PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Harold W. Keiser
Vice President-Nuclear Operations
215/770-7502

APR 30 1986

Dr. T. E. Murley
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia PA 19406

SUSQUEHANNA STEAM ELECTRIC STATION
ANNUAL ENVIRONMENTAL OPERATING REPORTS
PLA-2630 FILE R41-2A

Docket Nos. 50-387
and 50-388

Dear Dr. Murley:

In accordance with Susquehanna SES Unit 1 and 2 Technical Specifications Section 6.9.1.7 and Environmental Protection Plan Section 5.4.1, the following reports are submitted:

Annual Radiological Environmental Operating Report
Annual Non-Radiological Environmental Operating Report

These reports cover the calendar year 1985.

Very truly yours

B L Kenyon for

H. W. Keiser
Vice-President - Nuclear Operations

Attachments

cc: Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington DC 20555 (18 copies of Attachment)

M. J. Campagnone - NRC
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KEISER, H. W. Pennsylvania Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION
MURLEY, J. E. Region 1, Office of Director

SUBJECT: Forwards "Radiological Environ Monitoring Program, 1985 Annual Report ~~Annual Rept" & "Annual Environ Operating Rept (Nonradiological), 1984.~~"

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SUSQUEHANNA STEAM ELECTRIC STATION

Radiological Environmental Monitoring Program

Units 1 and 2

1985 ANNUAL REPORT

FACILITY OPERATING LICENSE No. NPF-14 AND 22

Prepared for

PENNSYLVANIA POWER AND LIGHT COMPANY

By

TELEDYNE ISOTOPES
50 Van Buren Avenue
Westwood, New Jersey 07675

April 1986

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I. INTRODUCTION

The preoperational radiological environmental monitoring program (REMP) for Pennsylvania Power and Light Company (PP&L) at the Susquehanna Steam Electric Station (SSES) was conducted from April 1972 to September 1982. On September 10, 1982, Unit #1 became critical, thereby initating the operational phase of the program. The preoperational phase of the program, as well as the initial phase of the operational program (September 10, 1982 through June 1983) was conducted by Radiation Management Corporation (RMC). NUS Corporation conducted the REMP from June 1983 until August 1984 when Teledyne Isotopes (TI) took over the operational REMP. The analytical program is now being conducted by Teledyne Isotopes under contract with Pennsylvania Power and Light Company. The sample collection portion of the program was conducted by Ichthyological Associates until June 1985 when Ecology III assumed responsibility at the Susquehanna SES Biological Laboratory essentially utilizing the same staff.

This report covers the period January 02, 1985 through January 07, 1986. Teledyne Isotopes performed all the analyses including the Quality Control and the Quality Assurance Program. Data from programs conducted in prior years have been presented in a series of annual reports. [1-13, 21]

A. Site and Station Description

Susquehanna SES contains 2 BWR generating units, each with a capacity of about 1050 MWe. Unit #1 achieved initial criticality on September 10, 1982. Unit #2 achieved initial criticality on May 8, 1984. The site is located on an approximately 1300 acre tract along the Susquehanna River, five miles northeast of Berwick in Salem Township, Luzerne County, Pennsylvania.

The area surrounding the site can generally be characterized as rural, with forest and agricultural lands predominating. More specific information on the demography, hydrology, meteorology and land use characteristics of the local area may be found in the Environmental Report[14], the Final Safety Analysis Report[15] and the Final Environmental Statement[16] for Susquehanna SES.

B. Objectives and Overview of Susquehanna SES Monitoring Program

United States Nuclear Regulatory Commission (USNRC) regulations require that nuclear power plants be designed, constructed, and operated to keep levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable (ALARA) (10 CFR 50.34 and 10 CFR 20.1c). To ensure that these criteria are met, each license authorizing reactor operation includes technical specifications (10CFR 50.36a) governing the release of radioactive effluents.

In-plant monitoring will be used to ensure that these predetermined release limits are not exceeded. However, as a precaution against unexpected and undefined processes which might allow undue accumulation of radioactivity in any sector of man's environment, a program for monitoring the plant environs is also included in the Susquehanna technical specifications.

The regulations governing the quantities of radioactivity in reactor effluents allow nuclear power plants to contribute, at most, only a few percent increase above normal background radioactivity. Background levels at any one location are not constant but vary with time as they are influenced by external events such as cosmic ray bombardment, weapons test fallout, and seasonal variations. These levels also can vary spatially within relatively short distances reflecting variations in geological composition and other factors. Because of these spatial and temporal variations, the radiological surveys of the plant environs are divided into preoperational and operational phases. The preoperational phase of the program of sampling and measuring radioactivity in various media permits a characterization of the radiation levels and concentrations prevailing prior to plant operation along with an indication of the degree of natural variation to be expected. The operational phase of the program obtains data which, when considered along with the data obtained in the preoperational phase, assist in the evaluation of the radiological impact of plant operation.

The objectives of the operational Radiological Environmental Monitoring Program are:

1. To identify, measure and evaluate existing radionuclides in the environs of the Susquehanna SES site and fluctuations in radioactivity levels which may occur.

2. To determine whether any significant increase occurs in the concentration of radionuclides in critical pathways.

3. To detect changes in ambient radiation levels.

4. To verify that Susquehanna SES operations have no detrimental effects on the health and safety of the public or on the environment.

5. To fulfill the obligations of the Radiological Environmental Monitoring section of the technical specifications for Susquehanna SES.

Sampling locations were selected on the basis of local ecology, meteorology, physical characteristics of the region, and demographic and land use features of the site vicinity. The REMP was designed on the basis of the USNRC Radiological Assessment Branch Technical Position on radiological environmental monitoring as revised in Revision 1, November 1979.[17] PP&L expanded the basic program to aid in the characterization of area radiation levels and Susquehanna SES impact.

In 1985 the radiological monitoring program included the measurement of ambient gamma radiation by thermoluminescent dosimetry; the determination of gamma emitters, gross alpha, and gross beta in shoreline sediments; the determination of gamma emitters and gross beta in fish; the determination of gross beta, gross alpha, and gamma emitters in airborne particulates; the measurement of airborne iodine-131; the measurement of gross beta, gross alpha, gamma emitters, iodine-131, and tritium in water; the measurement of gross beta, gross alpha, gamma emitters, and tritium in precipitation; the measurement of iodine-131, gross beta minus potassium-40 and gamma emitters in cow milk and iodine-131 in goat milk; the determination of gamma emitters in game, poultry, eggs, and various fruits and vegetables; the determination of gamma emitters in algae; the determination of gamma emitters in pasture grass; and, the determination of gamma emitters in soil and vegetation.

II. PROGRAM DESCRIPTION

One-hundred and thirty-nine (139) locations were included in the Susquehanna SES monitoring program for 1985. Environmental sampling locations were divided into two classes, indicator and control. Indicator samples are those collected at locations which are expected to manifest station effects, if any exist, and were selected on the basis of distance from the site, topography, hydrology, meteorology, demography, and drainage characteristics. Control samples are collected at locations which are believed will be unaffected by station operation. These provide a basis on which to evaluate fluctuations in radioactivity at indicator locations in relation to natural phenomena and fallout. The number and locations of monitoring points were determined by considering the locations where the highest off-site environmental concentrations have been predicted from plant effluent source terms, site hydrology, and site meteorological conditions. Other factors considered were applicable regulations, population distribution, ease of access to sampling stations, security and future program integrity.

The operational environmental radiological program for Susquehanna SES is summarized in Table 1. Table 2 describes sample locations, associated media, and approximate distance and direction from the site. Figures 1 and 2 illustrate the locations of sampling stations relative to Susquehanna SES.

In addition to the described analytical program, a milk animal, vegetable garden, and residence survey was performed in 1985. This survey located the nearest milk animal, garden and residence in each sector (out to 5 miles) and will be updated annually. These land use parameters are used in the assessment of potential radiological doses to individuals and populations of the stated regions.

TABLE 1
(Page 1 of 3)

Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1985

Media	No. of Locations	Sample Freq.(1)	Analysis Required	Anal. Freq.(2)
Airborne Particulates (AP)	11	W	Gross Beta(3)	W
			Gross Alpha	QC
			Gamma Spec	QC
Airborne Iodine (C)	11	W	I-131	W
Sediment (SH)	6	SA	Gross Alpha	SA
			Gross Beta	SA
			Gamma Spec	SA
Fish (FI)	3	SA	Gross Beta	SA
			Gamma Spec (on edible portion)	SA
Surface Water(4) (WT)	9	MC or M	Gross Alpha	M
			Gross Beta	M
			I-131	M
			Gamma Spec	M
			Tritium	M
Well (ground) Water (WG)	8	M	Gross Alpha	M
			Gross Beta	M
			Gamma Spec	M
			Tritium	M
Drinking Water(5) (PW)	2	MC	Gross Alpha	M
			Gross Beta	M
			I-131	M
			Gamma Spec	M
			Tritium	M
Rain Water (WP)	10	QC	Gross Alpha	Q
			Gross Beta	Q
			Gamma Spec	Q
			Tritium	Q

Note: See footnotes at end of table.

TABLE 1
(Page 2 of 3)

Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1985

Media	No. of Locations	Sample Freq.(1)	Analysis Required	Anal. Freq.(2)
Cow Milk (M)	8	M or SM(6)	Gross Beta-K-40 I-131 Gamma Spec	SM or M SM or M SM or M
Goat Milk(7) (M)	1	Q	I-131	Q
Food Products (FD,FL,FV,FP,FR) Various Fruits and Vegetables	6	A	Gamma Spec	A
Game (AG,AS,AW,AN)	5	A	Gamma Spec	A
Meat, Poultry, and Eggs (ME,PO,E)	2	A	Gamma Spec	A
Pasture Grass(8) (FM)	2	M	Gamma Spec	M
Soil (S)	10	A	Gamma Spec	A
Vegetation (VT)	10	A	Gamma Spec	A
Direct Radiation (TQ)	66-73	Q	TLD	Q
Algae (VA)	6	M	Gamma Spec	SM,M or BM

Note: See footnotes at end of table.

Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1985

1. W = weekly, M = monthly, SM = semi-monthly, Q = quarterly, QC = quarterly composite, SA = semi-annual, A = annual, MC = monthly composite.

2. Codes are the same as for sample frequency.

3. If the gross beta activity is greater than 10 (ten) times the yearly mean of the control sample, gamma analysis should be performed on the individual filter. Perform the gross beta analysis 24 hours or more following filter change to allow for radon and thoron daughter decay.

4. Stations 6S6 and 6S7 are sampled weekly to assure automatic composite sampler operation which is time proportional. Stations 5S5 and 6S5 are grab sampled weekly. Individual composites of the weekly samples are made on a monthly basis (MC) and analyzed.

5. Stations 12H2 RAW and 12H2 TREATED are sampled weekly. Individual composites of the weekly samples are made on a monthly basis (MC) and analyzed. 12H2 Raw is a time proportional automatic composite sampler. 12H2 Treated is a daily grab sample.

6. Stations 12B2, 5E1, 13E3 and 10G1 are analyzed semi-monthly from April through October.

7. Goat milk at station 8D1, if available, is analyzed quarterly for I-131 only.

8. Pasture grass is sampled and analyzed for gamma at station 8D1 during the quarters goat milk is not available.

Table 2
(Page 1 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Code	Description[1]	Sample Types
IND(2)	0.9-1.4 mile ESE, At or below Discharge Structure	FI
1S(3)	0.3-0.6 mile N, Sybert's Hill Area	AS
1S2	0.3 mile N, Perimeter Fence	TQ
2S(3)	0.3-1.0 mile NNE, Sybert's Hill Area	AS
2S2	0.9 mile NNE, Energy Information Center	AP,C,TQ,WP
2S3	0.2 mile NNE, Perimeter Fence	TQ
2S4	0.9 mile NNE, Energy Information Center	S,VT
2S6	0.9 mile NNE, Energy Information Center	WG
3S(3)	0.5-0.7 mile NE, Sybert's Hill/Recreation Area	AG
3S3	0.9 mile NE, Recreational Area	TQ
3S4	0.3 mile NE, Perimeter Fence	TQ
3S5	0.9 mile NE, Riverlands Facility	WG
4S1	1.0 mile ENE, Susquehanna River Flood Plain	TQ
4S2	0.5 mile ENE, Site - Peach Stand	WG
4S3	0.2 mile ENE, Perimeter Fence	TQ
4S4	0.5 mile ENE, Training Center	WG
5S(3)	0.5-0.8 mile E, Recreation Area	AG
5S1	0.8 mile E, North of Biological Laboratory	TQ
5S4	0.8 mile E, West of Biological Laboratory	AP,C,TQ,WP
5S5	0.8 mile E, West of Biological Laboratory	S,VT
5S7	0.3 mile E, Perimeter Fence	TQ
5S8	0.8 mile E, Area under power line	WT
6S4	0.2 mile ESE, Perimeter Fence	TQ
6S5	0.9 mile ESE, Outfall Area	WT
6S6	0.8 mile ESE, River water intake line	WT
6S7	0.4 mile ESE, Cooling tower blowdown discharge line	WT
7S1/6S8	0.2 mile ESE, 12 KV Pole No 44316/N34036 (4)	TQ
7S3/6S9	0.2 mile ESE, Perimeter Fence (4)	TQ
7S5	0.4 mile SE, Southeast Garden	FD
7S6	0.2 mile SE, Perimeter Fence (4)	TQ
8S2	0.2 mile SSE, Perimeter Fence	TQ
9S2	0.2 mile S, Security Fence	TQ

Note: See footnotes at end of table.

Table 2
(Page 2 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Code	Description[1]	Sample Types
10S1	0.4 mile SSW, Perimeter Fence	TQ
10S2	0.2 mile SSW, Security Fence (4)	TQ
11S2	0.4 mile SW, Golomb House	AP,C,TQ,WP
11S3	0.3 mile SW, Security Fence	TQ
11S4	0.4 mile SW, Golomb House	S,VT
11S5	0.5 mile SW, EOF Building	WG
11S6	0.5 mile SW, SW Garden	FD,TQ
12S3	0.4 mile WSW, Perimeter Fence	TQ
13S2	0.4 mile W, Perimeter Fence	TQ
13S4	0.4 mile W, Security Fence, (4)	TQ
13S5	0.4 mile W, Security Fence, (4)	TQ
14S5	0.5 mile WNW, Site Boundary Pole No. 43996/N34230	TQ
14S6	0.7 mile WNW, Site Pole No. 43869/N34174 (4)	TQ
15S(3)	0.4-0.9 mile NW, Sybert's Hill Area	AS
15S4	0.6 mile NW, Transmission Corridor	AP,C,TQ,WP,S,VT
15S5	0.4 mile NW, Perimeter Fence (4)	TQ
16S1	0.3 mile NNW, Perimeter Fence	TQ
15S3/16S2	0.3 mile NNW, Perimeter Fence (4)	TQ
LTAW	NE to ESE, on site, Lake Took-A-While	FI
LTAW	0.8 mile NE, Lake Took-A-While	WT,SH
1A1	0.6 mile N, Thomas Residence (4)	TQ
AG3	0.8 mile E. above River Water Intake - surface	VA
AG5	0.8 mile E. above River Water Intake - bottom	VA
6A3	0.6 mile ESE, State Police	TQ
6A4	0.6 mile ESE, Bell Bend Pole No. 44462/N33984	TQ
AG4	0.9 mile ESE, below discharge diffuser - surface	VA
AG6	0.9 mile ESE, below discharge diffuser - bottom	VA
7A1	0.4 mile SE, Kline Residence	TQ
7A2	0.6 mile SE, Bell Bend Pole No. 44437/N33887 (4)	TQ
8A2	0.9 mile SSE, Bell Bend Pole No. 44395/N33679 (4)	TQ

Note: See footnotes at end of table.

Table 2
(Page 3 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Code	Description[1]	Sample Types
15A1	0.9 mile NW, Serafin Farm	FM
15A3	0.9 mile NW, Serafin Farm	TQ
15A4	0.9 mile NW, Serafin Farm	WG
16A(3)	0.3-1.0 NNW, Sybert's Hill Area	AG,AS
16A2	0.8 mile NNW, Rupinski Farm	TQ
2B(3)	1.6 miles NNE, Gould Island	SH
2B3	1.3 miles NNE, Luzerne Outerwear	TQ
7B(3)	1.2 miles SE, Bell Bend	SH
7B2	1.5 miles SE, Heller's Orchard	FR,FH
7B3	1.7 miles SE, Council Cup	TQ
8B2	1.4 miles SSE; Lawall Residence	TQ
9B1	1.3 miles S, Transmission Line East of Route 11	AP,C,TQ,WP
9B2	1.3 miles S, Transmission Line East of Route 11	S,VT
10B2	2.0 miles SSW, Algatt Residence	TQ
10B3	1.7 miles SSW, General Tank and Equipment Co.	TQ
12B1	1.3 miles WSW, Kisner Farm	E,FR,PU
12B2	1.7 miles WSW, Shultz Farm	M
12B3	2.0 miles WSW, Young Farm	M
12B4	1.7 miles WSW, Shultz Farm	TQ
16B1	1.6 miles NNW, Walton Power Line	TQ
6C1	2.7 miles ESE, Moyer Farm	M
11C(3)	2.6 miles SW, Hess Island	SH
1D2	4.0 miles N, Near Mocanaqua Substation	AP,C,TQ,WP
1D3	3.9 miles N, Near Mocanaqua Substation	WT
1D4	4.0 miles N, Near Mocanaqua Substation	S,VT
3D1	3.4 miles NE, Pond Hill	AP,C,TQ,WP
3D2	3.4 miles NE, Pond Hill	S,VT

Note: See footnotes at end of table.

Table 2
(Page 4 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Code	Description[1]	Sample Types
8D1	3.2 miles SSE, Poltrock Farm	M,FM
8D2	4.0 miles SSE, Mowry Residence	TQ
8D3	4.0 miles SSE, Mowry Residence (4)	TQ
9D1	3.6 miles S, Smith Farm	TQ
10D1	3.0 miles SSW, Ross Ryman Farm	M
10D2	3.0 miles SSW, Ross Ryman Farm	TQ
11D1	3.3 miles SW, Zehner Farm	FR,FD
12D2	3.7 miles WSW, Dagostin Farm	M
12D3	3.7 miles WSW, Dagostin Residence	TQ
1E1	4.5 miles N, Lane Residence	TQ
4E1	4.8 miles ENE, Pole No. 46422/N35197	TQ
5E1	4.5 miles E, Bloss Farm	M
5E2	4.5 miles E, Bloss Farm	TQ
6E1	4.7 miles ESE, St. James Church	TQ
7E1	4.2 miles SE, Harwood Trans. Line Pole No. 2	TQ
11E1	4.7 miles SW, Jacobsen Residence	TQ
12E1	4.7 miles WSW, Berwick Hospital	AP,C,TQ,WP
12E2	4.7 miles WSW, Berwick Hospital	S,VT
12E4	4.7 miles WSW, Berwick Hospital	WG
13E3	5.0 miles W, Dent Farm	M
13E4	4.1 miles W, Kessler Farm	TQ
14E1	4.1 miles WNW, Canouse Farm	TQ
2F(3)	6.4 miles NNE, Between Shickshinny and former State Hospital	SH
2F1	5.9 miles NNE, St. Adalberts Cemetery	TQ
3F1	9.1 miles NE, Valania Residence	TQ

Note: See footnotes at end of table.

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Code	Description[1]	Sample Types
7F1	9.0 miles SE, Conyngham School	TQ
12F(3)	6.9 miles WSW, Old Berwick Test Track	SH
12F1	5.3 miles WSW, Berwick Bridge	WT
12F2	5.2 miles WSW, Berwick Substation	TQ
12F3	5.2 miles WSW, Berwick Water Co.	WG
15F1	5.4 miles NW, Zawatski Farm	TQ
16F1	7.8 miles NNW, Hidlay Residence	TQ
AG1	15 miles NE, above WB STP	VA
AG2	14 miles NE, below WB STP	VA
3G3	16 miles NE, WB Horton St. Substation	TQ
3G4	17 miles NE, WB Service Center	TQ
4G1	14 miles ENE, Mountain Top - Ind. Park	TQ
7G1	14 miles SE, Hazelton Chem Lab	AP,C,TQ,WP,VT,S
10G1	14 miles SSW, Davis Farm	M
12G1	15 miles WSW, PP&L Service Center Bloomsburg	AP,C,TQ,WP
12G2	17 miles WSW, U.S. Radium Site Bloomsburg	WT
12G3	15 miles WSW, PP&L Service Center Bloomsburg	S,VT
12G4	10 miles WSW, Kinery/Naus Residence	TQ
2H(3)	30 miles NNE, Near Falls, PA	FI
2H1	21 miles NNE, Yalicks Produce Stand	FD
7H1	47 miles SE, PP&L roof, Allentown	AP,C,TQ
12H1	26 miles WSW, Merck Co.	WT
12H2RAW	26 miles WSW, Danville Water Company	PW
12H2TREATED	26 miles WSW, Danville Water Company	PW

(1) All distances measured from stand-by gas treatment vent at 44200/N34117 (PA Grid System)

(2) No actual location is indicated since fish are sampled over an area which extends through 3 sectors (5,6 and 7) near the outfall area.

(3) Station code is omitted because no permanent locations exist; samples are taken based on availability.

(4) See section VI Program Changes

Table 2
(Page 6 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1985

Location Codes:

The location codes are based on direction and distance from the site. The first two numbers represent each of the 16 angular sectors of 22-1/2 degrees centered about the reactor site. Sector one is divided evenly by the north axis and other sectors are numbered in a clockwise direction; i.e., 2=NNE, 3=NE, 4=ENE, etc. The next digit is a letter which represents the radial distance from the station:

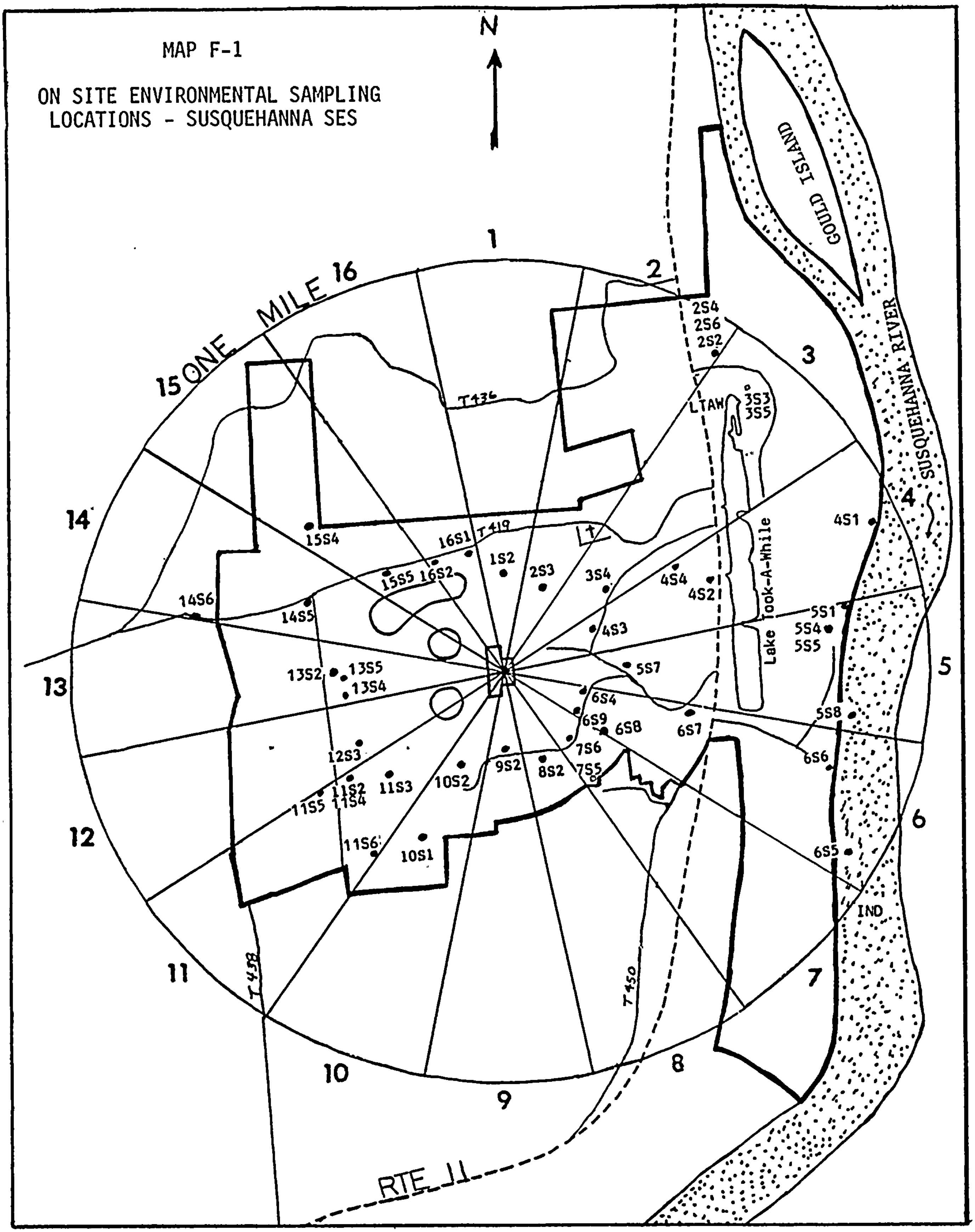
S = Site(1) location
A = 0-1 miles off-site
B = 1-2 miles off-site
C = 2-3 miles off-site
D = 3-4 miles off-site
E = 4-5 miles off-site
F = 5-10 miles off-site
G = 10-20 miles off-site
H = >20 miles off-site

The last number is the station numerical designation within each sector and zone; e.g., 1, 2, 3, ...

Sample Type Codes

AG = Animals/Game (Deer)
AN = Animals
AS = Animals/Squirrel
AP = Air Particulate Filters
AW = Animals/Wildlife
C = Charcoal Filters
E = Eggs
FD = Food/Garden Crops
FH = Food/Garden Crops - Honey
FL = Food/Garden Crops - Green Leafy Vegetables (cabbage, lettuce, spinach, swiss chard, etc.)
FP = Food/Garden Crops - Potatoes
FR = Food/Garden Crops - Fruit (apples, strawberries, melons)
FV = Food/Garden Crops - Vegetables (sweet corn, green beans, tomatoes, squash)
FI = Fish
FM = Feed and Forage - Milk Producers (pasture grass)
ME = Meat
M = Milk
PO = Poultry
PW = Potable Water
S = Soil
SH = Sediment/Shoreline (0-4' of water)
TQ = TLD
VT = Vegetation - Terrestrial
VA = Vegation - Aquatic
WG = Water - Ground (Well)
WP = Water - Precipitation
WT = Water - Surface

(1) Site is defined as that area within PP&L's property boundary.


MAP F-1
ON SITE ENVIRONMENTAL SAMPLING
LOCATIONS - SUSQUEHANNA SES
N
GOULD ISLAND
SUSQUEHANNA RIVER
ONE MILE
1
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T436
T419
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16S2
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11S2
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T458
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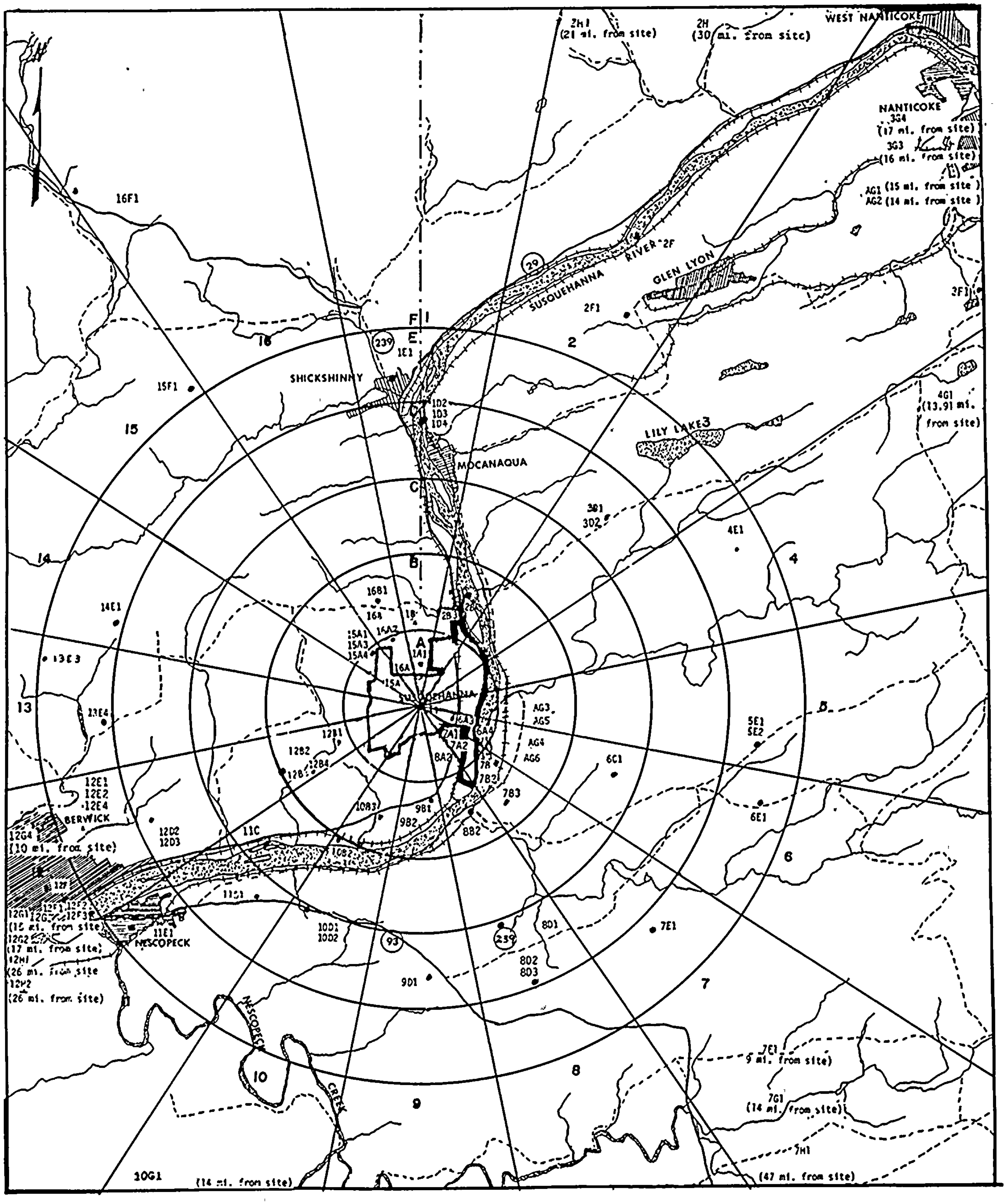
MAP F-2

OFF SITE ENVIRONMENTAL SAMPLING LOCATIONS - SUSQUEHANNA SES



III. SAMPLING METHODS AND PROCEDURES

To derive meaningful and useful data from the radiological environmental monitoring program, sampling methods and procedures are required which will provide samples representative of potential pathways of the area.

A. Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct (ambient) radiation levels at seventy-three (73) monitoring points as described in Tables 1 and 2. Sampling locations were chosen according to the criteria given in the USNRC Branch Technical Position on Radiological Monitoring (Revision 1, November 1979).[17]

The area around the station was divided into 16 radial sectors of 22 1/2 degrees each. TLDs were placed in all sectors. The TLDs were placed at locations designed to take advantage of local meteorologic and topographic characteristics and population distribution characteristics. There were seven (7) control locations: 3G3, 3G4, 4G1, 7G1, 7H1, 12G1, and 12G4.

In 1985 direct radiation measurements were made using Panasonic UD-801 thermolumenscent dosimeters (TLDs) consisting of calcium sulfate doped with thulium (CaSO4:TM). The dosimeters were exchanged on a quarterly basis. Element correction factors were determined for each dosimeter by exposure to an accurately known radiation field from a calibrated Cs-137 source.

B. Surface Water

Surface water was sampled at nine locations from the Susquehanna River and other surrounding bodies of water. Time proportional automatic composite samples were collected monthly at 12H1 (Merck Company). Monthly samples were also composited from weekly grab samples at location 5S8 (under the power line) and location 6S5 (outfall area). Monthly grab samples were collected at location 1D3 (Mocanaqua Substation), location 12F1 (Berwick Bridge), location 12G2 (between Bloomsburg and Berwick), and Lake Took-A-While (LTAW). Monthly surface water samples were analyzed for gross alpha, gross beta, gamma emitters, iodine-131 and tritium. Stations 5S8, 6S6 and 1D3, were the control stations.

Time proportional automatic composite water samplers were installed in 1983 at the river water intake (6S6) and the cooling tower blowdown discharge line (6S7). These samples are collected at least weekly. Monthly composites of weekly samples were analyzed for gross alpha, gross beta, iodine-131, gamma emitters and tritium. Locations 5S8 and 6S5 provide alternate data for locations 6S6 and 6S7, respecitvely, in the event that the automatic samplers malfunction.

C. Drinking Water

Drinking water was sampled by means of a time proportional automatic composite sampler on a weekly basis from station 12H2 RAW. A daily grab sample was taken at 12H2 TREATED and composited into a weekly sample. These stations are located at the Danville Water Company (drinking water supply closest to Susquehanna SES which could be affected by plant discharge). 12H2 RAW is taken from the Susquehanna river intake structure while 12H2 TREATED is drawn from the supply line after processing. Monthly composites of the 12H2 RAW and 12H2 TREATED samples were analyzed for gross alpha, gross beta, gamma emitters, iodine-131 and tritium.

D. Algae

Susquehanna River algae collections were set up at six locations beginning in May 1984 as a special study (not required by technical specifications) to locate the source of iodine-131 upstream of the Susquehanna SES as postulated earlier(11). Surface samplers were located above (AG-1) and below (AG-2) the Wilkes-Barre sewage treatment plant, above (AG-3) the Susquehanna SES river water intake structure, and below (AG-4) the cooling tower blowdown discharge diffuser. Bottom samplers were located above (AG-5) the intake structure and below (AG-6) the discharge diffuser.

Locations AG1, AG2, AG3 and AG5 serve as controls for indicator locations AG4 and AG6. Dry monthly samples were analyzed by gamma spectrometry.

E. Fish

Fish sampling was conducted in the spring (May) and the fall (October) at three locations for this program. Downstream of the Susquehanna SES on the Susquehanna River was selected as an indicator location (IND), and an upstream location was chosen as a control location (2H). Fish samples were also taken from Lake Took-A-While (LTAW), an indicator station.

Available edible species were filleted at the time of collection. The edible portions were packed in dry ice and shipped to the laboratory for analysis by gamma spectrometry and for gross beta.

F. Shoreline Sediment

Shoreline sediment (0 to 4 ft. of water) samples were collected in May and November at six locations in the Susquehanna River. These were Bell Bend (7B), near Hess Island (11C), the old Berwick test track (12F), near Gould Island (2B), between Shickshinny and the former State Hospital (2F) and Lake Took-A-While (LTAW). Samples were analyzed for gamma emitting nuclides, gross alpha and gross beta. The control locations are 2B and 2F.

G. Ground (Well) Water

Eight wells: the Energy Information Center (2S6), the Riverlands Facility (3S5), the Peach Stand (4S2), the Training Center (4S4), the EOF Building (11S5), the Serafin Farm (15A4), the Berwick Hospital (12E4) and the Berwick Water Company (12F3), a control station, were sampled monthly. Gross alpha, gross beta, gamma and tritium analyses were performed on the monthly samples.

H. Airborne Particulates/Air Iodine-131/Precipitation

Airborne pathways were examined by analyzing air particulates, air iodine and precipitation. Air particulates were collected on Gelman type-A/E, glass fiber filters with low-volume air samplers. Air iodine was collected on one-inch-deep Science Applications, Inc. charcoal cartridges. Air sample volumes were measured with temperature-compensated dry-gas meters.

The samplers were run continuously and the filters and charcoal cartridges exchanged weekly. The elapsed time of sampling was recorded on an elapsed-time meter. The initial and final volumes as registered on the dry gas meter, were recorded by the sample collector.

Atmospheric pathway samples were collected at eleven locations; the Information Center (2S2), the Biological Laboratory (5S4), the Golomb House (11S2), the north transmission line (15S4), the transmission line east of route 11 (9B1), the Mocanaqua Substation (1D2), near Pond Hill (3D1), the Berwick Hospital (12E1), the Hazelton Chemistry Lab (7G1), at the Bloomsburg Service Center (12G1) and the PP&L roof in Allentown (7H1). The last three locations, 7G1, 12G1, and 7H1 were the controls. Air filters were analyzed weekly for gross beta, then composited quarterly and analyzed for gross alpha and gamma emitters. Air iodine was collected on a charcoal cartridge in series with the air particulate filter at all locations. The charcoal cartridges are warranted to have an efficiency of removal of elemental iodine of 99%. The charcoal cartridges were analyzed weekly for iodine-131.

Precipitation samples were collected at least monthly from locations 2S2, 5S4, 11S2, 15S4, 9B1, 1D2, 3D1, 12E1, 7G1 (control) and 12G1 (control), composited quarterly and analyzed for gross alpha, gross beta, tritium and gamma emitters.

I. Milk/Pasture Grass

Cow milk samples were collected monthly from eight locations; 12B2, 12B3, 6C1, 10D1, 12D2, 5E1, 13E3 and 10G1 (control). Samples were collected semi-monthly from April through October from locations 12B2, 5E1, 13E3, and 10G1. Each monthly and semi-monthly sample was analyzed for gross beta minus potassium-40, iodine-131 and gamma emitters.

Goat milk sampling was scheduled at one location (8D1) on a quarterly basis. However, sampling was discontinued in May when goat milk was no longer available. Goat milk, if available, was analyzed for iodine-131 only.

Pasture grass was collected monthly at the farm closest to the site (15A1). Pasture grass samples from location 8D1 were scheduled for collection during quarters when the goat milk was unavailable. However, location 8D1 was discontinued in May when goat milk was no longer available. Each sample was analyzed by gamma spectrometry.

J. Vegetation, Top and Bottom

Soil Three samples, one vegetation, one top soil and one bottom soil were taken at ten stations: 2S4, 5S5, 11S4, 15S4, 9B2, 1D4, 3D2, 12E2 and 7G1, 12G3 (controls). These samples were taken in August by compositing twelve plugs at each location. The top soil consists of the first 2 inches of soil and the bottom soil is from the depth of 2 to 6 inches. All samples were analyzed for gamma emitting nuclides.

K. Food Products

Fruits and Vegetables

Gamma spectrometry was used to analyze various types of food products collected from farms or gardens within the vicinity of Susquehanna SES. These included the following: apples, honey, corn, cabbage, lettuce, potatoes, spinach, string beans, tomatoes, endive, red beets, and swiss chard. Indicator locations that were sampled were 11D1, 7S5, 7B2, 11S6 and 12B1. The control location sampled was 2H1.

Meat

Meat samples consisting of eggs, chicken and duck were collected from local farms at indicator locations 12B1 and 10D1. The edible portion was analyzed for gamma emitters.

Game

Two deer samples and three composite squirrel samples were collected in the fall and the flesh was analyzed for gamma emitters. The deer samples were collected from indicator stations 3S and 5S while the squirrel samples were collected from indicator stations 15S, 1S and 2S.

IV. SUMMARY AND DISCUSSION OF 1985 ANALYTICAL RESULTS

The analytical methods used by Teledyne Isotopes meet the lower limit of detection (LLD) requirements set forth in the Susquehanna Steam Electric Station Technical Specifications. The procedures, specifications and an explanation of the analytical calculation methods used in the laboratory for these analyses are summarized in Apendix B. Data from the radiological analyses of environmental media collected are tabulated and discussed below.

Radiological analyses of environmental media characteristically approach and frequently fall below the limits of state-of-the-art measurement methods. (18) For the gamma spectrometric results listed in this report only those radionuclides positively detected are listed in the tables. A positively detected radionuclide is one in which the activity is greater than a critical value. The critical value is defined as LLD/2. (22) However, due to the presence of the natural Ra-226 and Th-228 decay chains in background gamma spectrometric results, the critical value for reporting Ra-226 and Th-228 is LLD. Typical LLD's of selected nuclides searched for by gamma spectrometry are listed in Table 19.

For analyses other than gamma spectrometry, "LT" is used in the data tables where activity was not positively detected. The use of "LT" in the data tables is the equivalent of the less than symbol (<). The number following "LT" is a result of calculation as defined in Appendix B and Appendix C.

Tables 5 through 18 give the radioanalytical results for individual samples. A statistical summary of the results based only on positively detected activities appears in Table 3.

A. Direct Radiation

Environmental radiation exposure rates determined by thermoluminescent dosimeters (TLD's) are given in Table 5. The mean quarterly value for each of 76 locations is reported in this table. (Due to the deviations and program changes there were 66 to 73 locations per quarter). A description of the TLD system used by PP&L is contained in Appendix B of this report.

A statistical summary of the 1985 data is included in Table 3. Individual measurement of external radiation levels in the environs of the Susquehanna SES site ranged from 0.16 to 0.28 mR/day. The average for all indicator locations, 0.20 +- 0.02 mR/day, was virtually identical to the average for the control locations, 0.19 +- 0.03, and was also virtually identical, 0.20 +- 0.02, if the Allentown location was excluded from the control average.

Oakley [19] calculates an ionizing radiation dose equivalent of 82 mrem/year for the Wilkes-Barre area. Since Oakley's values represent averages covering wide geographical areas, the measured ambient radiation average of 73 mR/year for the immediate locale of Susquehanna SES is consistent with Oakley's observations. Significant variations occur between geographical areas as a result of geological composition and altitude differences. Temporal variations result from changes in cosmic ray intensitty, local human activities and factors such as ground cover and soil moisture.

B. Surface Water

Surface water was sampled from nine (9) locations including three control locations. Samples were analyzed for gross alpha, gross beta, iodine-131, tritium and gamma emitting radionuclides. The results are listed in Table 6.

Of the 83 indicator surface water samples analyzed, 9 had detectable gross alpha activity ranging from 1.3 to 2.4 pCi/liter. Gross alpha was detected in 2 of 42 control samples at a concentration ranging from 1.1 to 1.9 pCi/liter. These values are within the range for previously reported surface water samples.

A total of 125 surface water samples were analyzed for gross beta activity. Gross beta was detected in 82 of 83 indicator locations at concentrations ranging from 1.4 to 15 pCi/liter. Of the 42 control surface water samples, 40 had detectable gross beta activity ranging from 1.4 to 6.7 pCi/liter. These values are within the ranges reported in preoperational data.

A total of 125 surface water samples were analyzed for iodine-131. Of the 42 control surface water samples analyzed, 5 had detectable activity, ranging from 0.12 to 0.40 pCi/liter. Of the 83 indicator surface water samples analyzed, 7 had detectable activity, ranging from 0.12 to 0.42 pCi/liter.

The presence of iodine-131 in the control location samples, and the general distribution of the observed activities indicates that the presence of this isotope is not plant related. Similar activity levels were reported in preoperational data. Alternate sources of concentrations in surface water are medical uses in the area.

All 125 surface water samples were analyzed for tritium. The results are contained in Table 6.

Of the 42 control surface water samples analyzed, 32 had detectable tritium ranging from 64 to 180 pCi/liter. The average of all positive results was 112 pCi/liter. Excluding station 6S7, the discharge line, there were 70 indicator surface water samples analyzed. Of these, 58 had positive activity ranging from 66 to 390 pCi/liter, with an average of 141 pCi/liter. These numbers are within the range of data reported during the preoperational period.

The indicator station 6S7 was analyzed 13 times and contained tritium activity in all 13 samples. The range of activity was 110 to 2600 pCi/liter with an average of 595 pCi/liter. The presence of increased tritium in the plant discharge line is attributed to plant operations. The concentrations are well below U.S. NRC non-routine reporting limits. The calculated dose to the maximally exposed individual is presented below in section IV-L.

All 125 surface water samples were analyzed for gamma emitting radionuclides. The results are presented in Table 6.

Using gamma spectrometry, naturally occurring potassium-40 was detected in 15 of the 125 samples at concentrations ranging from 17 to 230 pCi/liter. Thorium-228 was detected in one sample with a concentration of 27 pCi/liter. The man-made radionuclide cesium-137 was detected in 1 of 42 control samples at a concentration of 4 pCi/liter. Cesium-137 was detected in 2 of 83 indicator samples at a mean concentration of 4.6 pCi/liter. The presence of Cs-137 in these samples is attributed to global fallout from previous atmospheric weapons testing.

The man made radionuclides of Cr-51, Mn-54, Co-60 and Zn-65 were detected in indicator surface water samples as follows: Chromium-51 was seen in one sample at a concentration of 98 pCi/liter, manganese-54 was detected in two samples at a mean concentration of 4.6 pCi/liter, cobalt-60 was identified twice at an average concentration of 4.3 pCi/liter and Zn-65 was detected once at a level of 4.6 pCi/liter. All of these positive results were found at the 6S7 sample station. This station is the composite sampler located on the discharge line of Susquehanna SES. These positive values are attributed to the operation of Susquehanna SES. The calculated dose to the maximally exposed individual is presented below in section IV-L.

C. Drinking Water

A total of 26 drinking water samples were taken at the Danville Water Company (12H2). Drinking water for Danville is taken from the Susquehanna River and is the closest to Susquehanna SES which could be affected by plant discharge. These samples were analyzed for gross alpha, gross beta, iodine-131, tritium and gamma emitting radionuclides. The results are presented in Table 6. As there are no public upstream drinking water facilities, the results of the analysis of the indicator drinking water should be compared to the control surface water samples.

The results of gross alpha and gross beta analyses are shown in Table 6. Alpha activity appeared in 4 of 26 samples with a mean of 1.2 pCi/liter and a range of 1.1 to 1.3 pCi/liter. Positive beta activity was detected in all of the samples with a mean concentration of 2.4 pCi/liter and a range of 1.5 to 3.4 pCi/liter.

Tritium was detected in 15 of 26 samples. The average concentration was 102 pCi/liter and the range was 59 to 150 pCi/liter.

No iodine-131 was detected in any sample.

The results of the gamma spectrometry analysis are also shown in Table 6. Naturally occurring potassium-40 was detected in 4 of 26 samples with a range of 25 to 78 pCi/liter. The fallout radionuclide cesium-137 was detected once at a concentration of 2.9 pCi/liter.

Activity seen in drinking water was no different than those concentrations noted for the surface water control stations. Also, all concentrations are within the range of preoperational data. There is no indication of the presence of any radionuclide in these drinking water samples attributed to the operation of Susquehanna SES.

D. Algae

A total of 32 algae samples were collected for analysis during the program year. Stations AG1, AG2, AG3 and AG5 are upstream and are considered control stations for Susquehanna SES. AG4 and AG6 are indicator stations. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these samples are contained in Table 7.

The naturally occurring radionuclide Radium-226 was found in 5 of 32 samples. Thorium-228, a naturally occurring radioisotope, was found in 18 of 32 samples. The observed values for both Ra-226 and Th-228 were within the expected range of normal distribution.

Cesium-137 was detected in 3 of the 19 control samples at an average activity of 0.22 pCi/g (dry). Cesium-137 was detected in 5 of 13 indicator samples at an average activity of 0.22 pCi/g (dry). Since it is present in global fallout, the occasional detection of cesium-137 in the environmental media is not unusual.

Iodine-131 was found to be present in 11 of the 19 control samples and 5 of the 13 indicator stations with the average concentrations of 1.82 and 0.55 pCi/g (dry) respectively.

The presence of iodine-131 in the control locations and the general distribution of the observed activities indicates that the presence of this isotope is not plant related. Alternate sources of concentrations in algae are medical uses in the area. This data is consistent with iodine-131 levels which are reported in the surface water tables of this report.

The man-made radioisotopes of Mn-54, Co-58 and Co-60 were detected in downstream algae samples. Manganese-54 was seen in 2 of 13 indicator samples at a concentration of 0.55 pCi/g (dry). Cobalt-58 was detected once at a level of 0.43 pCi/g (dry) and cobalt-60 was found in 2 of the 13 indicator samples at levels of 0.25 and 0.74 pCi/g (dry). These activities substantiate values already seen in surface water samples and are therefore attributed to the operation of SSES. The Mn-54 and Co-60 detected in the algae sample collected on 07/08/85 were also seen in the 6S7 composite water sample collected on the same day. The Co-58 detected in the algae, however, was not seen in the corresponding 6S7 composite water sample. The ratio of Co-58 to Co-60 (0.43/0.74) seen in the 07/08/85 algae sample was used to predict the concentration of Co-58 used in the dose to man from water calculations presented below in section IV-L.

E. Fish

Fish samples were collected during May and October from three locations. Smallmouth Bass, Walleye and Channel Catfish were collected at both the indicator and control locations in May. White Sucker, Walleye and Channel Catfish were collected at both locations in October. In May and October Largemouth Bass and Channel Catfish were collected at Lake Took-A-While. A total of 17 samples were analyzed, 7 from the indicator location, 6 from the control location and 4 from Lake Took-A-While.

The results of gross beta analyses of fish samples collected during 1985 are presented in Table 8. All 17 samples had detectable gross beta activity ranging from 3.0 to 7.9 pCi/g (wet) with a mean for all stations of 6.0 pCi/g (wet). This is probably due to naturally occurring potassium-40 which is a beta emitter. The range of gross beta activity was not significantly different from ranges reported during the previous year.

The results of gamma spectrometric analyses of fish samples collected during 1985 are presented in Table 8. As expected, naturally occurring K-40 was the major detectable activity in the edible portions of the fish and was found in all 17 samples. Cesium-137 was the only man-made isotope detected in fish. Cesium-137 was detected in 2 of the 6 control samples and ranged from 0.007 to 0.012 pCi/g (wet). Cesium-137 was also detected in one indicator sample at a level of 0.013 pCi/g (wet) and in one sample from Lake Took-A-While at a level of 0.009 pCi/g (wet). The Cs-137 concentrations are consistent with preoperatinal and control data and concentrations expected from atmospheric weapons testing.

There were no detectable levels of radioactivity in fish due to the operation of Susquehanna SES during the period of this report.

F. Shoreline Sediment

Sediment samples were collected twice during this program year. Six locations were sampled, including three indicator, two control locations and Lake Took-A-While. All samples were analyzed by gamma spectrometry, gross alpha and gross beta. A statistical summary of the analytical results including the average, fraction of detectables, and range of radionuclide concentrations is shown in Table 3, section IX.

The results of the analysis of sediment samples for gross alpha activity are listed in Table 9. Detectable activity was observed in 8 of 11 samples from the indicator locations. The range of observed activity was 5.6 to 17 pCi/g (dry). Detectable activity was observed in all four samples from the control location. The range of observed activity was 7.6 to 16 pCi/g (dry). The data from indicator locations are consistent with preoperational and control data.

The results of the analysis of sediment samples for gross beta activity are listed in Table 9. All 15 sediment samples had detectable activity with a mean of 16.7 pCi/g (dry). The mean for the 11 indicator stations is 25.6 pCi/g (dry) and the mean for the 4 control stations is 29.5 pCi/g (dry). The range of the indicator stations is 15 to 39 pCi/g (dry) and the range of the control stations is 23 to 35 pCi/g (dry). The results from the indicator locations are consistent with the results from the control locations and with data reported in previous years. The gross beta results can be attributed to naturally occurring radium, thorium and potassium-40 contained in the sediment.

A number of naturally occurring radioisotopes were detected in these samples. Potassium-40 was detected in all samples, ranging from 7.7 to 19 pCi/g (dry). Beryllium-7 was detected in 8 of 15 samples, ranging from 0.30 to 1.7 pCi/g (dry). Radium-226 was found to be present in 14 of 15 samples and Thorium-228 was found in all 15 samples.

The man-made isotope Cesium-137 was detected in 12 of 15 samples. Cesium-137 was detected in 3 of 4 control samples and ranged from 0.18 to 0.25 pCi/g (dry). Cesium-137 was also detected in 9 of 11 indicator locations at concentrations ranging from 0.04 to 0.38 pCi/g (dry). Since the data from indicator locations are consistent with preoperational and control data and the presence of Cs-137 can be explained by previous atmospheric weapons testing, it is felt that the Cs-137 is not from the operation of SSES.

