.

TABLE RSD-E-03D

HIGH, LOW AND AVERAGE CONCENTRATIONS FOR HIGHEST AVERAGE SAMPLING LOCATION

PALISADES NUCLEAR PLANT

JANUARY 1, 1982 to December 31, 1982

<u>Medium</u>	<u>Type of Analysis(1)</u>	<u>Location</u>	<u>High</u>	<u>Low</u>	<u>Average</u>
Milk	I-131	LLD all	-	-	-
	Sr-89	LLD all	-	-	-
	Sr-90	GM (5 ml SE)	23 pCi/l	3 pCi/l	7.5 pCi/l
	Cs-137	GM (5 ml SE)	36 pCi/l	2 pCi/l	8.5 pCi/l
	BaLa-140	LLD all	-	-	-
Gamma Dose(4)	TLD (Monthly)	PO-4 JS 3.5 ml ESE	17.1	8.9	12.4
	TLD (Quarterly)	PO-5 PR 3 ml E	23.2	16.7	20.3
	TLD (Yearly)	PO-4 JS 3.5 ml ESE	57.2	57.2	57.2
Crops(2)	Gross Beta	JS-farm (3.5 ESE)	3.1 pCi/g	1 pCi/g	1.6 pCi/g
	Sr-89	LLD	-	-	-
	Sr-90	JS-farm (3.5 ml ESE)	.06 pCi/g	.017 pCi/g	.026 pCi/g
	Cs-137	LLD	-	-	-
	Other Gamma	LLD	-	-	-

TABLE RSD-E-03D

HIGH, LOW AND AVERAGE CONCENTRATIONS FOR HIGHEST AVERAGE SAMPLING LOCATION
PALISADES NUCLEAR PLANT
JANUARY 1, 1982 to December 31, 1982

<u>Medium</u>	<u>Type of Analysis(1)</u>	<u>Location</u>	<u>High</u>	<u>Low</u>	<u>Average</u>
<u>Sediment(3)</u>	Gross Beta	S. Haven Public Beach (5 mi N)	25 pCi/g	4 pCi/g	15 pCi/g
	Sr-89	< LLD	-	-	-
	Sr-90	North plant boundary	.010	< .008	.009
	Cs-137	< LLD	-	-	-
	Other Gamma	< LLD	-	-	-
Aquatic (fish only)	Gross Beta	Fish caught within plant discharge areas.	2.2	< 1	1.1
	Sr-89	Fish caught within plant discharge areas.	< LLD	-	-
	Sr-90	Fish caught within plant discharge areas.	.17	.02	.09
	Cs-137	Fish caught within plant discharge areas.	.11	< .08	.085