NUCLEAR FUEL SERVICES, INC.

West Valley, New York

ENVIRONMENTAL REPORT NO. 30

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1.0 INTRODUCTION

The Nuclear Fuel Services, Inc. spent fuel reprocessing plant is located at the Western New York Nuclear Service Center, a 3,345-acre site located approximately 30 miles southeast of Buffalo in Cattaraugus County in western New York.

The purpose of this plant was to recover the reusable uranium and plutonium contained in spent nuclear power plant fuels. This recovery was accomplished by the mechanical separation of the fuel materials from their associated hardware, followed by the chemical separation of the uranium and plutonium from the associated fission product elements in the fuel materials. The recovered uranium and plutonium was shipped off site. Reprocessing operations were suspended March, 1972. The plant is maintained in a safe shutdown condition.

Since the plant startup in 1966, monitoring of the environment by NFS and cognizant government agencies has shown that exposures to radiation of the general population in the vicinity of the plant are not significantly different from those received in other portions of the state. The exposure levels that do exist in the area are attributed to natural background radiation and northern hemisphere fallout from past weapons testing.

Nuclear Fuel Services maintains an extensive environmental program to assess the impact of the reprocessing plant on the surrounding environment. This is augmented by completely independent environmental monitoring programs carried out on a routine basis by the New York State Department of Environmental Conservation.

The NFS environmental monitoring program provides a measure of the current environmental background surrounding the reprocessing plant. Samples collected at points where concentrations of effluents in the environment are expected to be the greatest are compared, where possible, with samples collected at points unaffected by plant operations. The latter samples provide background measurements as a basis for distinguishing radioactivity introduced into the environment by the operation of the plant from that due to other sources. The sampling schedule assures that potentially significant changes in the environmental radioactivity are sampled most frequently. Those which are less affected by transient changes but may show long-term accumulations are sampled less frequently.

The NFS environment program at the Service Center began in July, 1963 with a preoperational monitoring program of the background gross alpha, beta and gamma activity at and near the Center. This program has since been extensively expanded to obtain the most significant data. The present NFS environmental program outlined in Table 1-1 provides for over 1,000 analyses per year. The location of the fixed sampling stations operated by NFS at the Center are shown in Figure 1-1.