Detectable levels of Mn-54, Co-58 and Co-60 were observed in sediment from some indicator locations. The presence of these radioisotopes is consistent with the data reported from surface water and can be attributed to the operation of SSES. Manganese-54 was found in 3 of 11 indicator samples at concentrations ranging from 0.03 to 0.73 pCi/g (dry). Cobalt-58 and cobalt-60 were each detected once at levels of 0.15 and 0.42 pCi/g (dry), respectively. The calculated dose to the maximally exposed individual from these gamma emitting radionuclides is presented below in section IV-L.

G. Ground (Well) Water

A total of 102 ground (well) water samples were collected during this program period. These samples were analyzed for gross alpha and gross beta, tritium and gamma emitting radionuclides. The results are presented in Table 10.

Of the 89 indicator ground water samples, 8 had detectable gross alpha activity, ranging from 0.69 to 5.0 pCi/liter. No detectable alpha activity was seen in the control samples. These data are within the range of preoperational data.

Gross beta activity was detected in 54 of the 89 indicator samples. The range of concentration was 0.86 to 5.7 pCi/liter. Of the 13 control ground water samples analyzed, 12 had detectable gross beta activity, ranging from 0.79 to 3.3 pCi/liter. These values are within the ranges of preoperational data.

Tritium activity was found in 71 of 89 indicator well water samples. The average concentration was 116 pCi/liter and the range was 60 to 280 pCi/liter. Of the 13 control well water samples analyzed, 12 had tritium activity with a mean concentration of 109 pCi/liter. The range was 78 to 230 pCi/liter. All tritium levels are within the range noted in preoperational reports.

Gamma spectrometric analyses of the well water samples revealed the typical concentrations of naturally occurring radionuclides. Potassium-40 was detected in 13 of the indicator samples and 1 of the control samples. Thorium-228 was detected in one indicator sample. The fallout radionuclide cesium-137 was detected twice with an average concentration of 4.3 pCi/liter.

Due to the above observations, it is concluded that operation of Susquehanna SES has not resulted in a detectable increase of radioactivity in ground (well) water.

H. Air Particulates/Air Iodine-131/Precipitation

Air Particulate

Air filters were collected weekly from 11 locations. Each weekly filter was analyzed for gross beta activity. Quarterly composites were analyzed for gamma emitting radionuclides and for gross alpha activity.

Results of gross beta analyses on air particulate filters are given in Table 11. The mean gross beta activity for all stations was 16.3 and the range of gross beta ctivity was 3.3 to 36.0 E-03 pCi/m^3. Figure 4 illustrates the variation of beta activity in airborne particulates over the program year. Comparison of this data with that of previous years shows no significant difference in activity. Figure 5 shows the data from the current reporting period in the context of reported measurements for the program over the period 1973 through 1985.

Results of gross alpha analyses on air particulate filters are given in Table 12. The mean gross alpha activity for all stations was 3.9 E-03 pCi/m^3 and the range of gross alpha activity was 0.9 to 5.8 E-03 pCi/m^3. The average activity in the sample from the indicator locations was 4.0 E-03 pCi/m^3. The average activity in the sample from the control locations was 3.6 E-03 pCi/m^3. All gross alpha activity measured on air particulate filters in this program year falls within the range of preoperational data.

Air filters from each location were composited quarterly and analyzed by gamma spectrometry. A total of 44 composited samples were analyzed and the results are presented in Table 12. Several naturally occurring radionuclides were detected on these filters. Cosmogenic beryllium-7 was detected in all samples with a range of activity from 53 to 95 E-03 pCi/m^3. Potassium-40 was detected in 25 of 44 samples with a mean activity of 4.2 E-03 pCi/m^3. The only man-made radionuclide detected was the fallout radionuclide cesium-137 which was detected on 2 of 12 control samples with a mean of 0.2 E-03 pCi/m^3. Cesium-137 was measured on one of 32 indicator locations at a level of 0.3 E-03 pCi/m^3.

Due to the above observations, it is concluded that operation of Susquehanna SES has not resulted in a detectable increase of particulate activity in the environment.

Air Iodine

Results of airborne iodine-131 analyses on charcoal cartridges are presented in Table 11. Iodine-131 was not detected in any of the samples.

Precipitation

Precipitation was composited to quarterly samples from eight indicator and two control locations. Samples were analyzed for gross alpha, gross beta, tritium and gamma activity.

The results of gross alpha and gross beta are shown in Table 13. Alpha was detected in one indicator sample at a level of 0.61 pCi/liter and in one control sample at a concentration of 0.93 pCi/liter. Beta activity was observed in all samples. The average activity in the samples from the indicator and control stations were 2.5 and 3.4 pCi/liter, respectively.

The results of the gamma spectrometry analysis are shown in Table 13. Cosmogenic beryllium-7 was detected in 19 of 44 samples. The range of beryllium -7 activity was 24 to 110 pCi/liter. Potassium-40 was detected in 5 of 44 samples with a mean activity of 31 pCi/liter. The naturally occurring radioisotope of thorium-228 was detected in 4 samples. The range of thorium-228 concentration was 8.9 to 29 pCi/liter. The fallout radionuclide cesium-137 was detected in one indicator sample at a concentration of 3.4 pCi/liter.

Results of the analyses for tritium are contained in Table 13. Tritium was detected in 6 of 9 analyses of samples from control locations and in 30 of 35 analyses of samples from the indicator locations. The mean concentration of tritium detected at the control locations was 114 pCi/liter and at the indicator location the mean concentration was 116 pCi/liter. These results are typical for environmental samples and are within the ranges previously reported in Susquehanna SES annual reports.

Due to the above observations, it is concluded that operation of Susquehanna SES has not resulted in a detectable increase of radioactivity in precipitation in the environment.

I. Milk/Pasture Grass

Milk

Monthly and semimonthly milk samples were analyzed for iodine-131 by radiochemical methods and for other gamma emitting radionuclides by gamma spectrometry. All samples were also analyzed for beta activity after potassium had been chemically extracted. Some samples with high beta activity were analyzed for strontium 89 and 90 activity. The results of all analyses are shown in Table 14.

No iodine-131 was detected in any milk samples.

Using gamma spectrometry, naturally occurring potassium-40 was detected in all samples. The man-made radionuclide cesium-137 was detected in 3 of 22 control samples and 2 of 122 indicator samples. The mean concentration of Cs-137 was 4.4 pCi/liter for the control samples and 4.8 pCi/liter for the indicator samples. The presence of Cs-137 in these samples is attributed to global fallout from previous atmospheric weapons testing.

The analysis of gross beta following chemical extraction of potassium is shown in Table 14. The control samples exhibited beta activity in all 22 samples. The mean activity was 9.1 pCi/liter and the range was 5.3 to 16 pCi/liter. For the indicator samples beta activity was detected in 110 of the 122 samples. The average concentration was 7.3 pCi/liter with a range of 2.5 to 26 pCi/liter. Of the 144 total samples, one control and seven indicator samples had beta activity higher than 14 pCi/liter. Five of these eight samples were analyzed for Strontium-89 and Strontium-90 activity. Strontium-89 was not detected in any sample. Strontium-90 was found in the control sample at a concentration of 6.9 pCi/liter and in the four indicator samples analyzed at a mean concentration of 7 pCi/liter. These values are within the ranges reported in preoperational data. The presence of Sr-90 in these samples is attributed to global fallout from previous atmospheric weapons testing.

From the observations presented, there is no indication of the presence of any radionuclide in milk attributed to the operation of Susquehanna SES.

Pasture Grass

A total of 14 pasture grass samples were collected for analysis during this program year. Samples were collected monthly except when the ground was covered by snow and ice. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these samples are contained in Table 15.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout, was found in all 14 samples. Potassium-40, a naturally occurring isotope, was also found in all the samples. Table 3 contains the summarized average, fraction of detectable, and range of radionuclide concentrations. The observed values for both beryllium-7 and potassium-40 were within the expected range of normal distribution.

There is no indication of the presence of any radionuclide in grass attributed to the operation of Susquehanna SES.

J. Vegetation, Top and Bottom Soil

A total of 30 vegetation and soil samples were collected for analysis during this program year. These samples consisted of 10 vegetation, 10 from the top two inches of soil and 10 from the bottom soil (2-6 inches deep). The results of the gamma spectrometric analysis are presented in Table 16. Cesium-137 was present in 20 of 20 soil samples and in none of the vegetation samples.

Radium-226 was found to be present in 16 of 20 of the soil samples and none of the vegetation samples. Radium-226 is a naturally occurring isotope and was observed within the expected range of normal distribution.

Thorium-228 was found to be present in all of the 20 soil samples and none of the vegetation samples. Thorium-228 is a naturally occurring isotope and was observed to be within the expected range of normal distribution.

Cosmogenic beryllium-7 was found in all ten of the vegetation samples but none of the soil samples. Potassium-40, as expected because it is a naturally occurring isotope, was found to be present in all of the soil and vegetation samples. The observed values were within the expected range of normal distribution.

There is no indication of the presence of any radionuclide in these vegetation and soil samples attributed to the operation of Susquehanna SES.

K. Food Products

A total of 50 fruit, vegetable and food product samples and 8 game, poultry and egg samples were collected for analysis during this program year. Samples were collected as available during the harvest season. All samples were analyzed by gamma spectrometry.

Fruits, Vegetables and Honey

A total of 50 edible food samples were collected from various gardens over the period June through October. These samples consisted of cabbage, lettuce, swiss chard, beans, corn, potatoes, apples, spinach, tomatoes, strawberries and honey. Results of gamma spectrometric analyses of food samples are contained in Table 17.

Cesium-137 was detected in 3 of 50 food samples at an average activity of 0.02 pCi/g (wet). The single sample of honey contained 0.03 pCi/g of Cs-137. This data is consistent with data obtained from prior years. Since it is present in global fallout, the occasional detection of Cs-137 in environmental media is not unusual. No other man-made nuclides were detected in any of the 50 samples.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout, was found in 19 of the 50 samples. Potassium-40, a naturally occurring isotope, was found in all the samples. Table 3 contains the summarized average, fraction of detectables and range of radionuclide concentrations.

There is no indication of the presence of any radionuclide in food products attributed to the operation of Susquehanna SES.

Game, Poultry and Eggs

In addition to the samples discussed above, a total of 8 non-vegetable food product samples were collected for analysis during this program year. These included squirrel, deer, duck, poultry and eggs. All samples were analyzed by gamma spectrometry. Results are contained in Table 18.

Potassium-40, a naturally occurring isotope, was found in all the samples at its expected ranges of activity. Table 3 contains the summarized average, fraction of detectables, and range of radionuclide concentrations.

As expected, the sample of squirrel meat contained high levels of cesium-137 relative to all other types of food products sampled. These elevated activities have been reported previously in the annual reports on the Susquehanna SES REMP and in other sources.[19] Cesium-137 was detected in all squirrel meat samples at an average activity of 2.6 pCi/g (wet). This is consistent with previously reported values. Since it is present in global fallout, the occasional detection of cesium-137 in environmental media is not unusual. The comparatively high levels in squirrel meat apparently result from high concentration factors in the components of the squirrel's diet. Detectable levels of cesium-137 were found in the deer samples, at the mean level of 0.23 pCi/g (wet). No other man-made nuclides were detected in any of the samples of food product analyzed.

There is no indication of the presence of any radionuclide in these food products attributed to the operation of Susquehanna SES.

L. CALCULATED DOSE TO THE MAXIMALLY EXPOSED INDIVIDUAL

As shown from the discussion above the only radioactivity detected in the environment from the operation of Susquehanna SES was in the surface water pathway. Specifically, slight amounts of radioactivity were detected in the composite sampler on the station discharge line (6S7), in some algae samples collected from the Susquehanna river downstream of the discharge and in some sediment samples collected from the Susquehanna river downstream of the plant. To judge the impact of these observations the hypothetical dose to the maximally exposed individual is calculated from both surface water and sediment.

Surface Water

The dose contribution received by the hypothetical maximally exposed individual from the radioactivity found in the surface water samples was determined using the methodology in the Susquehanna SES Offsite Dose Calculation Manual (ODCM). (25) To use the methodology expressed in the ODCM, the total activity released must be estimated. As all positively detected surface water radioactivity attributed to Susquehanna SES operation was found in the discharge line composite sampler (6S7), the total activity of H-3, Cr-51, Mn-54, Co-58, Co-60, and Zn-65 released was estimated by multiplying the mean detected concentrations by the total volume of water that passed through the discharge line during the one year reporting period. The total amount of water was estimated by assuming a discharge rate of 10,000 gallons per minute for the entire year. The mean or average concentrations of Cr-51, Mn-54, Co-60 and Zn-65 are found in Table 3. The net mean activity of H-3 was determined by subtracting the average surface water control value (113 pCi/liter) from the average value of the discharge line (595 pCi/liter). The mean activity of Co-58 released was estimated by multiplying the Co-60 activity by the Co-58/Co-60 ratio found in the indicator algae samples. The hypothetical maximally exposed individual is a child. The whole body was the organ that had the highest percent of the applicable limit. The total whole body dose is conservatively calculated to be 0.00534 mrem or 0.089% of the 6 mrem limit (as expressed in 10CFR 50 Appendix 1) and an even smaller percentage of the normally occurring ingestion dose from background radioactivity.

Shoreline Sediment

A hypothetical dose to a person from the radioactivity found in the shoreline sediment was calculated using the methodology found in Regulatory Guide 1.109. The assumption was made that the individual was exposed to shoreline sediment containing Mn-54, Co-58 and Co-60 at the mean detected concentrations as listed in Table 3 for 67 hours per year. A shore-width factor of 0.2 was used to describe the geometry of the exposure. The whole body was the organ that had the highest percent of the applicable limit. The hypothetical total whole body dose is conservatively calculated to be 0.00526 mrem or 0.088% of the 6 mrem limit (as expressed in 10CFR 50 Appendix I). The hypothetical skin dose was 0.00636 mrem. These values are well below the expected dose from exposure to naturally occurring radioactive materials.

DEVIATIONS FROM THE PROGRAM 1985

The required analysis sensitivities were met throughout the year. The program sampling schedule was adhered to, except as discussed below.

TLDs at locations 7F1 and 14S6 were vandalized during the year. The poles and TLDs were destroyed at locations 1A1, 6A3 and 8D2. These deviations are noted in Table 5. See PROGRAM CHANGES for new locations for 6A3 and 8D2. The entire residence was razed at location 1A1. It was decided that the TLD located nearby at 16A2 was adequate for monitoring in this community.

The time proportional surface water automatic composite samplers at locations 6S6, 6S7 and 12H2 RAW malfunctioned infrequently during the year. These deviations are noted in Table 6. Corrective actions were completed prior to the end of the next sampling period. These samplers are not flow proportional.

The pump for ground (well) water location 4S2 was temporarily out of service in November. Location 3S5 is closed down seasonally from November through April. These deviations are noted in Table 10.

Various air samplers malfunctioned infrequently during the year. These deviations are noted in Table 11. Corrective actions were completed prior to the end of the next sampling period.

PROGRAM CHANGES - 1985

Changes to the REMP were made in 1985 to provide more uniformity in the analysis performed. These changes are noted.

1. Surface Water - Iodine-131 analysis at locations 6S6 and 6S7 was changed from weekly to monthly.

2. Drinking Water - Iodine-131 analysis at locations 12H2 Raw and 12H2 Treated was changed from weekly to monthly.

Various sampling locations were added, deleted, moved or given a new code as noted below.

1. Surface Water - Locations 1D5 and 13E1 were discontinued from the sampling program. Location 1D5 was a redundant up-river location which is sufficiently monitored by locations 1D3, 5S8 and 6S6. Location 13E1 is not a good indicator location as it is beyond the influence of any aquatic discharge from the plant.

2. Drinking Water - Location 12F3 treated was deleted. The ground (well) water location 12F3 was retained to monitor Berwick water.

3. Milk - The goat milk location 8D1 was discontinued after the goat milking operation was discontinued in May.

4. Pasture Grass - Location 8D1 was discontinued after the goat milking operation was discontinued in May.

5. TLDs - Location 1A1, 8D2 and 6A3 were destroyed during the second, second and fourth quarters, respectively. New nearby locations were begun the fourth quarter for 8D2 at 8D3 and for 6A3 at 6A4.

   - After a careful review of aerial photos and site survey maps, it was discovered that three TLDs were actually located in adjoining sectors. Location 7S1 became 6S8, location 7S3 became 6S9 and location 15S3 became 16S2 beginning the third quarter.

   - Location 7S1/6S8 is a 12KV pole no. 44316/N34036, not a 230KV Tower.

   - Two new locations were added at the third quarter due to the above code changes. They are locations 7S6 and 15S5.

   - Six new locations were added during the third and fourth quarters to better characterize the radiation environment. These locations are 10S2, 13S4, 13S5 (third quarter) and 14S6, 7A2, 8A2 (fourth quarter).

   - Location 12G4 became the Naus residence in August.

VII. LAND USE CENSUS

The USNRC Branch Technical Position on "An Acceptable Radiological Environmental Monitoring Program" (November 1979, Revision 1), states that "a census shall be conducted annually during the growing season to determine the location of the nearest milk animal and nearest garden greater than 50 square meters (500 sq. ft.) producing broad leaf vegetation in each of the 16 meteorological sectors within a distance of 8 km (5 miles)." To comply with this requirement, a land-use survey was conducted for the Susquehanna SES during the period June 26, 1985 through August 8, 1985. The closest garden (greater than 50 square meters, producing broad leaf vegetation) and residence in each radial sector was determined and all dairy animals within five (5) miles were identified.

Table 4 lists the nearest dairy animals, the nearest garden and residence in each sector identified during the survey. These land-use parameters are used in the assessment of potential radiological doses to individuals and populations of the stated regions.

TABLE 4

Nearest residence, garden, and dairy animal in each of the 16 meteorological sectors within a 5-mile radius of the Susquehanna Steam Electric Station, 1985.

Sector	Direction	Nearest Residence		Nearest Garden		Nearest Dairy Animal	
		Name	Distance	Name	Distance	Name	Distance
1	N	--	1.33 mi	--	1.62 mi	--	>5.0 mi
2	NNE	--	0.93 mi	--	1.10 mi	--	>5.0 mi
3	NE	--	2.33 mi	--	2.33 mi	--	>5.0 mi
4	ENE	--	2.12 mi	--	2.28 mi	--	2.7 mi
5	E	--	1.40 mi	--	1.40 mi	--	4.5 mi
6	ESE	--	0.54 mi	--	2.05 mi	--	2.4 mi
7.	SE	--	0.38 mi	--	0.57 mi	--	2.6 mi
8	SSE	--	0.66 mi	--	0.66 mi	--	3.5 mi
9	S	--	1.10 mi	--	1.10 mi	--	2.4 mi

TABLE 4
(Page 2 of 2

Sector	Direction	Nearest Residence		Nearest Garden		Nearest Dairy Animal	
		Name	Distance	Name	Distance	Name	Distance
10	SSW	--	1.24 mi	--	1.24 mi	--	3.0 mi
11	SW	--	1.48 mi	--	1.48 mi	--	>5.0 mi
12	WSW	--	1.16 mi	--	1.16 mi	--	1.7 mi
13	W	--	0.76 mi	--	1.47 mi	--	5.0 mi
14	WNW	--	0.71 mi	--	0.71 mi	--	1.8 mi
15	NW	--	0.86 mi	--	1.90 mi	--	>5.0 mi
16	NNW	--	0.65 mi	--	2.33 mi	--	4.2 mi

VIII. CONCLUSIONS

Results of the 1985 Radiological Environmental Monitoring Program for the Susquehanna SES Nuclear Station have been presented. Generally, the results were as expected for normal environmental samples. Naturally occurring activity was observed in the usual sample media at the expected magnitude.

A few man-made isotopes, in particular cesium-137, were also observed in a variety of sample types. These were also generally present at the anticipated concentrations and are attributable to long-term fallout from atmospheric nuclear weapons tests. A recurring detection of low levels of I-131 in surface water samples was noted. The absence of recent atmospheric testing rules out fallout as a source because of the short half-life of this isotope. However, the pattern of detection is such that plant operations are not implicated.

The program detected plant related radioactivity at very low levels in the composite sampler on the station discharge line, in some downstream algae samples and in some downstream sediment samples. These results support the results reported in the Semiannual Effluent and Waste Disposal reports for Susquehanna SES for 1985. (23 and 24)

The resulting conservatively calculated radiation doses to a hypothetically exposed individual were 5.3 E-3 mrem whole body from the surface water pathway and 5.3 E-3 mrem from the shoreline sediment. These doses are insignificant as they are only a small fraction of observed variation in local natural background. The calculated doses are well below 10 CFR 50 Appendix I design objectives and will not result in observable effects on the ecosystem or the public.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Direct Radiation mR/day	TLD 269	-	0.20(241/241) (0.16-0.28)	Station 9S2 0.2 miles S Station 11S3 0.3 miles SW	0.26(8/8) (0.25-0.28)	0.19(28/28) (0.12-0.23)	0
Fish (pCi/kg (wet))	Gamma Spec 17						
	K-40	-	3650(11/11) (3000-4500)	Station 2H 30 miles NNE	3720(6/6) (3400-3900)	3720(6/6) (3400-3900)	0
	Cs-134	130	LLD			LLD	
	Cs-137	150	11(2/11) (9-13)	Station IND 0.9-1.4 miles ESE	13(1/7) -	9.5(2/6) (7-12)	0
	Co-58	130	LLD			LLD	
	Co-60	130	LLD			LLD	
	Fe-59	260	LLD			LLD	
	Mn-54	130	LLD			LLD	
	Zn-65	260	LLD			LLD	
	Gross Beta 17	-	5640(11/11) (3000-7800)	Station 2H 30 miles NNE	6770(6/6) (5600-7900)	6770(6/6) (5600-7900)	0

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Sediment (pCi/kg (dry))	Gamma Spec 15						
	K-40	-	13200(11/11) (7700-19000)	Station 7B 1.2 miles SE	17300(3/3) (17000-18000)	12500(4/4) (9100-15000)	0
	Be-7	-	990(5/11) (300-1700)	Section 7B 1.2 miles SE	1080(3/3) (700-1700)	750(3/4) (330-960)	0
	Cs-137	180	150(9/11) (40-380)	Station 7B 1.2 miles SE	290(3/3) (220-380)	210(3/4) (180-250)	0
	Mn-54	-	290(3/11) (30-730)	Station 12F 6.9 miles WSW	380(2/2) (30-730)	LLD	0
	Ra-226	-	1900(10/11) (1200-2800)	Station 7B 1.2 miles SE	2600(3/3) (2400-2800)	2100(4/4) (1700-2800)	0
	Co-60	-	420(1/11) -	Station 12F On Site ENE	420(1/2) -	LLD	0
	Th-228	-	1290(11/11) (720-2000)	Station 7B 1.2 miles SE	1800(3/3) 1500-2000	1400(4/4) (1100-1600)	0
	Gross Alpha 15		11050(8/11) (5600-17000)	Station 7B 1.2 miles SE	15300(3/3) (14000-17000)	12400(4/4) 7600-16000	0
	Gross Beta 15		25600(11/11) (15000-39000)	Station 7B 1.2 miles SE	32300(3/3) (20000-39000)	29500(4/4) (23000-35000)	0
	Co-58		150(1/11) -	Station 12F On Site ENE	150(1/2) -	LLD	0

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Surface Water (pCi/ℓ)	Gamma Spec 125						
	Ba-140	60	LLD			LLD	0
	Co-58	15	LLD			LLD	
	Co-60	15	4.3(2/83) (2.4-6.1)	Station 6S7 Discharge	4.3(2/13) (2.4-6.1)	LLD	0
	Cr-51	-	98(1/83) -	Station 6S7 Discharge	98(1/13) -	LLD	0
	Cs-134	15	LLD			LLD	
	Cs-137	18	4.6(2/83) (3.1-6.1)	Station LTAW 0.8 miles NE	4.6(2/14) (3.1-6.1)	4.0(1/42) -	0
	Fe-59	30	LLD			LLD	
	K-40	-	57(10/83) (17-230)	Station 12H1 26 miles WSW	93(3/13) (24-230)	49(5/42) (23-98)	0
	LA-140	15	LLD			LLD	
	Mn-54	15	4.6(1/83) (1.6-7.5)	Station 6S7 Discharge	4.6(2/13) (1.6-7.5)	LLD	0
	Th-228	-	27(1/83) -	Station LTAW 0.8 miles NE	27(1/14) -	LLD	0
	Nb-95	15	LLD			LLD	
	Zn-65	30	4.6(1/83) -	Station 6S7 Discharge	4.6(1/13) -	LLD	
	Zr-95	30	LLD			LLD	
	I-131 125	2	0.22(7/83) (0.12-0.42)	Station 6S5 0.9 miles ESE	0.29(2/16) (0.16-0.42)	0.24(5/42) (0.12-0.40)	0
	Gross Alpha 125	2	1.8(10/83) (1.3-2.4)	Station 12G2 17 miles WSW	2.4(2/14) (2.4)	1.5(2/42) (1.1-1.9)	0
	Gross Beta 125	4	4.4(82/83) (1.4-15)	Station 6S7 Discharge	8.6(13/13) (3.5-12)	2.9(40/42) (1.4-6.7)	0
	Tritium 125	2000	220(71/83) (66-2600)	Station 6S7 Discharge	594(13/13) (110-2600)	112(32/42) (64-180)	0

Note:

See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Well Water (pCi/ℓ)	Gamma Spec 102						
	Ba-140	60	LLD			LLD	0
	Co-58	15	LLD			LLD	
	Co-60	15	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	4.3(2/89) (3.6-4.9)	Station 2S6 0.9 miles NNE	4.9(1/14) -	LLD	0
	Fe-59	30	LLD			LLD	
	K-40	-	33(13/89) (22-51)	Station 12F3 5.2 miles WSW	71(1/13) -	71(1/13) -	0
	La-140	15	LLD			LLD	
	Mn-54	15	LLD			LLD	
	Nb-95	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	
	Th-228	-	25(1/89) -	Station 2S6 0.9 miles NNE	25(1/14) -	LLD	0
	Gross Alpha 102	-	1.9(8/89) (0.69-5.0)	Station 4S2 0.5 miles ENE	4.2(2/14) (3.5-5.0)	LLD	0
	Gross Beta 102	-	2.2(54/89) (0.86-5.7)	Station 15A4 0.9 miles NW	4.1(13/13) (2.2-5.7)	1.8(12-13) (0.79-3.3)	0
	Tritium 102	2000	116(7/189) (60-280)	Station 4S2 0.5 miles ENE	125(10/14) (60-240)	109(12/13) (78-230)	0

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Potable Water (pCi/ℓ)	Gamma Spec 26						
	Ba-140	60	LLD			Only Indicator Stations sampled for this medium.	0
	Co-58	15	LLD				
	Co-60	15	LLD				
	Cs-134	15	LLD				
	Cs-137	18	2.9(1/26) -	Station 12H2 Treated 26 miles WSW	2.9(1/13)		0
	Fe-59	30	LLD				
	K-40	-	43(4/26) (25-78)	Station 12H2 Raw 26 miles WSW	78(1/13) -		0
	La-140	15	LLD				
	Mn-54	15	LLD				
	Nb-95	15	LLD				
	Zn-65	30	LLD				
	Zr-95	30	LLD				
	I-131 26	1.0	LLD				
	Gross Alpha 26	-	1.2(4/26) (1.1-1.3)	Station 12H2 Raw 26 miles WSW	1.2(3/13) (1.1-1.3)		0
	Gross Beta 26	-	2.4(26/26) (1.5-3.4)	Station 12H2 Raw 26 miles WSW	2.5(14/13) (1.8-3.4)		0
	Tritium 26	2000	102(15/26) (59-150)	Station 12H2 Raw 26 miles WSW	104(7-13) (59-130)		0

Control drinking water stations are the same as the surface water control stations. This is because there are no public upstream drinking water facilities.

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Precipitation (pCi/ℓ)	Gross Alpha 44	-	0.61(1/35) -	Station 7G1 14 miles SE	0.93(1/5) -	0.93(1/9) -	0
	Gross Beta 44	-	2.5(35/35) (1.3-4.8)	Station 12G1 1.5 miles WSW	3.4(4/4) (2.5-4.3)	3.4(9/9) (1.6-7.3)	0
	Tritium 44	2000	116(30/35) (53-210)	Station 11S2 0.4 miles SW	150(4/4) (120-180)	114(6/9) (82-180)	0
	Gamma Spec 44 Be-7	-	47(15/35) (24-110)	Station 1D2 4 miles N	110(1/4) -	52(4/9) (37-70)	0
	Ba-140	60	LLD			LLD	
	Co-58	15	LLD			LLD	
	Co-60	15	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	3.4(1/35) -	Station 11S2 0.4 miles SW	3.4(1/4) -	LLD	0
	Fe-59	30	LLD			LLD	
	K-40	-	22(3/35) (21-23)	Station 7G1 14 miles SE	48(1/5) -	45(2/9) (41-48)	0
	La-140	15	LLD			LLD	
	Nb-95	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	
	Mn-54	15	LLD			LLD	
	Th-228	-	20(4/35) (8.9-29)	Station 9B1 1.3 miles S	29(1/5) -	LLD	0

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
(Page 7 of 12)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Air Particulates (E-03 pCi/m^3)	Gamma Spec 44 Be-7	-	76(32/32) (61-95)	Station 5S4 0.8 miles E	82(4/4) (65-86)	68(12/12) (53-88)	0
	Cs-134	50	LLD			LLD	
	Cs-137	60	0.27(1/32) -	Station 2S2 0.9 miles NNE	0.27(1/32) -	0.19(2/12) (0.15-0.22)	0
	K-40	-	4.4(19/32) (1.5-11)	Station 2S2 0.9 miles NNE	5.6(2/4) (2.6-8.6)	3.5(6/12) (2.5-5.1)	0
	Gross Alpha 44	-	4.0(32/32) (2.5-5.8)	Station 12G1 15 miles WSW	4.3(4/4) (3.1-5.0)	3.6(12/12) (0.9-5.0)	0
	Gross Beta 565	10	16.3(409/409) (7.6-32.0)	Station 7H1 47 miles SE	16.8(53/53) (3.3-30.0)	16.3(156/156) (3.3-36.0)	0
Air Iodine (pCi/m^3)	I-131 565	0.07	LLD			LLD	0
Milk (pCi/ℓ)	I-131 144	1.0	LLD			LLD	0
	Gross Beta 144 Minus K-40	-	7.3(110/122) (2.5-26)	Station 12B3 2 miles WSW	14.6(13/13) (6.1-26)	9.2(22/22) (5.3-14)	0
	Gamma Spec 144 Ba-140	15	LLD			LLD	0
	K-40	-	1350(122/122) (1070-1630)	Station 13E3 5 miles W	1430(23/23) (1270-1590)	1320(22/22) (1120-1460)	0
	Cs-134	15	LLD			LLD	
	Cs-137	18	4.8(2/122) (4.7-4.9)	Station 10D1 3 miles SSW	4.9(1/23) -	4.4(3/22) (3.3-5.4)	0
	La-140	-	LLD			LLD	

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Pasture Grass (pCi/kg (wet))	Gamma Spec 14						
	Cs-137	80	LLD			Only Indicator stations sampled for this	
	K-40	-	6700(14/14) (1700-30000)	Station 15A1 0.9 miles NW	7050(13/13) (1700-30000)		0
	Be-7	-	4300(14/14) (260-21000)	Section 8D1 3.2 miles SSE	7100(1/1) -		0
	Ba-140	-	LLD				
	Co-58	-	LLD				
	Co-60	-	LLD				
	Cs-134	60	LLD				
	Fe-59	-	LLD				
	I-131	60	LLD				
	La-140	-	LLD				
	Nb-95	-	LLD				
	Mn-54	-	LLD				
	Zn-65	-	LLD				
	Zr-95	-	LLD				

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Food Products (pCi/kg (wet))	Gamma Spec 50						
	Cs-137	80	20(3/45) (10-34)	Station 7B2 1.5 miles SE	34(1/3) -	LLD	0
	K-40	-	4000(44/45) (1000-9300)	Station 12B1 1.3 miles WSW	9300 (1/1) -	2800(5/5) (1500-3900)	0
	Be-7	-	290(19/45) (120-630)	Section 7B2 1.5 miles SE	630(1/3) -	LLD	0
	Ba-140	-	LLD			LLD	
	Co-58	-	LLD			LLD	
	Co-60	-	LLD			LLD	
	Cs-134	60	LLD			LLD	
	Fe-59	-	LLD			LLD	
	I-131	60	LLD			LLD	
	La-140	-	LLD			LLD	
	Nb-95	-	LLD			LLD	
	Mn-54	-	LLD			LLD	
	Zn-65	-	LLD			LLD	
	Zr-95	-	LLD			LLD	

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
(Page 10 of 12)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Algae (pCi/kg (dry))	Gamma Spec 32 K-40	-	12100(13/13) (7500-21000)	Station AG4 0.9 miles ESE	157000(6/6) (13000-21000)	10600(19/19) (1500-17000)	0
	Cs-137	-	220(5/13) (120-430)	Station AG4 0.9 miles ESE	280(3/6) (140-430)	220(3/19) (190-250)	0
	I-131	-	550(5/13) (270-890)	Section AG2 14 miles NE	7000(2/3) (2100-12000)	1800(11/19) (190-12000)	0
	Be-7	-	5200 (11/13) (680-10000)	Station AG2 14 miles ne	9300(3/3) (3800-13000)	6600(17/19) (700-13000)	0
	Mn-54	-	550(2/13) (400-690)	Station AG4 0.9 miles ESE	690(1/6) -	LLD	0
	Co-58	-	430(1/13) -	Section AG4 0.9 miles ESE	430(1/6) -	LLD	0
	Co-60	-	490(2/13) (250-740)	Station AG4 0.9 miles ESE	740(1/6) -	LLD	0
	Ra-226	-	3200(1/13) -	Station AG6 0.9 miles ESE	3200(1/7) -	6300(4/19) (3300-9500)	0
	Th-228	-	880(10/13) (570-1300	Station AG3 0.8 miles E	1600(3/6) (1100-2000)	1150(8/19) (620-2000)	0

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Game, Poultry and Eggs (pCi/kg (wet))	Gamma Spec 8						
	Cs-137	80	1600(5/8) (170-3900)	Station 15S 0.5-0.8 miles E	3900(1/1) -	Only Indicator locations sampled for this medium.	0
	K-40	-	2800(8/8) (1100-3800)	Station 2S 0.3-1.0 miles NNE	3800(1/1) -		0
	Ba-140	-	LLD				
	Co-58	-	LLD				
	Co-60	-	LLD				
	Cs-134	60	LLD				
	Fe-59	-	LLD				
	I-131	60	LLD				
	La-140	-	LLD				
	Mn-54	-	LLD				
	Nb-95	-	LLD				
	Zn-65	-	LLD				
	Zr-95	-	LLD				

Note: See footnotes at end of table.

TABLE 3

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1985

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 2 January 1985 to January 7, 1986
(Page 12 of 12)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Soil and Vegetation (pCi/kg (dry))	Gamma Spec 30 Cs-137	-	350(16/24) (100-950)	Station 7G1 14 miles SE	1950(2/3) (1700-2200)	1050(4/6) (110-2200)	0
	K-40	-	16000(24/24) (7400-50000)	Station 3D2 3.4 miles NE	23700(3/3) (10000-50000)	17000(6/6) (8400-30000)	
	Ra-226	-	(2500(12/24) (1400-7700)	Station 3D2 3.4 miles NE	5700(2/3) (3600-7700)	2000(4/6) (1700-2300)	
	Th-228	-	1260(16/24) (570-4300)	Station 3D2 3.4 miles NE	3250(2/3) (2200-4300)	1180(4/6) (1100-1300)	
	Be-7	-	4100(8/24) (1200-7200)	Station 12G3 15 miles WSW	10000(1/3) -	9950(2/6) (9900-10000)	

(1) LLD is lower limit of detection as defined and required in PP&L Technical Specifications. Typical LLD values can be found in table 19 in this report.

(2) (f) is the ratio of positive results to the number of samples analyzed for the parameter of interest. Means are of positive results only. Also given are the minimum and maximum values of detectable activity during the reporting period (RANGE).

X. REFERENCES

X. REFERENCES

1. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, Report #1 (April - December 1972)" RMC-TR-73-14, July 1973.

2. Radiation Management Corporation, "Susquehanna Steam Electric Station, Preoperational Radiological Environmental Monitoring Program 1973," RMC-TR-74-07, May 1974.

3. Radiation Management Corporation, "Susquehanna Steam Electric Station, Preoperational Radiological Environmental Monitoring Program, 1974 Annual Report," RMC-TR-75-07, April 1975.

4. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1975 Annual Report," RMC-TR-76-05, May 1976.

5. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1976 Annual Report," RMC-TR-77-04, March 1977.

6. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1977 Annual Report," RMC-TR-78-01, May 1978.

7. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1978 Annual Report," RMC-TR-79-01, April 1979.

8. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1979 Annual Report," RMC-TR-80-01, March 1980.

9. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1980 Annual Report," RMC-TR-81-02, July 1981.

10. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1981 Annual Report," RMC-TR-82-03, July 1982.

11. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1982 Preoperational Report," RMC-TR-83-01, April 1983.

12. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1982 Operational Report." RMC-TR-83-02, April 1983.

13. NUS Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1983 Annual Report," NUS-4516 March 1984.

14. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Environmental Report, Operating License Stage," May 1978.

15. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Final Safety Analysis Report," 1978.

16. United States Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, "Final Environmental Statement Related to the Operation of Susquehanna Steam Electric Station, Units 1 and 2," Docket Nos. 50-387 and 50-388, June 1981.

17. United States Nuclear Regulatory Commission, "An Acceptable Radiological Environmental Monitoring Program," Radiological Assessment Branch Technical Position, November 1979, Revision 1.

18. National Council on Radiation Protection and Measurements, "Environmental Radiation Measurement," NCRP Report No. 50, Washington, D.C., December 27, 1976.

19. Oakley, D.C., "Natural Radiation Exposure in the United States," ORP/SID 72-1 Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C., June 1972.

X. REFERENCES (continued)

20. Denham, D.H., Roberts, M.C., Novitsky, W.M., Testa, E.D., "Investigation of Elevated Cesium-137 Concentrations in Small Game in Luzerne County, Pennsylvania." Proceedings of Papers presented at Health Physics Society Tenth Midyear Topical Symposium, October 11-13, 1976, pgs 271-279.

21. Teledyne Isotopes, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1984 Annual Report," April 1985.

22. Currie L.A., "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements," NUREG/CR-4007, September 1984.

23. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Semi-annual Effluent Waste Disposal Report, Data Period: January - June 1985," August 1986.

24. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Semi-annual Effluent Waste Disposal Report, Data Period: July - December 1985," February 1986.

25. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Offsite Dose Calculation Manual," Docket nos. 50-387 and 50-388. November 22, 1985.

26. Pennsylvania Power and Light Company Technical Specifications Susquehanna Steam Electric Station, Units no. 1 and 2; Docket no. 50-387 and 50-388 Appendix A to License no. NPF-14, July 82 and NPF-22, March 84.

TABLE 5
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DIRECT RADIATION - THERMOLUMINESCENT DOSIMETRY (12) RESULTS
SSES 1985

(All results are in mR/day ± 2s)

LOCATION	QUARTER 1 01/02/85 to 04/04/85	QUARTER 2 04/01/85 to 07/03/85	QUARTER 3 07/01/85 to 10/03/85	QUARTER 4 10/01/85 to 01/03/86
7F1	0.18 ± 0.00	(2)	(2)	(2)
7G1	0.20 ± 0.02	0.21 ± 0.02	0.20 ± 0.01	0.20 ± 0.01
8S2	0.20 ± 0.02	0.20 ± 0.00	0.21 ± 0.01	0.20 ± 0.02
8A2(10)				0.20 ± 0.04
8B2	0.19 ± 0.00	0.18 ± 0.00	0.20 ± 0.01	0.18 ± 0.01
8D2	0.18 ± 0.01	(1)	(1)	
8D3(10)				0.19 ± 0.01(13)
9S2	0.25 ± 0.02	0.26 ± 0.01	0.25 ± 0.02	0.28 ± 0.01
9B1	0.17 ± 0.01	0.20 ± 0.05	0.20 ± 0.06	0.20 ± 0.00(4)
9D1	0.19 ± 0.01	0.19 ± 0.00	0.19 ± 0.01	0.20 ± 0.02
10S1	0.19 ± 0.01	0.19 ± 0.03	0.18 ± 0.02	0.19 ± 0.01
10S2(11)			0.25 ± 0.00	0.24 ± 0.03
10B2	0.16 ± 0.01	0.18 ± 0.06	0.15 ± 0.02	0.15 ± 0.02
10B3	0.17 ± 0.00	0.17 ± 0.04	0.16 ± 0.01	0.16 ± 0.01
10D2	0.19 ± 0.02	0.19 ± 0.01	0.20 ± 0.02	0.18 ± 0.02
11S2	0.17 ± 0.00	0.17 ± 0.02	0.16 ± 0.01	0.17 ± 0.00
11S3	0.26 ± 0.01	0.27 ± 0.01	0.25 ± 0.01	0.26 ± 0.01
11S6	0.17 ± 0.00	0.17 ± 0.01	0.18 ± 0.02	0.17 ± 0.01
11E1	0.17 ± 0.01	0.17 ± 0.02	0.16 ± 0.01	0.17 ± 0.01
12S3	0.23 ± 0.01	0.23 ± 0.01	0.23 ± 0.01	0.24 ± 0.01
12B4	0.18 ± 0.01	0.18 ± 0.00	0.20 ± 0.03	0.18 ± 0.01
12D3	0.21 ± 0.01	0.22 ± 0.03	0.20 ± 0.01	0.20 ± 0.01
12E1	0.19 ± 0.03	0.19 ± 0.01	0.19 ± 0.01	0.19 ± 0.01
12F2	0.20 ± 0.01	0.21 ± 0.02	0.21 ± 0.05	0.20 ± 0.01
12G1	0.16 ± 0.01	0.16 ± 0.02	0.15 ± 0.01	0.16 ± 0.01
12G4	0.20 ± 0.01	0.19 ± 0.02	0.20 ± 0.01	0.20 ± 0.01
13S2	0.20 ± 0.01	0.24 ± 0.01	0.21 ± 0.03	0.21 ± 0.01
13S4(11)			0.26 ± 0.02	0.25 ± 0.01
13S5(11)			0.25 ± 0.01	0.24 ± 0.01
13E4	0.21 ± 0.02	0.20 ± 0.00	0.19 ± 0.01	0.21 ± 0.01
14S5	0.23 ± 0.01	0.22 ± 0.02	0.22 ± 0.02	0.22 ± 0.01
14S6(10)				(2)
14E1	0.20 ± 0.01	0.21 ± 0.03	0.21 ± 0.01	0.19 ± 0.01
15S3/16S2	0.22 ± 0.03	0.22 ± 0.01	0.24 ± 0.05(7)	0.21 ± 0.02
15S4	0.17 ± 0.01	0.17 ± 0.00	0.19 ± 0.03(5)	0.17 ± 0.01
15S5(11)			0.21 ± 0.01	0.22 ± 0.03
15A3	0.20 ± 0.01	0.20 ± 0.02	0.19 ± 0.01	0.20 ± 0.02

See foot notes at end of table

TABLE 5
(Page 1 of 3)

DIRECT RADIATION - THERMOLUMINESCENT DOSIMETRY (12) RESULTS
SSES 1985

(All results are in mR/day ± 2s)

LOCATION	QUARTER 1 01/02/85 to 04/04/85	QUARTER 2 04/01/85 to 07/03/85	QUARTER 3 07/01/85 to 10/03/85	QUARTER 4 10/01/85 to 01/03/86
1S2	0.20 ± 0.01	0.20 ± 0.01	0.20 ± 0.02	0.21 ± 0.01
1A1	0.19 ± 0.00	Station Destroyed	Station Destroyed	Station Destroyed
1D2	0.20 ± 0.01	0.21 ± 0.02	0.19 ± 0.00	0.20 ± 0.02
1E1	0.18 ± 0.01	0.18 ± 0.04	0.17 ± 0.01	0.17 ± 0.01
2S2	0.18 ± 0.01	0.17 ± 0.01	0.18 ± 0.02	0.17 ± 0.00(4)
2S3	0.19 ± 0.01	0.20 ± 0.01	0.24 ± 0.03	0.20 ± 0.01
2B3	0.19 ± 0.01	0.19 ± 0.02	0.19 ± 0.02	0.20 ± 0.02
2F1	0.19 ± 0.01	0.19 ± 0.02	0.20 ± 0.05	0.19 ± 0.02
3S3	0.17 ± 0.01	0.16 ± 0.01	0.19 ± 0.06	0.18 ± 0.02
3S4	0.19 ± 0.01	0.18 ± 0.02	0.20 ± 0.02	0.18 ± 0.01
3D1	0.22 ± 0.00	0.22 ± 0.02	0.22 ± 0.02	0.21 ± 0.00
3F1	0.18 ± 0.01	0.19 ± 0.01	0.18 ± 0.02(5)	0.17 ± 0.01
3G3	0.21 ± 0.02	0.20 ± 0.01	0.20 ± 0.02	0.21 ± 0.01
3G4	0.20 ± 0.01	0.20 ± 0.00(4)	0.18 ± 0.01	0.19 ± 0.01
4S1	0.16 ± 0.00	0.16 ± 0.01	0.15 ± 0.00(4)	0.16 ± 0.01
4S3	0.21 ± 0.01	0.19 ± 0.02	0.21 ± 0.00	0.21 ± 0.01
4E1	0.19 ± 0.02	0.20 ± 0.01	0.19 ± 0.00(4)	0.19 ± 0.01
4G1	0.20 ± 0.01	0.23 ± 0.02(4)	0.21 ± 0.00	0.22 ± 0.01
5S1	0.16 ± 0.00	0.16 ± 0.02	0.16 ± 0.01	0.16 ± 0.01
5S4	0.18 ± 0.00	0.21 ± 0.09	0.19 ± 0.01	0.18 ± 0.01
5S7	0.19 ± 0.02	0.18 ± 0.01	0.17 ± 0.02	0.18 ± 0.01
5E2	0.20 ± 0.02	0.21 ± 0.02	0.20 ± 0.01(4)	0.19 ± 0.01
6S4	0.23 ± 0.01	0.22 ± 0.02	0.24 ± 0.04(5)	0.22 ± 0.01
6A3	0.21 ± 0.01	0.20 ± 0.01(4)	0.21 ± 0.01	0.20 ± 0.00(3)
6A4				0.21 ± 0.02(3)
6E1	0.22 ± 0.01	0.22 ± 0.02(4)	0.22 ± 0.01	0.22 ± 0.02
7S1/6S8	0.18 ± 0.01	0.17 ± 0.00	0.18 ± 0.03(8)	0.18 ± 0.00
7S3/6S9	0.21 ± 0.01	0.21 ± 0.00	0.22 ± 0.04(9)	0.20 ± 0.01
7S6(11)			0.20 ± 0.04	0.19 ± 0.01
7A1	0.18 ± 0.02	0.18 ± 0.01	0.19 ± 0.00	0.19 ± 0.01
7A2(10)				0.20 ± 0.01
7B3	0.20 ± 0.03	0.18 ± 0.01	0.21 ± 0.03	0.22 ± 0.07
7E1	0.21 ± 0.02	0.20 ± 0.02	0.21 ± 0.00	0.21 ± 0.01

See foot notes at end of table

DIRECT RADIATION - THERMOLUMINESCENT DOSIMETRY (12) RESULTS
SSES 1985

(All results are in mR/day ± 2s)

LOCATION	QUARTER 1 01/02/85 to 04/04/85	QUARTER 2 04/01/85 to 07/03/85	QUARTER 3 07/01/85 to 10/03/85	QUARTER 4 10/01/85 to 01/03/86
15F1	0.20 ± 0.01	0.22 ± 0.01(4)	0.20 ± 0.01	0.28 ± 0.00(4)
16S1	0.21 ± 0.02	0.20 ± 0.01	0.21 ± 0.01	0.21 ± 0.02
16A2	0.17 ± 0.02	0.20 ± 0.05	0.17 ± 0.01	0.17 ± 0.00
16B1	0.17 ± 0.02	0.20 ± 0.00(4)	0.18 ± 0.03	0.17 ± 0.02
16F1	0.20 ± 0.01	0.20 ± 0.01	0.20 ± 0.01	0.23 ± 0.02
7H1	0.13 ± 0.00	0.13 ± 0.00	0.12 ± 0.01	0.12 ± 0.00
Average(6)	0.19 ± 0.04	0.20 ± 0.05	0.20 ± 0.05	0.20 ± 0.06

(1) TLD and location destroyed; replaced by station 8D3.
(2) TLD Vandalized
(3) Location 6A3 moved to 6A4 on 11/12/85.
(4) Mean is average of 2 TLD elements.
(5) Mean is average of 3 TLD elements.
(6) Errors of row averages are two standard deviations calculated from the mean of each..
(7) Location code was changed to 16S2 July 1985.
(8) Location code was changed to 6S8 July 1985.
(9) Location code was changed to 6S9 July 1985.
(10) New location in October 1985
(11) New location in July 1985
(12) Errors for individual measurements are two standard deviations of the average of four readings per station.
(13) TLD vandalized in October; reinstalled 10/15/85

TABLE 6

(Page 1 of 5)

GROSS ALPHA, GROSS BETA, TRITIUM, IODINE-131 AND GAMMA* SPECTROMETRY OF WATER
(SURFACE AND DRINKING)
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Gr-Beta	H-3	I-131(3)	K-40	Ra-226	Th-228	Cs-137	Other
6S6	01/07/85-02/11/85	LT 2	2.7 ± 1.2	140 ± 40						
5S8	01/14/85-02/11/85	LT 2	3.7 ± 1.2	110 ± 50						
1D3	01/08/85	LT 1	3.2 ± 0.9	89 ± 40						
6S7	01/07/85-02/11/85(5a)	LT 2	9.7 ± 1.8	320 ± 40						Cr-51 98 ± 58
6S5	01/14/85-02/11/85	LT 2	3.0 ± 1.2	LT 50		78 ± 64				
12F1	01/08/85	LT 1	1.8 ± 0.7	81 ± 41						
12G2	01/08/85	LT 2	4.2 ± 1.0	160 ± 30						
12H1	01/07/85-02/11/85	LT 2	15 ± 2	89 ± 46		25 ± 21				
LTAW	01/08/85	LT 2	3.9 ± 1.0	130 ± 40					3.1 ± 2.5	
LTAW Dup.	01/08/85	LT 2	4.2 ± 1.1	140 ± 40						
12H2 R(1)	01/07/85-02/11/85(6a)	LT 1	2.0 ± 0.8	130 ± 40						
12H2 T(1)	01/07/85-02/11/85	LT 1	2.2 ± 0.8	130 ± 40						
6S6	02/11/85-03/11/85	LT 1	2.4 ± 0.8	140 ± 50	LT 0.5(2)	23 ± 25				
5S8	02/19/85-03/11/85	LT 0.9	3.2 ± 0.8	150 ± 50	LT 0.5(2)	98 ± 68				
1D3	02/12/85	LT 2	3.2 ± 1.3	100 ± 40						
6S7	02/11/85-03/11/85	LT 2	6.8 ± 1.2	110 ± 40	LT 0.5(2)					
6S5	02/19/85-03/11/85	LT 1	3.0 ± 0.8	LT 50	LT 0.4(2)					
12F1	02/12/85	LT 2	3.8 ± 1.3	74 ± 41						
12G2	02/12/85	LT 2	10 ± 2	190 ± 40						
12H1	02/11/85-03/11/85	LT 1	2.8 ± 0.8	90 ± 44	LT 0.2(2)	230 ± 50				
LTAW	02/12/85	LT 2	5.8 ± 1.5	99 ± 40					6.1 ± 3.8	
12F1 Split	02/12/85	LT 2	2.9 ± 1.2	96 ± 38						
12H2 R	02/11/85-03/11/85	LT 1	2.8 ± 0.8	110 ± 40	LT 0.5(2)	78 ± 58				
12H2 T	02/11/85-03/11/85	LT 1	2.4 ± 0.8	150 ± 40	LT 0.5(2)					
6S6	03/11/85-04/08/85	LT 0.8	6.7 ± 1.0	110 ± 50						
5S8	03/18/85-04/08/85	LT 0.9	2.0 ± 0.8	99 ± 40	LT 0.2(2)	62 ± 37				
1D3	03/12/85	LT 1	4.3 ± 0.9	84 ± 48	LT 0.2(2)					
6S7	03/11/85-04/08/85	LT 1	4.1 ± 0.9	380 ± 50						
6S5	03/18/85-04/08/85	LT 0.9	2.2 ± 0.8	LT 50						
12F1	03/12/85	LT 0.9	3.6 ± 0.8	110 ± 40	LT 0.2(2)					
12G2	03/12/85	2.4 ± 1.5	6.2 ± 1.1	140 ± 50	LT 0.3(2)	38 ± 33				
12H1	03/11/85-04/08/85	LT 1	1.5 ± 0.7	120 ± 50						
LTAW	03/12/85	LT 1	4.3 ± 1.0	140 ± 40	LT 0.2(2)					
12G2 Split	03/12/85	2.4 ± 1.5	7.3 ± 1.1	180 ± 40	LT 0.2(2)					
12H2 R	03/11/85-04/08/85	LT 0.9	1.9 ± 0.7	68 ± 31						
12H2 T	03/11/85-04/08/85	LT 1	1.8 ± 0.7	100 ± 40						

See footnotes at end of table.