Table 1-1

NFS ENVIRONMENTAL SAMPLING PROGRAM

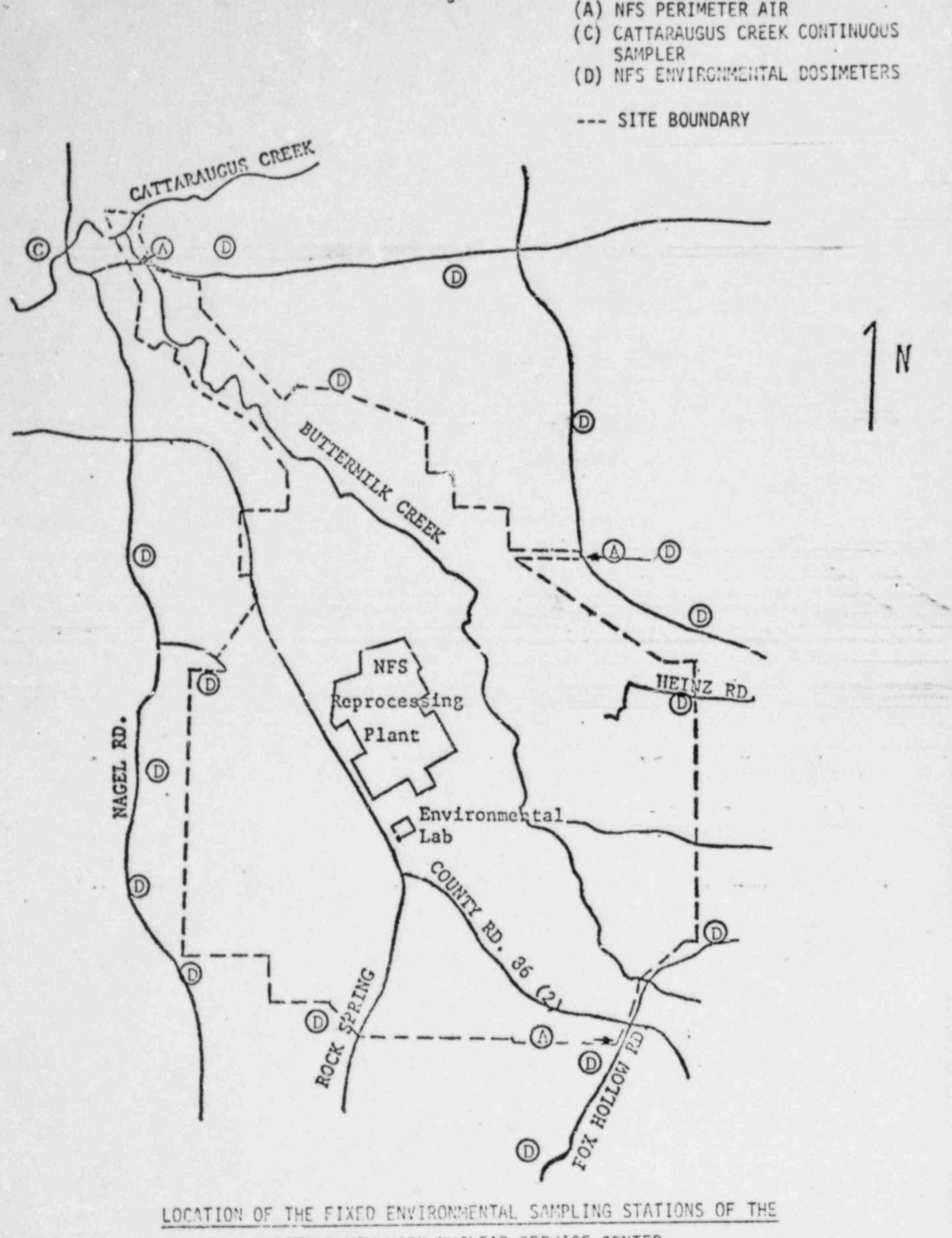
WESTERN NEW YORK NUCLEAR SERVICE CENTER

Sample Location	Sample Type	Sample Frequency	Analysis
Buttermilk Creek (at Thomas Corners Bridge)	Silt	Quarterly	Gross Alpha, Gross Beta, Gamma Scan
	Water	Quarterly	Gross Alpha, Gross Beta, H-3
Cattaraugus Creek (between Buttermilk Creek & Springville Dam)	9 Fish (6" Long)	Second, Third Qtrs	Flesh of each for Cs-134, Cs-137, Sr-90 Skeleton of each for Sr-90
Cattaraugus Creek (Felton Bridge)	Water	Weekly	Gross Alpha, Gross Beta, H-3
	Water	Monthly Composite	Gross Alpha, Gross Beta, Sr-90, *I-129
	Flow	Monthly	Flow in Creek for Month
Plant Liquid Effluent	Water	Daily when Discharging Lagoon	Gross Alpha, Gross Beta, H-3, Cs-134, Cs-137
	Water	Monthly Composite	Gross Alpha, Gross Beta, H-3, Sr-90, Ru-106, Rh-106, I-129, Cs-134, Cs-137
	Water	Quarterly Composite	U Isotopic, Pu Isotopic
	Flow	Monthly	Discharge Volume for Month
On-site, North of Plant	Deer	Once/Year (Fall)	Flesh Cs-137, Cs-134, Sr-90 Skeleton Sr-89, Sr-90
Perimeter Farms Northeast & Northwest	Milk	August	I-129, Sr-90, Cs-134, Cs-137

Table 1-1 (Contd.)

Sample Location	Sample Type	Sample Frequency	Analysis
Perimeter Stations	Air	Continuous Sample Analyzed Weekly	Gross Alpha, Gross Beta
	Direct Radiation	Monthly	Millirad per Standard Month
Gaseous Effluent	Air	Continuous Sample Analyzed Weekly	Gross Alpha, Gross Beta
		Continuous Sample Analyzed Quarterly	I-129
		Quarterly Leaching of Weekly Continuous Sample	Sr-90, Ru-106, Cs-134, Cs-137

*Calculated based on dilution



LOCATION OF THE FIXED ENVIRONMENTAL SAMPLING STATIONS OF THE WESTERN NEW YORK NUCLEAR SERVICE CENTER

Fig 1-1

2.0 SUMMARY OF RESULTS

During the first half of 1981, over 800 separate analyses of air, water, fish, milk, and silt were performed. These analyses indicated the concentrations of radioactivity in the environmental media are less than the applicable limits of the U. S. Nuclear Regulatory Commission.

The concentration of radionuclides in Cattaraugus Creek during the first six months of 1981 average 1.3[illegible] of MPC with a maximum observed concentration of 2.31% of MPC.

The concentration of radionuclides in the stack during the first six months of 1981 average 0.04% of the Technical Specification limit with the maximum observed at 0.08%.

The concentration of radionuclides in perimeter air for the first half of 1981 was higher than samples from previous years. The increase in airborne activity is due to springtime transfer of radioactivity from the stratosphere to the troposphere. The stratosphere stores long-lived fission products from weapons testing. The 1981 springtime increase in airborne activity is higher than normal due to the increased inventory of weapons testing fission products and the increased particulate matter in the stratosphere. The fission product inventory increased with the October, 1980 Chinese bomb test. The increase in particulate matter is due to Mt. St. Helen's eruptions. The particulate has become contaminated with the weapons testing long-lived fission products. The direct radiation from the environment remained stable at the 1980 determined average.

3.0 LIQUID EFFLUENTS

Liquid wastes are collected in two interceptor tanks and discharged to holding ponds if activity is less than the technical specification limit. The holding ponds provide surge capacity prior to further treatment.

In May of 1971, a low level waste treatment plant was put into operation to reduce cesium and strontium concentration in the liquid wastes. Typically the plant removes 96% of the cesium and 99% of the strontium from the liquid wastes.

Following treatment, the liquid wastes are collected batchwise in two small lagoons. The water in the lagoon is analyzed for gross beta, cesium-137, and cesium-134. If cesium-134 and cesium-137 are below their respective MPC, the lagoon is transferred to the number 3 storage lagoon. The water which collects in the number 3 storage lagoon is discharged to the creek system through a calibrated weir. During times of discharge, daily grab samples are taken from the weir and analyzed for gross beta activity. These grab samples from the weir are composited, based on lagoon discharge volume, and analyzed monthly for specific radionuclides to determine activity released. A total of 91 samples were used to make up the five monthly composites. Table 3-1 summarizes the monthly liquid discharges as determined by composite analyses and flow measurements.

In addition to the data presented in Table 3-1, a quarterly composite of weir samples is analyzed for specific alpha emitting radionuclides. Table 3-2 shows the quarterly liquid discharges based on these analyses.

Buttermilk Creek is the first major on-site stream to receive liquid discharges from the lagoon system. A bottom silt sample of Buttermilk Creek is taken quarterly near the Thomas Corners Road Bridge and analyzed for gamma emitting radionuclides. Samples in the first and second quarters of 1981 indicated principle radionuclides present were cesium-137 and potassium-40. Table 3-3 shows gross alpha and gross beta results on samples. Water samples taken from Buttermilk Creek during the first and second quarters of 1981 and analyzed for gross alpha, gross beta and tritium are shown in Table 3-4.

Table 3-1

LAGOON DISCHARGES
(Curies)

Month	Total Beta Other Than H-3	Total Alpha	H-3	Sr-90	Ru-106	Rh-106	I-129	Cs-134	Cs-137	Water Over the Weir (Gals x 10^6)	Cattaraugus Creek Flow Average (GPM x 10^5)
Jan 1981	0.178	0.00004	681	0.0008	0.0004	0.0004	0.00058	0.00027	0.0101	1.49	2.15
Feb 1981	0.244	0.00011	834	0.0015	0.0007	0.0007	0.00051	0.00033	0.0132	3.62	6.08
Mar 1981	NO DISCHARGE THIS MONTH -										2.80
Apr 1981	0.057	0.00009	325	0.0006	0.0004	0.0004	0.00013	0.00005	0.0021	1.53	3.02
May 1981	0.123	0.00017	1300	0.0009	0.0009	0.0009	0.00043	0.00027	0.0142	2.50	2.34
Jun 1981	0.033	0.00007	295	0.0003	0.0002	0.0002	0.00009	0.00011	0.0043	0.66	2.31