TABLE 6

(Page 2 of 5)

GROSS ALPHA, GROSS BETA, TRITIUM, IODINE-131 AND GAMMA* SPECTROMETRY OF WATER
(SURFACE AND DRINKING)
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Gr-Beta	H-3	I-131(3)	K-40	Ra-226	Th-228	Cs-137	Other
6S6	04/08/85-05/13/85	LT 1	1.4 ± 0.8	120 ± 50		34 ± 23				
5S8	04/15/85-05/13/85	LT 1	1.4 ± 0.8	100 ± 40					4.0 ± 3.6	
1D3	04/09/85	LT 2	1.7 ± 0.7	80 ± 45						
6S7	04/08/85-05/13/85	LT 2	3.5 ± 1.0	370 ± 50		44 ± 26				
6S5	04/15/85-05/13/85	LT 1	1.5 ± 0.8	150 ± 50						
12F1	04/09/85	LT 1	1.8 ± 0.7	120 ± 40						
12G2	04/09/85	LT 0.8	1.4 ± 0.7	120 ± 40		17 ± 19				
12H1	04/08/85-05/13/85	LT 1	LT 1	120 ± 40						
LTAW	04/09/85	LT 2	4.5 ± 1.1	230 ± 50						
5S8 Dup.	04/15/85-05/13/85	LT 1	LT 1	94 ± 43						
12G2 Split	04/09/85	LT 0.8	2.3 ± 0.8	120 ± 40						
12H1 Split	04/08/85-05/13/85	LT 1	1.8 ± 0.8	100 ± 50						
12H2 R	04/08/85-05/13/85	LT 2	3.4 ± 1.0	LT 70						
12H2 T	04/08/85-05/13/85	LT 1	2.3 ± 0.9	59 ± 36		37 ± 29				
6S6	05/13/85-06/10/85	LT 1	2.3 ± 0.8	150 ± 50		29 ± 22				
5S8	05/20/85-06/10/85	LT 1	2.6 ± 0.9	150 ± 50						
1D3	05/14/85	LT 2	LT 1	120 ± 40						
6S7	05/13/85-06/10/85	2.2 ± 2.1	12 ± 2	1900 ± 100						Co-60 6.1 ± 2.0 Mn-54 7.5 ± 2.0
6S5	05/20/85-06/10/85	LT 1	2.6 ± 0.8	140 ± 70						
12F1	05/14/85	LT 2	2.3 ± 0.9	90 ± 42						
12G2	05/14/85	LT 2	2.1 ± 0.8	120 ± 40	0.12 ± 0.06					
12H1	05/13/85-06/10/85	LT 1	1.8 ± 0.8	380 ± 60						
LTAW	05/14/85	LT 2	3.4 ± 1.0	89 ± 33						
6S5 Dup.	05/20/85-06/10/85	LT 1	2.5 ± 0.8	66 ± 29						
12H2 R	05/13/85-06/10/85	LT 1	2.3 ± 0.8	110 ± 40						
12H2 T	05/13/85-06/10/85	LT 1	2.3 ± 0.8	LT 60						
6S6	06/10/85-07/08/85(4b)	LT 2	2.2 ± 1.0	140 ± 40						
5S8	06/18/85-07/08/85	LT 2	1.6 ± 1.0	99 ± 31						
1D3	06/11/85	LT 1	3.1 ± 0.9	120 ± 30						
6S7	06/10/85-07/08/85	LT 1	4.7 ± 1.4	670 ± 60						Co-60 2.4 ± 1.3 Mn-54 1.6 ± 1.7
6S5	06/18/85-07/08/85	LT 2	2.2 ± 1.0	120 ± 50						
12F1	06/11/85	LT 1	3.3 ± 0.9	130 ± 70						
12G2	06/11/85	LT 1	3.2 ± 0.9	390 ± 70						
12H1	06/10/85-07/08/85	LT 2	2.9 ± 0.9	120 ± 40		24 ± 21				
LTAW	06/11/85	LT 2	3.3 ± 0.9	290 ± 60						
5S8 Dup.	06/18/85-07/08/85	LT 2	2.4 ± 1.0	120 ± 40						
12H2 R	06/10/85-07/08/85	LT 1	1.8 ± 0.9	120 ± 40						
12H2 T	06/10/85-07/08/85	LT 0.9	1.5 ± 0.8	75 ± 32						

See footnotes at end of table.

TABLE 6

(Page 3 of 5)

GROSS ALPHA, GROSS BETA, TRITIUM, IODINE-131 AND GAMMA* SPECTROMETRY OF WATER
(SURFACE AND DRINKING)
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Gr-Beta	H-3	I-131(3)	K-40	Ra-226	Th-228	Cs-137	Other
6S6	07/08/85-08/12/85(4c)	LT 2	2.2 ± 0.9	140 ± 60						
5S8	07/15/85-08/12/85	LT 1	3.4 ± 0.9	140 ± 80						
1D3	07/09/85	LT 2	1.7 ± 1.0	130 ± 40	LT 0.2					
6S7	07/08/85-08/12/85	LT 3	9.2 ± 1.6	420 ± 120						
6S5	07/15/85-08/12/85	LT 1	2.7 ± 0.9	270 ± 80						
12F1	07/09/85	LT 2	3.3 ± 1.0	84 ± 39						
12G2	07/09/85	LT 2	3.4 ± 1.0	200 ± 40						
12H1	07/08/85-08/12/85	LT 1	3.2 ± 0.9	150 ± 70						
LTAW	07/09/85	LT 2	2.7 ± 1.1	160 ± 70						
6S5 Dup.	07/15/85-08/12/85	LT 1	2.9 ± 0.9	240 ± 70						
12H2 R	07/08/85-08/12/85(6b)	1.3 ± 0.6	2.5 ± 1.0	130 ± 80						
12H2 T	07/08/85-08/12/85	LT 0.7	2.8 ± 1.1	130 ± 60		32 ± 27				
6S6	08/12/85-09/09/85(4a)	LT 1	3.0 ± 0.9	LT 90						
5S8	08/19/85-09/09/85	1.1 ± 1.1	2.1 ± 0.8	LT 100	0.16 ± 0.08					
1D3	08/13/85	LT 2	3.7 ± 1.0	180 ± 80						
6S7	08/12/85-09/09/85(5b)	2.1 ± 1.4	12 ± 2	230 ± 120	0.25 ± 0.10					Zn-65 4.6 ± 2.8
6S5	08/19/85-09/09/85	LT 1	3.5 ± 1.0	LT 100		36 ± 23				
12F1	08/13/85	LT 1	4.4 ± 1.0	210 ± 70						
12G2	08/13/85	LT 1	4.2 ± 1.0	140 ± 70						
12H1	08/12/85-09/09/85	LT 1	2.9 ± 0.9	LT 100						
LTAW	08/13/85	LT 2	5.0 ± 1.1	340 ± 110						
5S8 Dup.	08/19/85-09/09/85	1.9 ± 1.4	5.8 ± 1.1	LT 100	0.12 ± 0.07					
12H2 R	08/12/85-09/09/85	1.2 ± 1.1	2.5 ± 0.9	LT 100						
12H2 T	08/12/85-09/09/85	LT 1	3.1 ± 0.9	LT 100						
12H2 R Split	08/12/85-09/09/85	LT 1	2.8 ± 0.9	LT 100						
6S6	09/09/85-10/07/85	LT 1	4.1 ± 1.0	93 ± 47						
5S8	09/16/85-10/07/85	LT 0.9	2.1 ± 0.7	LT 90						
1D3	09/10/85	LT 1	3.7 ± 1.0	110 ± 60	0.36 ± 0.07					
6S7	09/09/85-10/07/85(5c)	1.6 ± 1.3	12 ± 2	140 ± 40						
6S5	09/16/85-10/07/85	LT 1	7.2 ± 1.2	120 ± 40						
12F1	09/10/85	LT 1	4.0 ± 1.0	140 ± 80	0.18 ± 0.08					
12G2	09/10/85	LT 1	3.7 ± 1.0	120 ± 70						
12H1	09/09/85-10/07/85	1.3 ± 1.1	3.4 ± 0.9	92 ± 51						
LTAW	09/10/85	1.4 ± 1.3	4.8 ± 1.1	150 ± 50						
LTAW Split	09/10/85	LT 1	2.8 ± 1.0	140 ± 70						
6S5 Dup.	09/16/85-10/07/85	LT 1	4.1 ± 1.0	85 ± 52						
6S5 Split	09/16/85-10/07/85	LT 2	5.2 ± 1.0	LT 70						
12H2 R	09/09/85-10/07/85	1.1 ± 1.0	2.7 ± 0.8	LT 100						
12H2 T	09/09/85-10/07/85	LT 1	3.4 ± 0.9	LT 100						
12H2 T Split	09/09/85-10/07/85	1.1 ± 1.1	2.8 ± 0.8	LT 100		25 ± 24			2.9 ± 2.7	

See footnotes at end of table.

TABLE 6

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GROSS ALPHA, GROSS BETA, TRITIUM, IODINE-131 AND GAMMA* SPECTROMETRY OF WATER
(SURFACE AND DRINKING)
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Gr-Beta	H-3	I-131(3)	K-40	Ra-226	Th-228	Cs-137	Other
6S6	10/07/85-11/11/85(4d)	LT 2	2.0 ± 0.9	98 ± 45						
5S8	10/14/85-11/11/85	LT 2	3.1 ± 1.0	85 ± 40						
1D3	10/08/85	LT 1	3.6 ± 0.9	LT 80						
6S7	10/07/85-11/11/85(5d)	LT 2	7.9 ± 1.3	110 ± 50	0.26 ± 0.09					
6S5	10/14/85-11/11/85	LT 2	2.9 ± 0.9	LT 70	0.16 ± 0.10					
12F1	10/08/85	1.6 ± 1.2	3.0 ± 0.8	76 ± 42						
12G2	10/08/85	LT 1	3.1 ± 0.8	78 ± 40						
12H1	10/07/85-11/11/85	LT 2	2.3 ± 0.9	79 ± 42						
LTAW	10/08/85	1.5 ± 1.3	5.1 ± 1.0	140 ± 40						
6S6 Split	10/07/85-11/11/85	LT 2	2.4 ± 0.9	LT 80						
12H2 R	10/07/75-11/11/85	LT 2	2.4 ± 0.9	LT 70						
12H2 T	10/07/85-11/11/85	LT 2	1.7 ± 0.9	95 ± 49						
6S6	11/11/85-12/09/85	LT 1	2.1 ± 0.7	64 ± 40						
5S8	11/18/85-12/09/85	LT 1	4.5 ± 0.9	LT 50						
1D3	11/12/85	LT 2	2.6 ± 1.0	LT 80	0.15 ± 0.08					
6S7	11/11/85-12/09/85(5e)	LT 2	10 ± 1	240 ± 30						
6S5	11/18/85-12/09/85	LT 0.9	2.9 ± 0.7	74 ± 44						
12F1	11/12/85	LT 1	3.8 ± 0.9	LT 70						
12G2	11/12/85	LT 2	2.6 ± 0.9	120 ± 50	0.21 ± 0.10					
12H1	11/11/85-12/09/85	LT 1	2.9 ± 0.8	95 ± 36						
LTAW	11/12/85	LT 2	3.9 ± 1.0	100 ± 50				27 ± 8		
5S8 Split	11/18/85-12/09/85	LT 0.9	3.6 ± 0.8	LT 50						
6S7 Split	11/11/85-12/09/85(5e)	LT 2	9.8 ± 1.5	240 ± 50						
12H2 R	11/11/85-12/09/85	LT 0.9	2.1 ± 0.7	LT 60						
12H2 T	11/11/85-12/09/85	LT 1	2.3 ± 0.7	LT 60						
6S6	12/09/85-01/06/86	LT 1	2.6 ± 0.8	81 ± 39						
5S8	12/16/85-01/06/86	LT 0.9	2.5 ± 0.8	LT 70	0.40 ± 0.08					
1D3	12/10/85	LT 1	1.6 ± 0.7	76 ± 37						
6S7	12/09/85-01/06/86(5f)	LT 2	9.7 ± 1.5	2600 ± 100						
6S5	12/16/85-01/06/86	LT 1	2.9 ± 0.8	LT 70	0.42 ± 0.11					
12F1	12/10/85	LT 0.9	1.9 ± 0.7	77 ± 39		41 ± 36				
12G2	12/10/85	LT 0.9	2.6 ± 0.7	LT 70		37 ± 30				
12H1	12/09/85-01/06/86	LT 0.4	2.6 ± 0.6	LT 60						
LTAW	12/10/85	LT 1	2.6 ± 0.8	83 ± 42						
1D3 Split	12/10/85	LT 0.9	1.5 ± 0.6	LT 60						
12H2 R	12/09/85-01/06/86	LT 1	3.0 ± 0.9	59 ± 37						
12H2 T	12/09/85-01/06/86	LT 1	2.7 ± 0.8	69 ± 40						

See footnotes at end of table.

TABLE 6

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GROSS ALPHA, GROSS BETA, TRITIUM, IODINE-131 AND GAMMA* SPECTROMETRY OF WATER
(SURFACE AND DRINKING)
SSES 1985

(Results in pCi/ℓ ± 2 s)

Footnotes

(1) 12H2R and 12H2T - Drinking Water - Nearest supply downstream of plant discharge.
(2) Used 2ℓ instead of 4ℓ. Lower sensitivity due to reduced sample volume.
(3) I-131 determined by radiochemical methods. See appendix B-5. All values are less than 0.1 pCi/ℓ unless noted.
(4) Location 6S6 deviations:
  a.) Sampler malfunctioned (overflowed) 08/29/85 and 09/03/85
  b.) Sampler malfunctioned (overflowed) 07/08/85
  c.) Sampler malfunctioned (overflowed) 08/02/85
  d.) Sampler malfunctioned (overflowed) 10/14/85, 10/21/85, 11/04/85 and 11/11/85.
  (* 11/14/85 spring installed on solenoid to mitigate the above malfunctions)
(5) Location 6S7 deviations:
  a.) Water line froze 01/21/85-01/24/85
  b.) Sampler pump out of service 08/14/85-08/15/85
  c.) Sampler out of service 09/23/85-09/25/85 for drain line modifications (Rad Waste discharge terminated during outage); overflowed 09/26/85
  d.) Sampler malfunctioned (overflowed) 10/28/85
  e.) Sampler out of service 11/21/85 due to construction activities. (Rad Waste discharge terminated during outage.)
  f.) Sampler out of service 12/13/85-12/19/85 and 01/01/86-01/02/86 due to construction activities; New pump installed 12/19/85.
(6) Location 12H2R deviations:
  a.) Water line frozen 01/21/85-01/22/85
  b.) No water to sampler 08/05/85-08/08/85

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.

TABLE 7

GAMMA* SPECTROMETRY OF ALGAE
SSES 1985

(Results in Units of pCi/g (Dry) ± 2 s)

LOCATION	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-137	Ra-226	Th-228
AG-3	04/11/85-05/13/85	9.3 ± 2.4	14 ± 3				0.63 ± 0.45			
AG-4	04/11/85-05/13/85	7.0 ± 2.1	13 ± 3				0.37 ± 0.37			
AG-5	04/12/85-05/13/85	3.3 ± 0.9	8.6 ± 1.5				0.27 ± 0.18			0.98 ± 0.13
AG-6	04/12/85-05/13/85	2.9 ± 0.8	8.9 ± 1.4				0.33 ± 0.16			1.3 ± 0.1
AG-3	(a)									
AG-4	05/13/85-06/10/85	10.0± 2.1	15 ± 2					0.43 ± 0.13		
AG-5	05/13/85-06/10/85	2.1 ± 0.7	9.1 ± 1.4							0.68 ± 0.16
AG-6	05/13/85-06/10/85	2.2 ± 0.6	7.7 ± 1.3	0.40 ± 0.09		0.25 ± 0.09		0.16 ± 0.07		0.96 ± 0.15
AG-3	06/21/85-07/08/85	11.0± 2	17 ± 3							
AG-4	06/10/85-07/08/85	8.9 ± 1.8	21 ± 3	0.69 ± 0.24	0.43 ± 0.22	0.74 ± 0.30				0.97 ± 0.27
AG-5	06/10/85-07/08/85	0.97± 0.44	9.8 ± 1.3							0.79 ± 0.09
AG-6	06/10/85-07/08/85	1.5 ± 0.8	12 ± 2					0.12 ± 0.10	3.2 ± 1.5	0.63 ± 0.10
AG-1	07/26/85-08/13/85		1.5 ± 1.4							
AG-2	07/26/85-08/13/85	11 ± 2	5.0 ± 1.6						7.7 ± 3.8	
AG-3	07/08/85-08/12/85	13 ± 2	14 ± 3				0.38 ± 0.28	0.19 ± 0.17		1.6 ± 0.4
AG-4	07/08/85-08/12/85	7.9 ± 1.0	13 ± 2				0.27 ± 0.15	0.14 ± 0.10		0.59 ± 0.10
AG-5	07/08/85-08/12/85	1.5 ± 0.8	7.3 ± 1.5							
AG-6	07/08/85-08/12/85	0.68± 0.50	7.5 ± 1.1							0.63 ± 0.07
AG-1	08/13/85-09/09/85	9.6 ± 1.7	13 ± 3				0.85 ± 0.36			
AG-2	08/13/85-09/09/85	13 ± 1	14 ± 2				2.1 ± 0.3	0.25 ± 0.13		
AG-3	08/12/85-09/09/85	10 ± 2	15 ± 3				1.4 ± 0.5			
AG-4	08/12/85-09/09/85	8.2 ± 1.5	17 ± 3				0.89 ± 0.03			0.57 ± 0.11
AG-5	08/12/85-09/09/85	0.70± 0.54	8.1 ± 1.1				0.19 ± 0.13		3.3 ± 1.2	0.62 ± 0.08
AG-6	08/12/85-09/09/85		9.9 ± 1.6							
AG-1	(b)									
AG-2	(b)									
AG-3	09/09/85-10/07/85	3.6 ± 1.4	16 ± 2				0.40 ± 0.23			2.0 ± 0.3
AG-4	(b)									
AG-5	09/09/85-10/07/85		7.8 ± 1.4						4.6 ± 1.5	1.4 ± 0.1
AG-6	09/09/85-10/07/85		8.9 ± 9.6							1.0 ± 0.2
AG-1	10/09/85-11/11/85	7.9 ± 2.5	14 ± 3							
AG-2	10/09/85-11/11/85	3.8 ± 1.3	6.4 ± 2.7				12 ± 1			
AG-3	10/07/85-11/11/85	5.7 ± 1.5	12 ± 2				1.3 ± 0.3	0.22 ± 0.16		1.1 ± 0.3
AG-4	10/09/85-11/11/85	6.6 ± 1.8	15 ± 3				0.89 ± 0.29	0.26 ± 0.17		1.3 ± 0.3
AG-5	10/07/85-11/14/85	6.2 ± 1.8	8.8 ± 3.9				0.49 ± 0.36		9.5 ± 3.9	
AG-6	10/07/85-11/14/85	1.2 ± 0.6	8.3 ± 1.1							0.84 ± 0.09

(a) Vandalized
(b) High Water
* Only gamma emitters detected are reported; typical LLD values can be found on Table 19.

TABLE 8

GROSS BETA AND GAMMA* SPECTROMETRY OF FISH
SSES 1985

(Results in pCi/g (wet) ± 2 s)

SAMPLE TYPE	LOCATION	COLLECTION DATE	Gr. Beta	K-40	Cs-137	Ra-226	Th-228
Small Mouth Bass	2H	05/09/85	7.9 ± 0.3	3.8 ± 0.4			
Walleye	2H	05/09/85	7.3 ± 0.2	3.9 ± 0.4			
Channel Catfish	2H	05/10/85	5.9 ± 0.2	3.5 ± 0.4	0.012 ± 0.010		
Small Mouth Bass	IND	05/07/85	5.3 ± 0.1	3.1 ± 0.3			
Walleye	IND	05/07/85	6.3 ± 0.2	4.5 ± 0.5	0.013 ± 0.009		
Channel Catfish	IND	05/11/85	5.6 ± 0.2	3.0 ± 0.3			
Large Mouth Bass	LTAW	04/30/85	4.7 ± 0.1	3.7 ± 0.4			
Channel Catfish	LTAW	04/30/85	5.5 ± 0.2	3.8 ± 0.4			
White Sucker	2H	10/10/85	6.8 ± 0.2	3.9 ± 0.4			
Walleye	2H	10/10/85	5.6 ± 0.1	3.8 ± 0.4	0.007 ± 0.006		
Channel Catfish	2H	10/11/85	7.1 ± 0.2	3.4 ± 0.3			
White Sucker	IND	10/16/85	7.8 ± 0.2	4.3 ± 0.4			
Walleye	IND	10/19/85	5.8 ± 0.1	4.0 ± 0.4			
Channel Catfish	IND	10/24/85	6.1 ± 0.2	3.2 ± 0.3			
Channel Catfish (Dup)	IND	10/24/85	5.8 ± 0.1	3.3 ± 0.3			
Large Mouth Bass	LTAW	10/14/85	3.0 ± 0.1	3.1 ± 0.3	0.009 ± 0.006		
Channel Catfish	LTAW	10/14/85	6.1 ± 0.1	4.2 ± 0.4			

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.

TABLE 9

GROSS ALPHA, GROSS BETA AND GAMMA* SPECTROMETRY OF SEDIMENT SHORELINE
SSES 1985

(Results in Units of pCi/g (dry) ± 2 s)

LOCATION	COLLECTION DATE	Gr-Alpha	Gr-Beta	Be-7	K-40	Mn-54	Co-60	Cs-137	Ra-226	Th-228	OTHER
2B	05/31/85	13 ± 6	27 ± 3		12 ± 1				1.7 ± 0.7	1.6 ± 0.2	
2F	05/31/85	16 ± 6	23 ± 2	0.33 ± 0.17	9.1± 0.9			0.18 ± 0.02	1.8 ± 0.4	1.1 ± 0.1	
7B	05/31/85	17 ± 6	20 ± 2	0.70 ± 0.42	17 ± 2			0.27 ± 0.06	2.7 ± 0.8	1.8 ± 0.2	
11C	05/31/85	6.6± 4.4	21 ± 2		10 ± 1	0.10 ± 0.05		0.14 ± 0.05	1.9 ± 0.7	0.99± 0.1	
12F	05/31/85	14 ± 6	22 ± 3	1.4 ± 0.3	12 ± 1	0.73 ± 0.07	0.42 ± 0.04	0.13 ± 0.03	2.3 ± 0.5	1.4 ± 0.1	0.15 ± 0.03 Co-58
LTAW	05/31/85	7.6± 4.8	30 ± 3		13 ± 1			0.08 ± 0.03	1.8 ± 0.6	1.3 ± 0.1	
7B-Duplicate	05/31/85	14 ± 6	39 ± 3	0.83 ± 0.43	17 ± 2			0.22 ± 0.05	2.4 ± 0.8	1.5 ± 0.2	
2B	11/06/85	7.6± 5.1	33 ± 3	0.96 ± 0.39	14 ± 1			0.25 ± 0.03	2.1 ± 0.7	1.5 ± 0.2	
2F	11/05/85	13 ± 6	35 ± 3	0.96 ± 0.45	15 ± 2			0.19 ± 0.04	2.8 ± 0.7	1.4 ± 0.1	
7B	11/06/85	15 ± 6	38 ± 3	1.7 ± 0.4	18 ± 2			0.38 ± 0.05	2.8 ± 0.7	2.0 ± 0.2	
11C	11/05/85	LT 5.	17 ± 2		7.7± 0.8			0.04 ± 0.03	1.2 ± 0.5	0.74± 0.07	
12F	11/05/85	LT 5.	17 ± 2	0.30 ± 0.25	8.8± 0.9	0.03 ± 0.02		0.06 ± 0.03	1.2 ± 0.5	0.80± 0.08	
LTAW	11/05/85	8.6± 5.3	32 ± 3		15 ± 2					1.5 ± 0.2	
11C Split	11/05/85	LT 5.	15 ± 2		8.0± 0.8			0.06 ± 0.03	1.3 ± 0.4	0.72± 0.07	
LTAW Split	11/05/85	5.6± 4.7	31 ± 3		19 ± 2				1.5 ± 0.5	1.4 ± 0.1	

* Only gamma emitters detected are reported; typical LLD values are found on table 19.

TABLE 10

(Page 1 of 3)

GROSS ALPHA, GROSS BETA, TRITIUM AND GAMMA* SPECTROMETRY IN GROUND (WELL) WATER
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Alpha	Gr-Beta	Tritium	K-40	Ra-226	Th-228	Cs-137
12F3	01/08/85	LT 2	2.1 ± 1.2	94 ± 38				
2S6	01/08/85	LT 1	LT 1	130 ± 40				
3S5	(1)							
4S2	01/08/85	LT 1	1.9 ± 0.8	79 ± 31				
4S4	01/08/85	LT 2	LT 1	88 ± 44				
11S5	01/08/85	LT 2	LT 1	88 ± 41				
15A4	01/08/85	LT 0.9	5.7 ± 0.9	LT 40				
12E4	01/08/85	LT 0.8	1.1 ± 0.6	100 ± 40				
2S6 Split	01/08/85	LT 1	LT 1	98 ± 40	32 ± 30			
12F3	02/12/85	LT 2	1.6 ± 0.9	120 ± 40				
2S6	02/12/85	LT 0.9	LT 0.9	87 ± 41				
3S5	(1)							
4S2	02/12/85	LT 2	LT 1	140 ± 40				3.6 ± 3.2
4S4	02/12/85	LT 2	2.4 ± 0.9	89 ± 34				
11S5	02/12/85	LT 2	LT 1	110 ± 40				
15A4	02/12/85	LT 0.9	3.4 ± 0.8	86 ± 38				
12E4	02/12/85	LT 0.8	1.4 ± 0.6	130 ± 40				
4S2 Split	02/12/85	LT 2	LT 1	140 ± 40	26 ± 30			
12F3	03/12/85	LT 2	1.4 ± 0.8	110 ± 40				
2S6	03/12/85	LT 0.7	LT 0.8	170 ± 70				
3S5	(1)							
4S2	03/12/85	LT 2	2.2 ± 1.0	82 ± 41				
4S4	03/12/85	LT 1	LT 1	97 ± 41				
11S5	03/12/85	LT 2	1.5 ± 0.9	97 ± 42				
15A4	03/12/85	LT 0.6	4.1 ± 0.8	120 ± 40	51 ± 27			
12E4	03/12/85	LT 0.6	1.3 ± 0.6	110 ± 40				
4S4 Split	03/12/85	LT 1	LT 1	97 ± 35				
12F3	04/09/85	LT 0.5	0.95 ± 0.57	82 ± 48	71 ± 24			
2S6	04/09/85	LT 0.6	LT 0.9	96 ± 33				
3S5	(1)							
4S2	04/09/85	LT 0.5	LT 0.8	160 ± 40				
4S4	04/09/85	LT 1	LT 1	110 ± 40	43 ± 49			
11S5	04/09/85	LT 2	LT 1	90 ± 43				
15A4	04/09/85	0.69 ± 0.60	4.3 ± 0.8	140 ± 50				
12E4	04/09/85	LT 0.5	LT 0.8	LT 60				
11S5 Split	04/09/85	LT 2	LT 1	87 ± 49				

See footnotes at end of table.

TABLE 10

(Page 2 of 3)

GROSS ALPHA, GROSS BETA, TRITIUM AND GAMMA* SPECTROMETRY IN GROUND (WELL) WATER
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Alpha	Gr-Beta	Tritium	K-40	Ra-226	Th-228	Cs-137
12F3	05/14/85	LT 2	3.3 ± 1.0	78 ± 42				
2S6	05/14/85	LT 0.7	LT 0.8	160 ± 40	30 ± 24			
3S5	05/14/85	LT 0.9	1.1 ± 0.6	130 ± 40				
4S2	05/14/85	LT 2	LT 1	150 ± 40				
4S4	05/14/85	LT 1	1.2 ± 0.6	130 ± 50				
11S5	05/14/85	LT 2	LT 1	110 ± 40				
15A4	05/14/85	LT 0.6	4.5 ± 0.8	73 ± 31				
12E4	05/14/85	0.74 ± 0.59	1.6 ± 0.6	LT 80				
15A4 Split	05/14/85	LT 0.6	5.1 ± 0.9	100 ± 40	31 ± 26			
12F3	06/11/85	LT 2	2.8 ± 1.0	88 ± 33				
2S6	06/11/85	LT 0.8	LT 0.8	120 ± 50				
3S5	06/11/85	LT 1	1.1 ± 0.7	180 ± 50				
4S2	06/11/85	LT 2	1.2 ± 0.8	110 ± 70				
4S4	06/11/85	LT 1	2.0 ± 0.8	95 ± 43				
11S5	06/11/85	LT 2	LT 1	79 ± 33				
15A4	06/11/85	LT 0.7	4.8 ± 0.8	92 ± 48	39 ± 37			
12E4	06/11/85	LT 0.7	1.7 ± 0.6	LT 100				
12E4 Split	06/11/85	LT 0.7	1.4 ± 0.6	82 ± 47				
12F3	07/09/85	LT 2	LT 1	93 ± 53				
2S6	07/09/85	LT 0.7	LT 0.9	LT 70				
3S5	07/09/85	LT 0.9	LT 1	120 ± 40				
4S2	07/09/85	LT 2	LT 1	LT 70	23 ± 23			
4S4	07/09/85	LT 0.9	1.5 ± 0.8	93 ± 44				
11S5	07/09/85	LT 1	LT 1	LT 80				
15A4	07/09/85	LT 0.5	2.2 ± 0.7	95 ± 43				
12E4	07/09/85	LT 0.7	1.4 ± 0.7	82 ± 46				
4S2 Split	07/09/85	LT 0.8	LT 1	83 ± 45				
12F3	08/13/85	LT 2	1.5 ± 0.9	230 ± 100				
2S6	08/13/85	LT 0.8	1.4 ± 0.6	140 ± 80				
3S5	08/13/85	LT 0.7	1.0 ± 0.6	LT 100				
4S2	08/13/85	LT 2	1.5 ± 0.9	240 ± 80				
4S4	08/13/85	LT 0.9	1.5 ± 0.7	260 ± 90				
11S5	08/13/85	LT 2	LT 1	280 ± 70				
15A4	08/13/85	LT 0.6	3.1 ± 0.7	170 ± 80				
12E4	08/13/85	LT 0.7	0.86 ± 0.56	190 ± 90				
12F3 Split	08/13/85	LT 2	1.8 ± 0.9	LT 100				

See footnotes at end of table.

TABLE 10

(Page 3 of 3)

GROSS ALPHA, GROSS BETA, TRITIUM AND GAMMA* SPECTROMETRY IN GROUND (WELL) WATER
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Alpha	Gr-Beta	Tritium	K-40	Ra-226	Th-228	Cs-137
12F3	09/10/85	LT 2	1.5 ± 0.9	94 ± 42				
2S6	09/10/85	1.1 ± 0.9	1.3 ± 0.7	LT 60				
3S5	09/10/85	LT 1	2.4 ± 0.8	LT 70				
4S2	09/10/85	5.0 ± 3.0	2.4 ± 1.1	110 ± 40				
4S4	09/10/85	LT 1	2.0 ± 0.8	150 ± 40				
11S5	09/10/85	LT 2	LT 1	130 ± 50				
15A4	09/10/85	LT 0.7	3.8 ± 0.8	62 ± 31	22 ± 25			
12E4	09/10/85	1.3 ± 1.0	1.1 ± 0.7	74 ± 45				
3S5 Split	09/10/85	1.4 ± 1.2	2.7 ± 0.9	87 ± 43				
12F3	10/08/85	LT 2	1.7 ± 0.9	110 ± 40				
2S6	10/08/85	LT 0.8	1.1 ± 0.7	130 ± 40				4.9 ± 2.6
3S5	10/08/85	LT 0.9	1.4 ± 0.7	97 ± 38				
4S2	10/08/85	LT 2	LT 1	160 ± 40	39 ± 34			
4S4	10/08/85	LT 1	1.4 ± 0.7	120 ± 40				
11S5	10/08/85	LT 2	LT 1	110 ± 40				
15A4	10/08/85	LT 0.6	4.0 ± 0.8	110 ± 40				
12E4	10/08/85	LT 1	1.1 ± 0.7	100 ± 40	34 ± 27			
2S6 Split	10/08/85	LT 0.8	LT 0.9	110 ± 50				
12F3	11/12/85	LT 2	1.8 ± 0.9	110 ± 40				
2S6	11/12/85	LT 1	1.1 ± 0.7	84 ± 45			25 ± 4	
3S5	(1)							
4S2	11/21/85 (2)	3.4 ± 2.4	2.9 ± 0.9	LT 81	34 ± 28			
4S4	11/12/85	LT 1	1.8 ± 0.8	81 ± 46				
11S5	11/12/85	LT 2	LT 1	LT 70				
15A4	11/12/85	LT 0.8	3.7 ± 0.8	LT 70				
12E4	11/12/85	1.3 ± 1.1	1.8 ± 0.8	84 ± 45				
4S4 Split	11/12/85	LT 1	1.5 ± 0.7	LT 70				
12F3	12/10/85	LT 0.7	0.79 ± 0.54	98 ± 40				
2S6	12/10/85	LT 1	1.1 ± 0.6	LT 60				
3S5	(1)							
4S2	12/10/85	LT 2	1.7 ± 0.9	60 ± 33				
4S4	12/10/85	LT 1	2.3 ± 0.8	74 ± 31				
11S5	12/10/85	LT 2	LT 1	LT 80				
15A4	12/10/85	LT 0.8	5.3 ± 0.9	LT 60				
12E4	12/10/85	LT 1	1.7 ± 0.7	79 ± 33	28 ± 23			
11S5 Split	12/10/85	LT 2	LT 1	LT 50				

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.
(1) Closed for Season (November-April)
(2) Pump temporarily out of service

TABLE 11

ANALYTICAL DATA FOR AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES*
SSES 1985

(Page 1 of 2)

(Gross Beta results in E-03 pCi/m^3 ± 2 s)

MONTH	COLLECTION PERIOD	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1(1)
Jan.	01/08/85 to 01/15/85	13.0±2.0	14.0±2.0	16.0±2.0	15.0±2.0	14.0±2.0	13.0±2.0	14.0±2.0	14.0±2.0	17.0±3.0	13.0±2.0	15.0±2.0
	01/15/85 to 01/22/85	19.0±2.0	19.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	19.0±2.0	20.0±2.0	21.0±2.0	24.0±3.0(3)	21.0±2.0	16.0±2.0
	01/22/85 to 01/29/85	16.0±2.0	16.0±2.0	18.0±2.0	15.0±2.0	16.0±2.0	(2)	15.0±2.0	18.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0
	01/29/85 to 02/05/85	18.0±2.0	18.0±2.0	21.0±2.0	19.0±2.0	20.0±2.0	(2)	18.0±2.0	19.0±2.0	15.0±2.0	20.0±2.0	17.0±2.0
Feb.	02/05/85 to 02/12/85	19.0±2.0	21.0±2.0	21.0±2.0	19.0±2.0	22.0±2.0	22.0±2.0	23.0±2.0	22.0±2.0	21.0±2.0	21.0±2.0	25.0±2.0
	02/12/85 to 02/19/85	23.0±2.0	23.0±2.0	22.0±2.0	19.0±2.0	22.0±2.0	21.0±2.0	21.0±2.0	22.0±2.0	36.0±4.0	21.0±2.0	20.0±2.0
	02/19/85 to 02/26/85	12.0±2.0	15.0±2.0	14.0±2.0	14.0±2.0	18.0±2.0	30.0±5.0	16.0±2.0	15.0±2.0	20.0±3.0	15.0±2.0	14.0±2.0
	02/26/85 to 03/05/85	20.0±2.0	17.0±2.0	18.0±2.0	(2)	17.0±2.0	(2)	28.0±3.0	17.0±2.0	28.0±3.0	16.0±2.0	14.0±2.0
Mar.	03/05/85 to 03/12/85	20.0±2.0	15.0±2.0	19.0±2.0	15.0±2.0	16.0±2.0	17.0±2.0	17.0±2.0	18.0±2.0	16.0±2.0	16.0±2.0	21.0±2.0
	03/12/85 to 03/19/85	11.0±2.0	12.0±2.0	12.0±2.0	12.0±2.0	11.0±2.0	12.0±2.0	13.0±2.0	13.0±2.0	12.0±2.0	11.0±2.0	15.0±2.0
	03/19/85 to 03/26/85	14.0±2.0	14.0±2.0	13.0±2.0	14.0±2.0	11.0±2.0	12.0±2.0	13.0±2.0	14.0±2.0	14.0±2.0	11.0±2.0	17.0±2.0
	03/26/85 to 04/02/85	8.9±1.9	9.9±1.8	9.3±1.8	8.4±1.7	9.0±1.7	8.2±1.8	10.0±2.0	8.6±1.8	8.4±1.7	9.8±1.9	13.0±2.0
Apr.	04/02/85 to 04/09/85	17.0±2.0	13.0±2.0	12.0±2.0	13.0±2.0	16.0±2.0	12.0±2.0	13.0±2.0	12.0±2.0	11.0±2.0	13.0±2.0	11.0±2.0
	04/09/85 to 04/16/85	19.0±2.0	19.0±2.0	18.0±2.0	18.0±2.0	18.0±2.0	18.0±2.0	19.0±2.0	18.0±2.0	18.0±2.0	20.0±2.0	19.0±3.0
	04/16/85 to 04/23/85	20.0±2.0	19.0±2.0	20.0±2.0	20.0±2.0	20.0±5.0	17.0±2.0	19.0±2.0	20.0±5.0(4)	17.0±2.0	22.0±2.0	17.0±2.0
	04/23/85 to 04/30/85	12.0±2.0	12.0±2.0	13.0±2.0	11.0±2.0	10.0±2.0	11.0±2.0	11.0±2.0	14.0±2.0(5)	13.0±2.0	13.0±2.0	14.0±2.0
May	04/30/85 to 05/07/85	14.0±2.0	16.0±2.0	12.0±2.0	16.0±2.0	15.0±2.0	15.0±2.0	15.0±2.0	16.0±2.0	12.0±2.0	14.0±2.0	16.0±2.0
	05/07/85 to 05/14/85	13.0±2.0	17.0±2.0	18.0±2.0	13.0±2.0	14.0±2.0	15.0±2.0	13.0±2.0	15.0±2.0	15.0±2.0	16.0±2.0	18.0±2.0
	05/14/85 to 05/21/85	8.6±1.6	10.0±1.0	11.0±2.0	9.4±1.6	8.3±1.5	9.8±1.5	10.0±1.0	8.2±1.5	8.7±1.5	9.6±1.6	12.0±1.0
	05/21/85 to 05/28/85	16.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	15.0±2.0	14.0±2.0	16.0±2.0	13.0±2.0	15.0±2.0	16.0±2.0	18.0±2.0
Jun.	05/28/85 to 06/04/85	13.0±2.0	14.0±2.0	12.0±2.0	14.0±2.0	13.0±2.0	13.0±2.0	12.0±2.0	15.0±2.0	14.0±2.0	17.0±2.0	16.0±2.0
	06/04/85 to 06/11/85	12.0±2.0	12.0±1.0	13.0±2.0	11.0±2.0	11.0±2.0	10.0±2.0	10.0±2.0	11.0±2.0	12.0±2.0	9.9±1.5	12.0±2.0
	06/11/85 to 06/18/85	11.0±2.0	10.0±2.0	11.0±2.0	11.0±2.0	10.0±2.0	12.0±2.0	11.0±2.0	(2)	11.0±2.0	9.4±1.8	13.0±2.0
	06/18/85 to 06/25/85	15.0±2.0	16.0±2.0	15.0±2.0	13.0±2.0	13.0±2.0	17.0±2.0	14.0±2.0	15.0±2.0	15.0±2.0	16.0±2.0	12.0±2.0
	06/25/85 to 07/02/85	8.4±1.5	10.0±2.0	9.5±1.5	8.2±1.6	9.2±1.6	9.7±1.8	7.6±1.5	9.4±2.4(6)	8.2±1.6	9.5±1.7	11.0±2.0
Jul.	07/02/85 to 07/09/85	22.0±2.0	17.0±2.0	17.0±2.0	16.0±2.0	15.0±2.0(7)	14.0±2.0	14.0±2.0	17.0±2.0	20.0±2.0	15.0±2.0	19.0±2.0
	07/09/85 to 07/16/85	18.0±2.0	17.0±2.0	17.0±2.0	17.0±2.0	17.0±2.0(8)	18.0±2.0	16.0±2.0	18.0±2.0	18.0±2.0	17.0±2.0	18.0±2.0
	07/16/85 to 07/23/85	14.0±2.0	20.0±2.0	21.0±2.0	17.0±2.0	21.0±2.0	23.0±2.0	17.0±2.0	19.0±2.0	18.0±2.0	22.0±2.0	17.0±2.0
	07/23/85 to 07/30/85	15.0±2.0	14.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	14.0±2.0	13.0±2.0	13.0±2.0	13.0±2.0	14.0±2.0	14.0±2.0

* All Iodine-131 results were found to be LT LLD; typical LLD's are found on Table 19.

See footnotes at end of table

TABLE 11

ANALYTICAL DATA FOR AIR PARTICULATE FILTERS AND CHARCOAL CARTRIDGES*
SSES 1985

(Page 2 of 2)

(Gross Beta results in E-03 pCi/m^3 ± 2 s)

MONTH	COLLECTION PERIOD	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1(1)
Aug.	07/30/85 to 08/06/85	14.0±2.0	14.0±2.0	12.0±2.0	14.0±2.0	13.0±2.0	15.0±2.0	(2)	14.0±1.0	12.0±2.0	15.0±2.0	13.0±2.0
	08/06/85 to 08/13/85	18.0±2.0	15.0±2.0	19.0±2.0	17.0±2.0	19.0±2.0	17.0±2.0	16.0±2.0	19.0±2.0	16.0±2.0	20.0±2.0	3.3±1.5
	08/13/85 to 08/20/85	17.0±2.0	21.0±2.0	21.0±2.0	20.0±2.0	23.0±3.0	20.0±3.0	21.0±2.0	21.0±2.0	19.0±2.0	18.0±2.0	22.0±2.0
	08/20/85 to 08/27/85	14.0±2.0	19.0±2.0	15.0±2.0	14.0±2.0	17.0±2.0	14.0±2.0	14.0±2.0	16.0±2.0	15.0±2.0	16.0±2.0	20.0±2.0
Sep.	08/27/85 to 09/03/85	20.0±2.0	20.0±2.0	21.0±2.0	21.0±2.0	20.0±2.0	16.0±2.0	19.0±2.0	21.0±2.0	21.0±2.0	19.0±2.0	22.0±2.0
	09/03/85 to 09/10/85	25.0±2.0	22.0±2.0	22.0±2.0	23.0±2.0	21.0±2.0	21.0±3.0	21.0±2.0	21.0±2.0	22.0±2.0	22.0±2.0	27.0±2.0
	09/10/85 to 09/17/85	13.0±2.0	12.0±2.0	12.0±2.0	13.0±2.0	12.0±2.0	12.0±2.0	11.0±2.0	11.0±2.0	11.0±2.0	12.0±2.0	14.0±2.0
	09/17/85 to 09/24/85	31.0±3.0	29.0±2.0	32.0±3.0	26.0±2.0	27.0±2.0	31.0±3.0	27.0±3.0	32.0±3.0	23.0±2.0	29.0±2.0	30.0±2.0
	09/24/85 to 10/01/85	16.0±2.0	17.0±2.0	15.0±2.0	15.0±2.0	15.0±2.0	14.0±2.0	15.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	16.0±2.0
Oct.	10/01/85 to 10/08/85	15.0±2.0	14.0±2.0	15.0±2.0	14.0±2.0	14.0±2.0	16.0±2.0	13.0±2.0	15.0±2.0	13.0±2.0	14.0±2.0	14.0±2.0
	10/08/85 to 10/15/85	20.0±2.0	17.0±2.0	16.0±2.0	18.0±2.0	18.0±2.0	18.0±2.0	18.0±2.0	18.0±2.0	16.0±2.0	18.0±2.0	17.0±2.0
	10/15/85 to 10/22/85	19.0±2.0	18.0±2.0	17.0±2.0	17.0±2.0	19.0±2.0	18.0±2.0	18.0±2.0	15.0±2.0	17.0±2.0	17.0±2.0	21.0±2.0
	10/22/85 to 10/29/85	12.0±2.0	11.0±2.0	11.0±2.0	13.0±2.0	12.0±2.0	12.0±2.0	13.0±2.0	11.0±2.0	10.0±2.0	13.0±2.0	13.0±2.0
Nov.	10/29/85 to 11/05/85	11.0±2.0	8.1±1.5	9.6±1.8	11.0±2.0	10.0±2.0	12.0±2.0	9.5±1.8	10.0±2.0	8.9±1.8	11.0±2.0	9.7±1.8
	11/05/85 to 11/11/85	9.9±2.1	11.0±2.0	12.0±2.0	12.0±2.0	11.0±2.0	11.0±2.0	11.0±2.0	12.0±2.0	11.0±2.0	10.0±2.0	12.0±1.0
	11/11/85 to 11/18/85	13.0±2.0	12.0±2.0	11.0±2.0	11.0±2.0	12.0±2.0	10.0±2.0	11.0±2.0	10.0±2.0	12.0±2.0	10.0±2.0	13.0±2.0
	11/18/85 to 11/25/85	25.0±2.0	22.0±2.0	25.0±2.0	21.0±3.0(9)	22.0±2.0	26.0±2.0	23.0±2.0	23.0±2.0	20.0±2.0	24.0±2.0	17.0±2.0
	11/25/85 to 12/02/85	13.0±2.0	13.0±2.0	11.0±2.0	12.0±2.0	12.0±2.0	13.0±2.0	11.0±2.0	13.0±2.0	11.0±2.0	9.7±1.7	13.0±2.0
Dec.	12/02/85 to 12/09/85	23.0±2.0	23.0±2.0	24.0±2.0	22.0±2.0	24.0±2.0	23.0±2.0	23.0±2.0	22.0±2.0	19.0±4.0(10)	21.0±2.0	24.0±2.0
	12/09/85 to 12/16/85	28.0±2.0	26.0±2.0	26.0±2.0	26.0±2.0	29.0±2.0	28.0±2.0	28.0±3.0	28.0±2.0	24.0±2.0	26.0±2.0	30.0±3.0
	12/16/85 to 12/23/85	21.0±2.0	23.0±2.0	23.0±2.0	22.0±2.0	22.0±2.0	25.0±2.0	21.0±2.0	22.0±2.0	22.0±2.0	21.0±2.0	29.0±3.0
	12/23/85 to 12/30/85	19.0±2.0	17.0±2.0	16.0±2.0	15.0±2.0	17.0±2.0	18.0±2.0	15.0±2.0	14.0±2.0	14.0±2.0	15.0±2.0	16.0±2.0
	12/30/85 to 01/07/86	(2)	16.0±2.0	17.0±2.0	19.0±2.0	18.0±2.0	20.0±2.0	18.0±2.0	17.0±2.0	15.0±2.0	19.0±2.0	19.0±2.0

* All Iodine-131 results were found to be <LLD; typical LLD's are found on Table 19.

(1) Collection periods for 7H1 are the same as above except for 07/30-08/07, 08/07-08/13, 09/24-10/02, 10/02-10/08, 11/05-11/12, 11/12-11/19, 11/19-11/25.
(2) Unacceptable sample due to sampler malfunction.
(3) Start date 01/17/85
(4) Stop date 04/18/85
(5) Stop date 04/24/85
(6) Stop date 06/30/85
(7) Stop date 07/10/85
(8) Start date 07/10/85
(9) Stop date 11/23/85
(10) Stop date 12/05/85

TABLE 12

(Page 1 of 2)

GROSS ALPHA AND GAMMA* SPECTROMETRY OF COMPOSITED AIR PARTICULATES
SSES 1985

(Results in E-03 pCi/m^3 ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Be-7	K-40	Cs-137	Ra-226	Th-228
	FIRST QUARTER						
7G1	01/08/85 to 04/09/85	4.5 ± 0.6	73 ± 7	4.0 ± 2.7			
12G1	01/08/85 to 04/09/85	4.8 ± 0.5	71 ± 7				
7H1	01/08/85 to 04/09/85	0.9 ± 0.2	69 ± 7				
5S4	01/08/85 to 04/09/85	4.7 ± 0.7	86 ± 9	5.3 ± 2.8			
11S2	01/08/85 to 04/09/85	5.8 ± 0.7	76 ± 8	7.9 ± 4.3			
9B1	01/08/85 to 04/09/85	4.7 ± 0.5	67 ± 7				
12E1	01/08/85 to 04/09/85	4.7 ± 0.5	75 ± 8	2.9 ± 2.4			
2S2	01/08/85 to 04/09/85	5.3 ± 0.6	73 ± 7				
15S4	01/08/85 to 04/09/85	4.9 ± 0.5	74 ± 7				
1D2	01/08/85 to 04/09/85	5.5 ± 0.6	95 ±10				
3D1	01/08/85 to 04/09/85	5.0 ± 0.5	81 ± 8	4.5 ± 4.7			
	SECOND QUARTER						
7G1	04/09/85 to 07/09/85	3.3 ± 0.4	88 ± 9	3.1 ± 2.3	0.22 ± 0.19		
12G1	04/09/85 to 07/09/85	3.1 ± 0.4	70 ± 7				
7H1	04/09/85 to 07/09/85	3.4 ± 0.5	80 ± 8	2.5 ± 2.0			
5S4	04/09/85 to 07/09/85	3.5 ± 0.5	85 ± 9				
11S2	04/09/85 to 07/09/85	2.7 ± 0.4	89 ± 9				
9B1	04/09/85 to 07/10/85	3.1 ± 0.4	92 ± 9				
12E1	04/09/85 to 07/09/85	3.2 ± 0.5	65 ± 7				
2S2	04/09/85 to 07/09/85	3.6 ± 0.5	84 ± 8				
15S4	04/09/85 to 07/09/85	2.5 ± 0.4	76 ± 8	2.4 ± 1.9			
1D2	04/09/85 to 07/09/85	3.3 ± 0.5	77 ± 8	3.2 ± 1.4			
3D1	04/09/85 to 07/09/85	2.7 ± 0.4	73 ± 7	1.5 ± 1.6			

See footnotes at end of table

TABLE 12

(Page 2 of 2)

GROSS ALPHA AND GAMMA* SPECTROMETRY OF COMPOSITED AIR PARTICULATES
SSES 1985

(Results in E-03 pCi/m^3 ± 2 s)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Be-7	K-40	Cs-137	Ra-226	Th-228
	THIRD QUARTER						
7G1	07/09/85 to 10/08/85	3.8 ± 0.5	67 ± 7				
12G1	07/09/85 to 10/08/85	4.2 ± 0.5	58 ± 6	3.5 ± 1.5			
7H1	07/09/85 to 10/08/85	3.8 ± 0.4	67 ± 7				
5S4	07/09/85 to 10/08/85	2.6 ± 0.3	76 ± 8	3.5 ± 2.5			
11S2	07/09/85 to 10/08/85	3.1 ± 0.4	78 ± 8	3.3 ± 2.2			
9B1	07/10/85 to 10/08/85	3.5 ± 0.4	80 ± 8	4.8 ± 1.9			
12E1	07/09/85 to 10/08/85	3.8 ± 0.4	76 ± 8	3.5 ± 3.6			
2S2	07/09/85 to 10/08/85	3.2 ± 0.4	85 ± 9	8.6 ± 3.7			
15S4	07/09/85 to 10/08/85	3.2 ± 0.4	81 ± 8				
1D2	07/09/85 to 10/08/85	3.3 ± 0.5	72 ± 7	3.5 ± 2.8			
3D1	07/09/85 to 10/08/85	3.5 ± 0.4	80 ± 8	4.5 ± 3.8			
	FOURTH QUARTER						
7G1	10/08/85 to 01/07/86	3.3 ± 0.5	53 ± 5	2.9 ± 2.0			
12G1	10/08/85 to 01/07/86	5.0 ± 0.6	62 ± 6		0.15 ± 0.15		
7H1	10/08/85 to 01/07/86	2.6 ± 0.4	69 ± 7	5.1 ± 2.4			
5S4	10/08/85 to 01/07/86	4.4 ± 0.5	65 ± 7				
11S2	10/08/85 to 01/07/86	4.9 ± 0.5	73 ± 7				
9B1	10/08/85 to 01/07/86	4.8 ± 0.5	71 ± 7				
12E1	10/08/85 to 01/07/86	4.2 ± 0.5	61 ± 6	3.7 ± 4.2			
2S2	10/08/85 to 01/07/86	3.9 ± 0.5	70 ± 7	2.6 ± 3.0	0.27 ± 0.25		
15S4	10/08/85 to 01/07/86	4.8 ± 0.6	71 ± 7	4.3 ± 2.0			
1D2	10/08/85 to 01/07/86	4.0 ± 0.5	65 ± 7	3.6 ± 2.3			
3D1	10/08/85 to 01/07/86	4.6 ± 0.5	66 ± 7	11.0 ± 5.0			

* Only gamma emitters detected are reported; typical LLD values can be found on Table 19.