Table 3-2

LIQUID DISCHARGES

Quarter	Alpha Emitting Components (Curies)				
	U-234	U-235	U-238	Pu-238	Pu-239
1st/1981	$2.51 \pm 1.16 \times 10^{-5}$	$<4.45 \times 10^{-6}$	$2.71 \pm 1.16 \times 10^{-5}$	$<3.67 \times 10^{-6}$	$<1.08 \times 10^{-5}$
2nd/1981	$3.91 \pm 0.53 \times 10^{-5}$	$1.58 \pm 0.91 \times 10^{-6}$	$3.55 \pm 0.36 \times 10^{-5}$	$7.10 \pm 1.07 \times 10^{-5}$	$<2.06 \times 10^{-6}$

Table 3-3

BUTTERMILK CREEK SILT ACTIVITY
(Microcuries per Gram)

1981 Quarter	Gross Alpha	Gross Beta
1st	$<8.6 \times 10^{-6}$	$1.8 \pm 0.4 \times 10^{-5}$
2nd	$<2.1 \times 10^{-5}$	$1.8 \pm 0.7 \times 10^{-5}$

Table 3-4

BUTTERMILK CREEK WATER ACTIVITY
(Microcuries per Milliliter)

1981 Quarter	Gross Alpha	Gross Beta	Tritium
1st	$<4.15 \times 10^{-10}$	$8.12 \pm 6.07 \times 10^{-9}$	$1.21 \pm 0.03 \times 10^{-4}$
2nd	$<3.32 \times 10^{-10}$	$2.58 \pm 0.35 \times 10^{-8}$	$2.96 \pm 0.06 \times 10^{-4}$

4.0 GASECUS EFFLUENT

Gaseous plant effluents are sampled in the plant stack. The stack sampler contains a filter to collect particulates and an impregnated charcoal filter to collect iodine. Samples are removed from the stack sampler at least once every seven days and analyzed.

In addition to the stack sampler, a stack monitor is used to continuously determine the particulate radioactivity in the stack air and to alert operators if pre-set limits are approached. The filter paper on the particulate monitor is advanced daily and will alarm if the accumulation of particulate radioactivity over a four-hour period exceeds that which would occur if particulates were being discharged over the same time period at the limit set by Technical Specifications.

The particulate radioactivity in the stack and the relationship to the Technical Specification limit are shown on Table 4-1. The curies of radioactivity released from the plant stack as determined on a quarterly combined sample is shown on Table 4-2.

Table 4-1

PARTICULATE RADIOACTIVITY RELEASED FROM PLANT STACK

1981 Month	Alpha (Curies)	Beta (Curies)	% of Tech Spec Limit[1]
Jan	1.85×10^{-6}	1.60×10^{-4}	0.05
Feb	6.84×10^{-7}	5.29×10^{-5}	0.02
Mar	8.87×10^{-7}	1.88×10^{-4}	0.08
Apr	1.09×10^{-6}	5.76×10^{-5}	0.02
May	1.88×10^{-6}	7.22×10^{-5}	0.02
Jun	1.23×10^{-6}	5.50×10^{-5}	0.02

[1]Particulate release limit 0.1 microcurie per second

Table 4-2

RADIOACTIVITY RELEASED FROM PLANT STACK

QUARTERLY DATA

1981 Quarter	CURIES				
	Sr-90	Ru-106	I-129	Cs-134	Cs-137
1st	$6.94 \pm 0.50 \times 10^{-5}$	$<3.91 \times 10^{-6}$	$<5.80 \times 10^{-8}$	$1.24 \pm 0.50 \times 10^{-6}$	$1.04 \pm 0.05 \times 10^{-4}$
2nd	$2.92 \pm 0.05 \times 10^{-5}$	$<4.18 \times 10^{-6}$	$<6.34 \times 10^{-8}$	$<5.45 \times 10^{-7}$	$6.94 \pm 0.50 \times 10^{-5}$

5.0 ENVIRONMENTAL MEASUREMENTS

In the first half of 1981, the average concentrations of gross radioactivity and the average concentration of specific radionuclides in environmental samples of air, water, milk, fish and silt continued to be less than applicable limits of the U. S. Nuclear Regulatory Commission.

5.1 AIR MONITORING

Particulate air activity is continuously sampled at three perimeter sampling stations. The Fox Valley sampler is located two miles southeast of the plant, Route 240 sampler is 1-1/2 miles northeast of the plant, and Thomas Corners sampler is 2-1/2 miles north-northwest of the plant. A total of 78 weekly samples were collected during the first half of 1981 and analyzed for gross alpha and gross beta particulate radioactivity. To allow for decay of naturally occurring short lived radioisotopes such as lead-212, lead-214, and their daughter products, the air samples are stored for one week prior to counting. Following this decay period, the long lived activity from natural occurring radionuclides and fallout can be determined. The results of these analyses appear in Table 5-1.

5.2 BACKGROUND RADIATION

Radiation background measurements around the site are determined by using energy corrected $CaSO_4$:Tm TLDs at 16 locations around the NFS site perimeter. These dosimeters are changed and evaluated monthly. Data obtained for January through June 1981 are shown in Table 5-2.

5.3 CATTARAUGUS CREEK

Samples of water from Cattaraugus Creek are taken with a continuous sampler located about one-half mile downstream from the confluence of Cattaraugus Creek and Buttermilk Creek. These samples are collected weekly and analyzed for gross alpha, gross beta and tritium. The results of these analyses are shown in Table 5-3. The 26 weekly samples were composited based on creek flow and analyzed for gross alpha, gross beta and Strontium-90. The Iodine-129 was calculated from Lagoon 3 composites. Data is shown in Table 5-4.

5.4 FISH

During the second and third quarters of each year, NFS takes fish samples from Cattaraugus Creek between the point of discharge of Buttermilk Creek and the Springville hydroelectric dam, two miles downstream. The results of analysis on the fish samples collected for the second quarter of 1981 are shown in Table 5-5.

Table 5-1

PERIMETER AIR ACTIVITY
(Curies per Cubic Meter)

1981 Month	Alpha Max.	Alpha Avg.	Beta Max.	Beta Avg.
		FOX VALLEY		
January	2.56×10^{-16}	1.64×10^{-16}	6.41×10^{-14}	4.94×10^{-14}
February	1.38×10^{-16}	1.38×10^{-16}	1.45×10^{-13}	6.63×10^{-14}
March	1.57×10^{-16}	1.43×10^{-16}	1.99×10^{-13}	1.09×10^{-13}
April	1.38×10^{-16}	1.38×10^{-16}	2.19×10^{-13}	1.67×10^{-13}
May	3.27×10^{-16}	1.76×10^{-16}	1.95×10^{-13}	1.49×10^{-13}
June	1.38×10^{-16}	1.38×10^{-16}	9.45×10^{-14}	7.32×10^{-14}
		ROUTE 240		
January	3.10×10^{-16}	1.72×10^{-16}	6.84×10^{-14}	5.38×10^{-14}
February	8.27×10^{-16}	3.81×10^{-16}	7.56×10^{-14}	5.96×10^{-14}
March	1.38×10^{-16}	1.38×10^{-16}	1.92×10^{-13}	1.06×10^{-13}
April	1.38×10^{-16}	1.38×10^{-16}	2.09×10^{-13}	1.86×10^{-13}
May	2.26×10^{-16}	1.56×10^{-16}	2.74×10^{-13}	1.83×10^{-13}
June	5.09×10^{-16}	2.31×10^{-16}	1.11×10^{-13}	8.58×10^{-14}
		THOMAS CORNERS		
January	3.27×10^{-16}	1.76×10^{-16}	7.86×10^{-14}	4.84×10^{-14}
February	4.02×10^{-16}	2.20×10^{-16}	8.18×10^{-14}	5.37×10^{-14}
March	1.44×10^{-16}	1.40×10^{-16}	1.92×10^{-13}	1.03×10^{-13}
April	1.38×10^{-16}	1.38×10^{-16}	2.05×10^{-13}	1.73×10^{-13}
May	3.63×10^{-16}	2.26×10^{-16}	1.97×10^{-13}	1.59×10^{-13}
June	1.50×10^{-16}	1.43×10^{-16}	7.53×10^{-14}	6.45×10^{-14}