TABLE 13

GROSS ALPHA, GROSS BETA, TRITIUM AND GAMMA* SPECTROMETRY OF PRECIPITATION
SSES 1985

(Results in pCi/ℓ ± 2 sigma)

LOCATION	COLLECTION PERIOD	Gr-Alpha	Gr-Beta	H-3	Be-7	K-40	Ra-226	Th-228	Cs-137
7G1	01/08/85-04/09/85	0.93 ± 0.57	7.3 ± 0.9	83 ± 37	64 ± 26	48 ± 31			
12G1	01/08/85-04/09/85	LT 0.5	4.3 ± 0.6	LT 70	70 ± 25				
2S2	01/08/85-04/09/85	LT 0.5	3.9 ± 0.7	110 ± 40	55 ± 39				
5S4	01/08/85-04/09/85	LT 0.6	3.9 ± 0.7	69 ± 31	63 ± 24				
11S2	01/08/85-04/09/85	LT 0.5	1.6 ± 0.6	160 ± 40	26 ± 25				
15S4	01/08/85-04/09/85	LT 0.4	4.8 ± 0.8	100 ± 40	52 ± 27	21 ± 24			
9B1	01/08/85-04/09/85	LT 0.4	3.7 ± 0.7	82 ± 29	66 ± 36				
1D2	01/08/85-04/09/85	LT 0.4	3.4 ± 0.7	140 ± 40	110 ± 40				
3D1	01/08/85-04/09/85	LT 0.4	2.8 ± 0.6	100 ± 40	56 ± 46				
12E1	01/08/85-04/09/85	LT 0.4	4.2 ± 0.7	LT 50	46 ± 29				
9B1 Split	01/08/85-04/09/85	LT 0.4	3.8 ± 0.7	96 ± 42	42 ± 33				
7G1	04/09/85-07/09/85	LT 0.5	2.8 ± 0.7	130 ± 50					
12G1	04/09/85-07/09/85	LT 0.5	4.2 ± 0.8	180 ± 40	37 ± 33				
2S2	04/09/85-07/09/85	LT 0.5	2.6 ± 0.7	130 ± 40	28 ± 25				
5S4	04/09/85-07/09/85	LT 0.5	2.9 ± 0.7	210 ± 50					
11S2	04/09/85-07/09/85	LT 0.5	1.3 ± 0.6	180 ± 40					3.4 ± 3.7
15S4	04/09/85-07/09/85	LT 0.5	3.5 ± 0.7	100 ± 40	39 ± 26				
9B1	04/09/85-07/09/85	LT 0.5	1.8 ± 0.6	160 ± 40					
1D2	04/09/85-07/09/85	LT 0.5	2.6 ± 0.7	140 ± 50					
3D1	04/09/85-07/09/85	LT 0.5	1.6 ± 0.6	120 ± 40	31 ± 25				
12E1	04/09/85-07/09/85	LT 0.5	1.9 ± 0.6	140 ± 40					
5S4 Split	04/09/85-07/09/85	LT 0.5	2.5 ± 0.7	200 ± 50					
7G1	07/09/85-10/08/85	LT 0.5	1.6 ± 0.6	100 ± 40					
12G1	07/09/85-10/08/85	LT 0.5	2.5 ± 0.6	110 ± 40		41 ± 27			
2S2	07/09/85-10/08/85	0.61 ± 0.41	3.4 ± 0.7	120 ± 40					
5S4	07/09/85-10/08/85	LT 0.5	1.6 ± 0.6	100 ± 40					
11S2	07/09/85-10/08/85	LT 0.5	2.2 ± 0.6	140 ± 50					
15S4	07/09/85-10/08/85	LT 0.5	1.9 ± 0.6	120 ± 50					
9B1	07/09/85-10/08/85	LT 0.5	1.7 ± 0.6	83 ± 48					
1D2	07/09/85-10/08/85	LT 0.5	3.0 ± 0.7	110 ± 50					
3D1	07/09/85-10/08/85	LT 0.5	1.8 ± 0.6	88 ± 47					
12E1	07/09/85-10/08/85	LT 0.5	1.9 ± 0.6	79 ± 41					
7G1 Split	07/09/85-10/08/85	LT 0.5	2.0 ± 0.6	82 ± 49					
3D1 Split	07/09/85-10/08/85	LT 0.5	2.5 ± 0.6	85 ± 38					
7G1	10/08/85-01/07/86	LT 0.4	2.8 ± 0.6	LT 70					
12G1	10/08/85-01/07/86	LT 0.5	2.7 ± 0.6	LT 60	37 ± 21				
2S2	10/08/85-01/07/86	LT 0.4	1.7 ± 0.6	LT 70	37 ± 22			16 ± 6	
5S4	10/08/85-01/07/86	LT 0.4	1.7 ± 0.6	LT 60	24 ± 21	21 ± 22			
11S2	10/08/85-01/07/86	LT 0.4	2.3 ± 0.6	120 ± 40		23 ± 19			
15S4	10/08/85-01/07/86	LT 0.4	1.9 ± 0.6	LT 50	26 ± 22			8.9 ± 3.2	
9B1	10/08/85-01/07/86	LT 0.4	2.3 ± 0.6	53 ± 33				29 ± 8	
1D2	10/08/85-01/07/86	LT 0.4	1.6 ± 0.6	LT 60				27 ± 8	
3D1	10/08/85-01/07/86	LT 0.4	1.3 ± 0.5	72 ± 31					
12E1	10/08/85-01/07/86	LT 0.4	2.3 ± 0.6	55 ± 34					

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.

TABLE 14

(Page 1 of 4)

GROSS BETA MINUS K-40, IODINE-131 AND GAMMA* SPECTROMETRY OF MILK
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Beta Minus K-40	I-131(1)	K-40	Cs-137	Ra-226	Th-228
10G1	01/07/85	12 ± 2		1300 ± 130			
12B2	01/07/85	LT 3		1430 ± 140			
5E1	01/07/85	11 ± 2	LT 0.2	1190 ± 120			
13E3	01/07/85	4.7± 2.0		1590 ± 160			
12B3	01/07/85	16 ± 2		1390 ± 140	4.7 ± 3.7		
6C1	01/07/85	8.9± 2.2	LT 0.2	1300 ± 130			
10D1	01/08/85	10 ± 2		1350 ± 140			
12D2	01/07/85	4.7 ± 2.1		1340 ± 130			
12D2 Dup.	01/07/85	4.3 ± 2.1		1340 ± 130			
10G1	02/11/85	12 ± 2		1260 ± 130	3.3 ± 3.4		
12B2	02/12/85	5.1± 1.6		1350 ± 140			
5E1	02/11/85	8.5± 1.7		1260 ± 130			
13E3	02/11/85	6.0± 1.6		1360 ± 140			
12B3	02/11/85	16 ± 2		1290 ± 130			
6C1	02/11/85	8.5± 1.7		1310 ± 130			
10D1	02/12/85	6.2± 1.6		1260 ± 130			
12D2	02/12/85	11 ± 2		1230 ± 130			
5E1 Dup.	02/11/85	9.5± 1.8		1270 ± 130			
5E1 Split	03/11/85	7.7± 1.8		1360 ± 140			
10G1	03/11/85	14 ± 2		1290 ± 130			
12B2	03/11/85	3.9± 1.5		1430 ± 140			
5E1	03/11/85	11 ± 2		1350 ± 140			
13E3	03/11/85	6.4± 1.5	LT 0.2	1450 ± 150			
12B3	03/11/85	13 ± 2	LT 0.3	1340 ± 130			
6C1	03/11/85	7.9± 1.7	LT 0.2	1260 ± 130			
10D1	03/12/85	8.1± 1.6	LT 0.2	1500 ± 150			
12D2	03/12/85	4.0± 1.4	LT 0.2	1420 ± 140			
13E3 Dup.	03/11/85	4.1± 1.4	LT 0.2	1300 ± 130			
13E3 Split	03/11/85	5.7± 1.5	LT 0.2	1570 ± 160			
10G1	04/08/85	12 ± 2		1370 ± 140			
12B2	04/08/85	3.6 ± 1.9		1330 ± 130			
5E1	04/08/85	7.0 ± 2.1		1310 ± 130			
13E3	04/08/85	4.6 ± 2.0		1520 ± 150			
12B3(2a)	04/08/85	26 ± 3		1310 ± 130			
6C1	04/08/85	3.9 ± 1.7		1500 ± 150			
10D1	04/09/85	12 ± 3		1360 ± 140			
12D2	04/09/85	3.5 ± 1.8		1190 ± 120			
10G1 Dup.	04/08/85	7.3 ± 2.1		1340 ± 130			
10G1 Split	04/08/85	7.4 ± 2.2		1390 ± 140			

See footnotes at end of table

TABLE 14

(Page 2 of 4)

GROSS BETA MINUS K-40, IODINE-131 AND GAMMA* SPECTROMETRY OF MILK
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Beta Minus K-40	K-40	Cs-137	Ra-226	Th-228
10G1	04/22/85	8.8± 2.0	1410 ± 140			
12B2	04/22/85	7.0± 2.1	1380 ± 140			
5E1	04/22/85	3.4± 1.9	1340 ± 130			
13E3	04/22/85	5.3± 2.0	1560 ± 160			
10G1	05/13/85	9.8± 1.9	1390 ± 140			
12B2	05/13/85	3.0± 1.3	1480 ± 150			
5E1	05/13/85	7.1± 1.8	1390 ± 140			
13E3	05/13/85	3.6± 1.5	1290 ± 130			
12B3	05/13/85	14 ± 2	1360 ± 140			
6C1	05/13/85	13 ± 2	1410 ± 140			
10D1	05/14/85	6.2± 1.5	1250 ± 130			
12D2	05/13/85	3.5± 1.4	1300 ± 130			
12B2 Dup.	05/13/85	2.5± 1.5	1360 ± 140			
12B3 Split	05/13/85	15 ± 2	1450 ± 150			
10G1	05/28/85	11 ± 2	1380 ± 140			
12B2	05/28/85	LT 3	1390 ± 140			
5E1	05/28/85	9.2± 2.2	1270 ± 130			
13E3	05/28/85	4.5± 2.1	1500 ± 150			
10G1	06/10/85	7.9± 2.1	1290 ± 130			
12B2	06/10/85	4.4± 1.9	1410 ± 140			
5E1	06/10/85	4.9± 1.9	1350 ± 140			
13E3	06/10/85	7.2± 2.2	1270 ± 130			
12B3 (2b)	06/10/85	20 ± 3	1330 ± 130			
6C1	06/10/85	7.7± 2.1	1200 ± 120			
10D1	06/10/85	5.8± 2.0	1330 ± 130			
12D2	06/10/85	3.4± 2.0	1350 ± 140			
5E1 Dup.	06/10/85	4.5± 2.0	1310 ± 130			
6C1 Split	06/10/85	6.4± 2.0	1360 ± 140			
10G1	06/24/85	10 ± 2	1290 ± 130			
12B2	06/24/85	LT 2	1320 ± 130			
5E1	06/24/85	7.2± 1.6	1380 ± 140			
13E3	06/24/85	5.7± 1.5	1500 ± 150			
10G1	07/08/85	7.7± 2.1	1120 ± 110			
12B2	07/08/85	LT 3	1360 ± 140			
5E1	07/08/85	5.1± 1.8	1390 ± 140			
13E3	07/09/85	5.5± 2.0	1410 ± 140			
12B3	07/08/85	11 ± 2	1370 ± 140			
6C1	07/08/85	4.3± 1.7	1230 ± 120			
10D1	07/08/85	8.1± 2.3	1510 ± 150			
12D2	07/08/85	3.9± 2.1	1250 ± 120			
13E3 Dup.	07/09/85	5.1± 2.0	1500 ± 150			

See footnotes at end of table

TABLE 14

(Page 3 of 4)

GROSS BETA MINUS K-40, IODINE-131 AND GAMMA* SPECTROMETRY OF MILK
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Beta Minus K-40	K-40	Cs-137	Ra-226	Th-228
10G1	07/22/85	8.0± 1.7	1250 ± 130			
12B2	07/22/85	5.1± 1.7	1460 ± 150			
5E1	07/22/85	6.9± 1.8	1330 ± 130			
13E3	07/22/85	3.5± 1.3	1510 ± 150			
10G1 (2c)	08/12/85	16 ± 2	1370 ± 140	5.4 ± 3.3		
12B2	08/12/85	5.3± 2.1	1480 ± 150			
5E1	08/12/85	4.8± 2.0	1250 ± 130			
13E3	08/12/85	5.3± 2.2	1400 ± 140			
12B3 (2d)	08/12/85	15 ± 2	1330 ± 130			
6C1 (2e)	08/12/85	16 ± 2	1330 ± 130			
10D1	08/13/85	6.9± 2.0	1630 ± 160			
12D2	08/12/85	LT 3	1240 ± 120			
12B2 Dup.	08/12/85	LT 3	1250 ± 130			
10G1	08/27/85	7.4± 2.0	1360 ± 140			
12B2	08/27/85	3.1± 2.0	1470 ± 150			
5E1	08/26/85	11 ± 2	1180 ± 120			
13E3	08/26/85	7.2± 2.0	1320 ± 130			
10G1	09/09/85	5.8± 2.0	1460 ± 150	4.6 ± 3.0		
12B2	09/09/85	5.4± 1.9	1240 ± 120			
5E1	09/09/85	6.7± 2.1	1300 ± 130			
13E3	09/09/85	4.7± 1.9	1440 ± 140			
12B3	09/09/85	13 ± 2	1230 ± 120			
6C1	09/09/85	6.0± 2.0	1310 ± 130			
10D1	09/09/85	6.5± 2.1	1320 ± 130			
12D2	09/09/85	LT 3	1160 ± 120			
12D2 Split	09/09/85	LT 3	1480 ± 150			
10G1	09/23/85	11 ± 2	1300 ± 130			
12B2	09/23/85	5.1± 2.0	1430 ± 140			
5E1	09/23/85	9.8± 2.1	1480 ± 150			
13E3	09/23/85	5.8± 1.9	1490 ± 150			
5E1 Split	09/23/85	6.8± 2.1	1470 ± 150			
10G1	10/07/85	7.5± 2.1	1350 ± 130			
12B2	10/07/85	3.3± 1.8	1360 ± 140			
5E1	10/07/85	5.3± 2.0	1190 ± 120			
13E3	10/07/85	6.1± 2.0	1500 ± 150			
12B3	10/07/85	12 ± 2	1070 ± 110			
6C1	10/07/85	4.2± 1.9	1310 ± 130			
10D1	10/08/85	11 ± 2	1360 ± 140			
12D2	10/07/85	LT 3	1120 ± 110			
6C1 Split	10/07/85	LT 3	1330 ± 130			

See footnotes at end of table.

TABLE 14

(Page 4 of 4)

GROSS BETA MINUS K-40, IODINE-131 AND GAMMA* SPECTROMETRY OF MILK
SSES 1985

(Results in pCi/ℓ ± 2 s)

LOCATION	COLLECTION DATE	Gr-Beta Minus K-40	K-40	Cs-137	Ra-226	Th-228
10G1	10/22/85	5.3± 2.1	1400 ± 140			
12B2	10/21/85	4.1± 2.3	1300 ± 130			
5E1	10/21/85	6.2± 2.2	1280 ± 130			
13E3	10/21/85	LT 3	1330 ± 130			
12B2 Split	10/21/85	LT 3	1240 ± 120			
10G1	11/11/85	6.2± 2.0	1260 ± 130			
12B2	11/11/85	5.3± 2.0	1410 ± 140			
5E1	11/11/85	11 ± 2	1260 ± 130			
13E3	11/11/85	5.8± 2.3	1490 ± 150			
12B3	11/11/85	11 ± 2	1300 ± 130			
6C1	11/11/85	6.7± 2.0	1230 ± 120			
10D1	11/12/85	9.1± 2.1	1250 ± 130	4.9 ± 3.3		
12D2	11/12/85	4.8± 2.2	1280 ± 130			
13E3 Split	11/11/85	5.1± 1.9	1310 ± 130			
10D1 Split	11/11/85	5.4± 1.9	1120 ± 110			
10G1	12/09/85	7.9± 2.3	1340 ± 130			
12B2	12/09/85	3.9± 1.9	1360 ± 140			
5E1	12/09/85	10 ± 2	1280 ± 130			
13E3	12/09/85	5.1± 2.3	1380 ± 140			
12B3	12/09/85	8.3± 2.2	1330 ± 130			
6C1	12/09/85	6.7± 2.1	1320 ± 130			
10D1	12/10/85	4.4± 1.9	1400 ± 140			
12D2	12/10/85	4.4± 2.0	1370 ± 140			
10G1 Split	12/09/85	7.7± 2.1	1170 ± 120			

* Only gamma emitters detected are reported; typical LLD values can be found on Table 19.

Note No goat milk was available from location 8D1 in March for quarterly collection. When goat died in May location was discontinued.

(1) Iodine was determined by radiochemical methods. See Appendix B-5. All values are less than 0.1 pCi/ℓ unless noted.

(2) Sr-89 and Sr-90 analyses were performed; results were as follows:
- (a) Sr-89 = LT 6; Sr-90 = 1.6 ± 0.6
- (b) Sr-89 = LT 5; Sr-90 = 9.9 ± 0.8
- (c) Sr-89 = LT 7; Sr-90 = 6.9 ± 1.1
- (d) Sr-89 = LT 7; Sr-90 = 11 ± 1
- (e) Sr-89 = LT 5; Sr-90 = 5.5 ± 0.8

TABLE 15

GAMMA* SPECTROMETRY OF PASTURE GRASS
SSES 1985

(Results in pCi/g (wet) ± 2 s)

LOCATION	COLLECTION DATE	Be-7	K-40	Ra-226	Th-228
15A1	01/08/85	6.1 ± 0.6	5.9 ± 0.6		
15A1	02/12/85	1.9 ± 0.2	2.0 ± 0.2		
15A1	03/12/85	8.8 ± 0.9	1.7 ± 0.4		
8D1 (1)	03/12/85	7.1 ± 0.7	2.1 ± 0.4		
15A1	04/09/85	21 ± 2	6.1 ± 0.6		
15A1	05/14/85	0.55 ± 0.10	6.9 ± 0.7		
15A1 Duplicate	05/14/85	2.4 ± 0.7	30 ± 3		
15A1	06/11/85	0.26 ± 0.17	6.0 ± 0.6		
15A1	07/09/85	0.87 ± 0.17	8.5 ± 0.9		
15A1	08/13/85	0.67 ± 0.28	6.5 ± 0.7		
15A1	09/10/85	0.98 ± 0.17	3.3 ± 0.3		
15A1	10/08/85	1.3 ± 0.1	7.0 ± 0.7		
15A1	11/12/85	1.7 ± 0.2	2.9 ± 0.3		
15A1	12/10/85	6.7 ± 0.7	4.8 ± 0.5		

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.
(1) Location deleted after goat milk operation was discontinued in May 1985.

TABLE 16

GAMMA* SPECTROMETRY OF SOIL AND VEGETATION
SSES 1985

(Results in pCi/g (dry) ± 2 s)

LOCATION	COLLECTION DATE	Be-7	K-40	Cs-137	Ra-226	Th-228	Other
SOIL							
2S4 Bot.	08/19/85		8.8 ± 0.9	0.18 ± 0.05		1.1 ± 0.1	
2S4 Top	08/19/85		9.3 ± 0.9	0.12 ± 0.05	1.7 ± 0.8	0.94 ± 0.09	
5S5 Bot.	08/19/85		9.7 ± 1.0	0.27 ± 0.06	1.8 ± 0.8	1.1 ± 0.1	
5S5 Top	08/19/85		9.6 ± 1.0	0.29 ± 0.04	2.0 ± 0.6	1.1 ± 0.1	
11S4 Bot.	08/21/85		10 ± 1	0.10 ± 0.04		0.64 ± 0.06	
11S4 Top	08/21/85		12 ± 1	0.14 ± 0.03	1.4 ± 0.5	0.80 ± 0.08	
15S4 Bot.	08/21/85		10 ± 1	0.16 ± 0.06	2.4 ± 0.8	1.3 ± 0.1	
15S4 Top	08/21/85		14 ± 1	0.12 ± 0.05	2.1 ± 0.9	1.0 ± 0.1	
9B2 Bot.	08/21/85		9.5 ± 1.0	0.30 ± 0.04	1.4 ± 0.5	0.68 ± 0.07	
9B2 Top	08/21/85		10 ± 1	0.43 ± 0.04		0.57 ± 0.06	
1D4 Bot.	08/19/85		9.6 ± 1.0	0.78 ± 0.08		1.5 ± 0.2	
1D4 Top	08/19/85		7.4 ± 0.9	0.69 ± 0.08	2.9 ± 1.0	1.3 ± 0.1	
3D2 Bot.	08/19/85		11 ± 1	0.53 ± 0.07	7.7 ± 1.7	4.3 ± 0.4	
3D2 Top	08/19/85		10 ± 1	0.95 ± 0.10	3.6 ± 1.0	2.2 ± 0.2	
12E2 Bot.	08/19/85		10 ± 1	0.23 ± 0.05	1.8 ± 0.7	0.87 ± 0.09	
12E2 Top	08/19/85		9.8 ± 1.0	0.23 ± 0.04	1.6 ± 0.5	0.68 ± 0.07	
7G1 Bot.	08/21/85		8.7 ± 0.9	1.7 ± 0.2	1.7 ± 0.6	1.3 ± 0.1	
7G1 Top	08/21/85		8.4 ± 0.8	2.2 ± 0.2	2.3 ± 0.8	1.2 ± 0.1	
12G3 Bot.	08/19/85		12 ± 1	0.11 ± 0.03	1.8 ± 0.6	1.1 ± 0.1	
12G3 Top	08/19/85		12 ± 1	0.18 ± 0.05	2.2 ± 0.9	1.1 ± 0.1	
VEGETATION/TERRESTRIAL							
2S4	08/19/85	2.6 ± 0.9	42 ± 4				
5S5	08/19/85	4.5 ± 1.1	39 ± 4				
11S4	08/21/85	1.7 ± 0.4	13 ± 1				
15S4	08/21/85	6.7 ± 1.3	21 ± 2				
9B2	08/21/85	7.2 ± 0.7	14 ± 1				
1D4	08/19/85	2.4 ± 0.6	25 ± 3				
3D2	08/19/85	6.6 ± 1.1	50 ± 5				
12E2	08/19/85	1.2 ± 0.5	21 ± 2				
7G1	08/21/85	9.9 ± 1.0	32 ± 3				
12G3	08/19/85	10 ± 1	30 ± 3				

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.

TABLE 17

(Page 1 of 2)

GAMMA* SPECTROMETRY OF FOOD PRODUCTS (Fruits, Vegetables and Honey)
SSES 1985

(Results in pCi/g (wet) ± 2 s)

LOCATION (1)	COLLECTION DATE	Be-7	K-40	Cs-137	Ra-226	Th-228
11S6 Spinach-BD	05/28/85		6.1 ± 0.6			
11S6 Lettuce-BS	05/28/85	0.17 ± 0.08	3.1 ± 0.3			
2H1 Strawberries	06/09/85		1.5 ± 0.2			
11D1 Strawberries	06/10/85		1.7 ± 0.2			
7S5 Spinach - BD	06/18/85	0.12 ± 0.13	8.2 ± 0.8			
7S5 Lettuce - BS	06/18/85	0.23 ± 0.11	4.6 ± 0.5			
7S5 Swiss Chard - FH	06/18/85		6.4 ± 0.6			
11S6 Spinach - BD	06/18/85	0.22 ± 0.10	7.2 ± 0.7	0.010 ± 0.011		
11S6 Lettuce - BS	06/18/85		3.9 ± 0.4			
11S6 Swiss Chard - FH	06/18/85	0.14 ± 0.11	6.3 ± 0.6			
11S6 Curled Endive	07/08/85	0.32 ± 0.13	5.9 ± 0.6			
11S6 Lettuce - PH	07/08/85		3.2 ± 0.3			
7S5 Curled Endive	07/08/85	0.29 ± 0.10	5.9 ± 0.6			
7S5 Lettuce - PH	07/08/85	0.29 ± 0.09	3.9 ± 0.4			
7S5 Green Bean - LT	07/16/85		2.4 ± 0.2			
7S5 Detroit Red Beet	07/16/85		4.1 ± 0.4			
11S6 Green Bean - LT	07/16/85		2.7 ± 0.3			
11S6 Detroit Red Beet	07/16/85		3.6 ± 0.4			
7S5 Oak Leaf Lettuce	07/16/85	0.24 ± 0.10	2.5 ± 0.3			
11S6 Oak Leaf Lettuce	07/16/85	0.14 ± 0.11	2.5 ± 0.3			
11S6 Prize Cabbage	07/22/85		2.8 ± 0.4			
7S5 Prize Cabbage	07/22/85		2.1 ± 0.3			
2H1 Cabbage	08/13/85		3.7 ± 0.4			
11D1 Green Beans	08/13/85		2.9 ± 0.3			
11D1 Sweet Corn	08/13/85		2.0 ± 0.2			
2H1 Green Beans	08/13/85		1.7 ± 0.2			
2H1 Sweet Corn	08/13/85		3.0 ± 0.3			
11D1 Cabbage	08/19/85		2.7 ± 0.3			
11S6 Sweet Corn - BS	08/13/85		2.0 ± 0.2			
11S6 Tomatoe - BB	08/13/85		2.9 ± 0.3			
7S5 Sweet Corn - BS	08/13/85		2.7 ± 0.3			
7S5 Tomatoe - BB	08/13/85		2.1 ± 0.2			

See footnotes at end of table.

TABLE 17

(Page 2 of 2)

GAMMA* SPECTROMETRY OF FOOD PRODUCTS (Fruits, Vegetables and Honey)
SSES 1985

(Results in pCi/g (wet) ± 2 s)

LOCATION (1)	COLLECTION DATE	Be-7	K-40	Cs-137	Ra-226	Th-228
11D1 Potatoes	09/10/85		3.1 ± 0.3			
2H1 Potatoes	09/10/85		3.9 ± 0.4			
11D1 Tomatoes	09/10/85		1.9 ± 0.2			
11D1 Tomatoes, Dup.	09/10/85		2.4 ± 0.2			
7S5 Curled Endive	09/10/85	0.46 ± 0.13	4.8 ± 0.5			
7S5 Swiss Chard - FH	09/10/85	0.19 ± 0.08	3.1 ± 0.3			
11S6 Curled Endive	09/10/85	0.29 ± 0.12	3.7 ± 0.4			
11S6 Swiss Chard - FH	09/10/85	0.31 ± 0.09	4.0 ± 0.4			
7S5 Potatoe - KB	09/10/85		5.1 ± 0.5			
11S6 Potatoe - KB	09/10/85		4.0 ± 0.4			
11S6 Spinach-BD	10/08/85	0.58 ± 0.10	8.6 ± 0.9	0.017 ± 0.010		
11S6 Lettuce-BS	10/08/85	0.32 ± 0.09	4.0 ± 0.4			
7S5 Spinach-BD	10/08/85	0.32 ± 0.13	8.4 ± 0.8			
7S5 Lettuce-BS	10/08/85	0.34 ± 0.08	4.6 ± 0.5			
7B2 Cortland Apples	10/08/85	0.63 ± 0.12				
7B2 MacIntosh Apples	10/08/85		1.0 ± 0.1			
12B1 MacIntosh Apples	10/09/85		9.3 ± 0.9			
7B2 Honey	10/08/85		1.6 ± 0.2	0.034 ± 0.008		

* Only gamma emitters detected are reported; typical LLD values are found on table 19.

(1) Variety codes for stations 7S5 and 11S6 are as follows: Lettuce-BS = Black-seeded Simpson, Spinach-BD = Winter Bloomsdale, Swiss Chard-FH = Ford hook, Lettuce-PH = Prizehead, Green Bean-LT = Long Tender, Tomatoe-BB = Big Boy, Potatoe-KB = Kennebec

TABLE 18

GAMMA* SPECTROMETRY OF GAME, POULTRY AND EGGS
SSES 1985

(Results in pCi/g (wet) ± 2 s)

	LOCATION	COLLECTION DATE	K-40	Cs-137	Th-228
Eggs	12B1	09/09/85	1.1 ± 0.1		
Chicken	12B1	09/09/85	2.6 ± 0.3		
Duck	10D1	09/09/85	2.9 ± 0.3		
Deer	3S	11/15/85	2.7 ± 0.3	0.17 ± 0.02	
Deer	5S	11/15/85	2.9 ± 0.3	0.29 ± 0.03	
Squirrel	15S	10/19/85	3.5 ± 0.4	3.9 ± 0.4	
Squirrel	1S	10/19/85	3.0 ± 0.3	2.0 ± 0.2	
Squirrel	2S	10/19/85	3.8 ± 0.4	1.9 ± 0.2	

* Only gamma emitters detected are reported; typical LLD values are found on Table 19.

TABLE 19

TYPICAL * LOWER LIMITS OF DETECTION OF NUCLIDES SEARCHED FOR BUT NOT FOUND BY GAMMA SPECTROMETRY

IN THE VICINITY OF SUSQUEHANNA STEAM ELECTRIC STATION, 1985

NUCLIDE	FISH (pCi/g wet)	SHORELINE SEDIMENT (pCi/g dry)	SURFACE WATER (pCi/ℓ)	GROUND WATER (pCi/ℓ)	POTABLE WATER (pCi/ℓ)	RAIN WATER (pCi/ℓ)
Mn-54	.018	.068	6.4	5.6	6.4	5.0
Co-58	.022	.078	6.5	6.2	6.5	5.4
Fe-59	.051	.21	11	11	14	11
Co-60	.018	.071	6.4	6.1	6.4	5.6
Zn-65	.040	.16	12	13	10	11
Zr-95	.050	.16	14.	12	14	11
Nb-95	.031	.088	7.4	6.9	7.2	5.9
I-131**	.61	.97	0.28	24	0.34	26
Cs-134	.020	.084	6.8	6.2	7.5	5.9
Cs-137	.020	.082	6.6	6.3	7.0	6.0
Ba-140	.39	.77	33	34	33	33
La-140	.11	.42	11	11	11	12

NUCLIDE	AIR PARTICULATES (10-3 pCi/m3)	MILK (pCi/ℓ)	PASTURE GRASS (pCi/g wet)	FRUITS/VEG. (pCi/g wet)	ALGAE (pCi/g dry)	GAME, POULTRY AND EGGS (pCi/g wet)	SOIL (pCi/g dry)
Mn-54	0.46	7.1	.051	.023	.33	.026	.097
Co-58	0.52	7.2	.060	.022	.32	.037	.10
Fe-59	0.68	15	.15	.051	.74	.090	.30
Co-60	0.52	13	.056	.024	.41	.023	.098
Zn-65	1.1	19	.11	.052	.77	.055	.20
Zr-95	1.0	17	.15	.052	.69	.078	.25
Nb-95	0.56	7.9	.065	.027	.33	.043	.11
I-131**	3.3	0.16	.20	.056	.59	2.8	.73
Cs-134	0.49	8.2	.054	.025	.38	.026	.10
Cs-137	0.48	7.9	.059	.025	.40	.026	.12
Ba-140	3.9	31	.17	.086	1.1	.94	.85
La-140	2.0	10	.063	.037	.59	.33	.32

* Typical refers to mean plus two standard deviations.
** Iodine-131 in surface water, potable water and milk is determined by radiochemical methods. See appendix B-5.

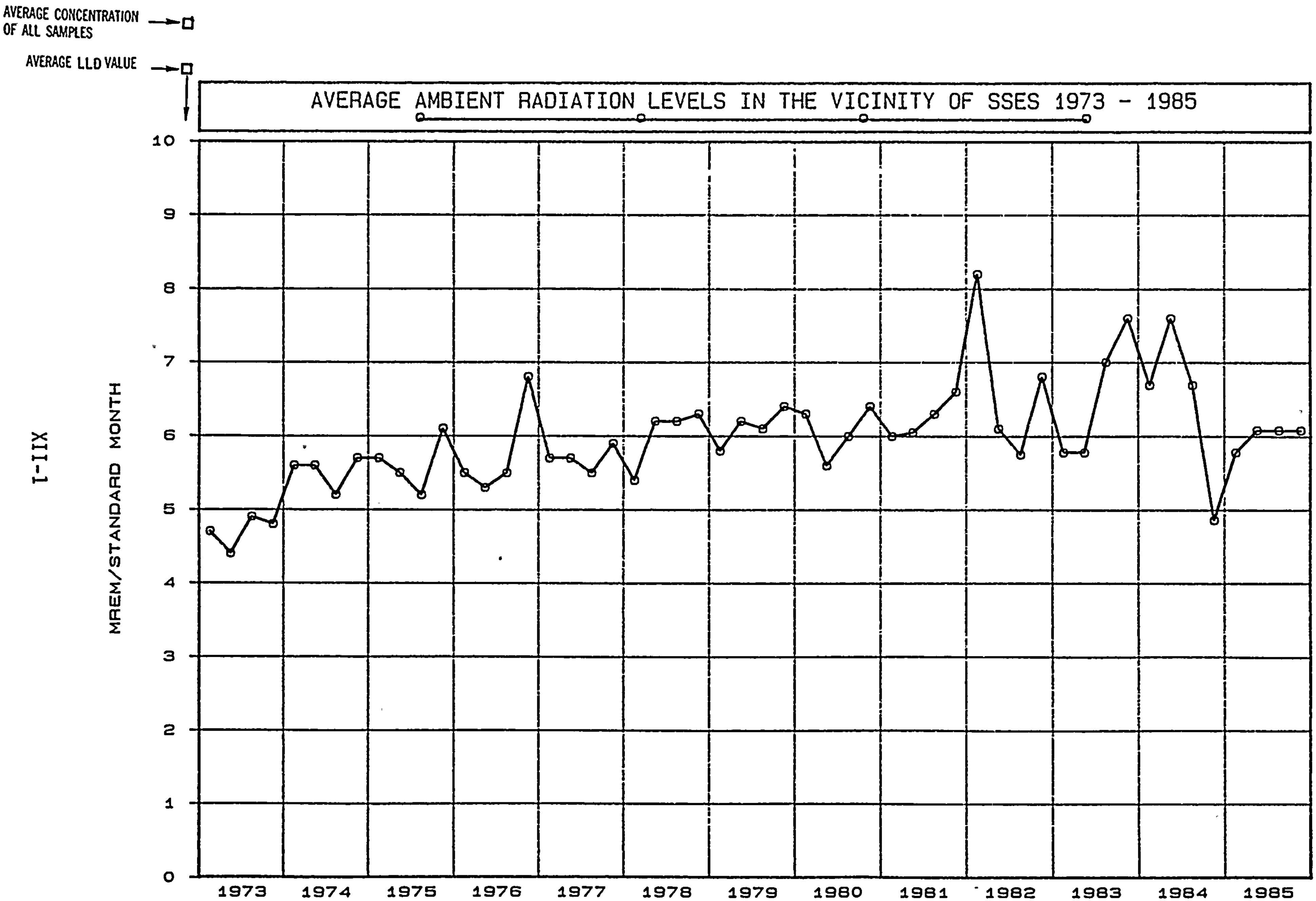
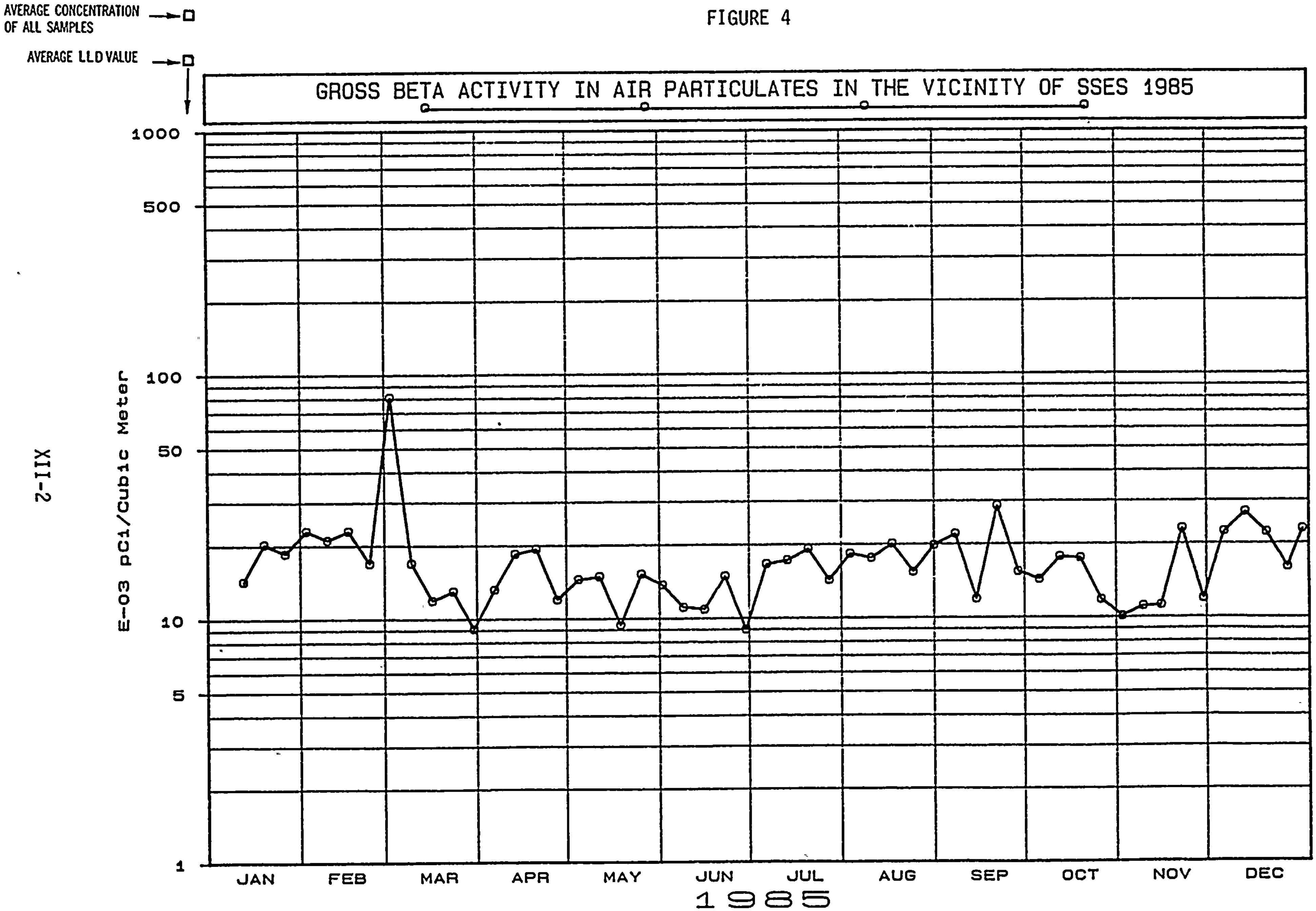
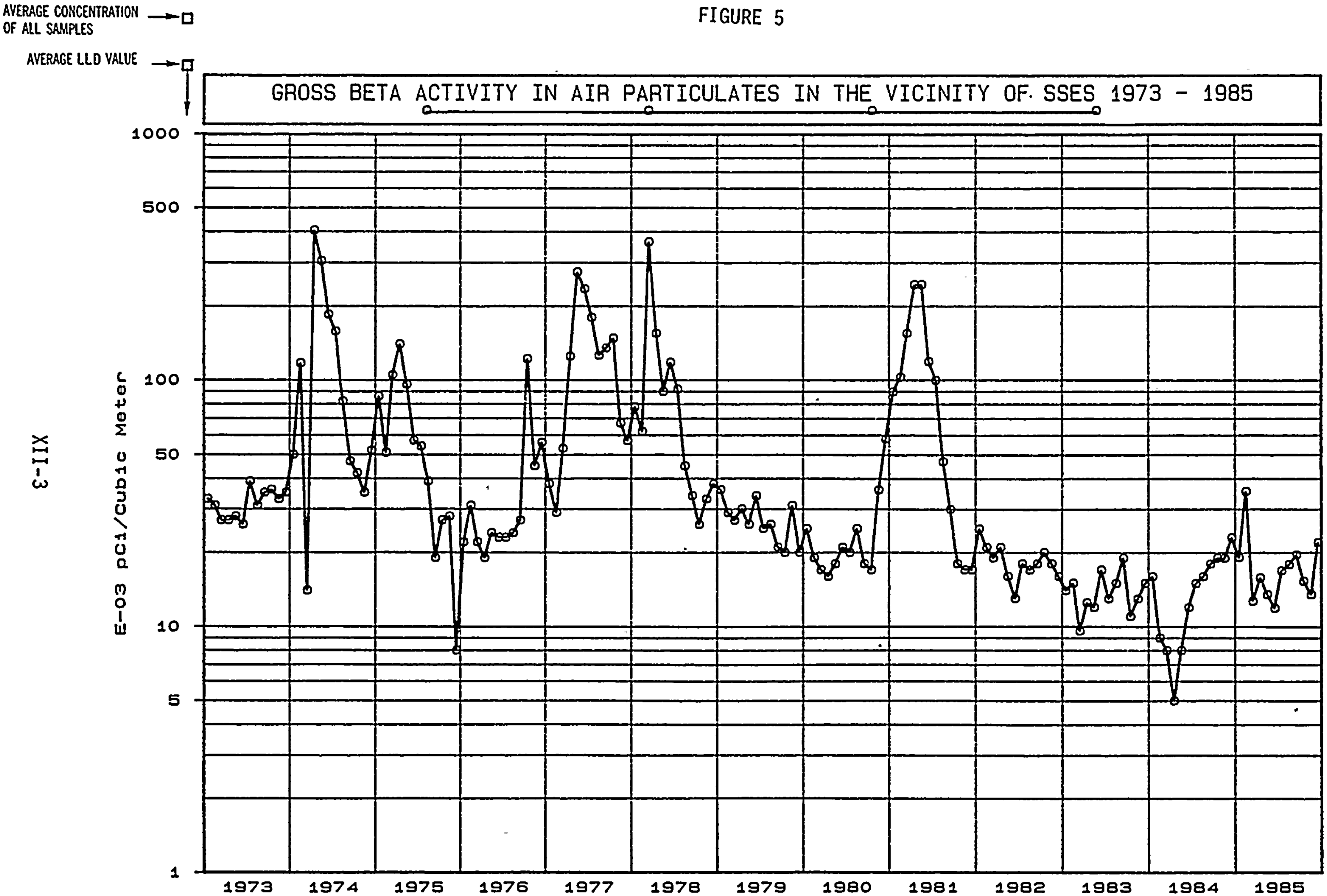

AVERAGE CONCENTRATION OF ALL SAMPLES
AVERAGE LLD VALUE
AVERAGE AMBIENT RADIATION LEVELS IN THE VICINITY OF SSES 1973 - 1985
MREM/STANDARD MONTH
10
9
8
7
6
5
4
3
2
1
0
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985

FIGURE 4



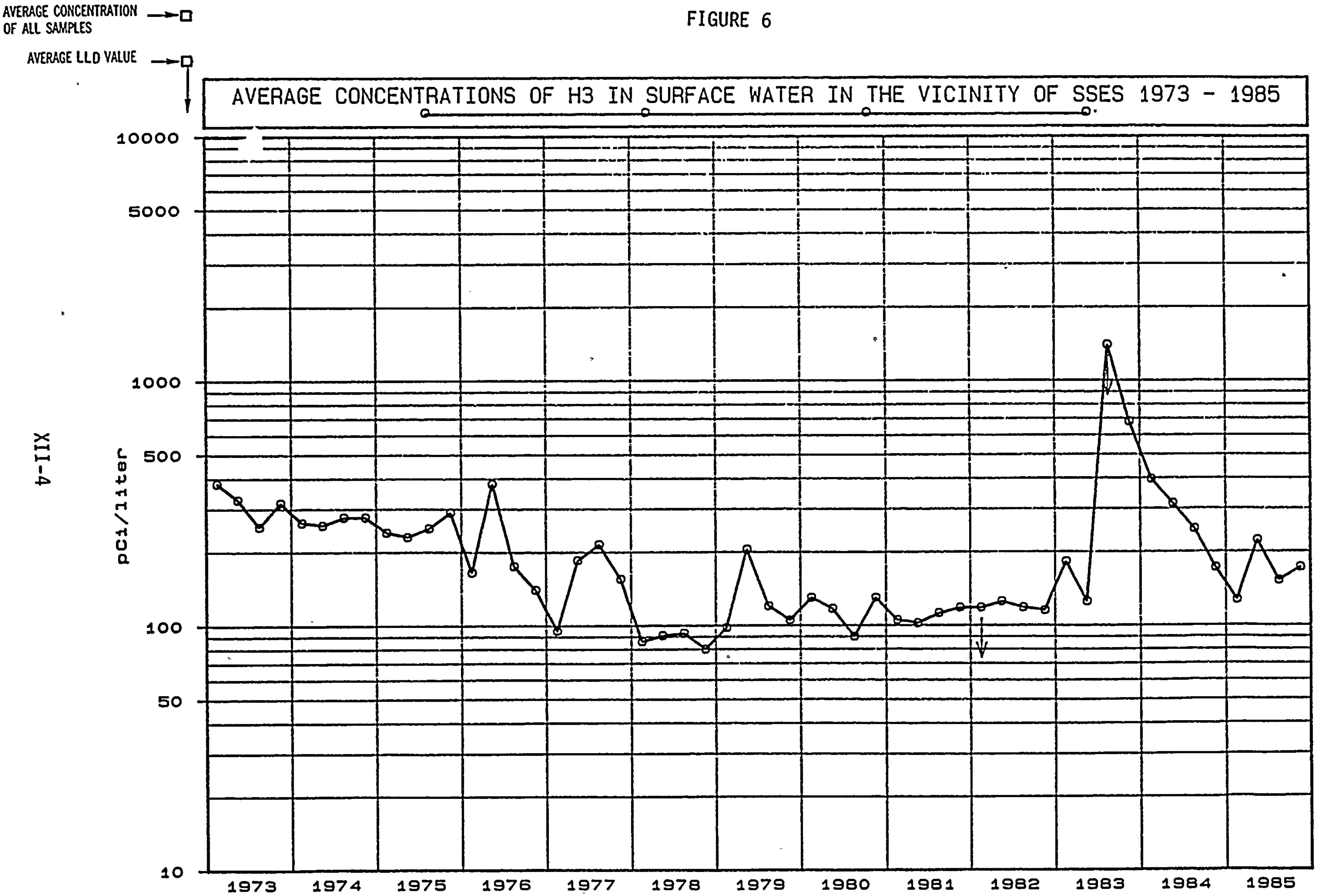
AVERAGE CONCENTRATION OF ALL SAMPLES
AVERAGE LLD VALUE
GROSS BETA ACTIVITY IN AIR PARTICULATES IN THE VICINITY OF SSES 1985
1000
500
100
50
10
5
1
E-03 pCi/Cubic Meter
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
1985

FIGURE 5



XII-3

FIGURE 6


AVERAGE CONCENTRATION OF ALL SAMPLES
AVERAGE LLD VALUE
AVERAGE CONCENTRATIONS OF H3 IN SURFACE WATER IN THE VICINITY OF SSES 1973 - 1985
pCi/liter
10000
5000
1000
500
100
50
10
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985

APPENDIX A

US EPA INTERCOMPARISON PROGRAM RESULTS

1. Introduction

The quality assurance program of the Radiological Laboratory of Teledyne Isotopes (TI) is briefly described in this appendix.

Information on each incoming sample is entered in a permanent log book. A sample number is assigned to each sample at the time of receipt. This sample number uniquely identifies each sample.

Laboratory counting instruments are calibrated, using radionuclide standards obtained from the National Bureau of Standards, the EPA, and reliable commercial suppliers, such as Amersham-Searle. Calibration of counting instruments is maintained by regular counting of radioactive reference sources. Background counting rates are measured regularly on all counting instruments. Additional performance checks for the gamma-ray scintillation spectrometer include regular checks and adjustment, when necessary, of energy calibration.

Blank, spiked (known quantities of radioactivity added), and replicate samples are processed periodically to determine analytical precision and accuracy.

2. Laboratory Analyses for Quality Assurance

Teledyne Isotopes participates in the U.S. Environmental Protection Agency Radioactivity Intercomparison Studies (Cross-check) Program. The TI results of analyses performed on samples and the known values are listed in Table A-1.