Table 5-2

MONTHLY ACCRUED BACKGROUND NEAR SITE PERIMETER

Location		Millirad per Standard Month - 1981					
Direction From Plant	Distance From Plant (Miles)	January	February	March	April	May	June
SSW	1.3	5.55 ± 1.62	7.33 ± 1.03	6.25 ± 0.96	7.06 ± 0.38	7.04 ± 0.78	6.36 ± 0.24
S	2.3	5.12 ± 1.10	6.16 ± 1.56	6.38 ± 0.12	6.20 ± 0.29	6.57 ± 1.11	5.91 ± 0.77
SSE	1.8	6.07 ± 1.67	6.97 ± 0.98	6.23 ± 0.48	6.01 ± 0.42	5.47 ± 0.83	5.73 ± 0.37
SE	1.7	6.38 ± 1.52	6.55 ± 0.58	5.56 ± 0.66	5.53 ± 0.96	6.07 ± 0.93	6.15 ± 0.82
ESE	1.5	5.49 ± 0.39	6.53 ± 0.59	5.80 ± 0.26	6.29 ± 0.50	6.25 ± 1.04	5.75 ± 1.28
E	1.6	6.49 ± 0.53	6.91 ± 0.47	6.19 ± 0.86	6.49 ± 0.25	5.86 ± 0.60	5.66 ± 0.89
ENE	1.2	6.21 ± 1.08	6.08 ± 1.52	5.67 ± 0.73	5.84 ± 0.61	5.72 ± 0.35	5.24 ± 0.88
NE	1.6	6.42 ± 0.25	6.47 ± 0.58	5.56 ± 0.39	6.16 ± 1.07	5.66 ± 0.25	5.18 ± 0.48
NNE	2.1	5.59 ± 0.86	7.34 ± 1.28	6.10 ± 0.19	6.02 ± 0.47	5.86 ± 0.55	5.90 ± 0.80
N	1.5	6.09 ± 0.68	6.87 ± 0.28	5.74 ± 0.47	6.67 ± 0.47	6.34 ± 0.67	5.80 ± 0.36
NNW	2.4	6.07 ± 1.07	6.93 ± 0.64	6.70 ± 1.00	6.59 ± 1.41	6.62 ± 0.44	**
NW	1.4	5.40 ± 0.72	7.50 ± 0.95	5.88 ± 0.85	6.37 ± 0.26	5.46 ± 0.70	5.55 ± 0.69
WNW	0.8	6.53 ± 1.05	6.80 ± 0.59	7.50 ± 0.41	6.61 ± 0.58	6.44 ± 0.72	6.95 ± 0.26
W	1.2	5.95 ± 0.95	7.30 ± 0.27	5.80 ± 0.45	6.62 ± 0.74	6.51 ± 0.77	6.21 ± 1.02
WSW	1.4	5.41 ± 1.36	5.79 ± 1.18	4.52 ± 0.62	6.54 ± 0.94	5.79 ± 0.83	5.50 ± 0.45
SW	1.5	6.03 ± 1.32	**	6.15 ± 0.40	5.96 ± 0.80	**	5.85 ± 0.63

**Missing - Vandalism

Table 5-3

RADIOACTIVITY IN CATTARAUGUS CREEK - WEEKLY SAMPLES
(Microcuries per Milliliter)

Date	Gross Alpha	Gross Beta	Tritium
1/06/81	$<3.27 \times 10^{-10}$	$8.80 \pm 3.20 \times 10^{-9}$	$1.47 \pm 0.21 \times 10^{-6}$
1/13/81	$<3.19 \times 10^{-10}$	$1.59 \pm 0.36 \times 10^{-8}$	$4.38 \pm 1.96 \times 10^{-7}$
1/20/81	$<3.97 \times 10^{-10}$	$1.91 \pm 0.41 \times 10^{-8}$	$6.37 \pm 0.14 \times 10^{-5}$
1/27/81	$<3.07 \times 10^{-10}$	$7.62 \pm 3.12 \times 10^{-9}$	$5.47 \pm 0.12 \times 10^{-5}$
2/03/81	$<3.92 \times 10^{-10}$	$9.45 \pm 3.02 \times 10^{-9}$	$4.17 \pm 0.10 \times 10^{-5}$
2/10/81	$<3.20 \times 10^{-10}$	$1.20 \pm 0.40 \times 10^{-8}$	$4.04 \pm 0.09 \times 10^{-5}$
2/17/81	$<5.50 \times 10^{-10}$	$2.62 \pm 0.47 \times 10^{-8}$	$1.73 \pm 0.05 \times 10^{-5}$
2/24/81	$<1.11 \times 10^{-9}$	$3.37 \pm 0.58 \times 10^{-8}$	$8.16 \pm 0.32 \times 10^{-6}$
3/03/81	$<4.67 \times 10^{-10}$	$1.07 \pm 0.35 \times 10^{-8}$	$8.90 \pm 1.82 \times 10^{-7}$
3/10/81	$<5.68 \times 10^{-10}$	$1.80 \pm 0.42 \times 10^{-8}$	$1.05 \pm 0.19 \times 10^{-6}$
3/17/81	$<3.27 \times 10^{-10}$	$8.40 \pm 2.97 \times 10^{-9}$	$1.54 \pm 0.20 \times 10^{-6}$
3/24/81	$<3.73 \times 10^{-10}$	$4.02 \pm 3.23 \times 10^{-9}$	$2.19 \pm 0.21 \times 10^{-6}$
3/31/81	$<4.07 \times 10^{-10}$	$8.15 \pm 3.14 \times 10^{-9}$	$1.22 \pm 0.21 \times 10^{-6}$
4/07/81	$<2.90 \times 10^{-10}$	$1.10 \pm 0.31 \times 10^{-8}$	$5.40 \pm 1.47 \times 10^{-7}$
4/14/81	$<9.90 \times 10^{-10}$	$2.16 \pm 0.47 \times 10^{-8}$	$1.39 \pm 0.22 \times 10^{-6}$
4/21/81	$<3.11 \times 10^{-10}$	$1.42 \pm 0.41 \times 10^{-8}$	$1.15 \pm 0.20 \times 10^{-6}$
4/28/81	$<2.86 \times 10^{-10}$	$7.97 \pm 3.02 \times 10^{-9}$	$1.12 \pm 0.04 \times 10^{-5}$
5/05/81	$<2.86 \times 10^{-10}$	$1.01 \pm 0.35 \times 10^{-8}$	$3.52 \pm 0.08 \times 10^{-5}$
5/12/81	$<3.31 \times 10^{-10}$	$1.24 \pm 0.43 \times 10^{-8}$	$3.14 \pm 0.05 \times 10^{-5}$
5/19/81	$<2.94 \times 10^{-10}$	$4.13 \pm 2.98 \times 10^{-9}$	$4.14 \pm 0.10 \times 10^{-5}$
5/26/81	$<2.94 \times 10^{-10}$	$7.83 \pm 4.84 \times 10^{-9}$	$5.90 \pm 0.13 \times 10^{-5}$
6/02/81	$<2.90 \times 10^{-10}$	$<3.33 \times 10^{-9}$	$6.19 \pm 0.14 \times 10^{-5}$
6/09/81	$<3.03 \times 10^{-10}$	$6.42 \pm 3.64 \times 10^{-9}$	$6.30 \pm 0.13 \times 10^{-5}$
6/1[illegible]/81	$<4.27 \times 10^{-10}$	$1.06 \pm 0.36 \times 10^{-8}$	$4.94 \pm 0.26 \times 10^{-6}$
6/23/81	$<4.52 \times 10^{-10}$	$2.01 \pm 0.47 \times 10^{-8}$	$4.47 \pm 0.26 \times 10^{-6}$
6/30/81	$<2.82 \times 10^{-10}$	$<3.94 \times 10^{-9}$	$2.88 \pm 0.21 \times 10^{-6}$