TABLE A-1

INTER-LABORATORY COMPARISONS, 1985

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(a)	Teledyne Isotopes Results(b)	All Participants Mean ± 2 s.d.
04/20/84	Water (Sample A)	Gross Alpha	35. ± 15.2	22. ± 4.6	28. ± 7.
04/20/84	Water	Gross Beta	147. ± 12.4	117. ± 17.3	(p)
	(Sample B)	Sr-89	23. ± 8.7	18. ± 7.5	24. ± 7.
		Sr-90	26. ± 2.6	22. ± 3.5 (h)	25. ± 4.
		Co-60	30. ± 8.7	29. ± 6.2	30. ± 4.
		Cs-134	30. ± 8.7	29. ± 4.6	29. ± 4.
		Cs-137	26. ± 8.7	29. ± 6.0	26. ± 3.
07/20/84	Water	Gross Alpha	6. ± 8.7	3.8 ± 2.4	(k)
	(k)	Gross Beta	13. ± 8.7	11.3 ± 3.5	(k)
07/27/84	Food	Sr-89	25.0 ± 8.7	17. ± 9.	(k)
	(c)(k)	Sr-90	20.0 ± 2.6	20. ± 9.	(k)
		I-131	39.0 ± 10.4	19. ± 3.5	(k)
		Cs-137	25.0 ± 8.7	26. ± 11.	(k)
		K	2605.0 ±226.0	3027. ±1183.	(k)
11/23/84	Air Filter	Gross Alpha	15. ± 8.7	15. ± 1.7	16. ± 6.
		Gross Beta	52. ± 8.7	54. ± 3.5	56. ± 12.
		Sr-90	21. ± 2.6	23. ± 3.0	21. ± 6.
		Cs-137	10. ± 8.7	9. ± 4.6	11. ± 6.
12/21/84	Water	Ra-226	8.6 ± 2.2	9.3 ± 1.8	8.0 ± 3.0
		Ra-228	4.1 ± 1.1	L.T. 1.3 (e)	3.8 ± 2.0
01/04/85	Water	Sr-89	3. ± 8.7	L.T. 3.	6. ± 3.
		Sr-90	30. ± 2.6	29. ± 10.5	28. ± 6.
01/18/85	Water	Gross Alpha	5. ± 8.7	5. ± 0.	5. ± 4.
		Gross Beta	15. ± 8.7	15.3 ± 1.7	17. ± 3.
01/25/85	Food	Sr-89	34.0 ± 8.7	17.0 ± 0.0 (d)	24.8 ± 20.1
	(c)	Sr-90	26.0 ± 2.6	22.0 ± 6.0	30.1 ± 17.8
		I-131	35.0 ± 10.4	26.3 ± 6.2	35.5 ± 10.8
		Cs-137	29.0 ± 8.7	31.0 ± 10.4	31.4 ± 8.2
		K	1382.0 ±207.9	1393.0 ± 96.4	1379.1 ±290.1

TABLE A-1

INTER-LABORATORY COMPARISONS, 1985

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(a)	Teledyne Isotopes Results(b)	All Participants Mean ± 2 s.d.
02/02/85	Water	H-3	3796. ±634.	3933. ±174.	3916. ±744.
02/08/85	Water	Cr-51	48. ± 8.7	L.T. 57.	47. ± 18.
		Co-60	20. ± 8.7	19. ± 6.	19. ± 6.
		Zn-65	55. ± 8.7	57. ± 6.	56. ± 12.
		Ru-106	25. ± 8.7	L.T. 40.	25. ± 14.
		Cs-134	35. ± 8.7	37. ± 12.	33. ± 8.
		Cs-137	25. ± 8.7	31. ± 5.	25. ± 6.
03/01/85	Milk	I-131	9. ± 1.6	8.0 ± 3.0	8. ± 4.
03/15/85	Water	Ra-226	5.0 ± 1.3	5.9 ± 2.1	4.9 ± 0.7
		Ra-228	9.0 ± 2.3	5.1 ± 1.8 (e)	8.4 ± 1.8
03/29/85	Air Filter	Gross Alpha	10.0 ± 8.7	10.3 ± 1.7	10.7 ± 4.8
		Gross Beta	36.0 ± 8.7	36.7 ± 7.5	38.3 ± 11.2
		Sr-90	15.0 ± 2.6	14.7 ± 1.7	15. ± 3.6
		Cs-137	6.0 ± 8.7	6.0 ± 0.0	6.8 ± 3.3
04/05/85	Water	I-131	7.5 ± 1.3	6.7 ± 1.7	6.96 ± 1.34
04/12/85	Water	H-3	3559. ±630.	3367. ±963.	3534. ±536.
04/19/85	Water (Sample A)	Gross Alpha	32.0 ± 8.7	25.33 ± 1.74 (f)	30.61 ± 19.91
		Ra-226	4.1 ± 1.0	3.66 ± 0.90	3.99 ± 2.64
		Ra-228	6.2 ± 1.6	6.13 ± 0.69	6.15 ± 4.26
		U	7.0 ± 10.4	6.67 ± 1.74	7.58 ± 4.46
04/19/85	Water (Sample B)	Gross Beta	72.0 ± 8.7	92.33 ± 9.63 (g)	69.98 ± 19.18
		Sr-89	10.0 ± 8.7	10.0 ± 0.0	9.71 ± 7.78
		Sr-90	15.0 ± 2.6	13.33 ± 3.45	14.37 ± 3.98
		Co-60	15.0 ± 8.7	20.0 ± 5.2	15.59 ± 5.46
		Cs-134	15.0 ± 8.7	14.66 ± 3.45	14.63 ± 5.90
		Cs-137	12.0 ± 8.7	16.33 ± 9.63	13.16 ± 4.96
05/10/85	Water	Sr-89	39.0 ± 8.7	35.66 ± 9.15	36.16 ± 16.74
		Sr-90	15.0 ± 2.6	12.66 ± 1.74 (h)	13.53 ± 1.16

Collection Date	Media	Nuclide	EPA-Results(a)	Teledyne Isotopes Results(b)	All Participants Mean ± 2 s.d.
05/24/85	Water	Gross Alpha	12.0 ± 8.7	12.00 ± 5.19	10.50 ± 6.40
		Gross Beta	11.0 ± 8.7	12.66 ± 1.74	12.46 ± 6.28
06/07/85	Water	Cr-51	44.0 ± 8.7	L.T. 53.3	47.81 ± 21.38
		Co-60	14.0 ± 8.7	15.66 ± 3.45	15.02 ± 5.34
		Zn-65	47.0 ± 8.7	48.33 ± 7.53	49.26 ± 12.34
		Ru-106	62.0 ± 8.7	53.67 ± 9.63 (i)	58.42 ± 24.10
		Cs-134	35.0 ± 8.7	33.0 ± 13.08	33.31 ± 7.56
		Cs-137	20.0 ± 8.7	23.33 ± 6.24	21.23 ± 5.78
06/14/85	Water	H-3	2416.0 ±608.0	2366.66 ±346.38	2399.15 ±622.92
06/21/85	Water	Ra-226	3.1 ± 0.7	3.86 ± 0.18 (j)	3.13 ± 1.14
		Ra-228	4.2 ± 1.0	3.66 ± 2.01	4.15 ± 2.02
06/28/85	Milk	Sr-89	11.00 ± 8.66	11.66 ± 3.45	9.82 ± 4.60
		Sr-90	11.00 ± 2.60	10.00 ± 0.0	10.11 ± 4.10
		I-131	11.00 ± 10.39	9.00 ± 3.00	11.74 ± 4.92
		Cs-137	11.00 ± 8.66	11.00 ± 7.92	11.62 ± 3.46
		K	1525.00 ±131.63	1540.0 ±103.92	1523.52 ±234.44
07/19/85	Water	Gross Alpha	11.0 ± 8.7	5.67 ± 1.74	9.10 ± 5.74
		Gross Beta	8.0 ± 8.7	4.33 ± 1.74	8.88 ± 6.40
07/26/85	Food (c)	Sr-89	33.00 ± 8.66	25.33 ± 6.24 (l)	24.66 ± 11.54
		Sr-90	26.00 ± 2.60	28.33 ± 4.56 (l)	26.77 ± 11.18
		I-131	35.00 ± 10.39	37.33 ± 4.56	37.13 ± 9.58
		Cs-137	29.00 ± 8.66	31.00 ± 3.00	30.74 ± 6.06
		K	1514.00 ±131.63	1633.33 ±153.96 (m)	1500.08 ±240.34
08/09/85	Water	I-131	33.00 ± 10.39	36.66 ± 4.56	31.86 ± 7.74
08/16/85	Water	H-3	4480.00±776.00	4433.3 ±458.25	4421.91 ±681.48
08/30/85	Air Filter	Gross Alpha	13.00 ± 8.66	12.66 ± 1.74	12.98 ± 5.04
		Gross Beta	44.00 ± 8.66	43.00 ± 9.00	47.48 ± 12.58
		Sr-90	18.00 ± 2.60	20.00 ± 3.00 (n)	17.73 ± 4.00
		Cs-137	8.00 ± 8.66	10.00 ± 3.00	9.42 ± 4.06

TABLE A-1

INTER-LABORATORY COMPARISONS, 1985

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(a)	Teledyne Isotopes Results(b)	All Participants Mean ± 2 s.d.
09/06/85	Water	Sr-89	20.00 ± 8.66	18.33 ± 4.56	18.80 ± 9.66
		Sr-90	7.00 ± 2.60	6.00 ± 0.00	6.94 ± 2.52
09/13/85	Water	Ra-226	8.90 ± 2.32	9.23 ± 1.47	8.44 ± 2.96
		Ra-228	4.60 ± 1.20	4.03 ± 0.60	4.47 ± 2.30
09/20/85	Water	Gross Alpha	8.00 ± 8.66	3.33 ± 1.74 (q)	7.62 ± 4.36
		Gross Beta	8.00 ± 8.66	4.00 ± 0.00 (q)	8.39 ± 4.28
10/04/85	Water	Cr-51	21.00 ± 8.66	L.T. 63.	24.37 ± 22.82
		Co-60	20.00 ± 8.66	17.66 ± 9.63	19.73 ± 4.30
		Zn-65	19.00 ± 8.66	25.33 ± 7.53 (o)	20.30 ± 6.90
		Ru-106	20.00 ± 8.66	L.T. 37.	23.00 ± 14.52
		Cs-134	20.00 ± 8.66	18.33 ± 9.15	18.62 ± 4.66
		Cs-137	20.00 ± 8.66	22.33 ± 3.45	20.33 ± 4.02
10/11/85	Water	H-3	1974.00 ±597.56	2133.33 ±624.48	1984.23 ±400.06

NOTES:

(a) EPA Results-Expected laboratory precision (3 sigma). Units are pCi/ℓ for water, urine, and milk except K is in mg/ℓ. Units are total pCi for air particulate filters.

(b) Teledyne Results - Average ± three sigma. Units are pCi/ℓ for water, urine, and milk except K is in mg/ℓ. Units are total pCi for air particulate filters.

(c) Units for food analysis are pCi/kg except K which is in mg/kg.

(d) The results from the EPA were received on August 09, 1985 for the analysis completed in April. The EPA had difficulty determining the correct results for this sample. It was difficult to scavenge and the results were reported as a courtesy although they were considered suspect because of the difficulty of analyzing a synthetic food sample.

(e) A new chemistry was tried but did not give good results. A further refinement of the chemistry is planned.

(f) The proportional counters are calibrated for alpha efficiency with Am-241. Low energy alpha emitters are included in the spike; however, no correction for efficiency was made.

(g) The proportional counters are calibrated for beta efficiency with Cs-137. The efficiency correction applied for the low energy beta emitters overcompensated because the amount of the low energy emitters was small compared with the high energy emitters.

Collection Date	Media	Nuclide	EPA-Results(a)	Teledyne Isotopes Results(b)	All Participants Mean ± 2 s.d.

Notes (Cont.)

(h) The low Sr-90 results were caused by erroneously high Sr-89 yields because of trace calcium and barium in the precipitated mount. Experiments will be conducted to eliminate this problem.

(i) The three results were 50, 55 and 56 pCi/ℓ. The one low result of 50 caused the average to be below the two sigma normalized deviation from the known.

(j) A new NBS traceable standard was prepared to check the efficiency calibration of the ZS coated alpha counters used to count Ra-226.

(k) Results were not released to Teledyne Isotopes.

(l) The results for these samples showed high variability with some results near the spike value. In the future samples will be counted longer and sooner after milk time to reduce the amount of ingrowth correction of Sr-90 into Sr-89.

(m) The weight of the sample analyzed will be controlled more carefully since the density may vary from sample to sample.

(n) The reported results were 21, 20 and 19. If the counting error (± 1.0) is taken into consideration, these results would have been within the two sigma normalized deviation from the known.

(o) The reported results were 23, 25 and 28. The one high result of 28 caused the average to be above the 2 sigma normalized deviation from the known.

(p) There was a significant difference between the known value and the grand average, therefore, the EPA deleted the results from the final report.

(q) Low results were caused by a misunderstanding of the dilution instructions by the analyst. Samples were diluted by 2.

APPENDIX B

SUMMARY OF ANALYTICAL METHODS

The following section contains a description of the analytical laboratory procedures along with an explanation of the analytical calculation methods used by Teledyne Isotopes for sample analysis. These are considered proprietary and are published for informational purposes only.

A further discussion on data reporting conventions can be found in Appendix C.

TLD MEASUREMENTS

During the four quarters of 1985, a PP&L dosimetry system was used which consists of a Panasonic UD-710 reader and UD-801 badges. The UD-801 badges have two elements of lithium borate (Cu) and two elements of calcium sulfate (Tm). Only the calcium sulfate (Tm) elements are used for environmental measurements. This phosphor was chosen for its characteristic high light output, minimal thermally induced signal loss (fading) and negligible self-dosing.

In handling, the badges are kept clean, and the element phosphors are not touched. The badges are stored and transported in plastic bags or other containers.

Before going to the field, the dosimeters are read twice (separated by one hour) in which the second reading is used as an inherent (background) reading for each element. After the inherent read, the badges are placed in sealed plastic bags (to aid in preventing moisture contacting the TLDs) labeled with the sampling location and taken immediately out to the field. Upon removal from the field, the TLDs are inspected for any damage and readout immediately. In-transit TLDs are not used because of the short time period between the inherent reading and field placement.

An element correction factor has been calculated for each element, and the reader is calibrated using a cesium-137 source.

DETERMINATION OF GROSS ALPHA AND/OR GROSS BETA ACTIVITY IN WATER SAMPLES, AIR PARTICULATE FILTERS, COMPOSITED AIR PARTICULATE FILTERS OR SEDIMENTS

TELEDYNE ISOTOPES

This describes the process used to measure the overall alpha and/or beta radioactivity of water samples, air particulate filters, composited air particulate filters or sediments without identifying the radioactive species present. No chemical separation techniques are involved. One liter of the water sample is evaporated on a hot plate. The evaporated sample is rinsed into a 2-inch diameter stainless steel planchet which is stamped with a concentric ring pattern to distribute residue evenly. Final evaporation to dryness takes place under heat lamps. Residue mass is determined by weighing the planchet before and after mounting the sample. In the case of an air particulate sample, the filter is mounted directly on a 2-inch stainless steel planchet. Composited air filter samples are leached with nitric acid to bring the deposit into solution. The solution is filtered and a aliquot is evaporated and then mounted on a 2-inch stainless steel planchet. Sediment samples are dried and a 1 gram aliquot is mounted directly on a 2-inch stainless steel planchet.

The planchets are then counted for alpha and/or beta activity in a low-background gas flow proportional counter. Calculation of activity includes an empirical self-absorption correction curve which allow for the change in effective counting efficiency caused by the residue mass. Self absorption is not considered in the case of air particulate filters because of the impracticality of accurately weighing the deposit and because the penetration depth of the deposit into the filter is unknown.

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE LLD

$$\frac{\text{Net pCi on collection date}}{\text{unit volume or wt.}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22\ (v)\ (\varepsilon)}}_{\text{net activity}} \pm \underbrace{\frac{\sigma m \sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\ (v)\ (\varepsilon)}}_{\text{counting error}}$$

where:

- N = total counts from sample (counts)
- Δt = counting time for sample (min)
- β = background rate of counter (cpm)
- $2.22 = \frac{\text{dpm}}{\text{pCi}}$
- $v(w)$ = volume or weight of sample analyzed
- ε = efficiency of the counter
- σm = multiples of counting error

For gross alpha and gross beta calculations set y = 1 and DF = 1.

A detection limit (MDL) or "less than" (LT) value is reported if no activity is found. If the net activity, as calculated above, is less than or is equal to a predetermined multiple (σm) of the background counting error, then the LT value is reported. A sigma multiple (σm) of 4.66 is used for calculation of the LT value unless the customer requests another value such as 2.83.

Thus LT =

$$\frac{\sigma m \sqrt{\frac{\beta}{\Delta t}}}{2.22\ (v)\ (\varepsilon)\ (y)\ (DF)}$$

DETERMINATION OF I-131 IN MILK AND WATER SAMPLES BY RADIOCHEMISTRY AND LIQUID PHASE BY ANALYSIS

TELEDYNE ISOTOPES

This describes the radiochemical methods for determining I-131 activity in milk and water samples by coincidence counting in the liquid phase.

Four liters of sample are first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin is used to remove iodide from the sample. The iodine is then stripped from the resin with sodium hypochlorite solution, is reduced with hydroxylamine hydrochloride, and is extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution.

The iodide sample solution is oxidized to the free state using $NaNO_2$ reagent and is extracted several times into a total of 15 ml of toluene. A 200 μl aliquot is taken for determining chemical yield by spectrophotometer. A decolorizing agent (2-methyl-2-butene) is added to the toluene-iodine solution to form an inert molecule and to minimize liquid scintillation quenching. A toluene-based liquid scintillation counting solution is added to the sample, which is then analyzed by a beta-gated gamma-coincidence counting system.

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE MDL

The Sample Activity and the 2-sigma Counting Error are Calculated as Follows:

$$\frac{\text{Net pCi on collection date}}{\text{liter}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22(v)(y)(DF)(\mathcal{E})}}_{\text{net activity}} \pm \underbrace{\frac{2\sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\ (v)(y)(DF)(\mathcal{E})}}_{\text{counting error}}$$

where: N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

2.22 = $\frac{\text{dpm}}{\text{pCi}}$

v = volume of sample analyzed (liters)

y = chemical yield of the mount or sample counted

DF = decay factor from the collection to the mid count time

$\mathcal{E}$ = efficiency of the counter for I-131

Note: Efficiency is determined by counting an I-131 standard. Consequently, the branching intensity (abundance) of the I-131 gamma does not appear in the above equation.

Calculation of the MDL

If the net activity (previously defined) is equal to or is less than a specified multiple of the background counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

The L.T. value can be specified by stating only the counting error at a predetermined multiple (σm) of the one sigma statistics. A sigma multiple (σm) of 4.66 is used for calculation of the L.T. values unless another multiple such as 2.83 is specified.

$$\text{thus L.T.} = \frac{\sigma m\sqrt{\frac{\beta}{\Delta t}}}{(2.22(v)(y)(DF)(\mathcal{E})}$$

DETERMINATION OF TRITIUM BY GAS COUNTING

TELEDYNE ISOTOPES

A 2 ml aliquot is reduced into hydrogen gas and collected in an activated charcoal trap. The hydrogen is then transferred into a previously evacuated one liter proportional counter. Non tritiated hydrogen and ultra-high purity methane is added and then counted. Backgrounds and standards are counted in the same gas mixture as the samples.

Calculation of the sample activity or the MDL:

$$\frac{\text{Net pCi}}{\text{unit vol.}} = \frac{3.234 x (TU)_N \times V_N}{CPM_N \times V_S} \left[(CPM)_G - BKG \pm \overline{\sigma m} \sqrt{\sigma G^2 + \sigma B^2} \right]$$

where: $(TU)_N$ = the tritium units of the standard

V_N = volume of the standard used to calibrate the efficiency of the detector - in psia

V_S = volume of the sample loaded into the detector - in psia

$(CPM)_N$ = the cpm activity of the standard of volume V_N

$(CPM)_G$ = the gross activity of the sample of volume V_S and the detector background

BKG = the background of the detector in cpm

3.234 = conversion factor changing TU to pC/ℓ

Δt = counting time for the sample

σm = multiple of the counting error

σG = standard deviation of the gross activity of the sample and the detector background, in cpm

σB = standard deviation of the background, in cpm

Tritium (cont.)

If the net activity $(CPM)_G$ - BKG is equal to or is less than twice the counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

$$\text{thus L.T.} = \frac{2 \times 3.234 \times (TU)_N \times V_N \times \sqrt{\sigma_G^2 + \sigma_\beta^2}}{(CPM)_N \times V_S}$$

where: σ_G = standard deviation of the gross activity of the sample and the detector background, in cpm

σ_β = standard deviation of the background, in cpm

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

TELEDYNE ISOTOPES

Gamma emitting radioisotopes are determined with the use of a lithium-drifted germanium (Ge(Li)) and high purity germanium detectors with high resolution spectrometry in specific media, for example, air particulate filters, charcoal filters, milk, water, vegetation, soil/sediments, biological media, etc. Each sample to be assayed is prepared and counted in standard geometries such as one liter wrap-around Marinelli containers, 300 mℓ or 150 mℓ bottles, or two-inch filter paper source geometries.

Samples are counted on large (>55 cc volume) Ge(Li) detectors connected to Nuclear Data 6620 data acquisition and computation systems. All resultant spectra are stored on magnetic tape.

The analysis of each sample consists of calculating the specific activities of all detected radionuclides or the detection limits from a standard list of nuclides. The Ge(Li) systems are calibrated for each standard geometry using certified radionuclide standards traceable to the National Bureau of Standards.

CALCULATION OF THE SAMPLE ACTIVITY AND COUNTING ERROR

$$\text{Net pCi/vol or mass} = \underbrace{\frac{N - \beta}{2.22\,(v)(\varepsilon)(BI)(DF)(\Delta t)}}_{\text{net activity}} \pm \underbrace{\frac{2\sqrt{N + \beta}}{2.22\,(v)(\varepsilon)(BI)(DF)(\Delta t)}}_{\text{counting error}}$$

Gamma Cont.

where:

- N = area, in counts, of a spectral region containing a gamma emission of the nuclide of interest

  Note: if the detector exhibits a peak in this region when counting a blank (ie. from natural background) then $(BB)(\Delta t)$ is subtracted from N before using the above equation. BB is the count rate of the blank, cpm, in the background peak.

- B = background counts in the region of interest, calculated by fitting a straight line across the region connecting the two adjacent regions.

- Δt = counting interval of sample, minutes

- 2.22 = dpm/pCi

- v = volume or mass of sample analysed

- = efficiency of counter at the energy region of interest

- BI = branching intensity of the nuclide at the gamma emission energy under consideration

- DF = decay factor from sample collection time to midpoint of the counting interval

CALCULATION OF MINIMUM DETECTABLE LEVEL (MDL)

$$\text{MDL pCi/vol or mass} = \frac{4.66\sqrt{N}}{2.22\,(v)(\varepsilon)(BI)(DF)(\Delta t)}$$

The width of the spectral band around the emission energy is calculated differently from the case of an identified peak, so that the value of N used in the two equations may differ.

A detection limit (MDL) or "less than" (LT) value is reported if no activity is found. If no spectral lines are identified at the energies appropriate to a nuclide, the LT value is calculated by the above equation. If spectral lines are identified but the 2 sigma error in the first equation is greater than 60% of the net activity, then a LT value is also assigned by the second equation.

The analyst's judgement is excercised in the decision to report an activity or an MDL. The agreement between various spectral lines of the same nuclide, and possible interference from other nuclides, are considered in this decision.

APPENDIX C

DATA REPORTING CONVENTIONS

The results from Teledyne Isotopes analyses are reported to two significant figures. Errors are reported to the same decimal place as the result. If the error has no digit before the third figure in the result, the error is rounded up to the second significant figure. If the error is less than 10% of the result, an error of 10% of the result is reported. Detection limits are rounded to one significant figure.

In the tables presenting analytical measurements, the calculated value is reported with the counting error of 2 standard deviations (2s) derived from a statistical analysis of both the sample and background count rates. The precision of the results is influenced by the size of the sample, the background count rate, and the method used to round off the value obtained to reflect its degree of significance. For the results of gamma spectrometric analysis, the precision is also influenced by the composition and concentrations of the radionuclides in the sample, the size of the sample, and the assumptions used in selecting the radionuclides to be quantitatively determined. The 2s error for the net counting rate is--

$$2s = 2\sqrt{\frac{R_s}{t_s} + \frac{R_b}{t_b}}$$

where

R_s = sample counting rate

R_b = background counting rate

t_s = sample counting time

t_b = background counting time

Results reported as less than (LT) are below the lower limit of detection (LLD). The LLD is defined as the smallest concentration of radioactive material in a sample that will yield a net count (above system background) with a 95 percent probability of detection and with only a 5 percent probability of falsely concluding that a blank observation represents a "real" signal.

For a measurement system that may include radiochemical separation--

$$LLD = \frac{4.66 s_b}{(E)(V)(2.22)(Y)\ (\exp(-\lambda \Delta t))}$$

where

LLD = lower limit of detection, as defined above, in pCi per unit mass or volume

s_b = standard deviation of the background counting rate or of the counting rate of a blank sample, as appropriate, in counts per minute

E = counting efficiency in counts per disintegration

V = sample size in units of mass or volume

2.22 = number of disintegrations per minute per picocurie

Y = fractional radiochemical yield, when applicable

λ = radioactive-decay constant for the particular radionuclide in units of reciprocal time

Δt = elapsed time between sample collection and counting

The folowing are definitions of statistical terms used in analyses and reporting of environmental-monitoring results:

1. Mean (or average or arithmetic mean) A measure of the central value of a set; the sum of all values in a set divided by the number of values in that set. The mean is expressed as follows:

$$\overline{X} = (X_1 + X_2 + \ldots X_n)/n = \sum_{i=i}^{n} X_i/n$$

2. Precision The reproducibility of measurements within a set; the scatter or dispersion of a set about its central value.

3. Measures of precision with a set

   a. Standard deviation The precision with which the values of a set are measured; the square root of the value yielded by division of the sum of squares of deviations of individual values from the mean by one less than the number of values in the set. The standard deviation, s, is expressed as follows:

$$s = \sqrt{\sum_{i=i}^{n} (X_i - \overline{X})^2/(n-1)}$$

   The standard deviation has the same units as the result. It becomes a more reliable expression of precision as n becomes larger. When the measurements are independent and normally distributed, the most useful statistics are the mean for the central value and the standard deviation for the dispersion.

   b. Relative standard deviation The standard deviation expressed as a fraction of the mean, $x/\overline{X}$. It is sometimes multiplied by 100 and expressed as a precentage.

   c. Range The difference in magnitude between the highest and the lowest values in a set. Instead of a single value, the actual limits (i.e., minimum value/maximum value) are sometimes expressed.

SUSQUEHANNA STEAM ELECTRIC STATION

Radiological Environmental Monitoring Program

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Prepared for

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By

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I. INTRODUCTION

The preoperational radiological environmental monitoring program (REMP) for Pennsylvania Power and Light Company (PP&L) at the Susquehanna Steam Electric Station (SSES) was conducted from April 1972 to September 1982. On September 10, 1982, Unit #1 became critical, thereby initating the operational phase of the program. The preoperational phase of the program, as well as the initial phase of the operational program (September 10, 1982 through June 1983) was conducted by Radiation Management Corporation (RMC). NUS Corporation conducted the REMP from June 1983 until August 1984 when Teledyne Isotopes (TI) took over the operational REMP. The analytical program is now being conducted by Teledyne Isotopes under contract with Pennsylvania Power and Light. The sample collection portion of the program is being conducted by Ichthyological Associates, a PP&L contractor located at the Susquehanna SES Biological Laboratory on site.

This report covers the period December 31, 1983 through January 08, 1985. In general, the data from the first half of 1984 was generated by NUS and the data from the second half of 1984 was generated by TI. Data from programs conducted in prior years have been presented in a series of annual reports.[1-12]

A. Site and Station Description

Susquehanna SES contains 2 BWR generating units, each with a capacity of about 1050 MWe. Unit #1 achieved initial criticality on September 10, 1982. Unit #2 achieved initial criticality on May 8, 1984. The site is located on an approximately 1300 acre tract along the Susquehanna River, five miles northeast of Berwick in Salem Township, Luzerne County, Pennsylvania.

The area surrounding the site can generally be characterized as rural, with forest and agricultural lands predominating. More specific information on the demography, hydrology, meteorology and land use characteristics of the local area may be found in the Environmental Report[13], the Final Safety Analysis Report[14] and the Final Environmental Statement[15] for Susquehanna SES.

B. Objectives and Overview of Susquehanna SES Monitoring Program

United States Nuclear Regulatory Commission (USNRC) regulations require that nuclear power plants be designed, constructed, and operated to keep levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable (ALARA) (10 CFR 50.34 and 10 CFR 20.1c). To ensure that these criteria are met, each license authorizing reactor operation includes technical specifications (10CFR 50.36a) governing the release of radioactive effluents.

In-plant monitoring will be used to ensure that these predetermined release limits are not exceeded. However, as a precaution against unexpected and undefined processes which might allow undue accumulation of radioactivity in any sector of man's environment, a program for monitoring the plant environs is also included in the Susquehanna technical specifications.

The regulations governing the quantities of radioactivity in reactor effluents allow nuclear power plants to contribute, at most, only a few percent increase above normal background radioactivity. Background levels at any one location are not constant but vary with time as they are influenced by external events such as cosmic ray bombardment, weapons test fallout, and seasonal variations. These levels also can vary spatially within relatively short distances reflecting variations in geological composition and other factors. Because of these spatial and temporal variations, the radiological surveys of the plant environs are divided into preoperational and operational phases. The preoperational phase of the program of sampling and measuring radioactivity in various media permits a general characterization of the radiation levels and concentrations prevailing prior to plant operation along with an indication of the degree of natural variation to be expected. The operational phase of the program obtains data which, when considered along with the data obtained in the preoperational phase, assist in the evaluation of the radiological impact of plant operation.

The objectives of the operational Radiological Environmental Monitoring Program are:

1. To identify, measure and evaluate existing radionuclides in the environs of the Susquehanna SES site and fluctuations in radioactivity levels which may occur.

2. To determine whether any significant increase occurs in the concentration of radionuclides in critical pathways.

3. To detect changes in ambient radiation levels.

4. To verify that Susquehanna SES operations have no detrimental effects on the health and safety of the public or on the environment.

5. To fulfill the obligations of the Radiological Environmental Monitoring section of the technical specifications for Susquehanna SES.

Sampling locations were selected on the basis of local ecology, meteorology, physical characteristics of the region, and demographic and land use features of the site vicinity. The REMP was designed on the basis of the USNRC Radiological Assessment Branch Technical Position on radiological environmental monitoring as revised in Revision 1, November 1979.[16]

In 1984 the radiological monitoring program included the measurement of ambient gamma radiation by thermoluminescent dosimetry; the determination of gamma emitters, gross alpha, and gross beta in shoreline sediments; the determination of gamma emitters and gross beta in fish; the determination of gross beta, gross alpha, and gamma emitters in airborne particulates; the measurement of airborne iodine-131; the measurement of gross beta, gross alpha, gamma emitters, iodine-131, and tritium in water; the measurement of gross beta, gross alpha, gamma emitters, and tritium in precipitation; the measurement of iodine-131 and gamma emitters in cow milk and iodine-131 in goat milk; the determination of gamma emitters in game, poultry, eggs, and various fruits and vegetables; the determination of gamma emitters in algae; and, the determination of gamma emitters in soil and vegetation.

II. PROGRAM DESCRIPTION

One-hundred and thirty-one (131) locations were included in the Susquehanna SES monitoring program for 1984. Environmental sampling locations were divided into two classes, indicator and control. Indicator samples are those collected at locations which are expected to manifest station effects, if any exist, and were selected on the basis of distance from the site, topography, hydrology, meteorology, demography, and drainage characteristics. Control samples are collected at locations which are believed will be unaffected by station operation. These provide a basis on which to evaluate fluctuations in radioactivity at indicator locations in relation to natural phenomena and fallout. The number and locations of monitoring points were determined by considering the locations where the highest off-site environmental concentrations have been predicted from plant effluent source terms, site hydrology, and site meteorological conditions. Other factors considered were applicable regulations, population distribution, ease of access to sampling stations, security and future program integrity.

The operational environmental radiological program for Susquehanna SES is summarized in Table 1. Table 2 describes sample locations, associated media, and approximate distance and direction from the site. Figures 1 and 2 illustrate the locations of sampling stations relative to Susquehanna SES.

In addition to the described analytical program, a milk animal, vegetable garden, and residence survey was performed in 1984. This survey located the nearest milk animal, garden and residence in each sector (out to 5 miles) and will be updated annually.

III. SAMPLING METHODS AND PROCEDURES

To derive meaningful and useful data from the radiological environmental monitoring program, sampling methods and procedures are required which will provide samples representative of potential pathways of the area.

A. Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct (ambient) radiation levels at sixty-six (66) monitoring points as described in Tables 1 and 2. Sampling locations were chosen according to the criteria given in the USNRC Branch Technical Position on Radiological Monitoring (Revision 1, November 1979).[16]

The area around the station was divided into 16 radial sectors of 22 1/2 degrees each. TLDs were placed in all sectors. The TLDs were placed at locations designed to take advantage of local meteorologic and topographic characteristics and population distribution characteristics. There were seven (7) control locations: 3G3, 3G4, 4G1, 7G1, 7H1, 12G1, and 12G4.

In the first, second and third quarters direct radiation measurements were made using TLDs consisting of $CaSO_4$:Dy in teflon cards. The dosimeters were exchanged on a quarterly basis. Additional TLDs were shipped with each quarterly batch and stored in a lead-pig for the duration of the quarter in order to determine the in-transit dose.

In the fourth quarter direct radiation measurements were made using Panasonic UD-801 thermoluminescent dosimeters (TLDs) consisting of calcium sulfate doped with thulium ($CaSO_4$:Tm). Element correction factors were determined for each dosimeter by exposure to an accurately known radiation field from a calibrated Cs-137 source.

B. Fish

Fish sampling was conducted in the spring (May) and the fall (late September and October) at three locations for this program. Downstream of the Susquehanna SES on the Susquehanna River was selected as an indicator location (IND), and an upstream location was chosen as a control location (2H). Fish samples were also taken from lake Took-A-While (LTAW), an indicator station.

Available edible species were filleted at the time of collection. The edible portions were packed in dry ice and shipped to the laboratory for analysis by gamma spectrometry and for gross beta.

C. Sediment

Sediment samples were collected in June and September at six locations in the Susquehanna River. These were Bell Bend (7B), near Hess Island (11C), the old Berwick test track (12F), near Gould Island (2B), between Shickshinny and the former State Hospital (2F) and Lake Took-A-While (LTAW). Samples were analyzed for gamma emitting nuclides, gross alpha and gross beta. The control locations are 2B and 2F.

D. Water

The waterborne pathways of exposure from Susquehanna SES were evaluated by analyzing samples of surface water, well water, and drinking water.

Surface Water

The Susquehanna River was sampled monthly at nine locations. Daily grab samples were collected at 12H1 (Merck Company) then composited into a monthly sample. Monthly samples were also composited from weekly grab samples at location 5S8 (under the power line) and location 6S5 (outfall area). Monthly grab samples were collected at location 1D3 (Mocanaqua Substation), location 12F1 (Berwick Bridge), location 12G2 (between Bloomsburg and Berwick), and location 1D5 (Shickshinny Sewage Treatment facility effluent). Monthly grab samples were also obtained from Glen Brook Reservoir (13E1) and Lake Took-A-While (LTAW). Monthly surface water samples were analyzed for gross alpha, gross beta, gamma emitters, iodine-131 and tritium. Stations 5S8, 6S6, 1D5, 1D3, and 13E1 were the control stations.

Automatic water samplers are installed at the river water intake (6S6) and the cooling tower blowdown discharge line (6S7). These samples were analyzed weekly for iodine-131. Monthly composites of the weekly samples were analyzed for gross alpha, gross beta, gamma emitters and tritium. Locations 5S8 and 6S5 provide alternate data for locations 6S6 and 6S7, respecitvely, in the event that the automatic samplers malfunction.

Well Water

Eight wells: the Energy Information Center (2S6), the Riverlands Security Office (3S5), the peach stand on-site (4S2), the Training Center (4S4), the EOF Building (11S5), the Serafin Farm (15A4), the Berwick Hospital (12E4) and the Berwick Water Company (12F3), a control station, were sampled monthly. The Berwick Water Company (12F3) actually discharges a portion of its surplus water into the Glen Brook Revervoir (a surface water location 13E1). Station 12F3 is included here because its sampling regime is that for well water. Gross alpha, gross beta, gamma and tritium analyses were performed on the monthly samples.

Drinking Water

Drinking water was sampled monthly at Berwick Water Company (12F3) and weekly at the Danville Water Company (drinking water supply closest to Susquehanna SES which could be affected by plant discharge) stations 12H2 RAW and 12H2 TREATED. 12H2 RAW is taken from the Susquehanna river intake structure while 12H2 TREATED is drawn from the supply line after processing. The weekly samples were analyzed for iodine-131. Monthly composites of the 12H2 RAW and 12H2 TREATED samples were made from the weekly composites and analyzed for gross alpha, gross beta, gamma emitters and tritium. The grab sample from 12F3 was analyzed for gross alpha, gross beta, gamma emitters, iodine-131 and tritium monthly.

E. Airborne Particulates/Air Iodine-131/Precipitation

Airborne pathways were examined by analyzing air particulates, air iodine and precipitation. Air particulates were collected on Gelman type-A/E, glass fiber filters with low-volume air samplers. Air iodine was collected on one-inch-deep Science Applications, Inc. charcoal cartridges. Air sample volumes were measured with temperature-compensated dry-gas meters.

The samplers were run continuously and the filters and charcoal cartridges exchanged weekly. The elapsed time of sampling was recorded on an elapsed-time meter. The initial and final volumes as registered on the dry gas meter, were recorded by the sample collector.

Atmospheric pathway samples were collected at eleven locations; the Information Center (2S2), the Biological Laboratory (5S4), the Golomb House (11S2), the transmission line at site 15 (15S4), the transmission line east of route 11 (9B1), the Mocanaqua Substation (1D2), near Pond Hill (3D1), the Berwick Hospital (12E1), the Hazelton Chemistry Lab (7G1), at Bloomsburg (12G1) and the PP&L roof in Allentown (7H1). The last three locations, 7G1, 12G1, and 7H1 were the controls. Air filters were analyzed weekly for gross beta and quarterly for gamma emitters and gross alpha. Air iodine was collected on charcoal cartridges in series with the air particulate filter at all locations. The charcoal cartridges are warranted to have an efficiency of removal of elemental iodine of 99%. The charcoal cartridges are analyzed weekly for iodine-131.

Precipitation samples were collected at least monthly from locations 2S2, 5S4, 11S2, 15S4, 9B1, 1D2, 3D1, 12E1, 7G1 (control) and 12G1 (control) and composited and analyzed quarterly for gross alpha, gross beta, tritium and gamma emitters.

F. Milk/Pasture Grass

Cow milk samples were collected monthly from eight locations; 12B2, 12B3, 6C1, 10D1, 12D2, 5E1, 13E3 and 10G1 (control). Samples were collected semi-monthly from April through October from locations 12B2, 5E1, 13E3, and 10G1. Each monthly and semi-monthly sample was analyzed for iodine-131 and gamma emitters.

Goat milk was sampled at one location (8D1) quarterly. Goat milk was analyzed for iodine-131 only.

Pasture grass was collected monthly at the farm closest to the site (15A1). Pasture grass samples from location 8D1 were collected during quarters when the goat milk was unavailable. Each sample was analyzed by gamma spectrometry.

G. Food Products

Fruits and Vegetables

Gamma spectrometry was used to analyze various types of food products collected from farms or gardens within the vicinity of Susquehanna SES. These included the following: apples, honey, corn, cabbage, lettuce, potatoes, collards, spinach, string beans, tomatoes, endive, strawberries, and swiss chard. Locations that were sampled were 11D1, 7S5, 7B2, 11S6, 12B1 and 2H1 (control).

Meat

Meat samples consisting of eggs and chicken were collected from a local farm (12B1). The edible portion was analyzed for gamma emitters.

Game

One deer sample and one composite squirrel sample were collected in the fall and the flesh was analyzed for gamma emitters. Both samples were collected from station 2A.

H. Algae

Susquehanna River algae collections were set up at six locations beginning in May as a special study to locate the source of iodine-131 upstream of the Susquehanna SES as postulated earlier(11a). Surface samplers were located above (AG-1) and below (AG-2) the Wilkes-Barre sewage treatment plant, above (AG-3) the Susquehanna SES river water intake structure, and below (AG-4) the cooling tower blowdown discharge diffuser. Bottom samplers were located above (AG-5) the intake structure and below (AG-6) the discharge diffuser.

Locations AG1, AG3, and AG5 serve as controls for indicator locations AG2, AG4, and AG6, respectively. Dry monthly or semi-monthly samples were analyzed by gamma spectrometry.

I. Vegetation, Top and Bottom Soil

Three samples, one vegetation, one top soil and one bottom soil were taken at ten stations: 2S4, 5S5, 11S4, 15S4, 9B2, 1D4, 3D2, 12E2 and 7G1, 12G3 (controls). These samples were taken in August by compositing twelve plugs at each location. The top soil consists of the first 2 inches of soil and the bottom soil is from the depth of 2 to 6 inches. All samples were analyzed for gamma emitting nuclides.

IV. SUMMARY AND DISCUSSION OF 1984 ANALYTICAL RESULTS

Data from the radiological analyses of environmental media collected during the report period are tabulated and discussed below. The procedures, specifications and an explanation of the analytical calculation methods used in the laboratory for these analyses are summarized in Appendix B. Analytical methods used by NUS during its portion of the program were the same as those reported in the 1983 annual report.[12]

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods.[17] The use of "LT" in the data tables is the equivalent of the less than symbol (<) and is consistent with the Teledyne Isotopes (TI) Radiological Laboratory practice of data reporting. The number following the "LT" is a result of the lower limit of detection (LLD) calculation as defined in Appendix C. "ND" (Not Detected) is used periodically in the tables presenting gamma analysis results for various media. It primarily appears under the "Others" column, where it indicates that no other detectable gamma emitting nuclides were identified. Teledyne Isotopes analytical methods meet the LLD requirements set forth in the Susquehanna Steam Electric Station Technical Specifications.

Tables 3 through 25 give the radioanalytical results for individual samples. A statistical summary of the results appears in Table 26. The reported averages in Table 26 are based only on concentrations above the limit of detection. In Table 26, the fraction (f) of the total number of analyses which were detectable follows the average in parentheses. Also given in parentheses are the minimum and maximum values of detectable activity during the report period.

A. Direct Radiation

Environmental radiation exposure rates determined by thermoluminescent dosimeters (TLDs) are given in Table 3. The results for the first three quarters are from NUS and results from the last quarter are from Pennsylvania Power and Light (PP&L). In both cases TLD packets or badges were deployed quarterly at 66 locations. The mean values (corrected individually for response to a known dose and for in-transit exposure) are reported in this table, unless indicated otherwise. A description of the TLD system used by NUS is contained in Appendix B of the 1983 annual report.[12] A description of the TLD system used by PP&L is contained in Appendix B of this report.

A statistical summary of the 1984 data is included in Table 26. Individual measurements of external radiation levels in the environs of the Susquehanna SES site ranged from 0.14 to 0.34 mR/day. The average for all indicator locations, 0.21 ± 0.08 mR/day, was virtually identical to the average of the control locations, 0.21 ± 0.07 and was also virtually identical, 0.21 ± 0.07 if the Allentown location was excluded from the control average. Annual levels ranged from 64 to 100 mR/year.

Oakley[18] calculates an ionizing radiation dose equivalent of 82 mrem/year for the Wilkes-Barre area. Since Oakley's values represent averages covering wide geographical areas, the measured ambient radiation average of

78 mR/year for the immediate locale of Susquehanna SES is consistent with Oakley's observations. Significant variations occur between geographical areas as a result of geological composition and altitude differences. Temporal variations result from changes in cosmic ray intensity, local human activities, and factors such as ground cover and soil moisture.

B. Fish

The primary fish samples were collected during May and September from three locations. The collected fish were divided into four classifications for analysis. These were designated predator, forage, catfish and panfish species. All samples from May were analyzed by NUS. A total of 17 samples were analyzed, 7 from the indicator location, 6 from the control location and 4 from Lake Took-A-While.

The results of gamma spectrometric analyses of fish samples collected during 1984 are presented in Table 4. As expected, naturally occurring K-40 was the major detectable activity in the edible portions of the fish and was found in all 17 samples. All other nuclides were below the detection limit. No significant differences were noted in the comparative results on the duplicate samples.

The results of gross beta analyses of fish samples collected during 1984 are presented in Table 5. All 17 samples had detectable gross beta activity ranging from 1000 to 6300 pCi/kg (wet) with a mean for all stations of 3180 pCi/kg (wet). This is probably due to naturally occuring potassium-40 which is a beta emitter. Since gross beta testing on fish is an addition to the program this year no comparison can be made with previous years data.

However the range of gross beta activity was not significantly different from ranges observed in other areas of the country.

C. Sediment

The processes by which radionuclides and stable elements are concentrated in shoreline sediments are complex, involving physicochemical interaction in the environment between the various organic and inorganic materials from the watershed. These interactions can proceed by a myriad of steps in which the elements are absorbed on or displaced from the surfaces of colloidal particles enriched with chelating organic materials. Biological action of bacteria and other benthic organisms also contribute to the concentration of certain elements and in the acceleration of the sedimentation process.

Sediment samples were collected twice during this program year. Six locations were sampled, including three indicator, two control locations and Lake Took-A-While. June samples were analyzed by NUS and the September samples by TI. All samples were analyzed by gamma spectrometry, gross alpha and gross beta. A statistical summary of the analytical results including the average, fraction of detectables, and range of radionuclide concentrations is shown in Table 26. Results of the gamma isotopic analyses of the sediments sampled from the Susquehanna SES environment are given in Table 6.

One man-made and a number of naturally occurring radioisotopes were detected in these samples. The isotope cesium-137 was the only man-made isotope detected in five of thirteen samples, ranging from 76 to 160 pCi/kg (dry). Cesium-137 was detected in 3 of 9 indicator samples ranging from 78 to 160 pCi/kg (dry). Cesium-137 was detected in 2 of 4 control samples. Its range was from 76 to 98 pCi/kg (dry). Since it is present in global fallout, the occasional detection of cesium-137 in environmental media is not unusual. It has also been reported in previous years reports. None of the positive values were significantly different from the LLDs reported for the remainder of the analyses.

In addition to the man-made isotope discussed above, a number of naturally occurring isotopes were observed in all samples. Potassium-40 was detected in all samples, ranging from 5800 to 12600 pCi/kg (dry). An assortment of daughters from the uranium and thorium chains were also detected in all of the samples. These generally ranged from 520 to 1100 pCi/kg (dry) between the different samples. The observed results were internally consistent for any given sample. Individual daughters are reported in the tabulation of NUS results. TI data for naturally occurring isotopes in the uranium and thorium chains are reported as the long-lived parents, radium-226 and thorium-228.

The results of the analysis of sediment samples for gross alpha activity are listed in Table 7. Detectable activity was observed in 7 of 9 samples from the indicator locations. The range/level of observed activity was 4800 to 13000 pCi/kg (dry). Detectable activity was observed in all four samples from the control location. The range/level of observed activity was 6600 to 14000 pCi/kg (dry). The range of gross alpha activities reported in the 1982 preoperational and the 1983 operational REMP report (11a) was 5500 to 14000 and 2900 to 9900 pCi/kg (dry), respectively.

The results of the analysis of sediment samples for gross beta activity are listed in Table 7. All 13 sediment samples had detectable activity with a mean of 19900 pCi/kg (dry). The mean for the 9 indicator stations is 19700 and the mean for the 4 control stations is 20500. The range of the indicator stations is 13000 to 40000 and the range of the control stations is 15000 to 27000 pCi/kg (dry). High gross beta results can be attributed to naturally occurring uranium, thorium and potassium-40 contained in the sediment. Since the average gross beta activity in the earth's crust is 31000 pCi/kg (uranium = 6000, thorium = 4000 and potassium = 21000 (21)(22), the gross beta activity detected is within a normal range. It is difficult to accurately compare these results with other gross beta results from the Susquehanna region because of the addition of this analysis to the 1984 REMP. Due to the inhomogeneity typical of sediment samples, wide variations between samples are expected even when the samples are taken from areas that are relatively near one another.

D. Water

Three types of water were sampled during 1984. Surface water was sampled from eleven (11) locations including five control locations. Well water was sampled from eight (8) locations, including one control. Drinking water was sampled from three (3) locations. Samples were analyzed by gamma spectrometry, gross beta, gross alpha, iodine-131, and tritium. Results are discussed in detail below.

Gamma Emitters

The results of the gamma spectrometric analyses of water samples are presented in Table 8 for NUS and 8a for TI. There were a total of 283 analyses performed; including 144 surface water analyses, 40 drinking water analyses, and 99 well water analyses. There was no detectable activity of fission or activation products in any of the drinking or well samples analyzed. With the exception of one sample from location 6S7, no gamma emitters were detected in any of the surface water samples. The isotope Mn-54 was detected in 1 of the 12 samples from 6S7. The observed activity of Mn-54 was 2.0 pCi/liter. The presence of the observed gamma-emitting nuclide can most likely be attributed to plant operations. The level was well below USNRC non-routine reporting limits.

Iodine-131

A total of 351 samples were analyzed for iodine-131. These included 227 surface water, and 124 drinking water samples. Results of the iodine-131 analyses are contained in Table 9 for NUS data and Table 9a for TI data.

Of the 124 drinking water samples analyzed, 10 had detectable activity, ranging from 0.037 to 0.50 pCi/liter. Of the 118 surface water samples from indicator locations, 12 had detectable activity, ranging from 0.037 to 0.77 pCi/liter. Of the 109 control surface water samples analyzed, 10 had detectable activity, ranging from 0.043 to 0.41 pCi/liter.

The presence of this isotope in the control location samples, and the general distribution of the observed activities indicates that the presence of this isotope is probably not plant related. Similar activity levels were reported in preoperational data. Alternate sources of this contamination could be medical uses in the area.

Gross Alpha

A total of 287 samples were analyzed for gross alpha activity. These included 148 surface water, 99 well water, and 40 drinking water samples. Results of the gross alpha analyses are contained in Table 10 for NUS data and 10a for TI data.

Of the 80 indicator surface water samples analyzed, 17 had detectable gross alpha activity ranging from 1.2 to 6.5 pCi/liter. One gross alpha result from station 12H1 had an unusually high result due to high solid content in the sample. The high solid content necessitated the use of a smaller volume and resulted in poor counting efficiency. This computation resulted in a value which was statistically poor. The value, therefore, was not used in any calculations. Since gross alpha analysis in surface waters was an addition to the program this year, no comparison can be made with previous years. The values are within the range of previously reported potable water. Of the 68 control surface water samples analyzed, 14 had detectable gross alpha activity, ranging from 1.1 to 4.7 pCi/liter.

Of the 85 indicator well water samples analyzed from the routine program, 10 had detectable gross alpha activity, ranging from 0.72 to 3.5 pCi/liter. Of the 14 control well water samples analyzed, 1 had detectable gross alpha activity, of 2.7 pCi/liter. This is within the range of preoperational data.

Of the 13 treated drinking water samples analyzed, 3 had detectable gross alpha activity, ranging from 0.95 to 3.2 pCi/liter. Of the 13 raw drinking water samples analyzed, 3 had detectable gross alpha activity, ranging from 1.7 to 5.6 pCi/liter. This is within the range of preoperational data.

Gross Beta

A total of 287 samples were analyzed for gross beta activity. These included 148 of surface water, 99 well water, and 40 drinking water samples. Results of the gross beta analyses are contained in Table 10 for NUS and Table 10a for TI data. Of the 80 indicator surface water samples analyzed, 75 had detectable gross beta activity, ranging from 1.4 to 13 pCi/liter. Of the 68 control surface water samples analyzed, 63 had detectable gross beta activity, ranging from 1.0 to 17 pCi/liter. The values are also within the ranges reported in preoperational data.

Of the 85 indicator well water samples analyzed, 53 had detectable gross beta activity, ranging from 1.1 to 6.4 pCi/liter. Of the 14 control well water samples analyzed, 10 had detectable gross beta activity, ranging from 1.5 to 2.6 pCi/liter.

Of the 26 indicator drinking water samples analyzed from 12H2, 22 had detectable gross beta activity, ranging from 1.3 to 12 pCi/liter. Of the 14 drinking water samples analyzed from station 12F3, 12 had detectable gross beta activity, ranging from 1.6 to 4.0 pCi/liter. The values are also within the ranges reported in preoperational data.

Tritium

The water samples from each location were also analyzed for tritium. A total of 284 samples were analyzed for tritium activity. These included 147 surface water, 99 well water, and 38 drinking water samples. Results of the tritium analyses are contained in Table 11 for NUS data and Table 11a for TI.

Of the 65 control surface water samples analyzed, 32 had detectable tritium activity ranging from 64 to 1600 pCi/liter. The average of all positive results was 212 pCi/liter. Excluding station 6S7, there were 69 indicator surface water samples analyzed. Of these, 35 had positive activity ranging from 68 to 420 pCi/liter, with an average of 210 pCi/liter. The indicator station 6S7, the discharge line, was analyzed 12 times and contained activity 11 times. The range of activity was 90 to 2200 pCi/liter with an average of 711 pCi/liter. The presence of increased tritium in the plant discharge line can most likely be attributed to plant operations. The level was well below US NRC non-routine reporting limits. In March, 1600 and 2200 pCi/liter was detected from station 6S6 and station 6S7 respectively. Because similar levels were detected in both the intake line (6S6) and the discharge line (6S7) the activity is probably not plant related.