Table 5-4

RADIOACTIVITY IN CATTARAUGUS CREEK - COMPOSITE SAMPLES

(Microcuries per Milliliter)

Month	Gross Alpha	Gross Beta	Sr-90	I-129
Jan 1981	$<3.32 \times 10^{-10}$	$6.64 \pm 3.16 \times 10^{-9}$	$1.27 \pm 0.43 \times 10^{-9}$	1.60×10^{-11}
Feb 1981	$<6.30 \times 10^{-10}$	$1.44 \pm 0.42 \times 10^{-8}$	$5.90 \pm 4.80 \times 10^{-10}$	5.47×10^{-12}
Mar 1981	$<5.48 \times 10^{-10}$	$8.21 \pm 3.57 \times 10^{-9}$	$4.81 \pm 1.90 \times 10^{-9}$	ND
Apr 1981	$<4.06 \times 10^{-10}$	$1.34 \pm 0.47 \times 10^{-8}$	$7.65 \pm 6.20 \times 10^{-10}$	2.58×10^{-12}
May 1981	$<3.42 \times 10^{-10}$	$1.15 \pm 0.44 \times 10^{-8}$	$<1.89 \times 10^{-9}$	1.10×10^{-11}
Jun 1981	$<3.40 \times 10^{-10}$	$8.97 \pm 4.32 \times 10^{-9}$	$9.01 \pm 2.60 \times 10^{-10}$	2.40×10^{-12}

ND - Not determined. No lagoon release this month.

Table 5-5

FISH SAMPLES FROM CATTARAUGUS CREEK - 2ND QUARTER 1981

Sample	Weight (grams)	Length (inches)	Bone Strontium-90	Flesh Strontium-90	Flesh Cesium-134	Flesh Cesium-137
Bluegill #1	111	7.5	$2.2 \pm 0.8 \times 10^{-7}$	$1.0 \pm 0.4 \times 10^{-7}$	$<4.8 \times 10^{-7}$	$<4.4 \times 10^{-7}$
Bullhead #2	145	9.0	$6.2 \pm 1.2 \times 10^{-7}$	$9.5 \pm 5.8 \times 10^{-8}$	$<7.2 \times 10^{-7}$	$<8.7 \times 10^{-7}$
Bullhead #3	65	7.5	$3.6 \pm 2.6 \times 10^{-7}$	$4.1 \pm 1.4 \times 10^{-7}$	$<6.9 \times 10^{-7}$	$<1.1 \times 10^{-6}$
Bullhead #4	43	6.75	$5.8 \pm 3.1 \times 10^{-7}$	$1.1 \pm 0.2 \times 10^{-6}$	$<2.2 \times 10^{-6}$	$<2.8 \times 10^{-6}$
Bullhead #5	45	6.5	$1.8 \pm 0.7 \times 10^{-6}$	$1.0 \pm 0.2 \times 10^{-6}$	$<1.8 \times 10^{-6}$	$<1.9 \times 10^{-6}$
Bullhead #6	37	6.5	$8.1 \pm 4.4 \times 10^{-7}$	$5.1 \pm 4.8 \times 10^{-8}$	$<4.7 \times 10^{-7}$	$<6.3 \times 10^{-7}$
Chub #7	62	7.0	$7.2 \pm 3.5 \times 10^{-7}$	$6.1 \pm 5.9 \times 10^{-8}$	$<5.5 \times 10^{-7}$	$<7.0 \times 10^{-7}$
Chub #8	60	6.75	$6.0 \pm 2.4 \times 10^{-7}$	$2.4 \pm 1.8 \times 10^{-7}$	$<1.5 \times 10^{-6}$	$<1.4 \times 10^{-6}$
Chub #9	45	6.5	$8.7 \pm 2.9 \times 10^{-7}$	$3.4 \pm 2.7 \times 10^{-7}$	$<2.6 \times 10^{-6}$	$<2.7 \times 10^{-6}$
Median			6.2×10^{-7}	2.2×10^{-7}	8.9×10^{-7}	1.1×10^{-6}
Geometric Deviation			1.94	4.19	2.44	2.29