Of the 85 indicator well water samples analyzed, 41 had detectable tritium activity, ranging from 55 to 470 pCi/liter with the average of 145 pCi/liter. Of the 14 control well water samples analyzed, 7 had detectable tritium activity, ranging from 85 to 840 pCi/liter with the average of 260 pCi/liter.

Of the 25 indicator drinking water samples analyzed, 15 had detectable tritium activity, ranging from 54 to 710 pCi/liter. Of the 13 control drinking water samples analyzed, 7 had detectable tritium ranging from 81 to 300 pCi/liter.

Except for station 6S7, as noted above, all tritium levels are within the range of values noted in preoperational reports.

E. Air Particulates/Air Iodine-131/Precipitation

Air Particulate

Air filters were collected weekly from 11 locations. Each weekly filter was analyzed for gross beta activity. Quarterly composites were analyzed for gamma emitting radionuclides and for gross alpha activity.

Results of gross beta analyses on air particulate filters are given in Table 12 for NUS and 12a for TI. The mean gross beta activity for all stations was 14 E-03 pCi/m^3 (14 X 10-3 pCi/m^3) and the range of gross beta activity was 2.1 to 46 E-03 pCi/m^3. Figure 4 illustrates the variation of beta activity in airborne particulates over the program year. Comparison of this data with that of previous years shows no significant difference in activity. Figure 5 shows the data from the current reporting period in the context of reported measurements for the program over the period 1973 through 1984.

Air filters from each location were composited quarterly and then analyzed by gamma spectrometry. A total of 44 composited samples were analyzed. The gamma spectrometry data are presented in Table 13 for NUS and Table 13a for TI. Cosmogenic beryllium-7 was detected in all of the samples. The range of beryllium-7 activity was 40 to 177 E-03 pCi/m^3. No differences were noted between indicator and control locations. No other gamma-emitting isotopes were detected in any of the samples analyzed.

Results of gross alpha analyses on air particulate filters are given in Tables 14 for NUS data and 14a for TI data. The mean gross alpha activity for all stations was 4.1±2.8 E-03 pCi/m^3 and the range of gross alpha activity was 1.4 to 7.9 E-03 pCi/m^3. The average activity in the sample from the indicator locations was 4.0±2.9 E-03 pCi/m^3. The average activity in the sample from the control locations was 4.2±2.9 E-03 pCi/m^3. All gross alpha activity measured on air particulate filters in this program year falls within the range of preoperational data.

Air Iodine

Results of airborne iodine-131 analyses on charcoal cartridges are presented in Table 15 for NUS data and 15a for TI data. Iodine-131 was not detected in any of the samples.

Precipitation

Precipitation samples were collected monthly from ten locations, nine indicators and one control. Samples were composited quarterly for analysis by gamma spectrometry, for tritium, gross alpha and gross beta.

The results of gross alpha and gross beta are shown in Table 16 for NUS data and 16a for TI data. The mean gross alpha for all stations was 0.84±0.86 pCi/liter and the range of gross alpha activity was 0.49 to 1.8 pCi/liter. No differences were noted between indicator and control locations. The mean gross beta for all stations was 3.7±2.7 pCi/liter and the range of gross beta activity was 1.4 to 7.4 pCi/liter. The average activity in the samples from the indicator and control stations were 3.5±2.6 and 4.5±3.0 pCi/liter respectively.

This signifies no significant difference between indicator and control locations. Since this analysis is a first time addition to the REMP in 1984 no historical data exists for comparison.

The results of the gamma spectrometry analyses are shown in Table 17 for NUS data and 17a for TI data. Cosmogenic beryllium-7 was detected in 17 of 51 samples. The range of beryllium-7 activity was 14 to 53 pCi/liter. No other gamma-emitting isotopes were detected in any of the samples. LLDs for beryllium-7 in samples for which no detectable activities were measured fell within the range of the positive results.

Results of the analyses for tritium are contained in Table 18 for NUS and 18a for TI data. Tritium was detected in 20 of 41 analyses of samples from indicator locations and in 6 of 10 analyses of samples from the control locations. Values of the activity ranged from 55 to 590 pCi/liter for the indicator samples. These values are typical for environmental samples. Values from 100 to 2500 pCi/liter were found for the control location. Except for the result of 2500 pCi/liter at a control location all others were within the ranges previously reported in Susquehanna SES annual reports.

F. Milk/Pasture Grass

Milk

Monthly and semi-monthly milk samples were analyzed by gamma spectrometry. The results are shown in Table 19 for NUS data and 19a for TI data. A total of 145 samples were analyzed, 123 from indicator locations and 22 from the control location.

As expected, naturally occurring potassium-40 was detectable in all the milk samples. No other gamma-emitting isotopes were detected in any of the samples analyzed.

The results of iodine-131 analyses of milk samples are presented in Table 20 for NUS data 20a for TI data. A total of 147 analyses were performed, 125 from indicator locations and 22 from the control location. No iodine-131 was detected in any of the milk samples.

Pasture Grass

A total of 12 pasture grass samples was collected for analysis during this program year. Samples were collected monthly except when covered by snow and ice. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these samples are contained in Table 21 for NUS data and 21a for TI data.

Cesium-137 was detected in 2 of 12 samples at an average activity of 36 pCi/kg (wet). Since it is present in global fallout, the occasional detection of cesium-137 in environmental media is not unusual. No other man-made nuclides were detected in any of the samples; nor were any members of the uranium or thorium decay chains detected in any of the samples. This is consistent with data reported in previous annual reports.

Cosmogenic beryllium -7, which exists due to its deposition as stratospheric fallout, was found in all 12 of the samples. Potassium-40, a naturally occurring isotope, was also found in all the samples. Table 26 contains the summarized average, fraction of detectables, and range of radionuclide concentrations. The observed values for both beryllium-7 and potassium-40 were within the expected range of normal distribution.

G. Food products

A total of 57 fruit, vegetable and food product samples were collected for analysis during this program year. Samples were collected as available during the harvest season. All samples were analyzed by gamma spectrometry.

Fruits, Vegetables and Honey

A total of 53 edible food samples were collected from various gardens over the period June through October. These samples consisted of cabbage (8 samples); lettuce, Swiss chard, beans and endive (6 samples); corn, potatoes, apples (4 samples); spinach and tomatoes (3 samples); and collards, strawberries and honey (1 sample each). Results of gamma spectrometric analyses of food samples are contained in Table 22 for NUS data and 22a for TI data.

Cesium-137 was detected in 2 of 53 edible food samples at an average activity of 39.9 pCi/kg (wet). Since it is present in global fallout, the occasional detection of cesium-137 in environmental media is not unusual. No other man-made nuclides were detected in any of the 53 samples of edible foods analyzed. Naturally occurring members of the uranium and thorium decay chains were not detected in any of the samples. This is consistent with data reported in previous annual reports.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout, was found in 12 of the 53 samples. Potassium-40, a naturally occurring isotope, was found in all the samples. Table 26 contains the summarized average, fraction of detectables, and range of radionuclide concentrations. Both beryllium-7 and potassium-40 were found at their expected ranges of activity.

The single sample of honey contained 68.7±10.6 pCi/kg of cesium-137. This data is consistent with the data obtained from prior years. No other man-made gamma-emitters were detected in this sample. The data obtained from its analysis are included in Table 22a.

Game, Poultry and Eggs

In addition to the samples discussed above, a total of 4 non-vegetable food product samples were collected for analysis during this program year. These included one sample each of squirrel, deer, poultry and eggs. The deer was collected in October, the squirrel, poultry and eggs in November. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these non-vegetable, food products samples are contained in Table 24.

As expected the sample of squirrel meat contained high levels of cesium-137 relative to all other types of food products sampled. These elevated activities have been reported previously in the annual reports on the Susquehanna SES REMP and in other sources.[19] Cesium-137 was detected in the squirrel meat sample at an activity of 1380 pCi/kg (wet). This is consistent with previously reported values. Since it is present in global fallout, the occasional detection of cesium-137 in environmental media is not unusual. The comparatively high levels in squirrel meat apparently result from high concentration factors in the components of the squirrel's diet. Detectable levels of cesium-137 were found in the deer sample, at the level of 540 pCi/kg (wet). No other man-made nuclides were detected in any of the samples of food product analyzed. Naturally occurring members of the uranium and thorium decay chains were not detected in any of the samples.

Potassium-40, a naturally occurring isotope, was found in all the samples at its expected ranges of activity. Table 26 contains the summarized average, fraction of detectables, and range of radionuclide concentrations.

H. Algae

A total of 39 algae samples were collected for analysis during this program year. Station AG1 is a control for AG2, station AG3 is a control for AG4 and station AG5 is a control for AG6. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these samples are contained in Table 23 for data produced by NUS and 23a for data produced by TI.

Cesium-137 was detected in 4 of the 19 control samples at an average activity of 816±1316 pCi/kg (dry). Cesium-137 was detected in 4 of 20 indicator samples at an average activity of 476±587 pCi/kg (dry).

Since it is present in global fallout, the occasional detection of cesium-137 in the environmental media is not unusual.

Iodine-131 was found to be present in 4 of the 19 control samples and 6 of the 20 indicator stations with the average concentrations of 1097 and 1316 pCi/kg (dry) respectively.

The presence of this isotope in the control locations and the general distribution of the observed activities indicates that the presence of this isotope is probably not plant related. Alternate sources of this contamination could be medical uses in the area. This data is consistent with iodine-131 levels which were reported in the surface water tables of this report.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout was found in 30 of the 39 samples. Potassium-40, a naturally occurring isotope, was found in all but 4 of the samples. The observed values for both beryllium-7 and potassium-40 were within the expected range of normal distribution.

I. Vegetation, Top and Bottom Soil

A total of 30 vegetation and soil samples were collected for analysis during this program year. These samples consisted of 10 vegetation, 10 from the top two inches of soil and 10 from the bottom soil (2-6 inches deep). The results of the gamma spectrometric analysis are presented in Table 25. Cesium-137 was present in 19 of 20 soil samples and in none of the vegetation samples.

Radium-226 was found to be present in 18 of 20 of the soil samples and none of the vegetation samples. Radium-226 is a naturally occuring isotope and was observed within the expected range of normal distribution.

Thorium-228 was found to be present in all of the 20 soil samples and none of the vegetation samples. Thorium-228 is a naturally occuring isotope and was observed to be within the expected range of normal distribution.

Cosmogenic beryllium-7 was found in all ten of the vegetation samples but none of the soil samples. Potassium-40, as expected because it is a naturally occurring isotope, was found to be present in all of the soil and vegetation samples. The observed values were within the expected range of normal distribution.

Deviations from the Program
(Page 1 of 6)

Month	Medium	Deviation
January	Air Particulates Air Iodine	Samples were collected from 7G1 and 12G1 on 01/17/84 after a two week period instead of a one-week period due to hazardous weather conditions.
	Pasture Grass	Sample from 15A1 was not collected due to heavy snow and ice cover.
	Surface Water	Samples from stations 12G2 and 12F1 were not collected due to heavy shelf ice on river bank. Station 6S7 was inoperative from 01/01/84 to 01/06/84 and on 01/08/84. A partial weekly composite sample was collected. Composite samples from stations 6S6 and 6S7 were not analyzed for tritium due to a laboratory error. Samples from stations 6S6 and 6S7 for the period 01/09/84 to 01/16/84 were not analyzed for I-131. Planchets from the original analysis were contaminated and a reanalysis was not performed.
	Precipitation	Monthly precipitation samples were not collected from any station due to an insufficient volume in the sample collection container.
	Potable Water	Sample from 12H2 Raw was not obtained for the period 01/09/84 to 01/16/84 due to a water sampler malfunction. It was repaired on 01/19/84. Composite sample from station 12H2 Raw was not analyzed for tritium due to a laboratory error.
	Well Water	Sample from station 3S5 not collected from January through April since pump was turned off for winter.

Month	Medium	Deviation
February	Air Particulates Air Iodine	Samples from all stations were collected on 02/14/84 after a two-week period instead of a one-week period due to sample collector's error.
	Surface Water	Sample from station 12G2 was not collected due to severe weather and flooding conditions.
	Potable Water	Samples from stations 12H2 Raw and 12H2 Treated were collected on 02/14/84 after a two-week period instead of a one-week period due to sample collector's error. Duplicate sample from station 12F3 was not analyzed for tritium due to a laboratory error.
	Precipitation	Sample was not obtained from 12G1 for period 11/14/83 to 02/22/84 due to a broken sample collection container.
	Pasture Grass	Samples from 15A1 for the months of February, April, May, and June were analyzed wet, however, wet:dry ratios were not determined. Reporting units, therefore, were pCi/kg (wet). This was due to a laboratory analyst error.
March	Direct Radiation	Results of the Quarter 1 TLD analysis from station 1S2 could not be reported due to an instrument malfunction. The problem was corrected prior to reading the other TLDs.
	Air Particulates Air Iodine	Sample from station 7G1 was not collected for the period 03/06/84 to 03/13/84 due to hazardous weather conditions.

Month	Medium	Deviation
	Surface Water	Weekly samples from 6S7 were not collected for the periods 03/05 to 03/12, 03/12 to 03/19, 03/19 to 03/26, and 03/26 to 04/02 due to water sampler malfunctions.
		Weekly sample from 6S6 was not collected for the period 03/26 to 04/02 due to a water sampler malfunction.
	Pasture Grass	Sample 15A1 was not collected due to heavy snow and ice cover.
April	Milk	Duration between samples exceeded defined specifications for this frequency.
	Surface Water	Station 6S7 was inoperative on 04/18/84 and 04/26/84. Sampler pump was reprimed within a day.
May	Surface Water	Only 125-ml of sample was received for station 6S7 for the period 05/14/84 to 05/21/84, due to damage in shipment. I-131 analysis could not be performed.
June	Milk	Sample from station 8D1 was not analyzed for iodine due to a laboratory error.
	Potable Water	A weekly grab sample was collected from station 12H2 Raw during the period 06/25/ to 09/24 due to excessive sediment in the river causing the collection lines to repeatedly become plugged in spite of weekly cleaning of the lines. This necessitated a design change to the system. The modification was completed on 09/26/84. A sample collection line from the main raw water line was connected to the automatic composite sampler, thus alleviating the sampler malfunction.

Month	Medium	Deviation
	Surface Water	Sample from station 13E1 was not analyzed for tritium due to a laboratory error.
		A weekly grab sample was collected as a substitute for station 6S6 at station 6S5 for the period 05/29 to 06/04 due to excessive sediment blocking sampler lines.
		A weekly grab sample was collected from station 6S6 for the period 06/04 to 06/11 due to continued sampler malfunction.
		Station 6S7 was inoperative on 06/30/84. The sample pump lost prime.
		A monthly grab sample was collected from station 12H1 for the period 05/15 to 06/12 due to a labor strike.
July	Surface Water	No I-131 data available for station Lake-TAW. Due to a laboratory error, the sample was destroyed in analysis.
		A weekly grab sample was collected from station 6S7 for the period 07/30 to 08/06 due to sampler malfunction.
		Station 6S7 was inoperative during the day shift on July 26, 27, 30, 31, and 08/01 due to maintenance on the discharge diffuser.

Month	Medium	Deviation
		A monthly grab sample was collected from station 12H1 for the period 06/12 to 07/10 due to a labor strike.
August	Surface Water	Gamma spectrometry, gross alpha and gross beta data not available for station 12H1. Due to a laboratory error, the sample was destroyed in analysis.
		Composite sample from station 6S5 was not analyzed for tritium due to a laboratory error.
		A weekly grab sample was collected for station 6S7 for the period 08/13 to 08/20 due to sampler malfunction. The flow adjustment was inoperative.
		A monthly grab sample was collected from station 12H1 for the period 07/10 to 08/07 due to a labor strike.
		Station 6S7 was inoperative on 08/21 and 08/31 due to sampler loosing its prime.
September	Direct Radiation	Quarter 3 TLD from station 9S1 was missing at time of collection, due to construction activities.

Month	Medium	Deviation
	Surface Water	A weekly grab sample was collected from station 6S6 for the period 09/24 to 10/02 due to sampler malfunction.
October	Surface Water	A grab sample was collected daily from station 6S6 for the period 10/02 to 10/08 due to sampler malfunction. The ACS was repaired on 10/11.
		Station 6S7 was inoperative on 10/07 and 10/08 and due to an electrical malfunction from 10/18 to 10/19 and 10/29 to 11/01.
November	Well Water	Sample from station 3S5 was not collected from November through December since the pump was turned off for the winter.
	Surface Water	A weekly grab sample was collected from station 6S7 for the period 11/26 to 12/03 due to sampler malfunction. This sample was used for the monthly composite sample. The I-131 analysis for 11/26 to 12/03 was performed using a small composite sample.
		Station 6S6 was inoperative from 12/03 to 12/05 due to a solenoid malfunction.
	Direct Radiation	Quarter 4 TLDs were collected on November 6,7, or 8 and replaced due to possible moisture problems.
December	Direct Radiation	Quarter 4 TLD from station 7F1 was missing at time of collection due to vandalism.
	Surface Water	A grab sample was collected from station 6S6 for the period 12/17 to 12/23 due to sampler malfunction.

PROGRAM CHANGES - 1984

Additions to the program were made in 1984 to provide more uniformity in the analysis performed and to expand the capability for detecting beta-emitting radionuclides. These changes are noted.

1. Surface water - tritium analysis was changed from quarterly to monthly. Monthly gross alpha analysis of surface water was begun for program uniformity. Lake Took-A-While was added to surface water monthly collections in the NE sector in December 1983.

2. Drinking water - gross alpha and tritium analysis were changed from quarterly to monthly.

3. Well water - gross alpha and tritium analysis were changed from quarterly to monthly.

4. Rain water - gross alpha and gross beta were added for quarterly composite analysis.

5. Sediment - gross beta analysis was added. Lake Took-A-While was added to sediment semi-annual collections in the NE sector in June 1984.

6. Fish - gross beta analysis was added. Lake Took-A-While was added to fish semi-annual collections in the NE to ESE sectors in October 1983.

All monthly water samples are now analyzed for gross alpha, gross beta, gamma-emitters, and tritium.

Various sampling locations were added, moved, or continued in 1984 as noted below.

1. Algae sampling in the Susquehanna River was begun as a special study to better characterize a source of iodine-131 upstream of the Susquehanna SES as reported in 1982(11a). Gamma spectrometry will be performed on the samples from the six stations AG1 through AG6.

2. The broad leaf vegetables and food products sampled from a PP&L garden was moved from the EOF garden (station 12S4) to the Southwest garden (station 11S6) due to better soil. New calculations indicate that the SW sector is one of the higher D/Q sectors.

3. Two TLD locations were moved on 10/01/84 due to construction activities destroying the old locations. Station 11S6 (SW garden) replaces station 11A2. Station 9S2 (Security Fence) replaces 9S1.

4. Soil and associated vegetation samples will be taken annually in the vicinity of the 10 existing air sampling stations. Gamma spectrometry analysis will be performed. The locations are 2S4, 5S5, 11S4, 15S4, 9B2, 1D4, 3D2, 12E2, 7G1 and 12G3.

5. There were no program deletions during this report period.

The descriptions of the sample locations were updated to better reflect current conditions. The changes are noted below.

1. Fourteen TLDs originally described as being located on the Security Fence are more accurately described as being on a Perimeter Fence. They are 1S2, 2S3, 3S4, 4S3, 5S7, 6S4, 7S3, 8S2, 9S1, 10S1, 12S2, 13S2, 15S3 and 16S1.

2. The Riverlands Security Office, 3S5, is more aptly described as the Riverlands Facilities.

3. Location 14S5 is more completely described as site Boundry Pole number 43996/N34230.

4. Location 10B3, Car-Mar, became General Tank and Equipment Company in 1984.

5. Locations 12G1 and 12G3 are the PP&L Service Center, Bloomsburg.

6. Location 12G2 is more accurately described as U.S. Radium site, Bloomsburg.

VII. LAND USE CENSUS

The USNRC Branch Technical Position on "An Acceptable Radiological Environmental Monitoring Program" (November 1979, Revision 1), states that "a census shall be conducted annually during the growing season to determine the location of the nearest milk animal and nearest garden greater than 50 square meters (500 sq. ft.) producing broad leaf vegetation in each of the 16 meteorological sectors within a distance of 8 km (5 miles)." To comply with this requirement, a land-use survey was conducted for the Susquehanna SES during the period July 6, 1984 through September 1, 1984. The closest garden (greater than 50 square meters, producing broad leaf vegetation) and residence in each radial sector was determined and all dairy animals within five (5) miles were identified.

Table 28 lists the nearest dairy animals in each sector. Table 27 presents the nearest garden and residence in each sector identified during the survey. These land-use parameters may be used in the assessment of potential radiological doses to individuals and populations of the stated regions.

VIII. CONCLUSIONS

Results of the 1984 Radiological Environmental Monitoring Program for the Susquehanna SES Nuclear Station have been presented. Generally the results were as expected for normal environmental samples. Naturally occurring activity was observed in the usual sample media at the expected magnitude. A few man-made isotopes, in particular cesium-137, were also observed in a variety of sample types. These were also generally present at the anticipated concentrations and are attributable to long-term fallout from atmospheric nuclear weapons tests.

A recurring detection of low levels of I-131 in surface water samples was noted. The absence of recent atmospheric testing rules out fallout as a source because of the short half-life of this isotope. However, the pattern of detection is such that plant operations are not implicated. One water sample collected from plant discharge (6S7) contained a trace amount of manganese-54. Most 6S7 samples contain levels of tritium slightly higher than expected in environmental samples. These are probably attributed to plant operations. However, observed activities were at very low concentrations and were of no significant dose consequence.

Based on all the evidence of the environmental monitoring program the operation of the station had no significant radiological impact on the environment and appears to be within regulatory limits.

IX. REFERENCES

1. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, Report Δ1 (April - December 1972)" RMC-TR-73-14, July 1973.

2. Radiation Management Corporation, "Susquehanna Steam Electric Station, Preoperational Radiological Environmental Monitoring Program 1973," RMC-TR-74-07, May 1974.

3. Radiation Management Corporation, "Susquehanna Steam Electric Station, Preoperational Radiological Environmental Monitoring Program, 1974 Annual Report," RMC-TR-75-07, April 1975.

4. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1975 Annual Report," RMC-TR-76-05, May 1976.

5. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1976 Annual Report," RMC-TR-77-04, March 1977.

6. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1977 Annual Report," RMC-TR-78-01, May 1978.

7. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1978 Annual Report," RMC-TR-79-01, April 1979.

8. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1979 Annual Report," RMC-TR-80-01, March 1980.

9. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1980 Annual Report," RMC-TR-81-02, July 1981.

10. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1981 Annual Report," RMC-TR-82-03, July 1982.

11a. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1982 Preoperational Report," RMC-TR-83-01, April 1983.

11b. Radiation Management Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1982 Operational Report." RMC-TR-83-02, April 1983.

12. NUS Corporation, "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1983 Annual Report," NUS-4516 March 1984.

13. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Environmental Report, Operating License Stage," May 1978.

14. Pennsylvania Power and Light Company, "Susquehanna Steam Electric Station, Final Safety Analysis Report," 1978.

15. United States Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, "Final Environmental Statement Related to the Operation of Susquehanna Steam Electric Station, Units 1 and 2," Docket Nos. 50-387 and 50-388, June 1981.

16. United States Nuclear Regulatory Commission, "An Acceptable Radiological Environmental Monitoring Program," Radiological Assessment Branch Technical Position, November 1979, Revision 1.

17. National Council on Radiation Protection and Measurements, "Environmental Radiation Measurement," NCRP Report No. 50, Washington, D.C., December 27, 1976.

18. Oakley, D.C., "Natural Radiation Exposure in the United States," ORP/SID 72-1 Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C., June 1972.

19. Denham, D.H., Roberts, M.C., Novitsky, W.M., Testa, E.D., "Investigation of Elevated Cesium-137 Concentrations in Small Game in Luzerne County, Pennsylvania." Proceedings of Papers presented at Health Physics Society Tenth Midyear Topical Symposium, October 11-13, 1976, pgs 271-279.

20. NUS Corporation "Susquehanna Steam Electric Station, Radiological Environmental Monitoring Program, 1984 Partial-Annual Report," NUS-4646 December 1984.

21. Adams, John A. S., and Lowder, Wayne M., editors, 1964 the Natural Radiation Environment, Rice University Semicentennial Publications, University of Chicago Press, 1069 pp.

22. Feldman Karl L., editor, Radiological Quality of the Environment, Environmental Protection Agency, 1976, Office of Radiation Programs, EPA-520/1-76-010, 247 pp.

TABLE 1
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Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1984

Media	No. of Locations	Sample Freq.(1)	Analysis Required	Anal. Freq.(2)
Airborne Particulates (AP)	11	W	Gross Beta(3)	W
			Gross Alpha	QC
			Gamma Spec	QC
Airborne Iodine (C)	11	W	I-131	W
Sediment (SH)	6	SA	Gamma Spec	SA
			Gross Alpha	SA
			Gross Beta	SA
Fish (FI)	3	SA	Gamma Spec	SA
			Gross Beta (on edible portion)	SA
Surface Water(4) (WT)	11	W or M	Gross Alpha	M or MC
			Gross Beta	M or MC
			Gamma Spec	M or MC
			I-131	W or M
			Tritium	M
Well Water (WG)	8	M	Gross Beta	M
			Gamma Spec	M
			Gross Alpha	M
			Tritium	M
Drinking Water(5) (PW)	3	M or W	Gross Beta	M or MC
			Gamma spec	M or MC
			I-131	M or W
			Gross Alpha	M or MC
			Tritium	M or MC
Rain Water (WP)	10	M	Gross Alpha	QC
			Gross Beta	QC
			Gamma Spec	QC
			Tritium	QC

Note: See footnotes at end of table.

Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1984

Media	No. of Locations	Sample Freq.(1)	Analysis Required	Anal. Freq.(2)
Cow Milk (M)	8	M or SM(6)	Gamma Spec I-131	SM or M SM or M
Goat Milk(7) (M)	1	Q	I-131	Q
Food Products (FD,FL,FV,FP,FR) Various Fruits and Vegetables	6	A	Gamma Spec	A
Game (AG,AS,AW,AN)	Approx. 6	A	Gamma Spec	A
Meat, Poultry, and Eggs (ME,PO,E)	2	A	Gamma Spec	A
Pasture Grass(8) (FM)	2	M	Gamma Spec	M
Soil (S)	14	A	Gamma Spec	A
Vegetation (VT)	14	A	Gamma Spec	A
Direct Radiation (TQ)	66	Q	TLD	Q
Algae (VA)	6	M	Gamma Spec	SM,M or BM

Note: See footnotes at end of table.

Annual Analytical Schedule for the
Susquehanna Steam Electric Station (PP&L)
Radiological Environmental Monitoring Program - 1984

1. W = weekly, M = monthly, SM = semi-monthly, Q = quarterly, QC = quarterly composite, SA = semi-annual, A = annual, WC = weekly composite, MC = monthly composite.

2. Codes are the same as for sample frequency.

3. If the gross beta activity is greater than 10 (ten) times the yearly mean of the control sample, gamma analysis should be performed on the individual filter. Perform the gross beta analysis 24 hours or more following filter change to allow for radon and thoron daughter decay.

4. Stations 6S6 and 6S7 are sampled weekly and analyzed for I-131 on a weekly basis. Individual composites of the 6S6 and 6S7 weekly samples are made on a monthly basis (MC) and analyzed for gross alpha, gross beta, gamma and tritium.

5. Station 12F3 is sampled monthly and analyzed for gross alpha, gross beta, gamma, tritium and I-131 on a monthly basis. Station 12H2 RAW and 12H2 TREATED are sampled weekly and analyzed for I-131 on a weekly basis. Individual composites of the 12H2 RAW and 12H2 TREATED weekly samples are made on a monthly basis (MC) and analyzed for gross alpha, gross beta, gamma and tritium.

6. Station 12B2, 5E1, 13E3 and 10G1 will be analyzed semi-monthly from April through October.

7. Goat milk will be analyzed quarterly for I-131 only.

8. Pasture grass will be sampled and analyzed for gamma at station 8D1 during the quarters goat milk is not available.

Table 2
(Page 1 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Code	Description[1]	Sample Types
IND[(2)]	0.9-1.4 mile ESE, At or below Discharge Structure	FI
1S2	0.3 mile N, Perimeter Fence	TQ
2S2	0.9 mile NNE, Energy Information Center	AP,C,TQ,WP
2S3	0.2 mile NNE, Perimeter Fence	TQ
2S4	0.9 mile NNE, Energy Information Center	S,VT
2S6	0.9 mile NNE, Energy Information Center	WG
3S3	0.5 mile NE, Recreational Area	TQ
3S4	0.3 mile NE, Perimeter Fence	TQ
3S5	0.9 mile NE, Riverlands Facility	WG
4S1	1.0 mile ENE, Susquehanna River Flood Plain	TQ
4S2	0.5 mile ENE, Site - Peach Stand	WG
4S3	0.2 mile ENE, Perimeter Fence	TQ
4S4	0.5 mile ENE, Training Center	WG
5S1	0.8 mile E, North of Biological Laboratory	TQ
5S4	0.8 mile E, West of Biological Laboratory	AP,C,TQ,WP
5S5	0.8 mile E, West of Biological Laboratory	S,VT
5S7	0.3 mile E, Perimeter Fence	TQ
5S8	0.8 mile E, Area under power line	WT
6S4	0.2 mile ESE, Perimeter Fence	TQ
6S5	0.9 mile ESE, Outfall Area	WT
6S6	0.8 mile ESE, River water intake line	WT
6S7	0.4 mile ESE, Cooling tower blowdown discharge line	WT
7S1	0.2 mile SE on 230 KV tower	TQ
7S3	0.2 mile SE, Perimeter Fence	TQ
7S5	0.4 mile SE, Southeast Garden	FD
8S2	0.2 mile SSE, Perimeter Fence	TQ
9S1	0.3 mile S, Perimeter Fence	TQ
9S2	0.2 mile S, Security Fence	TQ
10S1	0.4 mile SSW, Perimeter Fence	TQ

Note: See footnotes at end of table.

Table 2
(Page 2 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Code	Description[1]	Sample Types
11S2	0.4 mile SW, Golomb House	AP,C,TQ,WP
11S3	0.3 mile SW, Security Fence	TQ
11S4	0.4 mile SW, Golomb House	S,VT
11S5	0.5 mile SW, EOF Building	WG
11S6	0.5 mile SW, SW Garden	FD,TQ
12S3	0.4 mile WSW, Perimeter Fence	TQ
13S2	0.4 mile W, Perimeter Fence	TQ
14S5	0.5 mile WNW, Site Boundary Pole No. 43996/N34230	TQ
15S3	0.3 mile NW, Perimeter Fence	TQ
15S4	0.6 mile NW, Transmission Corridor	AP,C,TQ,WP,S,VT
16S1	0.3 mile NNW, Perimeter Fence	TQ
LTAW	NE to ESE, on site, Lake Took-A-While	FI
LTAW	0.8 mile NE, Lake Took-A-While	WT,SH
1A(3)	0.3-1.0 mile N, Sybert's Hill Area	AG,AS
1A1	0.6 mile N, Thomas Residence	TQ
2A(3)	0.4-1.0 mile NNE, Sybert's Hill Area	AG,AS
AG3	0.8 mile E. above River Water Intake	VA
AG5	0.8 mile E. above River Water Intake	VA
6A3	0.6 mile ESE, State Police	TQ
AG4	0.9 mile ESE, below discharge diffuser	VA
AG6	0.9 mile ESE, below discharge diffuser	VA
7A1	0.4 mile SE, Kline Residence	TQ
11A2	0.6 mile SE, Former Shortz Residence	TQ
15A(3)	0.3-1.0 mile NW, Sybert's Hill Area	AG,AS
15A1	0.9 mile NW, Serafin Farm	FM
15A3	0.9 mile NW, Serafin Farm	TQ
15A4	0.9 mile NW, Serafin Farm	GW

Note: See footnotes at end of table.

Table 2
(Page 3 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Code	Description[1]	Sample Types
16A(3)	0.3-1.0 NNW, Sybert's Hill Area	AG,AS
16A2	0.8 mile NNW, Rysinski Farm	TQ
1B(3)	1.0-1.3 miles N, Sybert's Hill Area	AG,AS
2B(3)	1.6 miles NNE, Gould Island	SH
2B3	1.3 miles NNE, Luzerne Outerwear	TQ
7B(3)	1.2 miles SE, Bell Bend	SH
7B2	1.5 miles SE, Heller's Orchard	FR,FH
7B3	1.7 miles SE, Council Cup	TQ
8B2	1.4 miles SSE, Lawall Residence	TQ
9B1	1.3 miles S, Transmission Line East of Route 11	AP,C,TQ,WP
9B2	1.3 miles S, Transmission Line East of Route 11	S,VT
10B2	2.0 miles SSW, Algatt Residence	TQ
10B3	1.7 miles SSW, General Tank and Equipment Co.	TQ
12B1	1.3 miles WSW, Kisner Farm	E,FR,PO
12B2	1.7 miles WSW, Shultz Farm	M
12B3	2.0 miles WSW, Young Farm	M
12B4	1.7 miles WSW, Shultz Farm	TQ
16B(3)	1.0-1.3 miles NNW, Sybert's Hill Area	AG,AS
16B1	1.6 miles NNW, Walton Power Line	TQ
6C1	2.7 miles ESE, Moyer Farm	M
11C(3)	2.6 miles SW, Hess Island	SH
1D2	4.0 miles N, Near Mocanaqua Substation	AP,C,TQ,WP
1D3	3.9 miles N, Near Mocanaqua Substation	WT
1D4	4.0 miles N, Near Mocanaqua Substation	S,VT
1D5	3.9 miles N, Shickshinny Sewage Treatment Facility	WT
3D1	3.4 miles NE, Pond Hill	AP,C,TQ,WP
3D2	3.4 miles NE, Pond Hill	S,VT
8D1	3.2 miles SSE, Poltrock Farm	M,FM
8D2	4.0 miles SSE, Mowry Residence	TQ

Note: See footnotes at end of table.

Table 2
(Page 4 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Code	Description[1]	Sample Types
9D1	3.6 miles S, Smith Farm	TQ
10D1	3.0 miles SSW, Ross Ryman Farm	M
10D2	3.0 miles SSW, Ross Ryman Farm	TQ
11D1	3.3 miles SW, Zehner Farm	FR,FD
12D2	3.7 miles WSW, Dagostin Farm	M
12D3	3.7 miles WSW, Dagostin Residence	TQ
1E1	4.5 miles N, Lane Residence	TQ
4E1	4.8 miles ENE, Pole No. 46422/N35197	TQ
5E1	4.5 miles E, Bloss Farm	M
5E2	4.5 miles E, Bloss Farm	TQ
6E1	4.7 miles ESE, St. James Church	TQ
7E1	4.2 miles SE, Harwood Trans. Line Pole No. 2	TQ
11E1	4.7 miles SW, Jacobsen Residence	TQ
12E1	4.7 miles WSW, Berwick Hospital	AP,C,TQ,WP
12E2	4.7 miles WSW, Berwick Hospital	S,VT
12E4	4.7 miles WSW, Berwick Hospital	WG
13E1	4.5 miles W, Glen Brook Reservoir	WT
13E3	5.0 miles W, Dent Farm	M
13E4	4.1 miles W, Kessler Farm	TQ
14E1	4.1 miles WNW, Knouse Farm	TQ
2F(3)	6.4 miles NNE, Between Shickshinny and former State Hospital	SH
2F1	5.9 miles NNE, St. Adalberts Cemetery	TQ
3F1	9.1 miles NE, Valania Residence	TQ
7F1	9.0 miles SE, Conyngham School	TQ

Note: See footnotes at end of table.

Table 2
(Page 5 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Code	Description[1]	Sample Types
12F(3)	6.9 miles WSW, Old Berwick Test Track	SH
12F1	5.3 miles WSW, Berwick Bridge	WT
12F2	5.2 miles WSW, Berwick Substation	TQ
12F3	5.2 miles WSW, Berwick Water Co.	WG,PW
15F1	5.4 miles NW, Zawatski Farm	TQ
16F1	7.8 miles NNW, Hidlay Residence	TQ
AG1	15 miles NE, above WB STP	VA
AG2	14 miles NE, below WB STP	VA
3G3	16 miles NE, WB Horton St. Substation	TQ
3G4	17 miles NE, WB Service Center	TQ
4G1	14 miles ENE, Mountain Top - Ind. Park	TQ
7G1	14 miles SE, Hazelton Chem Lab	AP,C,TQ,WP,VT,S
10G1	14 miles SSW, Davis Farm	M
12G1	15 miles WSW, PP&L Service Center Bloomsburg	AP,C,TQ,WP
12G2	17 miles WSW, U.S. Radium Site Bloomsburg	WT
12G3	15 miles WSW, PP&L Service Center Bloomsburg	S,VT
12G4	10 miles WSW, Kinery Residence	TQ
2H(3)	30 miles NNE, Near Falls, PA	FI
2H1	21 miles NNE, Yalicks Produce Stand	FD
7H1	47 miles SE, PP L roof, Allentown	AP,C,TQ
12H1	26 miles WSW, Merck Co.	WT
12H2RAW	26 miles WSW, Danville Water Company	PW
12H2TREATED	26 miles WSW, Danville Water Company	PW

(1) All distances measured from stand-by gas treatment vent.

(2) No actual location is indicated since fish are sampled over an area which extends through 3 sectors (5,6 and 7) near the outfall area.

(3) Station code is omitted because no permanent locations exist; samples are taken based on availability.

Table 2
(Page 6 of 6)

Sample Locations and Media for the SSES
Radiological Environmental Monitoring Program 1984

Location Codes:

The location codes are based on direction and distance from the site. The first two numbers represent each of the 16 angular sectors of 22-1/2 degrees centered about the reactor site. Sector one is divided evenly by the north axis and other sectors are numbered in a clockwise direction; i.e., 2=NNE, 3=NE, 4=ENE, etc. The next digit is a letter which represents the radial distance from the station:

S = Site(1) location
A = 0-1 miles off-site
B = 1-2 miles off-site
C = 2-3 miles off-site
D = 3-4 miles off-site
E = 4-5 miles off-site
F = 5-10 miles off-site
G = 10-20 miles off-site
H = >20 miles off-site

The last number is the station numerical designation within each sector and zone; e.g., 1, 2, 3, ...

Sample Type Codes

AG = Animals/Game (Deer)
AN = Animals
AS = Animals/Squirrel
AP = Air Particulate Filters
AW = Animals/Wildlife
C = Charcoal Filters
E = Eggs
FD = Food/Garden Crops
FH = Food/Garden Crops - Honey
FL = Food/Garden Crops - Green Leafy Vegetables (cabbage, lettuce, spinach, swiss chard, etc.)
FP = Food/Garden Crops - Potatoes
FR = Food/Garden Crops - Fruit (apples, strawberries, melons)
FV = Food/Garden Crops - Vegetables (sweet corn, green beans, tomatoes, squash)
FI = Fish
FM = Feed and Forage - Milk Producers (pasture grass)
ME = Meat
M = Milk
PO = Poultry
PW = Potable Water
S = Soil
SH = Sediment/Shoreline (0-4' of water)
TQ = TLD
VT = Vegetation - Terrestrial
VA = Vegation - Aquatic
WG = Water - Ground
WP = Water - Precipitation
WT = Water - Surface

(1) Site is defined as that area within PP&L's property boundary.

Table 3
(Page 1 of 3)

Direct Radiation - Thermoluminscent Dosimetry (1) Results
SSES REMP 1984

(All results are in mR/day ± 2s)

Station	Quarter 1(1A)	Quarter 2(1A)	Quarter 3(1A)	Quarter 4(8)
1S2	(3)	0.28 ± 0.02	0.23 ± 0.06	0.18 (0.17,0.18)
1A1	0.28 ± 0.10	0.30 ± 0.03	0.23 ± 0.06	0.17 (0.16,0.17)
1D2	0.23 ± 0.03	0.21 ± 0.03	0.22 ± 0.07	0.17 (0.17,0.17)
1E1	0.23 ± 0.04	0.25 ± 0.03	0.21 ± 0.06	0.15 (0.14,0.15)
2S3	0.25 ± 0.03	0.25 ± 0.03	0.23 ± 0.06	0.16 (0.16,0.17)
2S2	0.25 ± 0.05	0.23 ± 0.03	0.21 ± 0.06	0.15 (0.16,0.15)
2B3	0.22 ± 0.03	0.27 ± 0.03	0.20 ± 0.06	0.17 (0.18,0.16)
2F1	0.22 ± 0.03	0.24 ± 0.06	0.23 ± 0.06	0.16 (0.16,0.16)
3S4	0.23 ± 0.05	0.21 ± 0.02	0.22 ± 0.06	0.15 (0.16,0.15)
3S3	0.19 ± 0.04	0.22 ± 0.04	0.18 ± 0.06	0.14 (0.15,0.14)
3D1	0.24 ± 0.03	0.29 ± 0.02	0.25 ± 0.06	0.19 (0.20,0.19)
3F1	0.20 ± 0.03	0.25 ± 0.03	0.20 ± 0.06	0.16 (0.17,0.16)
3G3	0.22 ± 0.04	0.22 ± 0.03	0.21 ± 0.06	0.17 (0.16,0.18)
3G4	0.25 ± 0.07	0.25 ± 0.04	0.22 ± 0.06	0.16 (0.15,0.17)
4S3	0.23 ± 0.04	0.22 ± 0.03	0.24 ± 0.06	0.18 (0.18,0.18)
4S1	0.21 ± 0.04	0.23 ± 0.02	0.19 ± 0.06	0.14 (0.15,0.14)
4E1	0.25 ± 0.05	0.25 ± 0.04	0.22 ± 0.06	0.16 (0.16,0.16)
4G1	0.21 ± 0.04	0.25 ± 0.03	0.22 ± 0.06	0.17 (0.18,0.16)
5S7	0.21 ± 0.04	0.20 ± 0.02	0.20 ± 0.06	0.14 (0.15,0.14)
5S1	0.18 ± 0.03	0.21 ± 0.03	0.18 ± 0.06	0.14 (0.15,0.13)
5S4	0.24 ± 0.03	0.23 ± 0.03	0.19 ± 0.06	0.16 (0.16,0.16)
5E2	0.27 ± 0.04	0.27 ± 0.02	0.23 ± 0.06	0.17 (0.18,0.17)
6S4	0.26 ± 0.06	0.28 ± 0.03	0.24 ± 0.06	0.18 (0.19,0.18)
6A3	0.24 ± 0.04	0.30 ± 0.02	0.22 ± 0.06	0.17 (0.18,0.17)
6E1	0.27 ± 0.04	0.24 ± 0.02	0.23 ± 0.06	0.19 (0.20,0.18)
7S3	0.22 ± 0.04	0.25 ± 0.03	0.22 ± 0.06	0.17 (0.17,0.17)
7S1	0.23 ± 0.03	0.19 ± 0.03	0.21 ± 0.06	0.15 (0.15,0.15)
7A1	0.21 ± 0.04	0.24 ± 0.03	0.20 ± 0.06	0.16 (0.16,0.16)
7B3	0.21 ± 0.03	0.21 ± 0.02	0.24 ± 0.07	0.15 (0.16,0.15)
7E1	0.20 ± 0.03	0.22 ± 0.02	0.21 ± 0.07	0.18 (0.17,0.18)

See foot notes at end of table

Table 3
(Page 2 of 3)

Direct Radiation - Thermoluminscent Dosimetry (1) Results
SSES REMP 1984

(All results are in mR/day ± 2s)

Station	Quarter 1(1A)	Quarter 2(1A)	Quarter 3(1A)	Quarter 4(8)
7F1	0.20 ± 0.03	0.25 ± 0.03	0.21 ± 0.06	(7), (0.18)
7G1	0.22 ± 0.03	0.27 ± 0.03	0.27 ± 0.08	0.17 (0.15,0.19)
8S2	0.23 ± 0.04	0.21 ± 0.03	0.25 ± 0.07	0.17 (0.18,0.17)
8B2	0.23 ± 0.05	0.24 ± 0.04	0.21 ± 0.07	0.16 (0.16,0.16)
8D2	0.22 ± 0.03	0.29 ± 0.02	0.24 ± 0.06	0.16 (0.17,0.16)
9S1	0.23 ± 0.05	0.23 ± 0.02	(4)	(4)
9S2	(5)	(5)	(5)	0.20 (0.19,0.20)
9B1	0.20 ± 0.03	0.25 ± 0.03	0.22 ± 0.06	0.15 (0.14,0.16)
9D1	0.23 ± 0.04	0.25 ± 0.03	0.23 ± 0.06	0.16 (0.18,0.15)
10S1	0.20 ± 0.03	0.20 ± 0.03	0.21 ± 0.06	0.16 (0.17,0.16)
10B2	0.19 ± 0.03	0.22 ± 0.03	0.16 ± 0.06	0.14 (0.13,0.14)
10B3	0.20 ± 0.03	0.24 ± 0.03	0.21 ± 0.07	0.15 (0.14,0.15)
10D2	0.20 ± 0.03	0.28 ± 0.02	0.23 ± 0.06	0.17 (0.16,0.17)
11S3	0.28 ± 0.03	0.34 ± 0.03	0.29 ± 0.07	0.18 (0.24,0.14)
11S2	0.21 ± 0.04	0.21 ± 0.03	0.18 ± 0.06	0.19 (0.14,0.22)
11S6	(5)	(5)	(5)	0.15 (0.15,0.15)
11A2	0.19 ± 0.03	0.24 ± 0.03	0.18 ± 0.06	(6)
11E1	0.19 ± 0.03	0.20 ± 0.03	0.17 ± 0.06	0.14 (0.14,0.14)
12S3	0.27 ± 0.06	0.32 ± 0.04	0.25 ± 0.06	0.20 (0.20,0.20)
12B4	0.19 ± 0.03	0.23 ± 0.02	0.20 ± 0.06	0.15 (0.16,0.14)
12D3	0.24 ± 0.03	0.21 ± 0.02	0.28 ± 0.07	0.17 (0.18,0.17)
12E1	0.24 ± 0.03	0.28 ± 0.05	0.24 ± 0.07	0.16 (0.15,0.16)
12F2	0.24 ± 0.07	0.29 ± 0.05	0.22 ± 0.06	0.17 (0.18,0.16)
12G1	0.22 ± 0.03	0.18 ± 0.02	0.17 ± 0.06	0.17 (0.19,0.15)
12G4	0.22 ± 0.03	0.24 ± 0.04	0.23 ± 0.06	0.16 (0.13,0.18)
13S2	0.25 ± 0.03	0.31 ± 0.02	0.26 ± 0.07	0.18 (0.17,0.18)
13E4	0.27 ± 0.03	0.26 ± 0.03	0.22 ± 0.06	0.17 (0.16,0.17)
14S5	0.25 ± 0.04	0.28 ± 0.03	0.26 ± 0.06	0.19 (0.20,0.19)
14E1	0.23 ± 0.04	0.25 ± 0.02	0.26 ± 0.06	0.17 (0.17,0.17)
15S3	0.28 ± 0.03	0.30 ± 0.03	0.25 ± 0.06	0.18 (0.19,0.17)
15S4	0.19 ± 0.04	0.25 ± 0.03	0.22 ± 0.07	0.15 (0.15,0.15)
15A3	0.23 ± 0.04	0.31 ± 0.02	0.19 ± 0.06	0.17 (0.18,0.17)

See foot notes at end of table

Table 3
(Page 3 of 3)

Direct Radiation - Thermoluminscent Dosimetry (1) Results
SSES REMP 1984

(All results are in mR/day ± 2s)

Station	Quarter 1(1A)	Quarter 2(1A)	Quarter 3(1A)	Quarter 4(8)
15F1	0.29 ± 0.04	0.27 ± 0.03	0.23 ± 0.06	0.18 (0.17,0.19)
16S1	0.14 ± 0.04	0.26 ± 0.03	0.24 ± 0.07	0.18 (0.18,0.18)
16A2	0.19 ± 0.03	0.20 ± 0.02	0.20 ± 0.06	0.15 (0.15,0.15)
16B1	0.18 ± 0.04	0.22 ± 0.03	0.18 ± 0.06	0.14 (0.14,0.14)
16F1	0.24 ± 0.03	0.29 ± 0.03	0.23 ± 0.06	0.18 (0.17,0.18)
7H1	0.17 ± 0.03	0.23 ± 0.10	0.18 ± 0.06	0.12 (0.13,0.12)
Average(2)	0.22 ± 0.06	0.25 ± 0.07	0.22 ± 0.05	0.16 ± 0.03

(1) Errors for individual measurements are two standard deviations of the average of four readings per dosimeter for Quarter 1,2, and 3.
(1A) Samples analyzed by NUS Corporation.
(2) Errors of row averages are two standard deviations calculated from the same row data used to generate the average for quarter 1,2, and 3.
(3) No data, due to instrument malfunction.
(4) No sample. TLD location destroyed by construction activities. Moved to 9S2.
(5) No sample. New location for 4th quarter.
(6) No sample. TLD location destroyed by construction activities. Moved to 11S6.
(7) No sample. TLD lost in transit.
(8) Sample analyzed by PP and L. Results are weighted average of the two readings, each using two TLD elements, in parentheses. The formula used is

$$(X)\frac{(42)}{101} + \frac{(Y)(59)}{101} = \text{weighted average}$$

November: Direct Radiation -- Quarter 4 TLDs were collected on November 6,7,8 and replaced with badges placed in sealed plastic bags (to aid in preventing moisture contacting the TLDs).

Table 4
Gamma Spectrometry of Fish
SSES REMP 1984

(Results in pCi/kg (wet) ± 2s)

Month	Sample Type	Station	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
May[1]	Catfish	IND	05/23/84	LT 300[2]	LT 60	LT 90	LT 50	LT 50	LT 200	3000±900	LT 19	LT 70	LT 60	LT 190	LT 120
	Panfish	Lake T-A-W	05/21/84	LT 200	LT 50	LT 60	LT 40	LT 50	LT 130	3900±800	LT 100	LT 60	LT 60	LT 120	LT 100
	Forage Species[3]	IND	05/21/84	LT 400	LT 90	LT 90	LT 70	LT 70	LT 200	4600±1100	LT 170	LT 80	LT 80	LT 140	LT 140
	Predator Fish	IND	05/21/84	LT 300	LT 70	LT 80	LT 60	LT 70	LT 170	4000±1000	LT 200	LT 70	LT 70	LT 160	LT 110
	Forage Species	IND	05/21/84	LT 400	LT 90	LT 110	LT 60	LT 80	LT 180	2300±1000	LT 200	LT 70	LT 80	LT 160	LT 160
	Catfish	Lake T-A-W	05/25/84	LT 300	LT 100	LT 120	LT 70	LT 80	LT 200	3500±1100	LT 140	LT 60	LT 90	LT 170	LT 160
	Predator Fish	2H	05/24/84	LT 300	LT 80	LT 80	LT 60	LT 80	LT 200	4000±1000	LT 200	LT 80	LT 70	LT 190	LT 140
	Forage Species	2H	05/24/84	LT 300	LT 80	LT 100	LT 70	LT 70	LT 190	3900±1100	LT 120	LT 70	LT 90	LT 170	LT 140
	Catfish	2H	05/25/84	LT 300	LT 70	LT 80	LT 60	LT 70	LT 190	2900±800	LT 180	LT 50	LT 70	LT 150	LT 110
Sep	Catfish	IND	09/19/84	LT 200	LT 20	LT 10	LT 10	LT 10	LT 40	2410±240	LT 60	LT 10	LT 20	LT 30	LT 30
	Forage Species	IND	09/18/84	LT 300	LT 20	LT 20	LT 20	LT 20	LT 60	3460±350	LT 100	LT 20	LT 30	LT 40	LT 50
	Predator Fish	IND	09/20/84	LT 300	LT 30	LT 20	LT 20	LT 20	LT 60	3830±380	LT 100	LT 20	LT 30	LT 50	LT 50
	Predator Fish	2H	09/19/84	LT 300	LT 30	LT 30	LT 20	LT 30	LT 70	3250±330	LT 100	LT 20	LT 30	LT 50	LT 60
	Forage Species	2H	09/19/84	LT 400	LT 40	LT 30	LT 30	LT 30	LT 80	3310±330	LT 200	LT 30	LT 40	LT 60	LT 80
	Catfish	2H	09/20/84	LT 200	LT 20	LT 20	LT 20	LT 20	LT 50	2810±280	LT 90	LT 20	LT 20	LT 40	LT 50
OCT.	Catfish	Lake T-A-W	10/05/84	LT 100	LT 20	LT 20	LT 20	LT 20	LT 40	3760±380	LT 50	LT 20	LT 20	LT 40	LT 40
	Panfish	Lake T-A-W	10/10/84	LT 60	LT 10	LT 20	LT 10	LT 20	LT 30	3490±350	LT 20	LT 10	LT 20	LT 40	LT 30

(1) Samples analyzed by NUS Corporation.
(2) LT = Less Than
(3) Duplicate Sample and Analysis

Table 5

Gross Beta in Fish
SSES REMP 1984
(Results in pCi/kg (wet) ± 2s)

Month	Sample Type	Station	Collection Date	Gross Beta Activity
May(1)	Catfish	IND	05/23/84	3300±400
	Panfish	Lake T-A-W	05/21/84	2700±300
	Predator Fish	IND	05/21/84	3900±400
	Forage Species	IND	05/21/84	3500±400
	Forage Species(2)	IND	05/21/84	3100±400
	Catfish	Lake T-A-W	05/25/84	3400±400
	Predator Fish	2H	05/24/84	3600±400
	Forage Species	2H	05/24/84	3100±400
	Catfish	2H	05/25/84	3000±300
September	Catfish	IND	09/19/84	2000±100
	Predator Fish	IND	09/20/84	1400±100
	Forage Species	IND	09/18/84	6000±100
	Predator Fish	2H	09/19/84	1000±100
	Forage Species	2H	09/19/84	1300±100
	Catfish	2H	09/20/84	1200±100
October	Catfish	Lake T-A-W	10/05/84	6300±200
	Panfish	Lake T-A-W	10/10/84	5200±100

(1) Samples analyzed by NUS Corporation.
(2) Duplicate Sample and Analysis

Table 6
Gamma Spectrometry of Sediment
SSES REMP 1984

(Results in pCi/kg (dry) ± 2s)
Collection Date: June 13, 1984

	Station						
	11C(1)	2F(1)	12F(2)	7B(1)	7B(3)	2B(1)	Lake T-A-W(4) (1)
Ac-228:	860 ± 300	890 ± 310	790 ± 340	760 ± 220	700 ± 210	860 ± 280	860 ± 290
Ba-140:	LT 1300(5)	LT 1100	LT 1100	LT 800	LT 900	LT 1100	LT 800
Bi-212:	ND(6)	ND	ND	ND	ND	ND	1000 ± 900
Bi-214:	710 ± 170	820 ± 180	980 ± 200	520 ± 120	660 ± 140	750 ± 160	1200 ± 200
Co-58:	LT 140	LT 150	LT 140	LT 110	LT 120	LT 120	LT 130
Co-60:	LT 130	LT 110	LT 140	LT 100	LT 100	LT 130	LT 150
Cs-134:	LT 130	LT 140	LT 150	LT 90	LT 110	LT 140	LT 140
Cs-137:	LT 130	76 ± 71	LT 130	LT 100	LT 110	LT 130	LT 150
Fe-59:	LT 300	LT 400	LT 400	LT 200	LT 300	LT 300	LT 400
K-40:	9200 ± 1600	7500 ± 1700	6200 ± 1500	6900 ± 1300	5800 ± 1100	11000±2000	12000±2000
La-140:	LT 700	LT 700	LT 600	LT 600	LT 500	LT 600	LT 500
Mn-54:	LT 120	LT 130	LT 140	LT 80	LT 90	LT 90	LT 150
Nb 95:	LT 160	LT 140	LT 170	LT 110	LT 120	LT 150	LT 150
Pb-212:	670 ± 160	640 ± 160	670 ± 160	540 ± 120	560 ± 120	840 ± 160	890 ± 190
Pb-214:	640 ± 150	690 ± 170	1000 ± 200	670 ± 130	580 ± 120	910 ± 170	980 ± 170
Ra-226:	680 ± 160	700 ± 180	1000 ± 200	610 ± 130	630 ± 130	830 ± 160	1100 ± 200
Tl-208:	850 ± 220	910 ± 250	1100 ± 200	630 ± 170	750 ± 190	780 ± 200	950 ± 260
Zn-65:	LT 400	LT 400	LT 300	LT 300	LT 300	LT 300	LT 400
Zr-95:	LT 300	LT 300	LT 200	LT 180	LT 200	LT 300	LT 300
Collection Date: September 24, 1984							
	(7)		(7)				
Ac-228:	ND	ND	ND	ND		ND	ND
Ba-140:	LT 400	LT 400	LT 400	LT 300		LT 400	LT 600
Bi-212:	ND	ND	ND	ND		ND.	ND
Bi-214:	ND	ND	ND	ND		ND	ND
Co-58:	LT 40	LT 30	LT 30	LT 30		LT 40	LT 40
Co-60:	LT 40	LT 20	LT 20	LT 30		LT 30	LT 30
Cs-134:	LT 40	LT 30	LT 30	LT 30		LT 40	LT 40
Cs-137:	160 ± 39	98 ± 3	LT 30	78 ± 26		LT 40	137 ± 14
Fe-59:	LT 100	LT 80	LT 80	LT 90		LT 100	LT 90
K-40:	10800±1100	11500±1200	6790 ± 700	8960 ± 900		11300±1100	12600±1300
La-140:	LT 200	LT 200	LT 200	LT 200		LT 200	LT 300
Mn-54:	LT 40	LT 30	LT 30	LT 30		LT 40	LT 30
Nb 95:	LT 50	LT 40	LT 40	LT 40		LT 50	LT 50
Pb-212:	ND	ND	ND	ND		ND	ND
Pb-214:	ND	ND	ND	ND		ND	ND
Ra-226:	1830 ± 540	2080 ± 490	LT 500	1190 ± 400		2010 ± 600	2110 ± 510
Th-228:	1380 ± 140	1300 ± 130	802 ± 80	963 ± 96		1290 ± 130	1600 ± 160
Tl-208:	ND	ND	ND	ND		ND	ND
Zn-65:	LT 90	LT 60	LT 50	LT 70		LT 80	LT 70
Zr-95:	LT 100	LT 80	LT 80	LT 80		LT 100	LT 90

(1) Samples analyzed by NUS Corporation. (2) Collected 06/14/84. (3) Duplicate Sample and Analysis. (4) Collected 06/18/84. (5) LT = Less Than.
(6) ND = Not Detected. (7) Collected 09/26/84.
TI reports the long-lived Ra-226 and Th-228 while NUS reports the individual daughters in naturally occurring uranium and thorium chain.

Table 7

Gross Alpha and Gross Beta in Sediment
SSES REMP 1984
(Results in pCi/kg (dry) ± 2s)

Month	Station	Collectiom Date	Gross Alpha	Gross Beta
June (1)	2B	06/13/84	14,000 ± 5,000	18,000 ± 2,000
	7B	06/13/84	9,300 ± 4,400	13,000 ± 2,000
	11C	06/13/84	12,000 ± 5,000	14,000 ± 2,000
	2F	06/13/84	12,000 ± 5,000	15,000 ± 2,000
	12F	06/14/84	6,200 ± 3,900	15,000 ± 2,000
	Lake T-A-W	06/18/84	13,000 ± 5,000	19,000 ± 2,000
	7B(2)	06/13/84	5,800 ± 3,900	13,000 ± 2,000
September	2B	09/24/84	6,600 ± 3,000	22,000 ± 2,000
	7B	09/24/84	4,800 ± 2,600	17,000 ± 2,000
	11C	09/26/84	8,600 ± 5100	40,000 ± 3,000
	2F	09/24/84	9,700 ± 5,300	27,000 ± 3,000
	12F	09/26/84	LT 2000	17,000 ± 2,000
	Lake T-A-W	09/24/84	LT 4000	29,000 ± 3,000

(1) Samples analyzed by NUS Corporation.
(2) Duplicate Sample and Analysis

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Others
		1D5	01/16/84	LT 15 [1]	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	Cr-51 @ LT 30
Jan.	SW	5S8	01/02/84 to 01/30/84	LT 15	LT 4	LT 5	LT 3	LT 4	LT 9	LT 9	LT 4	LT 4	LT 8	LT 7	
(1A)		6S5	01/02/84 to 01/30/84	LT 13	LT 4	LT 4	LT 3	LT 4	LT 8	LT 8	LT 4	LT 4	LT 8	LT 7	
		6S6	01/02/84 to 01/30/84	LT 12	LT 3	LT 4	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 7	LT 6	
		1D3	01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	
		13E1	01/17/84	LT 14	LT 4	LT 4	LT 3	LT 3	LT 9	LT 7	LT 3	LT 4	LT 9	LT 6	Cr-51 @ LT 30
		12F1	NS [2]												
		12G2	NS												
		12H1	12/12/83 to 01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	
		6S7	01/02/84 to 01/30/84	LT 13	LT 3	LT 4	LT 3	LT 3	LT 8	LT 8	LT 3	LT 3	LT 7	LT 6	
		6S5 [3]	01/02/84 to 01/30/84	LT 13	LT 4	LT 5	LT 3	LT 4	LT 9	LT 7	LT 4	LT 4	LT 9	LT 7	
	GW	2S6	01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	
		4S2	01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	
		4S4	01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	Cr-51 @ LT 30
		15A4	01/17/84	LT 15	LT 3	LT 4	LT 3	LT 3	LT 6	LT 8	LT 3	LT 4	LT 7	LT 5	
		12E4	01/16/84	LT 15	LT 3	LT 4	LT 3	LT 3	LT 6	LT 8	LT 3	LT 4	LT 7	LT 5	
		12F3	01/17/84	LT 15	LT 3	LT 4	LT 3	LT 3	LT 6	LT 8	LT 3	LT 4	LT 7	LT 5	Cr-51 @ LT 30
		3S5	NS [5]												
		11S5	01/16/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 8	LT 3	LT 4	LT 9	LT 6	Cr-51 @ LT 30
	PW	12F3	01/17/84	LT 15	LT 4	LT 4	LT 3	LT 3	LT 9	LT 7	LT 3	LT 4	LT 9	LT 6	Cr-51 @ LT 30
		12H2 TREATED	01/02/84 to 01/30/84	LT 11	LT 2	LT 2	LT 2	LT 2	LT 3	LT 8	LT 2	LT 2	LT 5	LT 4	
		12H2 RAW	01/02/84 to 01/30/84	LT 15	LT 4	LT 4	LT 4	LT 4	LT 9	LT 8	LT 4	LT 4	LT 9	LT 7	

Note: See foot notes at end of table

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
Feb.		6S7	01/30/84 to 02/27/84	LT 7	LT 2	LT 2	LT 2	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
(1A)	SW	5S8	02/06/84 to 02/27/84	LT 5	LT 1.4	LT 1.8	LT 1.4	LT 1.6	LT 3	LT 3	LT 1.5	LT 1.4	LT 3	LT 3
		6S5	02/06/84 to 02/27/84	LT 5	LT 1.7	LT 1.9	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 1.7	LT 4	LT 3
		6S6	01/30/84 to 02/27/84	LT 7	LT 2	LT 2	LT 2	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		1D3	02/15/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4
		13E1	02/16/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12F1	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 3	LT 4
		12G2	NS											
		12H1	01/16/84 to 02/16/84	LT 8	LT 1.9	LT 2	LT 1.8	LT 1.9	LT 4	LT 5	LT 1.9	LT 2	LT 4	LT 4
		1D5	02/16/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
	GW	2S6	02/15/84	LT 8	LT 1.9	LT 2	LT 1.8	LT 1.9	LT 4	LT 5	LT 1.9	LT 2	LT 4	LT 4
		4S2	02/15/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 5
		4S4	02/16/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		15A4	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4
		12E4	02/15/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12F3	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4
		12F3(3)	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4
		3S5	NS (5)											
		11S5	02/16/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
	PW	12F3	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4
		12H2 TREATED	1/30 to 02/27/84	LT 7	LT 2	LT 2	LT 2	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		12H2 RAW	1/30 to 02/27/84	LT 7	LT 2	LT 2	LT 2	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		12F3(3)	02/16/84	LT 9	LT 3	LT 4	LT 2	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 4

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
March		6S7	02/27/84 to 03/05/84	LT 60	LT 5	LT 5	LT 4	LT 4	LT 12	LT 30	LT 5	LT 5	LT 10	LT 10
	SW	5S8	03/05/84 to 03/26/84	LT 5	LT 1.5	LT 1.8	LT 1.6	LT 1.7	LT 3	LT 3	LT 1.5	LT 1.5	LT 3	LT 3
(1A)		6S5	03/05/84 to 03/26/84	LT 5	LT 1.3	LT 1.6	LT 1.5	LT 1.4	LT 3	LT 3	LT 1.5	LT 1.5	LT 4	LT 2
		6S6	02/27/84 to 03/26/84	LT 20	LT 5	LT 6	LT 5	LT 5	LT 11	LT 13	LT 5	LT 5	LT 12	LT 10
		1D3	03/13/84	LT 5	LT 1.4	LT 1.6	LT 1.3	LT 1.4	LT 3	LT 3	LT 1.3	LT 1.4	LT 3	LT 2
		13E1	03/12/84	LT 15	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 7	LT 5
		12F1	03/12/84	LT 6	LT 1.4	LT 1.6	LT 1.3	LT 1.4	LT 3	LT 3	LT 1.3	LT 1.4	LT 3	LT 2
		12G2	03/13/84	LT 6	LT 1.4	LT 1.6	LT 1.3	LT 1.4	LT 3	LT 3	LT 1.3	LT 1.4	LT 3	LT 2
		12H1	02/16/84 to 03/12/84	LT 14	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 7	LT 5
		Lake T-A-W	03/14/84	LT 7	LT 1.9	LT 2	LT 1.7	LT 1.8	LT 4	LT 4	LT 1.8	LT 1.9	LT 4	LT 3
		1D5	03/13/84	LT 14	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 7	LT 5
	GW	2S6	03/12/84	LT 5	LT 1.1	LT 1.2	LT 1.0	LT 1.0	LT 2	LT 3	LT 1.0	LT 1.0	LT 2	LT 1.8
		4S2	03/13/84	LT 7	LT 1.9	LT 2	LT 1.7	LT 1.8	LT 4	LT 4	LT 1.8	LT 1.9	LT 4	LT 3
		4S4	03/13/84	LT 14	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 7	LT 6
		11S5	03/13/84	LT 8	LT 1.8	LT 2	LT 1.5	LT 1.8	LT 4	LT 4	LT 1.6	LT 1.7	LT 4	LT 3
		15A4	03/14/84	LT 13	LT 3	LT 3	LT 2	LT 3	LT 7	LT 7	LT 3	LT 3	LT 7	LT 5
		12E4	03/12/84	LT 6	LT 1.3	LT 1.4	LT 1.2	LT 1.3	LT 3	LT 3	LT 1.2	LT 1.3	LT 3	LT 3
		12F3	03/12/84	LT 8	LT 2	LT 2	LT 1.7	LT 1.8	LT 4	LT 5	LT 1.9	LT 1.9	LT 4	LT 3
		3S5	NS (5)											
	PW	12F3	03/12/84	LT 14	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 7	LT 5
		12H2 TREATED	02/27/84 to 4/02/84	LT 12	LT 4	LT 4	LT 4	LT 4	LT 8	LT 7	LT 4	LT 4	LT 9	LT 7
		12H2 RAW	02/27/84 to 4/02/84	LT 13	LT 4	LT 5	LT 4	LT 4	LT 8	LT 7	LT 4	LT 4	LT 9	LT 7

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
April		LakeT-A-W	04/12/84	LT 8	LT 3	LT 3	LT 3	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 5
(1A)	SW	5S8	04/02/84 to 04/30/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		6S5	04/02/84 to 04/30/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		6S6	04/02/84 to 04/30/84	LT 7	LT 1.9	LT 2	LT 1.9	LT 1.9	LT 4	LT 3	LT 2	LT 2	LT 4	LT 3
		1D3	04/10/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		13E1	04/10/84	LT 7	LT 1.4	LT 1.4	LT 1.2	LT 1.4	LT 3	LT 3	LT 1.3	LT 1.4	LT 3	LT 2
		12F1	04/10/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12F1[3]	04/10/84	LT 15	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 7	LT 6
		12G2	04/10/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12G2[2]	04/10/84	LT 15	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 7	LT 6
		12H1	03/12/84 to 04/10/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		1D5	04/10/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		6S7	04/02/84 to 04/30/84	LT 5	LT 1.5	LT 1.8	LT 1.3	LT 1.4	LT 3	LT 3	2.0±0.8	LT 1.3	LT 3	LT 2
	GW	2S6	04/10/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		4S2	04/10/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		4S4	04/10/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		11S5	04/10/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		15A4	04/11/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		12E4	04/10/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 5
		12F3	04/11/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 4
		3S5	NS (5)											
	PW	12F3	04/11/84	LT 8	LT 2	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 4
		12H2 TREATED	04/02/84 to 04/30/84	LT 5	LT 1.4	LT 1.8	LT 1.3	LT 1.3	LT 3	LT 3	LT 1.4	LT 1.4	LT 3	LT 3
		12H2 RAW	04/02/84 to 04/30/84	LT 7	LT 1.9	LT 2	LT 1.9	LT 1.9	LT 4	LT 3	LT 2	LT 2	LT 4	LT 3

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
May		LAKE T-A-W	05/15/84	LT 7	LT 1.9	LT 3	LT 1.8	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
	SW	5S8	05/07/84 to 05/29/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
(1A)		6S5	05/07/84 to 05/29/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		6S5 (3)	05/07/84 to 05/29/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		6S6	04/30/84 to 05/29/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		1D3	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		13E1	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		12F1	05/15/84	LT 7	LT 1.9	LT 3	LT 1.8	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		12G2	05/15/84	LT 7	LT 1.9	LT 3	LT 1.8	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		12H1	04/10/84 to 05/15/84	LT 7	LT 1.9	LT 3	LT 1.8	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		1D5	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		6S7	04/30/84 to 05/29/84	LT 11	LT 3	LT 4	LT 3	LT 3	LT 7	LT 6	LT 4	LT 3	LT 7	LT 6
	GW	11S5	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		2S6	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		4S2	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		4S4	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		15A4	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		12E4	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
		12F3	05/18/84	LT 8	LT 2	LT 2	LT 1.8	LT 1.9	LT 4	LT 5	LT 1.8	LT 2	LT 4	LT 4
		3S5	05/15/84	LT 7	LT 2	LT 3	LT 1.8	LT 2	LT 5	LT 4	LT 2	LT 2	LT 5	LT 4
	PW	12F3	05/15/84	LT 7	LT 1.9	LT 3	LT 1.8	LT 2	LT 4	LT 4	LT 2	LT 2	LT 4	LT 4
		12H2 TREATED	04/30/84 to 05/29/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12H2 RAW	04/30/84 to 05/29/84	LT 9	LT 3	LT 3	LT 3	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
June	SW	5S8	06/04/84 to 06/11/84	LT 11	LT 3	LT 4	LT 3	LT 3	LT 8	LT 8	LT 3	LT 4	LT 8	LT 7
		6S5	06/04/84 to 06/11/84	LT 13	LT 4	LT 5	LT 4	LT 4	LT 9	LT 9	LT 4	LT 4	LT 9	LT 9
(1A)		6S6	06/04/84 to 07/02/84	LT 9	LT 2	LT 3	LT 2	LT 3	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
		1D3	06/12/84	LT 10	LT 3	LT 4	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 8	LT 7
		13E1	06/12/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		12F1	06/12/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		12G2	06/12/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		12H1	06/12/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
		6S7	05/29/84 to 07/02/84	LT 5	LT 1.4	LT 1.7	LT 1.4	LT 1.6	LT 3	LT 3	LT 1.5	LT 1.5	LT 3	LT 3
		LAKE T-A-W	06/12/84	LT 9	LT 3	LT 3	LT 3	LT 2	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
		1D5	06/12/84	LT 8	LT 2	LT 3	LT 2	LT 2	LT 5	LT 5	LT 2	LT 2	LT 5	LT 4
	GW	2S6	06/12/84	LT 10	LT 3	LT 4	LT 3	LT 2	LT 7	LT 7	LT 3	LT 3	LT 8	LT 7
		4S2	06/12/84	LT 10	LT 3	LT 4	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 8	LT 7
		4S4	06/12/84	LT 10	LT 3	LT 4	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 8	LT 7
		11S5	06/12/84	LT 10	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 3	LT 3	LT 5	LT 5
		15A4	06/12/84	LT 10	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		12E4	06/12/84	LT 9	LT 3	LT 3	LT 3	LT 2	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
		12F3	06/13/84	LT 10	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5
		3S5	06/12/84	LT 9	LT 3	LT 3	LT 3	LT 2	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
	PW	12F3	06/13/84	LT 9	LT 3	LT 3	LT 3	LT 2	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
		12H2 TREATED	05/29/84 to 07/02/84	LT 9	LT 2	LT 3	LT 2	LT 3	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5
		12H2 RAW	05/29/84 to 07/02/84	LT 9	LT 2	LT 3	LT 2	LT 3	LT 5	LT 5	LT 3	LT 3	LT 6	LT 5

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
July (1A)	SW	5S8	06/18/84 to 07/09/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 5	LT 5	LT 1.8	LT 2	LT 5	LT 3
		5S8[3]	06/18/84 to 07/09/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 5	LT 5	LT 1.8	LT 2	LT 5	LT 3
		6S5	06/18/84 to 07/09/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 5	LT 5	LT 1.8	LT 2	LT 5	LT 3
		6S6	07/02/84 to 08/06/84	LT 13	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 6	LT 5
		1D3	07/10/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		13E1	07/11/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		12F1	07/11/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		12G2	07/10/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		12H1	07/10/84	LT 4	LT 0.8	LT 0.9	LT 0.7	LT 0.7	LT 1.7	LT 3	LT 0.8	LT 0.9	LT 1.6	LT 1.5
		6S7	07/02/84 to 08/06/84	LT 13	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 6	LT 5
		LAKE T-A-W	07/10/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		1D5	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
	GW	2S6	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		4S2	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		4S4	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		11S5	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		15A4	07/11/84	LT 8	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		12E4	07/11/84	LT 8	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		12F3	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
		3S5	07/10/84	LT 9	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 2	LT 3	LT 6	LT 5
	PW	12F3	07/10/84	LT 7	LT 2	LT 2	LT 1.8	LT 2	LT 4	LT 4	LT 1.8	LT 2	LT 5	LT 3
		12H2 TREATED	07/02/84 to 08/06/84	LT 13	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 6	LT 5
		12H2 RAW	07/09/84 to 08/06/84	LT 13	LT 3	LT 3	LT 3	LT 3	LT 7	LT 7	LT 3	LT 3	LT 6	LT 5

Note: See footnotes at end of table.

Table 8
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Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984 (Page 8 of 8)

(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	CO-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
August	SW	5S8	07/16/84 to 08/06/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 5	LT 7	LT 2	LT 3	LT 5	LT 5
(1A)		6S5[3]	07/16/84 to 08/06/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 5	LT 7	LT 2	LT 3	LT 5	LT 5
		6S5	07/16/84 to 08/06/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 5	LT 7	LT 2	LT 3	LT 5	LT 5
		1D3	08/07/84	LT 12	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 6	LT 5
		13E1	08/08/84	LT 11	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 6	LT 5
		12F1	08/08/84	LT 11	LT 2	LT 3	LT 2	LT 2	LT 5	LT 6	LT 2	LT 3	LT 5	LT 4
		12G2	08/08/84	LT 11	LT 2	LT 3	LT 2	LT 2	LT 5	LT 6	LT 2	LT 3	LT 5	LT 4
		12H1	08/07/84	ND[4]										
		1D5	08/07/84	LT 12	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 6	LT 5
		LAKE T-A-W	08/07/84	LT 12	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 6	LT 5
	GW	2S6	08/07/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 7	LT 2	LT 3	LT 6	LT 5
		4S2	08/07/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 7	LT 2	LT 3	LT 6	LT 5
		4S4	08/07/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 7	LT 2	LT 3	LT 6	LT 5
		11S5	08/07/84	LT 13	LT 3	LT 3	LT 2	LT 2	LT 6	LT 7	LT 2	LT 3	LT 5	LT 5
		15A4	08/08/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 9	LT 2	LT 3	LT 6	LT 5
		12E4	08/08/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 5	LT 7	LT 2	LT 3	LT 5	LT 5
		12F3	08/08/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 5	LT 6	LT 2	LT 3	LT 5	LT 5
		3S5	08/08/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 6	LT 2	LT 3	LT 6	LT 5
	PW	12F3	08/08/84	LT 12	LT 3	LT 3	LT 2	LT 2	LT 6	LT 6	LT 2	LT 3	LT 6	LT 5

(1A) Samples analyzed by NUS Corporation.
(1) LT = Less Than
(2) NS = No Sample
(3) Duplicate Sample and Analysis
(4) ND = No Data. Sample was inadvertently discarded prior to analysis.
(5) Station closed through April

Table 8a
Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
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(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
July	SW	6S6	07/02/84 to 08/06/84	LT 50	LT 5	LT 5	LT 4	LT 5	LT 10	LT 30	LT 4	LT 6	LT 8	LT 10
		6S7	07/02/84 to 08/06/84	LT 90	LT 8	LT 6	LT 7	LT 7	LT 20	LT 40	LT 7	LT 9	LT 20	LT 20
August		5S8	07/16/84 to 08/06/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 5	LT 3
		6S5	07/16/84 to 08/06/84	LT 20	LT 3	LT 8	LT 3	LT 3	LT 7	LT 8	LT 3	LT 4	LT 6	LT 8
		1D3	08/07/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 6	LT 7
		13E1	08/08/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 6	LT 6
		12F1	08/08/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 5	LT 6
		12G2	08/08/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 9	LT 9	LT 4	LT 4	LT 8	LT 8
		12H1	08/07/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 8	LT 3	LT 3	LT 6	LT 7
		1D5	08/07/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 8	LT 3	LT 3	LT 6	LT 6
		LTAW	08/07/84	LT 30	LT 4	LT 5	LT 4	LT 4	LT 9	LT 10	LT 4	LT 4	LT 7	LT 9
	GW	2S6	08/07/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 9	LT 3	LT 4	LT 7	LT 8
		3S5	08/08/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 9	LT 4	LT 4	LT 8	LT 8
		4S2	08/07/84	LT 20	LT 3	LT 4	LT 4	LT 4	LT 8	LT 10	LT 3	LT 4	LT 7	LT 8
		4S4	08/07/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 9	LT 3	LT 4	LT 7	LT 8
		11S5	08/07/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 7	LT 7
		15A4	08/08/84	LT 30	LT 5	LT 4	LT 5	LT 5	LT 10	LT 10	LT 4	LT 5	LT 8	LT 10
		12E4	08/08/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 1	LT 3	LT 4	LT 7	LT 7
		12F3	08/08/84	LT 20	LT 3	LT 3	LT 4	LT 4	LT 8	LT 8	LT 3	LT 4	LT 7	LT 7
July	PW Raw	12H2	07/09/84 to 08/06/84	LT 80	LT 7	LT 6	LT 6	LT 6	LT 20	LT 30	LT 6	LT 8	LT 10	LT 20
	Treated	12H2	07/02/84 to 08/06/84	LT 50	LT 4	LT 3	LT 3	LT 4	LT 9	LT 20	LT 3	LT 4	LT 7	LT 8
August		12F3	08/08/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 10	LT 4	LT 4	LT 8	LT 8
	Raw	12H2	08/13/84 to 09/04/84	LT100	LT 5	LT 5	LT 4	LT 5	LT 10	LT 40	LT 4	LT 6	LT 10	LT 10
	Treated	12H2	08/06/84 to 09/04/84	LT100	LT 7	LT 5	LT 6	LT 6	LT 20	LT 40	LT 5	LT 7	LT 10	LT 10

Note: See footnotes at end of table.

Table 8a
Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
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(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
September	SW	6S6	08/06/84 to 09/04/84	LT 70	LT 5	LT 3	LT 4	LT 4	LT 10	LT 30	LT 4	LT 6	LT 8	LT 10
		6S7	08/06/84 to 09/04/84	LT 80	LT 5	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 5	LT 9	LT 10
		(4) 5S8	08/13/84 to 09/04/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 7	LT 5	LT 3	LT 4	LT 6	LT 7
		(4) 5S8	08/13/84 to 09/04/84	LT 20	LT 5	LT 5	LT 5	LT 5	LT 10	LT 9	LT 5	LT 6	LT 10	LT 10
		6S5	08/13/84 to 09/04/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 8	LT 3	LT 4	LT 7	LT 8
		1D3	09/04/84	LT 20	LT 4	LT 4	LT 5	LT 5	LT 9	LT 7	LT 4	LT 4	LT 9	LT 9
		1D5	09/04/84	LT 20	LT 5	LT 6	LT 5	LT 5	LT 9	LT 8	LT 5	LT 5	LT 8	LT 10
		13E1	09/04/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 5	LT 5	LT 2	LT 3	LT 5	LT 5
		12F1	09/04/84	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 6	LT 3	LT 3	LT 6	LT 6
		12G1	09/04/84	LT 20	LT 5	LT 4	LT 5	LT 4	LT 9	LT 8	LT 4	LT 5	LT 10	LT 10
		12H1	08/07/84 to 09/04/84	LT 20	LT 3	LT 4	LT 4	LT 4	LT 7	LT 7	LT 3	LT 3	LT 6	LT 7
		LTAW	09/04/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 7	LT 4	LT 4	LT 7	LT 7
	GW	2S6	09/04/84	LT 30	LT 4	LT 3	LT 3	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8
		3S5	09/04/84	LT 30	LT 4	LT 3	LT 4	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8
		4S2	09/04/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 4	LT 7	LT 7
		4S4	09/04/84	LT 30	LT 4	LT 4	LT 4	LT 4	LT 8	LT 10	LT 4	LT 4	LT 7	LT 8
		11S5	09/04/84	LT 30	LT 4	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 4	LT 7	LT 7
		15A4	09/04/84	LT 30	LT 4	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 7	LT 9
		12E4	09/04/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 3	LT 6	LT 8
		12F3	09/04/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 7	LT 8
	PW	12F3	09/04/84	LT 20	LT 4	LT 3	LT 4	LT 4	LT 8	LT 6	LT 3	LT 4	LT 7	LT 8
	Raw	12H2	09/10/84 to 10/08/84	LT100	LT 6	LT 5	LT 5	LT 6	LT 20	LT 40	LT 5	LT 7	LT 10	LT 10
	Treated	12H2	09/04/84 to 10/08/84	LT 70	LT 5	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 5	LT 9	LT 10

Note: See footnotes at end of table.

Table 8a
Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
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(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
October	SW	6S6	09/04/84 to 10/08/84	LT 70	LT 4	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 6	LT 8	LT 10
		6S7	09/04/84 to 10/08/84	LT 80	LT 5	LT 4	LT 4	LT 4	LT 10	LT 40	LT 4	LT 6	LT 8	LT 10
		5S8	09/10/84 to 10/08/84	LT 20	LT 4	LT 3	LT 4	LT 3	LT 7	LT 9	LT 3	LT 4	LT 6	LT 7
		(4) 6S5	09/10/84 to 10/08/84	LT 20	LT 3	LT 4	LT 3	LT 3	LT 7	LT 10	LT 3	LT 4	LT 7	LT 7
		(4) 6S5	09/10/84 to 10/08/84	LT 30	LT 6	LT 5	LT 6	LT 6	LT 10	LT 10	LT 6	LT 6	LT 10	LT 10
		1D3	10/10/84	LT 30	LT 4	LT 4	LT 4	LT 5	LT 10	LT 10	LT 4	LT 5	LT 8	LT 9
		1D5	10/10/84	LT 40	LT 6	LT 6	LT 7	LT 6	LT 10	LT 20	LT 6	LT 7	LT 10	LT 10
		13E1	10/09/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 8	LT 3	LT 3	LT 6	LT 6
		12F1	10/09/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 6	LT 7
		12G2	10/09/84	LT 30	LT 6	LT 5	LT 5	LT 5	LT 10	LT 10	LT 5	LT 6	LT 10	LT 10
		12H1	09/04/84 to 10/09/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 9
		LTAW	10/09/84	LT 40	LT 6	LT 5	LT 6	LT 6	LT 10	LT 20	LT 5	LT 7	LT 10	LT 10
	GW	2S6	10/09/84	LT100	LT 6	LT 5	LT 6	LT 5	LT 10	LT 40	LT 5	LT 7	LT 10	LT 10
		3S5	10/09/84	LT 40	LT 4	LT 3	LT 4	LT 3	LT 8	LT 20	LT 3	LT 4	LT 7	LT 9
		4S2	10/09/84	LT 50	LT 4	LT 4	LT 3	LT 4	LT 9	LT 20	LT 3	LT 4	LT 7	LT 9
		4S4	10/09/84	LT 90	LT 5	LT 4	LT 4	LT 4	LT 10	LT 40	LT 4	LT 5	LT 8	LT 10
		11S5	10/09/84	LT 50	LT 4	LT 3	LT 3	LT 3	LT 9	LT 20	LT 3	LT 4	LT 7	LT 8
		15A4	10/09/84	LT 70	LT 5	LT 5	LT 5	LT 5	LT 10	LT 30	LT 4	LT 6	LT 8	LT 10
		12E4	10/09/84	LT 40	LT 3	LT 3	LT 3	LT 3	LT 9	LT 20	LT 3	LT 4	LT 7	LT 8
		12F3	10/09/84	LT 40	LT 4	LT 3	LT 3	LT 3	LT 8	LT 20	LT 3	LT 4	LT 6	LT 9
	PW	12F3	10/09/84	LT 30	LT 6	LT 5	LT 6	LT 6	LT 10	LT 10	LT 5	LT 6	LT 10	LT 10
	Raw	12H2	10/08/84 to 11/12/84	LT 60	LT 6	LT 5	LT 6	LT 6	LT 10	LT 20	LT 5	LT 7	LT 10	LT 10
	Treated	12H2	10/08/84 to 11/12/84	LT 40	LT 5	LT 4	LT 4	LT 4	LT 10	LT 20	LT 4	LT 4	LT 8	LT 9

Note: See footnotes at end of table.

Table 8a
Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
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(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
November	SW	6S6	10/11/84 to 11/12/84	LT 50	LT 4	LT 4	LT 4	LT 4	LT 10	LT 20	LT 3	LT 4	LT 8	LT 9
		6S7	10/08/84 to 11/12/84	LT 50	LT 4	LT 4	LT 4	LT 4	LT 9	LT 20	LT 4	LT 5	LT 8	LT 9
		(4) 5S8	10/15/84 to 11/12/84	LT 50	LT 4	LT 4	LT 3	LT 4	LT 10	LT 20	LT 3	LT 5	LT 8	LT 9
		(4) 5S8	10/15/84 to 11/12/84	LT 40	LT 5	LT 4	LT 5	LT 5	LT 10	LT 20	LT 4	LT 5	LT 9	LT 10
		6S5	10/15/84 to 11/12/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 6	LT 7
		1D3	11/13/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 2	LT 4	LT 7	LT 7
		1D5	11/13/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 6	LT 8
		13E1	11/13/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 3	LT 6	LT 6
		12F1	11/13/84	LT 20	LT 3	LT 2	LT 3	LT 3	LT 7	LT 10	LT 2	LT 4	LT 5	LT 6
		12G2	11/13/84	LT 40	LT 5	LT 4	LT 5	LT 5	LT 10	LT 20	LT 5	LT 6	LT 9	LT 10
		12H1	10/09/84 to 11/13/84	LT 30	LT 3	LT 3	LT 3	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8
		LTAW	11/13/84	LT 50	LT 6	LT 4	LT 6	LT 5	LT 10	LT 20	LT 5	LT 6	LT 10	LT 10
	GW	2S6	11/13/84	LT 30	LT 4	LT 3	LT 3	LT 4	LT 9	LT 10	LT 3	LT 4	LT 8	LT 8
		3S5	(6)											
		4S2	11/13/84	LT 30	LT 4	LT 4	LT 4	LT 4	LT 8	LT 10	LT 4	LT 4	LT 7	LT 9
		4S4	11/13/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 6	LT 7
		11S5	11/13/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 4	LT 6	LT 7
		15A4	11/13/84	LT 40	LT 6	LT 5	LT 5	LT 5	LT 10	LT 20	LT 5	LT 6	LT 10	LT 10
		12E4	11/13/84	LT 30	LT 4	LT 3	LT 4	LT 4	LT 10	LT 20	LT 4	LT 5	LT 8	LT 9
		12F3	11/14/84	LT 50	LT 6	LT 5	LT 6	LT 6	LT 20	LT 20	LT 5	LT 7	LT 10	LT 10
	PW	12F3	11/14/84	LT 40	LT 4	LT 3	LT 4	LT 4	LT 10	LT 10	LT 4	LT 5	LT 8	LT 9
	Raw	12H2	11/12/84 to 12/10/84	LT 50	LT 7	LT 6	LT 7	LT 7	LT 20	LT 20	LT 6	LT 7	LT 10	LT 10
	Treated	12H2	11/12/84 to 12/10/84	LT 40	LT 5	LT 5	LT 4	LT 5	LT 10	LT 20	LT 4	LT 5	LT 9	LT 10

Note: See footnotes at end of table.

Table 8a'
Gamma Spectrometry of Water
(Surface, Well, Drinking)
SSES REMP 1984
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(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
December	SW	6S6	11/12/84 to 12/10/84	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 7	LT 8
		6S7	11/12/84 to 12/10/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 9	LT 3	LT 4	LT 7	LT 7
		5S8	11/19/84 to 12/10/84	LT 40	LT 5	LT 5	LT 5	LT 5	LT 10	LT 10	LT 5	LT 6	LT 8	LT 10
		6S5	11/19/84 to 12/10/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 6	LT 6
		1D3	12/11/84	LT 30	LT 5	LT 4	LT 5	LT 5	LT 10	LT 10	LT 5	LT 6	LT 10	LT 10
		1D5	12/11/84	LT 20	LT 4	LT 4	LT 4	LT 4	LT 8	LT 10	LT 3	LT 4	LT 8	LT 8
		13E1	12/11/84	LT 30	LT 4	LT 4	LT 4	LT 4	LT 9	LT 9	LT 4	LT 5	LT 9	LT 9
		12F1	12/11/84	LT 20	LT 3	LT 3	LT 3	LT 4	LT 6	LT 8	LT 3	LT 3	LT 5	LT 6
		12G2	12/11/84	LT 60	LT 8	LT 6	LT 7	LT 7	LT 20	LT 20	LT 6	LT 8	LT 10	LT 20
		12H1	11/13/84 to 12/11/84	LT 20	LT 4	LT 4	LT 3	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8
		LTAW	12/11/84	LT 40	LT 6	LT 5	LT 6	LT 6	LT 10	LT 20	LT 5	LT 6	LT 10	LT 10
	GW	2S6	12/11/84	LT 40	LT 6	LT 5	LT 6	LT 6	LT 10	LT 10	LT 5	LT 6	LT 10	LT 10
		3S5	(6)											
		4S2	12/11/84	LT 40	LT 6	LT 5	LT 6	LT 6	LT 10	LT 10	LT 5	LT 6	LT 10	LT 10
		4S4	12/11/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 6	LT 10	LT 3	LT 4	LT 6	LT 7
		11S5	12/11/84	LT 40	LT 6	LT 5	LT 6	LT 5	LT 10	LT 20	LT 5	LT 7	LT 10	LT 10
		15A4	12/11/84	LT 30	LT 4	LT 4	LT 4	LT 4	LT 9	LT 10	LT 4	LT 5	LT 8	LT 8
		12E4	12/11/84	LT 40	LT 6	LT 6	LT 7	LT 7	LT 10	LT 20	LT 6	LT 7	LT 10	LT 10
		12F3	12/11/84	LT 20	LT 3	LT 3	LT 3	LT 3	LT 8	LT 9	LT 3	LT 4	LT 7	LT 7
	PW	12F3	12/11/84	LT 20	LT 3	LT 3	LT 3	LT 4	LT 7	LT 8	LT 3	LT 3	LT 6	LT 7
	Raw	12H2	12/10/84 to 01/07/85	LT 30	LT 4	LT 3	LT 4	LT 4	LT 8	LT 10	LT 3	LT 4	LT 6	LT 9
	Treated	12H2	12/10/84 to 01/07/85	LT 50	LT 5	LT 4	LT 4	LT 5	LT 10	LT 20	LT 4	LT 5	LT 9	LT 10
	SW	6S6	12/10/84 to 01/07/85	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 3	LT 7	LT 7
		6S7	12/10/84 to 01/07/85	LT 30	LT 4	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 7	LT 7
		5S8	12/17/84 to 01/07/85	LT 9	LT 3	LT 3	LT 3	LT 3	LT 5	LT 4	LT 3	LT 3	LT 6	LT 6
		6S5	12/17/84 to 01/07/85	LT 20	LT 5	LT 5	LT 6	LT 6	LT 10	LT 7	LT 5	LT 5	LT 10	LT 10
		12H1	12/11/84 to 01/07/85	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 4	LT 3	LT 3	LT 6	LT 7

(1) Samples analyzed by NUS Corporation.
(2) LT = Less Than
(3) NS = No Sample
(4) Duplicate Sample and Analysis
(5) ND = No Data. Sample was inadvertently discarded prior to analysis.
(6) Station closed through April

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
January (1)	Surface	5S8	01/02/84 to 01/30/84	LT 0.09 (2)
		6S5	01/02/84 to 01/30/84	LT 0.10
		1D3	01/16/84	LT 0.3
		13E1	01/17/84	LT 0.08
		12F1		NS (4)
		12G2		NS
		12H1	12/12/84 to 01/16/84	LT 0.12
		1D5	01/16/84	LT 0.08
		6S5 (5)	01/02/84 to 01/30/84	LT 0.08
		6S6	01/02/84 to 01/09/84	LT 0.14
		6S7	01/02/84 to 01/09/84	LT 0.13
		6S6	01/09/84 to 01/16/84	ND (3)
		6S7	01/09/84 to 01/16/84	ND
		6S6	01/16/84 to 01/23/84	LT 0.16
		6S7	01/16/84 to 01/23/84	LT 0.19
		6S6	01/23/84 to 01/30/84	LT 0.13
		6S7	01/23/84 to 01/30/84	LT 0.10
		6S7 (5)	01/09/84 to 01/16/84	ND
	Drinking	12F3	01/17/84	LT 0.2
		12H2 Raw	01/02/84 to 01/09/84	0.10 ± 0.08
		12H2 Treated	01/02/84 to 01/09/84	LT 0.10
		12H2 Raw	01/09/84 to 01/16/84	NS
		12H2 Treated	01/09/84 to 01/16/84	LT 0.2
		12H2 Raw	01/19/84 to 01/23/84	LT 0.17
		12H2 Treated	01/16/84 to 01/23/84	LT 0.2
		12H2 Raw	01/23/84 to 01/30/84	LT 0.08
		12H2 Treated	01/23/84 to 01/30/84	LT 0.09

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
February (1)	Surface	5S8	02/06/84 to 02/27/84	LT 0.06
		6S5	02/06/84 to 02/27/84	LT 0.05
		1D3	02/15/84	LT 0.3
		13E1	02/16/84	LT 0.14
		12F1	02/16/84	LT 0.10
		12G2		NS
		12H1	01/16/84 to 02/16/84	LT 0.10
		1D5	02/16/84	LT 0.10
		6S6	01/30/84 to 02/06/84	LT 0.06
		6S7	01/30/84 to 02/06/84	LT 0.08
		6S6	02/06/84 to 02/13/84	LT 0.11
		6S7	02/06/84 to 02/13/84	LT 0.07
		6S6	02/13/84 to 02/20/84	LT 0.10
		6S7	02/13/84 to 02/20/84	LT 0.12
		6S6	02/20/84 to 02/27/84	LT 0.11
		6S7	02/20/84 to 02/27/84	LT 0.08
	Drinking	12F3	02/16/84	LT 0.12
		12H2 Raw	01/30/84 to 02/14/84	LT 0.07
		12H2 Treated	01/30/84 to 02/14/84	LT 0.09
		12H2 Raw	02/14/84 to 02/20/84	LT 0.12
		12H2 Treated	02/14/84 to 02/20/84	LT 0.10
		12H2 Raw	02/20/84 to 02/27/84	LT 0.09
		12H2 Treated	02/20/84 to 02/27/84	LT 0.05
		12F3(5)	02/16/84	LT 0.14

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
March (1)	Surface	5S8	03/05/84 to 03/26/84	LT 0.08
		6S5	03/05/84 to 03/26/84	LT 0.05
		1D3	03/13/84	LT 0.08
		13E1	03/12/84	LT 0.06
		12F1	03/12/84	LT 0.08
		12G2	03/13/84	LT 0.09
		12H1	03/12/84	LT 0.06
		1D5	03/13/84	LT 0.06
		LAKE-T-A-W	03/14/84	LT 0.06
		6S6	02/27/84 to 03/05/84	LT 0.08
		6S7	02/27/84 to 03/05/84	LT 0.09
		6S6	03/05/84 to 03/12/84	LT 0.07
		6S7	03/05/84 to 03/12/84	NS
		6S6	03/12/84 to 03/19/84	0.10 ± 0.05
		6S7	03/12/84 to 03/19/84	NS
		6S6	03/19/84 to 03/26/84	LT 0.09
		6S7	03/19/84 to 03/26/84	NS
		6S6	03/26/84 to 04/02/84	NS
		6S7	03/26/84 to 04/02/84	NS
	Drinking	12F3	03/12/84	LT 0.08
		12H2 Raw	02/27/84 to 03/05/84	LT 0.08
		12H2 Treated	02/27/84 to 03/05/84	LT 0.08
		12H2 Raw	03/05/84 to 03/12/84	LT 0.07
		12H2 Treated	03/05/84 to 03/12/84	LT 0.07
		12H2 Raw	03/12/84 to 03/19/84	0.19 ± 0.03
		12H2 Treated	03/12/84 to 03/19/84	0.12 ± 0.04
		12H2 Raw	03/19/84 to 03/26/84	0.08 ± 0.03
		12H2 Treated	03/19/84 to 03/26/84	LT 0.14
		12H2 Raw	03/26/84 to 04/02/84	LT 0.06
		12H2 Treated	03/26/84 to 04/02/84	LT 0.13

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
April (1)	Surface	5S8	04/02/84 to 04/30/84	LT 0.05
		6S5	04/02/84 to 04/30/84	LT 0.06
		1D3	04/10/84	LT 0.09
		13E1	04/10/84	LT 0.07
		12F1	04/10/84	LT 0.08
		12G2	04/10/84	LT 0.08
		12H1	03/12/84 to 04/10/84	LT 0.10
		1D5	04/10/84	LT 0.09
		LAKE T-A-W	04/12/84	LT 0.10
		12F1(5)	04/10/84	LT 0.08
		12G2(5)	04/10/84	LT 0.08
		6S6	04/02/84 to 04/09/84	LT 0.09
		6S7	04/02/84 to 04/09/84	LT 0.09
		6S6	04/09/84 to 04/16/84	LT 0.05
		6S7	04/09/84 to 04/16/84	LT 0.05
		6S6	04/16/84 to 04/23/84	LT 0.07
		6S7	04/16/84 to 04/23/84	LT 0.07
		6S6	04/23/84 to 04/30/84	LT 0.06
		6S7	04/23/84 to 04/30/84	LT 0.06
	Drinking	12F3	04/11/84	LT 0.07
		12H2 Raw	04/02/84 to 04/09/84	LT 0.15
		12H2 Treated	04/02/84 to 04/09/84	LT 0.12
		12H2 Raw	04/09/84 to 04/16/84	LT 0.06
		12H2 Treated	04/09/84 to 04/16/84	LT 0.05
		12H2 Raw	04/16/84 to 04/23/84	LT 0.07
		12H2 Treated	04/16/84 to 04/23/84	LT 0.08
		12H2 Raw	04/23/84 to 04/30/84	LT 0.06
		12H2 Treated	04/23/84 to 04/30/84	LT 0.07
		12H2 Raw(5)	04/16/84 to 04/23/84	LT 0.08

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
May (1)	Surface	5S8	05/07/84 to 05/29/84	LT 0.05
		6S5	05/07/84 to 05/29/84	LT 0.06
		1D3	05/15/84	LT 0.09
		13E1	05/15/84	LT 0.06
		12F1	05/15/84	LT 0.12
		12G2	05/15/84	LT 0.06
		12H1	04/10/84 to 05/15/84	LT 0.08
		1D5	05/15/84	LT 0.06
		LAKE-T-A-W	05/15/84	LT 0.08
		6S5(5)	05/07/84 to 05/29/84	LT 0.05
		6S6	04/30/84 to 05/07/84	LT 0.07
		6S7	04/30/84 to 05/07/84	LT 0.07
		6S6	05/07/84 to 05/14/84	LT 0.10
		6S7	05/07/84 to 05/14/84	0.045 ± 0.045
		6S6	05/14/84 to 05/21/84	LT 0.10
		6S7	05/14/84 to 05/21/84	NS
		6S6	05/21/84 to 05/29/84	LT 0.10
		6S7	05/21/84 to 05/29/84	LT 0.05
	Drinking	12F3	05/15/84	LT 0.12
		12H2 Raw	04/30/84 to 05/07/84	LT 0.09
		12H2 Treated	04/30/84 to 05/07/84	LT 0.07
		12H2 Raw	05/07/84 to 05/14/84	LT 0.07
		12H2 Treated	05/07/84 to 05/14/84	LT 0.07
		12H2 Raw	05/14/84 to 05/21/84	LT 0.04
		12H2 Treated	05/14/84 to 05/21/84	LT 0.05
		12H2 Raw	05/21/84 to 05/29/84	LT 0.07
		12H2 Treated	05/21/84 to 05/29/84	LT 0.07

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
June (1)	Surface	5S8	06/04/84 to 06/11/84	LT 0.05
		6S5	06/04/84 to 06/11/84	LT 0.05
		1D3	06/12/84	LT 0.04
		13E1	06/12/84	LT 0.04
		12F1	06/12/84	LT 0.05
		12G2	06/12/84	LT 0.05
		12H1	06/12/84	LT 0.04
		1D5	06/12/84	LT 0.10
		LAKE-T-A-W	06/12/84	LT 0.05
		6S6	06/04/84	LT 0.05
		6S7	05/29/84 to 06/04/84	LT 0.09
		6S6	06/11/84	LT 0.06
		6S7	06/04/84 to 06/11/84	LT 0.06
		6S6	06/11/84 to 06/18/84	LT 0.06
		6S7	06/11/84 to 06/18/84	LT 0.02
		6S6	06/18/84 to 06/25/84	LT 0.05
		6S7	06/18/84 to 06/25/84	LT 0.04
		6S6	06/25/84 to 07/02/84	LT 0.05
		6S7	06/25/84 to 07/02/84	LT 0.04
	Drinking	12F3	06/13/84	LT 0.05
		12H2 Raw	05/29/84 to 06/04/84	LT 0.06
		12H2 Treated	05/29/84 to 06/04/84	LT 0.06
		12H2 Raw	06/04/84 to 06/11/84	LT 0.05
		12H2 Treated	06/04/84 to 06/11/84	LT 0.05
		12H2 Raw	06/11/84 to 06/18/84	LT 0.06
		12H2 Treated	06/11/84 to 06/18/84	LT 0.02
		12H2 Raw	06/25/84	LT 0.05
		12H2 Treated	06/18/84 to 06/25/84	LT 0.05
		12H2 Raw	07/02/84	LT 0.04
		12H2 Treated	06/25/84 to 07/02/84	LT 0.04

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/l ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
July (1)	Surface	5S8	06/18/84 to 07/09/84	LT 0.16
		6S5	06/18/84 to 07/09/84	LT 0.18
		1D3	07/10/84	LT 0.08
		13E1	07/11/84	LT 0.06
		12F1	07/11/84	LT 0.07
		12G2	07/10/84	LT 0.06
		12H1	07/10/84	LT 0.07
		1D5	07/10/84	LT 0.09
		LAKE T-A-W	07/10/84	ND
		5S8(5)	06/18/84 to 07/09/84	LT 0.16
		6S6	07/02/84 to 07/09/84	LT 0.12
		6S7	07/02/84 to 07/09/84	LT 0.18
		6S6	07/09/84 to 07/16/84	LT 0.14
		6S7	07/09/84 to 07/16/84	LT 0.15
		6S6	07/16/84 to 07/23/84	LT 0.10
		6S7	07/16/84 to 07/23/84	LT 0.08
		6S6	07/23/84 to 07/30/84	LT 0.05
		6S7	07/23/84 to 07/30/84	LT 0.05
		6S6	07/30/84 to 08/06/84	LT 0.05
		6S7	08/06/84	LT 0.05
	Drinking	12F3	07/10/84	LT 0.15
		12H2 Raw	07/09/84	LT 0.16
		12H2 Treated	07/02/84 to 07/09/84	LT 0.16
		12H2 Raw	07/16/84	LT 0.04
		12H2 Treated	07/09/84 to 07/16/84	LT 0.03
		12H2 Raw	07/16/84 to 07/23/84	LT 0.07
		12H2 Treated	07/16/84 to 07/23/84	LT 0.06
		12H2 Raw	07/30/84	LT 0.05
		12H2 Treated	07/23/84 to 07/30/84	LT 0.05
		12H2 Raw	08/06/84	LT 0.04
		12H2 Treated	07/30/84 to 08/06/84	0.037 ± 0.033

See footnotes at end of table.

Table 9
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Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
August (1)	Surface	5S8	07/16/84 to 08/06/84	0.043 ± 0.027
		6S5	07/16/84 to 08/06/84	LT 0.05
		1D3	08/07/84	LT 0.05
		13E1	08/08/84	LT 0.05
		12F1	08/08/84	LT 0.04
		12G2	08/08/84	LT 0.05
		12H1	08/07/84	0.037 ± 0.033
		1D5	08/07/84	LT 0.05
		Lake T-A-W	08/07/84	LT 0.05
		6S5(5)	07/16/84 to 08/06/84	LT 0.05
	Drinking	12F3	08/08/84	LT 0.12

(1) Samples analyzed by NUS Corporation
(2) LT = Less Than
(3) ND = No Data
(4) NS = No Sample
(5) Duplicate sample and analysis

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 1 of 6)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
July	Surface	5S8	07/16/84 to 08/06/84	LT 0.1
		6S5	07/16/84 to 08/06/84	LT 0.1
		6S6	07/16/84 to 07/23/84	0.36± 0.12
		6S7	07/16/84 to 07/23/84	0.34± 0.10
		6S6	07/23/84 to 07/30/84	LT 0.1
		6S7	07/23/84 to 07/30/84	0.21± 0.11
		6S6	07/30/84 to 08/06/84	LT 0.1
		6S7	08/06/84	LT 0.1
	Drinking	12H2 Raw	07/16/84 to 07/23/84	LT 0.1
		12H2 Treated	07/16/84 to 07/23/84	LT 0.1
		12H2 Raw	07/30/84	LT 0.1
		12H2 Treated	07/23/84 to 07/30/84	LT 0.1
		12H2 Raw	08/06/84	LT 0.1
		12H2 Treated	07/30/84 to 08/06/84	LT 0.1

See footnotes at end of table.

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 2 of 6)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
August	Surface	(5) 5S8	08/13/84 to 09/04/84	0.16±0.08
		(5) 5S8	08/13/84 to 09/04/84	LT 0.1
		6S5	08/13/84 to 09/04/84	LT 0.1
		1D3	08/07/84	LT 0.1
		13E1	08/08/84	LT 0.1
		12F1	08/08/84	LT 0.1
		12G2	08/08/84	LT 0.1
		12H1	08/07/84	LT 0.1
		12H1	08/07/84 to 09/04/84	LT 0.1
		1D5	08/07/84	LT 0.1
		LTAW	08/07/84	LT 0.1
		6S6	08/06/84 to 08/13/84	LT 0.1
		6S7	08/06/84 to 08/13/84	LT 0.1
		6S6	08/13/84 to 08/20/84	LT 0.08
		6S7	08/20/84	LT 0.1
		6S6	08/20/84 to 08/27/84	0.29±0.06
		6S7	08/20/84 to 08/27/84	0.64±0.07
		6S6	08/27/84 to 09/04/84	LT 0.1
		6S7	08/27/84 to 09/04/84	LT 0.2
	Drinking	12F3	08/08/84	LT 0.1
		12H2 Raw	08/13/84	LT 0.1
		12H2 Treated	08/06/84 to 08/13/84	LT 0.1
		12H2 Raw	08/20/84	LT 0.1
		12H2 Treated	08/13/84 to 08/20/84	0.12±0.06
		12H2 Raw	08/27/84	0.18±0.06
		12H2 Treated	08/20/84 to 08/27/84	LT 0.1
		12H2 Raw	09/04/84	0.15±0.08
		12H2 Treated	08/27/84 to 09/04/84	LT 0.1

See footnotes ta end of table.

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 3 of 6)

Month	Water Type		Station	Collection Date (Period)	I-131 Activity
September	Surface		5S8	09/10/84 to 10/08/84	LT 0.1
		(5)	6S5	09/10/84 to 10/08/84	LT 0.1
		(5)	6S5	09/10/84 to 10/08/84	LT 0.1
			1D3	09/04/84	LT 0.1
			13E1	09/04/84	LT 0.1
			12F1	09/04/84	LT 0.1
			12G2	09/04/84	0.20±0.08
			12H1	09/04/84 to 10/09/84	LT 0.2
			1D5	09/04/84	LT 0.1
			LTAW	09/04/84	LT 0.1
			6S6	09/04/84 to 09/10/84	LT 0.06
			6S7	09/04/84 to 09/10/84	LT 0.07
			6S6	09/10/84 to 09/17/84	LT 0.09
			6S7	09/10/84 to 09/17/84	LT 0.1
			6S6	09/17/84 to 09/24/84	LT 0.1
			6S7	09/17/84 to 09/24/84	LT 0.1
			6S6	10/02/84	0.096±0.047
			6S7	09/24/84 to 10/01/84	LT 0.1
	Drinking		12F3	09/04/84	LT 0.1
			12H2 Raw	09/10/84	LT 0.05
			12H2 Treated	09/04/84 to 09/10/84	LT 0.05
			12H2 Raw	09/17/84	LT 0.1
			12H2 Treated	09/10/84 to 09/17/84	LT 0.1
			12H2 Raw	09/24/84	LT 0.1
			12H2 Treated	09/17/84 to 09/24/84	LT 0.1
			12H2 Raw	09/27/84 to 10/01/84	LT 0.08
			12H2 Treated	09/24/84 to 10/01/84	LT 0.1

See footnotes at end of table.

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 4 of 6)

Month	Water Type		Station	Collection Date (Period)	I-131 Activity
October	Surface	(5)	5S8	10/15/84 to 11/12/84	LT 0.2
		(5)	5S8	10/15/84 to 11/12/84	LT 0.2
			6S5	10/15/84 to 11/12/84	LT 0.1
			1D3	10/10/84	LT 0.1
			13E1	10/09/84	LT 0.1
			12F1	10/09/84	LT 0.1
			12G2	10/09/84	LT 0.2
			12H1	10/09/84 to 11/13/84	LT 0.1
			1D5	10/10/84	LT 0.1
			LTAW	10/09/84	LT 0.1
			6S6	10/02/84 to 10/08/84	0.30±0.09
			6S7	10/01/84 to 10/08/84	0.34±0.10
			6S6	10/11/84 to 10/15/84	LT .08
			6S7	10/08/84 to 10/15/84	LT 0.1
			6S6	10/15/84 to 10/22/84	LT 0.1
			6S7	10/15/84 to 10/22/84	0.14±0.07
			6S6	10/22/84 to 10/29/84	LT 0.1
			6S7	10/22/84 to 10/29/84	0.16±0.06
			6S6	10/29/84 to 11/06/84	LT .09
			6S7	11/01/84 to 11/05/84	0.11±0.06
	Drinking		12F3	10/09/84	LT 0.1
			12H2 Raw	10/01/84 to 10/08/84	LT 0.1
			12H2 Treated	10/01/84 to 10/08/84	LT 0.1
			12H2 Raw	10/08/84 to 10/15/84	LT 0.1
			12H2 Treated	10/08/84 to 10/15/84	LT 0.08
			12H2 Raw	10/15/84 to 10/22/84	LT 0.08
			12H2 Treated	10/15/84 to 10/22/84	LT 0.08
			12H2 Raw	10/22/84 to 10/29/84	LT 0.08
			12H2 Treated	10/22/84 to 10/29/84	LT 0.1
			12H2 Raw	10/29/84 to 11/05/84	LT 0.1
			12H2 Treated	10/29/84 to 11/05/84	LT 0.09

See footnotes at end of table.

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 5 of 6)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
November	Surface	5S8	11/19/84 to 12/10/84	0.25±0.08
		6S5	11/19/84 to 12/10/84	LT 0.1
		1D3	11/13/84	LT 0.1
		13E1	11/13/84	LT 0.1
		12F1	11/13/84	LT 0.1
		12G2	11/13/84	LT 0.1
		12H1	11/13/84 to 12/11/84	LT 0.1
		1D5	11/13/84	LT 0.1
		LTAW	11/13/84	LT 0.1
		6S6	11/06/84 to 11/12/84	LT 0.1
		6S7	11/05/84 to 11/12/84	LT 0.1
		6S6	11/12/84 to 11/19/84	0.18±0.07
		6S7	11/12/84 to 11/19/84	0.77±0.08
		6S6	11/19/84 to 11/26/84	LT 0.2
		6S7	11/19/84 to 11/26/84	0.11±0.06
		6S6	11/26/84 to 12/03/84	LT 0.1
		6S7	11/26/84 to 12/03/84	LT 0.1
	Drinking	12F3	11/14/84	LT 0.1
		12H2 Raw	11/05/84 to 11/12/84	LT 0.1
		12H2 Treated	11/05/84 to 11/12/84	LT 0.1
		12H2 Raw	11/12/84 to 11/19/84	0.50±0.08
		12H2 Treated	11/12/84 to 11/19/84	0.34±0.07
		12H2 Raw	11/19/84 to 11/26/84	LT 0.09
		12H2 Treated	11/19/84 to 11/26/84	LT 0.1
		12H2 Raw	11/26/84 to 12/03/84	LT 0.1
		12H2 Treated	11/26/84 to 12/03/84	LT 0.1

See footnotes at end of table.

Table 9a

Iodine-131 in Water (Surface and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 6 of 6)

Month	Water Type	Station	Collection Date (Period)	I-131 Activity
December	Surface	5S8	12/17/84 to 01/07/85	LT 0.2
		6S5	12/17/84 to 01/07/85	LT 0.1
		1D3	12/11/84	LT 0.2
		13E1	12/11/84	LT .09
		12F1	12/11/84	LT .09
		12G2	12/11/84	LT 0.1
		12H1	12/11/84 to 01/07/85	LT 0.1
		1D5	12/11/84	0.41±0.10
		LTAW	12/11/84	LT 0.1
		6S6	12/05/84 to 12/10/84	LT 0.1
		6S7	12/03/84 to 12/10/84	LT 0.1
		6S6	12/10/84 to 12/17/84	LT 0.06
		6S7	12/10/84 to 12/17/84	LT 0.09
		6S6	12/23/84	LT 0.08
		6S7	12/17/84 to 12/23/84	LT 0.1
		6S6	12/23/84 to 12/30/84	LT 0.1
		6S7	12/23/84 to 12/30/84	LT 0.1
		6S6	12/30/84 to 01/07/85	LT 0.1
		6S7	12/30/84 to 01/07/85	LT 0.1
	Drinking	12F3	12/11/84	LT 0.1
		12H2 Raw	12/03/84 to 12/10/84	LT 0.1
		12H2 Treat.	12/03/84 to 12/10/84	LT 0.1
		12H2 Raw	12/10/84 to 12/17/84	LT 0.07
		12H2 Treat.	12/10/84 to 12/17/84	LT 0.07
		12H2 Raw	12/17/84 to 12/23/84	LT 0.1
		12H2 Treat.	12/17/84 to 12/23/84	LT 0.1
		12H2 Raw	12/23/84 to 12/20/84	LT 0.1
		12H2 Treat.	12/23/84 to 12/30/84	LT 0.3
		12H2 Raw	12/30/84 to 01/07/85	LT 0.1
		12H2 Treat.	12/30/84 to 01/07/85	LT 0.1

(1) Samples analyzed by NUS Corporation
(2) LT = Less Than
(3) ND = No Data
(4) NS = No Sample
(5) Duplicate sample and analysis

Table 10
(Page 1 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
January	Surface	5S8	01/02/84 to 01/30/84	LT 1.2(1)	LT 4
(6)		6S5	01/02/84 to 01/30/84	LT 3	LT 4
		6S6	01/02/84 to 01/30/84	2.7 ± 1.2	6.7 ± 1.8
		6S7	01/02/84 to 01/30/84	6.3 ± 1.8	7.6 ± 1.9
		1D3	01/16/84	LT 2	4.4 ± 1.3
		1D5	01/16/84	LT 2	7.2 ± 1.6
		13E1	01/17/84	LT 1.7	1.8 ± 1.3
		12F1	NS(2)		
		12G2	NS		
		12H1	12/12/83 to 01/16/84	LT 1.7	1.4 ± 1.3
		6S5(3)	01/02/84 to 01/30/84	LT 3	LT 4
	Well	2S6	01/16/84	LT 1.5	3.2 ± 1.2
		4S2	01/16/84	3.5 ± 2.4	3.3 ± 1.5
		4S4	01/16/84	LT 2	2.4 ± 1.4
		15A4	01/17/84	LT 1.6	4.5 ± 1.3
		12E4	01/16/84	LT 1.5	1.3 ± 1.3
		12F3	01/17/84	2.7 ± 1.0	1.8 ± 1.2
		3S5	NS (7)		
		11S5	01/16/84	2.1 ± 2.1	3.0 ± 1.3
	Drinking	12F3	01/17/84	LT 2	1.8 ± 1.2
		12H2 Raw	01/02/84 to 01/30/84	5.6 ± 1.9	8.3 ± 2.0
		12H2 Treated	01/02/84 to 01/30/84	LT 5(4)	12. ± 3.

See footnotes at end of table.

Table 10
(Page 2 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
February (6)	Surface	5S8	02/06/84 to 02/27/84	LT 1.2	3.8 ± 1.5
		6S5	02/06/84 to 02/27/84	1.4 ± 1.0	1.6 ± 1.4
		6S6	01/30/84 to 02/27/84	1.1 ± 1.0	1.8 ± 1.4
		6S7	01/30/84 to 02/27/84	1.3 ± 1.1	3.2 ± 1.4
		1D3	02/15/84	1.8 ± 1.3	2.6 ± 1.4
		1D5	02/16/84	LT 1.4	4.1 ± 1.2
		13E1	02/16/84	LT 1.4	LT 1.7
		12F1	02/16/84	LT 1.7	3.2 ± 1.2
		12G2	NS		
		12H1	01/16/84 to 02/16/84	LT 1.4	2.2 ± 1.4
	Well	2S6	02/15/84	LT 1.6	3.0 ± 1.4
		4S2	02/15/84	2.3 ± 1.7	6.4 ± 1.6
		4S4	02/16/84	LT 1.3	1.3 ± 1.3
		15A4	02/16/84	LT 1.6	4.5 ± 1.3
		12E4	02/15/84	LT 1.0	1.6 ± 1.3
		12F3	02/16/84	LT 2	2.6 ± 1.3
		3S5	NS (7)		
		11S5	02/16/84	LT 1.9	1.7 ± 1.1
		12F3(3)	02/16/84	LT 2	2.2 ± 1.2
	Drinking	12F3	02/16/84	1.3 ± 1.2	1.9 ± 1.2
		12H2 Raw	01/30/84 to 02/27/84	2.6 ± 1.4	3.1 ± 1.7
		12H2 Treated	01/30/84 to 02/27/84	1.6 ± 1.1	1.8 ± 1.4
		12F3(3)	02/16/84	1.3 ± 1.1	2.6 ± 1.2

See footnotes at end of table.

Table 10
(Page 3 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
March (6)	Surface	5S8	03/05/84 to 03/26/84	LT 1.4	2.5 ± 1.4
		6S5	03/05/84 to 03/26/84	2.1 ± 2.1	3.4 ± 2.8
		6S6	02/27/84 to 03/26/84	LT 20(4)	LT 4
		6S7	02/27/84 to 03/05/84	LT 10(4)	3.2 ± 2.2
		1D3	03/13/84	1.1 ± 0.9	3.4 ± 1.2
		1D5	03/13/84	LT 1.2	6.0 ± 1.3
		13E1	03/12/84	LT 0.8	1.5 ± 1.1
		12F1	03/12/84	LT 1.0	2.5 ± 1.2
		12G2	03/13/84	LT 1.1	2.3 ± 1.2
		12H1	03/12/84	22 ± 21 (8)	3.7 ± 3.2
		LAKE-T-A-W	03/14/84	LT 1.3	3.0 ± 1.2
	Well	2S6	03/12/84	LT 0.9	LT 1.7
		4S2	03/13/84	LT 1.5	LT 1.8
		4S4	03/13/84	LT 1.0	2.1 ± 1.1
		15A4	03/14/84	LT 1.0	4.3 ± 1.3
		12E4	03/12/84	LT 0.8	1.1 ± 1.1
		12F3	03/12/84	LT 1.6	1.5 ± 1.2
		3S5	NS (7)		
		11S5	03/13/84	1.3 ± 1.3	1.5 ± 1.2
	Drinking	12F3	03/12/84	LT 1.6	1.6 ± 1.2
		12H2 Raw	02/27/84 to 04/02/84	LT 13(4)	2.2 ± 2.2
		12H2 Treated	02/27/84 to 04/02/84	LT 18(4)	LT 3

See footnotes at end of table.

Table 10
(Page 4 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
April (6)	Surface	5S8	04/02/84 to 04/30/84	2.1 ± 1.3	3.3 ± 1.4
		6S5	04/02/84 to 04/30/84	1.9 ± 1.3	2.1 ± 1.4
		6S6	04/02/84 to 04/30/84	4.3 ± 2.8	12 ± 3
		6S7	04/02/84 to 04/30/84	6.5 ± 5.0	13 ± 3
		1D3	04/10/84	1.2 ± 0.8	2.0 ± 1.2
		1D5	04/10/84	LT 1.1	6.8 ± 1.4
		13E1	04/10/84	LT 0.8	1.3 ± 1.1
		12F1	04/10/84	LT 0.8	LT 1.7
		12G2	04/10/84	LT 0.9	2.7 ± 1.2
		12H1	03/12/84 to 04/10/84	LT 0.9	2.9 ± 1.2
		LAKE-T-A-W	04/12/84	LT 1.6	2.5 ± 1.3
		12G2(3)	04/10/84	LT 17(4)	5.3 ± 2.0
	Well	2S6	04/10/84	LT 0.8	LT 1.7
		4S2	04/10/84	LT 1.6	LT 1.9
		4S4	04/10/84	LT 1.0	1.1 ± 1.1
		15A4	04/11/84	0.75 ± 0.67	4.6 ± 1.3
		12E4	04/10/84	LT 0.8	LT 1.7
		12F3	04/11/84	LT 1.6	1.5 ± 1.2
		3S5	NS (7)		
		11S5	04/10/84	LT 1.5	2.4 ± 1.2
	Drinking	12F3	04/11/84	LT 1.7	LT 1.9
		12H2 Raw	04/02/84 to 04/30/84	LT 11(4)	4.4 ± 1.8
		12H2 Treated	04/02/84 to 04/30/84	LT 1.5	LT 2

See footnotes at end of table.

Table 10
(Page 5 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
May (6)	Surface	5S8	05/07/84 to 05/29/84	4.7 ± 2.1	7.1 ± 2.7
		6S5	05/07/84 to 05/29/84	3.4 ± 1.3	3.0 ± 1.4
		6S6	04/30/84 to 05/29/84	LT 60(4)	4.0 ± 1.7
		6S7	04/30/84 to 05/29/84	2.3 ± 1.6	7.3 ± 1.6
		1D3	05/15/84	3.8 ± 1.5	5.2 ± 1.3
		1D5	05/15/84	LT 1.9	7.2 ± 2.4
		13E1	05/15/84	LT 1.0	2.0 ± 1.1
		12F1	05/15/84	2.3 ± 1.7	4.7 ± 2.3
		12G2	05/15/84	2.1 ± 1.6	5.2 ± 2.3
		12H1	04/10/84 to 05/15/84	LT 1.3	2.6 ± 1.2
		LAKE-T-A-W	05/15/84	LT 2	3.5 ± 2.2
		6S5(3)	05/07/84 to 05/29/84	2.3 ± 1.6	4.8 ± 2.6
	Well	2S6	05/15/84	LT 0.9	1.6 ± 1.1
		4S2	05/15/84	LT 2	1.6 ± 1.2
		4S4	05/15/84	LT 1.1	LT 1.7
		15A4	05/15/84	0.72 ± 0.71	5.1 ± 1.3
		12E4	05/15/84	LT 0.9	LT 1.6
		12F3	05/18/84	LT 4(4)	1.9 ± 1.5
		3S5	05/15/84	LT 0.9	1.8 ± 1.1
		11S5	05/15/84	LT 2	LT 1.8
	Drinking	12F3	05/15/84	1.6 ± 1.6	2.7 ± 1.2
		12H2 Raw	04/30/84 to 05/29/84	1.7 ± 1.6	2.1 ± 1.4
		12H2 Treated	04/30/84 to 05/29/84	LT 1.1	1.3 ± 1.3

See footnotes at end of table.

Table 10
(Page 6 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
June (6)	Surface	5S8	06/04/84 to 06/11/84	3.0 ± 1.5	2.6 ± 1.3
		6S5	06/04/84 to 06/11/84	1.4 ± 1.2	2.8 ± 1.3
		6S6	06/04/84 to 07/02/84	LT 0.9	LT 2
		6S7	05/29/84 to 07/02/84	LT 1.3	3.0 ± 1.4
		1D3	06/12/84	LT 1.6	3.2 ± 1.3
		1D5	06/12/84	1.2 ± 1.2	8.1 ± 1.5
		13E1	06/12/84	LT 1.1	1.2 ± 1.2
		12F1	06/12/84	1.2 ± 1.2	4.5 ± 1.4
		12G2	06/12/84	LT 1.5	2.3 ± 1.3
		12H1	06/12/84	LT 1.3	1.7 ± 1.2
		LAKE-T-A-W	06/12/84	LT 2	3.6 ± 1.4
	Well	2S6	06/12/84	LT 1.2	LT 1.9
		4S2	06/12/84	LT 3[4]	LT 2
		4S4	06/12/84	LT 1.7	LT 2
		15A4	06/12/84	LT 1.2	4.3 ± 1.3
		12E4	06/12/84	LT 1.1	1.5 ± 1.2
		12F3	06/13/84	LT 3	1.5 ± 1.3
		3S5	06/12/84	LT 1.4	1.6 ± 1.3
		11S5	06/12/84	LT 2	1.9 ± 1.3
	Drinking	12F3	06/13/84	LT 3[4]	2.4 ± 1.4
		12H2 Raw	05/29/84 to 07/02/84	LT 0.9	LT 2
		12H2 Treated	05/29/84 to 07/02/84	LT 1.3	2.5 ± 1.4

See footnotes at end of table.

Table 10
(Page 7 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
July (6)	Surface	5S8	06/18/84 to 07/09/84	LT 2	6.8 ± 2.7
		6S5	06/18/84 to 07/09/84	1.8 ± 1.6	6.3 ± 2.7
		6S6	07/02/84 to 08/06/84	LT 1.7	2.7 ± 2.5
		6S7	07/02/84 to 08/06/84	LT 2	3.8 ± 2.7
		1D3	07/10/84	1.5 ± 1.2	4.8 ± 1.5
		1D5	07/10/84	LT 1.5	9.4 ± 1.7
		13E1	07/11/84	LT 1.0	1.3 ± 1.3
		12F1	07/11/84	LT 2	3.6 ± 2.6
		12G2	07/10/84	1.4 ± 1.1	4.8 ± 1.5
		12H1	07/10/84	LT 6(4)	4.7 ± 3.0
		LAKE-T-A-W	07/10/84	2.6 ± 1.4	7.0 ± 1.6
		5S8(4)	06/18/84 to 07/09/84	1.9 ± 1.8	11 ± 3
	Well	2S6	07/10/84	0.82 ± 0.66	LT 1.9
		4S2	07/10/84	LT 2	1.4 ± 1.3
		4S4	07/10/84	LT 1.0	LT 1.9
		15A4	07/11/84	0.81 ± 0.66	3.8 ± 1.3
		12E4	07/11/84	LT 1.0	LT 1.9
		12F3	07/10/84	LT 3(4)	LT 2
		3S5	07/10/84	LT 0.9	LT 1.9
		11S5	07/10/84	1.7 ± 1.7	LT 2
	Drinking	12F3	07/10/84	LT 3(4)	1.4 ± 1.4
		12H2 Raw	07/09/84 to 08/06/84	LT 1.7	2.6 ± 2.5
		12H2 Treated	07/02/84 to 08/06/84	0.95 ± 0.93	1.4 ± 1.3

See footnotes at end of table.

Table 10
(Page 8 of 8)

Gross Alpha and Gross Beta in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Alpha	Beta
August (6)	Surface	5S8	07/16/84 to 08/06/84	LT 1.5	2.0 ± 1.4
		6S5	07/16/84 to 08/06/84	LT 2	LT 4
		1D3	08/07/84	LT 2	4.3 ± 2.6
		1D5	08/07/84	LT 2	13 ± 3
		13E1	08/08/84	LT 0.9	1.5 ± 1.2
		12F1	08/08/84	LT 1.9	LT 4
		12G2	08/08/84	LT 1.4	2.0 ± 1.4
		12H1	08/07/84	ND(5)	ND
		LAKE-T-A-W	08/07/84	LT 2	5.0 ± 2.7
		6S5(3)	07/16/84 to 08/06/84	LT 1.6	1.7 ± 1.4
	Well	2S6	08/07/84	LT 0.9	LT 2
		4S2	08/07/84	LT 3(4)	LT 2
		4S4	08/07/84	LT 1.0	LT 2
		15A4	08/08/84	LT 0.9	3.5 ± 1.4
		12E4	08/08/84	LT 1.6	3.3 ± 1.4
		12F3	08/08/84	LT 3(4)	LT 2
		3S5	08/08/84	LT 1.0	LT 2
		11S5	08/07/84	LT 3(4)	LT 2
	Drinking	12F3	08/08/84	LT 2	LT 2

(1) LT = Less Than
(2) NS = No Sample
(3) Duplicate sample and analysis
(4) Lower sensitivity due to high solids
(5) ND = No Data
(6) SAMPLES ANALYZED BY NUS CORPORATION
(7) Closed through April
(8) High gross alpha activity due to high solids content.

Table 10a

Gross Alpha and Gross Beta in Water (Surface, Well and Drinking)
SSES REMP 1984

(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Alpha	Beta
July	Surface	5S8	07/16/84 to 08/06/84	LT 2.0	3.9 ± 1.0
		6S5	07/16/84 to 08/06/84	LT 2.0	3.0 ± 0.9
		6S6	07/02/84 to 08/06/84	LT 0.8	3.5 ± 0.5
		6S7	07/02/84 to 08/06/84	LT 1.0	7.4 ± 0.7
	Drinking	12H2 Raw	07/09/84 to 08/06/84	LT 0.8	3.3 ± 0.5
		12H2 Treat.	07/02/84 to 08/06/84	LT 0.8	2.8 ± 0.4
August	Surface	(3) 5S8	08/13/84 to 09/04/84	LT 2.0	6.1 ± 1.2
		(3) 5S8	08/13/84 to 09/04/84	LT 2.0	9.0 ± 1.3
		6S5	08/13/84 to 09/04/84	LT 2.0	4.4 ± 1.0
		1D3	08/07/84	LT 2.0	3.5 ± 1.0
		13E1	08/08/84	LT 1.0	1.3 ± 0.6
		12F1	08/08/84	LT 2.0	4.1 ± 1.0
		12G2	08/08/84	LT 2.0	3.3 ± 0.9
		12H1	08/07/84	LT 2.0	4.3 ± 1.0
		12H1	08/07/84 to 09/04/84	LT 2.0	5.0 ± 1.1
		1D5	08/07/84	LT 2.0	17. ± 2.
		LTAW	08/07/84	LT 1.0	5.0 ± 1.2
		6S7	08/06/84 to 09/04/84	LT 2.0	13. ± 2.
		6S6	08/06/84 to 09/04/84	LT 1.0	4.6 ± 1.1
	Well	2S6	08/07/84	LT 1.0	LT 1.0
		3S5	08/08/84	LT 1.0	1.7 ± 1.0
		4S2	08/07/84	LT 1.0	LT 2.0
		4S4	08/07/84	LT 1.0	1.5 ± 1.0
		11S5	08/07/84	1.4 ± 1.1	3.4 ± 1.4
		15A4	08/08/84	LT 1.0	4.0 ± 0.9
		12E4	08/08/84	LT 2.0	1.6 ± 0.9
		12F3	08/08/84	LT 1.0	2.3 ± 1.1
	Drinking	12F3	08/08/84	LT 2.0	4.0 ± 1.2
		12H2 Raw	08/13/84 to 09/04/84	LT 2.0	9.3 ± 1.4
		12H2 Treat.	08/06/84 to 09/04/84	3.2 ± 1.0	LT 1.0

Note: See footnotes at end of table.

Table 10a

Gross Alpha and Gross Beta in Water (Surface, Well and Drinking)
SSES REMP 1984
(Page 2 of 5)

(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Alpha	Beta
September	Surface	5S8	09/10/84 to 10/08/84	LT 2.0	4.3 ± 1.1
		(3) 6S5	09/10/84 to 10/08/84	LT 2.0	4.2 ± 1.1
		(3) 6S5	09/10/84 to 10/08/84	LT 2.0	5.2 ± 1.1
		1D3	09/04/84	LT 2.0	6.6 ± 1.2
		13E1	09/04/84	LT 1.0	1.4 ± 0.7
		12F1	09/04/84	LT 2.0	3.7 ± 1.0
		12G2	09/04/84	LT 2.0	3.7 ± 1.0
		12H1	09/04/84 to 10/09/84	LT 2.0	3.7 ± 1.0
		1D5	09/04/84	LT 2.0	13. ± 1.0
		LTAW	09/04/84	LT 3.0	7.4 ± 1.3
		6S6	09/04/84 to 10/08/84	LT 2.0	3.1 ± 1.3
		6S7	09/04/84 to 10/08/84	LT 2.0	12. ± 2.0
	Well	2S6	09/04/84	LT 0.9	LT 1.0
		3S5	09/04/84	LT 1.0	1.6 ± 0.9
		4S2	09/04/84	LT 2.0	LT 2.0
		4S4	09/04/84	LT 1.0	LT 1.0
		11S5	09/04/84	LT 2.0	LT 2.0
		15A4	09/04/84	LT 0.8	6.2 ± 1.1
		12E4	09/04/84	LT 1.0	LT 1.0
		12F3	09/04/84	LT 2.0	LT 2.0
	Drinking	12F3	09/04/84	LT 3.0	2.2 ± 1.2
		12H2 Raw	09/10/84 to 10/08/84	LT 2.0	2.9 ± 1.2
		12H2 Treat.	09/04/84 to 10/08/84	LT 2.0	3.2 ± 1.2

Note: See footnotes at end of table.

Table 10a

Gross Alpha and Gross Beta in Water (Surface, Well and Drinking)
SSES REMP 1984

(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Alpha	Beta
October	Surface	(3) 5S8	10/15/84 to 11/12/84	LT 2.0	4.3 ± 1.1
		(3) 5S8	10/15/84 to 11/12/84	LT 1.0	4.2 ± 1.4
		6S5	10/15/84 to 11/12/84	LT 1.0	4.5 ± 1.4
		1D3	10/10/84	LT 2.0	3.1 ± 1.0
		13E1	10/09/84	LT 0.6	1.0 ± 0.6
		12F1	10/09/84	LT 2.0	4.9 ± 1.1
		12G2	10/09/84	LT 2.0	5.0 ± 1.2
		12H1	10/09/84 to 11/13/84	LT 2.0	3.4 ± 1.1
		1D5	10/10/84	LT 1.0	16. ± 2.
		LTAW	10/09/84	LT 2.0	6.2 ± 1.2
		6S6	10/11/84 to 11/12/84	LT 2.0	3.4 ± 1.0
		6S7	10/08/84 to 11/12/84	LT 2.0	10. ± 2.
	Well	2S6	10/09/84	LT 1.0	1.6 ± 0.7
		3S5	10/09/84	LT 1.0	LT 1.0
		4S2	10/09/84	LT 2.0	LT 1.0
		4S4	10/09/84	LT 2.0	LT 1.0
		11S5	10/09/84	LT 2.0	2.4 ± 1.1
		15A4	10/09/84	LT 1.0	3.3 ± 0.8
		12E4	10/09/84	LT 1.0	1.4 ± 0.7
		12F3	10/09/84	LT 2.0	1.9 ± 1.0
	Drinking	12F3	10/09/84	LT 2.0	3.0 ± 1.1
		12H2 Raw	10/08/84 to 11/12/84	LT 2.0	3.9 ± 1.0
		12H2 Treat.	10/08/84 to 11/12/84	LT 2.0	3.3 ± 1.0

Note: See footnotes at end of table.

Table 10a

Gross Alpha and Gross Beta in Water (Surface, Well and Drinking)
SSES REMP 1984
(Page 4 of 5)

(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Alpha	Beta
November	Surface	5S8	11/19/84 to 12/10/84	LT 2.0	3.9 ± 1.1
		6S5	11/19/84 to 12/10/84	LT 2.0	4.1 ± 1.1
		1D3	11/13/84	LT 1.0	3.9 ± 1.3
		13E1	11/13/84	LT 1.0	2.6 ± 0.9
		12F1	11/13/84	LT 1.0	3.9 ± 1.0
		12G2	11/13/84	LT 1.0	3.7 ± 1.0
		12H1	11/13/84 to 12/11/84	LT 2.0	2.2 ± 0.9
		1D5	11/13/84	LT 2.0	3.6 ± 1.0
		LTAW	11/13/84	LT 2.0	5.0 ± 1.2
		6S6	11/12/84 to 12/10/84	LT 2.0	3.1 ± 0.9
		6S7	11/12/84 to 12/10/84	LT 2.0	9.3 ± 1.5
	Well	2S6	11/13/84	LT 1.0	1.6 ± 0.7
		3S5	(7)		
		4S2	11/13/84	LT 1.0	2.4 ± 1.1
		4S4	11/13/84	LT 2.0	1.3 ± 0.8
		11S5	11/13/84	LT 1.0	2.5 ± 1.1
		15A4	11/13/84	LT 1.0	5.1 ± 0.9
		12E4	11/13/84	LT 1.0	2.1 ± 0.7
		12F3	11/14/84	LT 2.0	1.7 ± 0.9
	Drinking	12F3	11/14/84	LT 1.0	2.0 ± 0.9
		12H2 Raw	11/12/84 to 12/10/84	LT 2.0	4.0 ± 1.0
		12H2 Treat.	11/12/84 to 12/10/84	LT 2.0	3.0 ± 0.9

Note: See footnotes at end of table.

Table 10a

Gross Alpha and Gross Beta in Water (Surface, Well and Drinking)
SSES REMP 1984
(Page 5 of 5)

(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Alpha	Beta
December	Surface	5S8	12/17/84 to 01/07/85	LT 1.0	2.9 ± 0.8
		6S5	12/17/84 to 01/07/85	LT 1.0	2.6 ± 0.8
		1D3	12/11/84	LT 1.0	LT 1.0
		13E1	12/11/84	LT 0.9	1.8 ± 0.8
		12F1	12/11/84	LT 1.0	2.9 ± 0.9
		12G2	12/11/84	LT 1.0	2.7 ± 0.9
		12H1	12/11/84 to 01/07/84	LT 1.0	2.3 ± 0.8
		1D5	12/11/84	LT 2.0	11. ± 1.
		LTAW	12/11/84	LT 2.0	4.8 ± 1.2
		6S6	12/10/84 to 01/07/85	LT 1.0	3.1 ± 0.8
		6S7	12/10/84 to 01/07/85	LT 2.0	5.4 ± 1.1
	Well	2S6	12/11/84	LT 1.0	1.6 ± 1.0
		3S5	(7)		
		4S2	12/11/84	LT 2.0	LT 2.0
		4S4	12/11/84	LT 2.0	2.2 ± 1.1
		11S5	12/11/84	LT 2.0	LT 2.0
		15A4	12/11/84	LT 1.0	5.0 ± 1.1
		12E4	12/11/84	LT 1.0	LT 1.0
		12F3	12/11/84	LT 2.0	LT 2.0
	Drinking	12F3	12/11/84	LT 2.0	2.0 ± 1.3
		12H2 Raw	12/10/84 to 01/07/85	LT 1.0	4.0 ± 0.9
		12H2 Treat.	12/10/84 to 01/07/85	LT 1.0	4.3 ± 0.9

(1) LT = Less Than
(2) NS = No Sample
(3) Duplicate sample and analysis
(4) Lower sensitivity due to high solids
(5) ND = No Data
(6) Samples analyzed by NUS Corporation.
(7) Closed through April

Table 11
(Page 1 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
January (5)	Surface	5S8	01/02/84 to 01/30/84	270 ± 200
		6S5	01/02/84 to 01/30/84	LT 400(1)
		6S6	01/02/84 to 01/30/84	(4)
		6S7	01/02/84 to 01/30/84	(4)
		1D3	01/16/84	140 ± 80
		1D5	01/16/84	120 ± 80
		13E1	01/17/84	LT 140
		12F1	NS(2)	
		12G2	NS	
		12H1	12/12/83 to 01/16/84	130 ± 80
		6S5(3)	01/02/84 to 01/30/84	420 ± 200
	Well	2S6	01/16/84	190 ± 90
		4S2	01/16/84	LT 140
		4S4	01/16/84	110 ± 90
		15A4	01/17/84	LT 400
		12E4	01/16/84	530 ± 90
		12F3	01/16/84	840 ± 90
		3S5	NS (6)	
		11S5	01/16/84	LT 140
	Drinking	12F3	01/17/84	340 ± 80
		12H2 Raw	01/02/84 to 01/30/84	(4)
		12H2 Treated	01/02/84 to 01/30/84	LT 140

See foofnotes at end of table.

Table 11
(Page 2 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
February (5)	Surface	5S8	02/06/84 to 02/27/84	85 ± 82
		6S5	02/06/84 to 02/27/84	160 ± 80
		6S6	01/30/84 to 02/27/84	140 ± 100
		6S7	01/30/84 to 02/27/84	600 ± 100
		1D3	02/15/84	LT 300
		1D5	02/16/84	LT 300
		13E1	02/16/84	LT 300
		12F1	02/16/84	LT 300
		12G2	NS	
		12H1	01/16/84 to 02/16/84	LT 300
	Well	2S6	02/15/84	LT 300
		4S2	02/15/84	LT 300
		4S4	02/16/84	LT 300
		15A4	02/16/84	LT 300
		12E4	02/15/84	LT 300
		12F3	02/16/84	LT 300
		3S5	NS (6)	
		11S5	02/16/84	LT 300
		12F3(3)	02/16/84	LT 300
	Drinking	12F3	02/16/84	LT 300
		12H2 Raw	01/30/84 to 02/27/84	320 ± 100
		12H2 Treated	01/30/84 to 02/27/84	340 ± 100
		12F3(3)	02/16/84	(4)

See footnotes at end of tables.

Table 11
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Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
March (5)	Surface	5S8	03/05/84 to 03/26/84	LT 300
		6S5	03/05/84 to 03/26/84	LT 300
		6S6	02/27/84 to 03/26/84	1600 ± 200
		6S7	02/27/84 to 03/05/84	2200 ± 300
		1D3	03/13/84	LT 300
		1D5	03/13/84	LT 300
		13E1	03/12/84	LT 300
		12F1	03/12/84	280 ± 190
		12G2	03/13/84	LT 400
		12H1	03/12/84	LT 300
		LAKE-T-A-W	03/14/84	LT 300
	Well	2S6	03/12/84	LT 300
		4S2	03/13/84	LT 300
		4S4	03/13/84	LT 300
		15A4	03/14/84	250 ± 200
		12E4	03/12/84	LT 300
		12F3	03/12/84	LT 300
		3S5	NS (6)	
		11S5	03/13/84	470 ± 200
	Drinking	12F3	03/12/84	300 ± 200
		12H2 Raw	02/27/84 to 04/02/84	600 ± 200
		12H2 Treated	02/27/84 to 04/02/84	710 ± 200

See footnotes at end of table.

Table 11
(Page 4 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
April (5)	Surface	5S8	04/02/84 to 04/30/84	LT 300
		6S5	04/02/84 to 04/30/84	LT 300
		6S6	04/02/84 to 04/30/84	LT 300
		6S7	04/02/84 to 04/30/84	LT 300
		1D3	04/10/84	LT 300
		1D5	04/10/84	LT 300
		13E1	04/10/84	LT 300
		12F1	04/10/84	LT 300
		12G2	04/10/84	LT 300
		12H1	03/12/84 to 04/10/84	LT 300
		LAKE-T-A-W	04/12/84	280 ± 190
		12F1(3)	04/10/84	LT 300
		12G2(3)	04/10/84	LT 300
	Well	2S6	04/10/84	LT 300
		4S2	04/10/84	220 ± 190
		4S4	04/10/84	LT 300
		15A4	04/11/84	LT 300
		12E4	04/10/84	LT 300
		12F3	04/11/84	440 ± 190
		3S5	NS (6)	
		11S5	04/10/84	380 ± 200
	Drinking	12F3	04/11/84	LT 300
		12H2 Raw	04/02/84 to 04/30/84	LT 300
		12H2 Treated	04/02/84 to 04/30/84	LT 300

See footnotes at end of table.

Table 11
(Page 5 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
May (5)	Surface	5S8	05/07/84 to 05/29/84	LT 300
		6S5	05/07/84 to 05/29/84	LT 300
		6S6	04/30/84 to 05/29/84	LT 300
		6S7	04/30/84 to 05/29/84	720 ± 190
		1D3	05/15/84	LT 300
		1D5	05/15/84	LT 300
		13E1	05/15/84	LT 300
		12F1	05/15/84	220 ± 190
		12G2	05/15/84	290 ± 190
		12H1	04/10/84 to 05/15/84	LT 300
		Lake-T-A-W	05/15/84	LT 300
		6S5(3)	05/07/84 to 05/29/84	LT 300
		S-2 Pond	05/30/84	LT 300
	Well	2S6	05/15/84	200 ± 180
		4S2	05/15/84	250 ± 180
		4S4	05/15/84	LT 300
		15A4	05/15/84	LT 300
		12E4	05/15/84	LT 300
		12F3	05/18/84	LT 300
		3S5	05/15/84	LT 300
		11S5	05/15/84	LT 300
	Drinking	12F3	05/15/84	LT 300
		12H2 Raw	04/30/84 to 05/29/84	LT 300
		12H2 Treated	04/30/84 to 05/29/84	210 ± 180

See footnotes at end of table.

Table 11
(Page 6 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
June (5)	Surface	5S8	06/04/84 to 06/11/84	LT 300
		6S5	06/04/84 to 06/11/84	LT 300
		6S6	06/04/84 to 07/02/84	LT 300
		6S7	05/29/84 to 07/02/84	520 ± 190
		1D3	06/12/84	LT 300
		1D5	06/12/84	LT 300
		13E1	06/12/84	(4)
		12F1	06/12/84	LT 300
		12G2	06/12/84	LT 300
		12H1	06/12/84	LT 300
		Lake-T-A-W	06/12/84	LT 300
	Well	2S6	06/12/84	LT 300
		4S2	06/12/84	LT 300
		4S4	06/12/84	LT 300
		15A4	06/12/84	LT 300
		12E4	06/12/84	LT 300
		12F3	06/13/84	LT 300
		3S5	06/12/84	LT 300
		11S5	06/12/84	LT 300
	Drinking	12F3	06/13/84	LT 300
		12H2 Raw	05/29/84 to 07/02/84	LT 300
		12H2 Treated	05/29/84 to 07/02/84	LT 300

See footnotes at end of table.

Table 11
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Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
July (5)	Surface	5S8	06/18/84 to 07/09/84	LT 300
		6S5	06/18/84 to 07/09/84	LT 300
		6S6	07/02/84 to 08/06/84	LT 300
		6S7	07/02/84 to 08/06/84	530 ± 190
		1D3	07/10/84	LT 300
		1D5	07/10/84	LT 300
		13E1	07/11/84	LT 300
		12F1	07/11/84	LT 300
		12G2	07/10/84	LT 300
		12H1	07/10/84	LT 300
		Lake-T-A-W	07/10/84	LT 300
		5S8(3)	06/18/84 to 07/09/84	LT 300
	Well	2S6	07/10/84	LT 300
		4S2	07/10/84	LT 300
		4S4	07/10/84	LT 300
		15A4	07/11/84	LT 300
		12E4	07/11/84	LT 300
		12F3	07/10/84	LT 300
		3S5	07/10/84	LT 300
		11S5	07/10/84	LT 300
	Drinking	12F3	07/10/84	LT 300
		12H2 Raw	07/09/84 to 08/06/84	LT 300
		12H2 Treated	07/02/84 to 08/06/84	LT 300

See footnotes at end of tables.

Table 11
(Page 8 of 8)

Tritium in Water
(Surface, Well, and Drinking)
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Water Type	Station	Collection Period	Tritium Activity
August (5)	Surface	5S8	07/16/84 to 08/06/84	290 ± 190
		6S5	07/16/84 to 08/06/84	LT 300
		1D3	08/07/84	LT 300
		1D5	08/07/84	LT 300
		13E1	08/08/84	LT 300
		12F1	08/08/84	LT 300
		12G2	08/08/84	LT 300
		12H1	08/07/84	LT 300
		Lake-T-A-W	08/07/84	LT 300
		6S5(3)	07/16/84 to 08/06/84	(4)
	Well	2S6	08/07/84	LT 300
		4S2	08/08/84	200 ± 190
		4S4	08/07/84	LT 300
		15A4	08/08/84	LT 300
		12E4	08/08/84	LT 300
		12F3	08/08/84	LT 300
		3S5	08/08/84	LT 300
		11S5	08/07/84	LT 300
	Drinking	12F3	08/08/84	200 ± 190

(1) LT = Less Than
(2) NS = No Sample
(3) Duplicate sample and analysis.
(4) Not analyzed for tritium.
(5) Samples analyzed by NUS Corporation.
(6) Closed through April

Table 11a

Tritium in Water (Surface, Well and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 1 of 5)

Month	Water Type	Station	Collection Date (Period)	Tritium
July	Surface	5S8	07/16/84 to 08/06/84	160 ± 40
		6S5	07/16/84 to 08/06/84	130 ± 40
		6S6	07/02/84 to 08/06/84	450 ± 70
		6S7	07/02/84 to 08/06/84	1000±100
	Drinking	12H2 Raw	07/09/84 to 08/06/84	LT 200
		12H2 Treat.	07/02/84 to 08/06/84	610 ± 120
August	Surface	(3) 5S8	08/13/84 to 09/04/84	110 ± 40
		(3) 5S8	08/13/84 to 09/04/84	69 ± 30
		6S5	08/13/84 to 09/04/84	130 ± 30
		1D3	08/07/84	150 ± 40
		13E1	08/08/84	110 ± 30
		12F1	08/08/84	130 ± 40
		12G2	08/08/84	340 ± 50
		12H1	08/07/84	170 ± 40
		12H1	08/07/84 to 09/04/84	150 ± 40
		1D5	08/07/84	150 ± 40
		LTAW	08/07/84	140 ± 40
		6S6	08/06/84 to 09/04/84	460 ± 90
		6S7	08/06/84 to 09/04/84	780 ± 290
	Well	2S6	08/07/84	56 ± 31
		3S5	08/08/84	LT 80
		4S2	08/07/84	LT 60
		4S4	08/07/84	50 ± 30
		11S5	08/07/84	120 ± 40
		15A4	08/08/84	110 ± 40
		12E4	08/08/84	81 ± 38
		12F3	08/08/84	85 ± 37
	Drinking	12F3	08/08/84	200 ± 40
		12H2 Raw	08/13/84 to 09/04/84	200 ± 90
		12H2 Treat.	08/06/84 to 09/04/84	180 ± 80

See footnotes at end of table.

Table 11a

Tritium in Water (Surface, Well and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 2 of 5)

Month	Water Type	Station	Collection Date (Period)	Tritium
September	Surface	5S8	09/10/84 to 10/08/84	LT 70
		(3) 6S5	09/10/84 to 10/08/84	98 ± 37
		(3) 6S5	09/10/84 to 10/08/84	85 ± 40
		1D3	09/04/84	130 ± 30
		13E1	09/04/84	140 ± 40
		12F1	09/04/84	140 ± 40
		12G2	09/04/84	360 ± 40
		12H1	09/04/84 to 10/09/84	150 ± 40
		1D5	09/04/84	120 ± 30
		LTAW	09/04/84	130 ± 30
		6S6	09/04/84 to 10/08/84	120 ± 30
		6S7	09/04/84 to 10/08/84	510 ± 40
	Well	2S6	09/04/84	120 ± 50
		3S5	09/04/84	100 ± 40
		4S2	09/04/84	100 ± 30
		4S4	09/04/84	130 ± 40
		11S5	09/04/84	96 ± 33
		15A4	09/04/84	85 ± 37
		12E4	09/04/84	140 ± 40
		12F3	09/04/84	99 ± 36
	Drinking	12F3	09/04/84	210 ± 80
		12H2 Raw	09/10/84 to 10/08/84	110 ± 30
		12H2 Treat.	09/04/84 to 10/08/84	120 ± 40

See footnotes at end of table.

Table 11a

Tritium in Water (Surface, Well and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 3 of 5)

Month	Water Type	Station	Collection Date (Period)	Tritium
October	Surface	(3) 5S8	10/15/84 to 11/12/84	93 ± 31
		(3) 5S8	10/15/84 to 11/12/84	120 ± 40
		6S5	10/15/84 to 11/12/84	120 ± 40
		1D3	10/10/84	69 ± 35
		13E1	10/09/84	160 ± 30
		12F1	10/09/84	150 ± 30
		12G2	10/09/84	360 ± 40
		12H1	10/09/84 to 11/13/84	130 ± 30
		1D5	10/10/84	120 ± 30
		LTAW	10/09/84	170 ± 30
		6S6	10/11/84 to 11/12/84	64 ± 29
		6S7	10/08/84 to 11/12/84	620 ± 40
	Well	2S6	10/09/84	150 ± 40
		3S5	10/09/84	150 ± 40
		4S2	10/09/84	140 ± 40
		4S4	10/09/84	93 ± 33
		11S5	10/09/84	150 ± 40
		15A4	10/09/84	110 ± 40
		12E4	10/09/84	120 ± 30
		12F3	10/09/84	140 ± 30
	Drinking	12F3	10/09/84	LT 100
		12H2 Raw	10/08/84 to 11/12/84	61 ± 28
		12H2 Treat.	10/08/84 to 11/12/84	54 ± 32

See footnotes at end of table.

Table 11a

Tritium in Water (Surface, Well and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Month	Water Type	Station	Collection Date (Period)	Tritium
November	Surface	5S8	11/19/84 to 12/10/84	110 ± 40
		6S5	11/19/84 to 12/10/84	140 ± 40
		1D3	11/13/84	95 ± 31
		13E1	11/13/84	770 ± 36
		12F1	11/13/84	120 ± 30
		12G2	11/13/84	180 ± 40
		12H1	11/13/84 to 12/11/84	84 ± 34
		1D5	11/13/84	91 ± 35
		LTAW	11/13/84	720 ± 35
		6S6	11/12/84 to 12/10/84	LT 60
		6S7	11/12/84 to 12/10/84	260 ± 40
	Well	2S6	11/13/84	100 ± 40
		3S5	(6)	
		4S2	11/13/84	110 ± 40
		4S4	11/13/84	89 ± 28
		11S5	11/13/84	55 ± 35
		15A4	11/13/84	90 ± 31
		12E4	11/13/84	69 ± 38
		12F3	11/14/84	110 ± 30
	Drinking	12F3	11/14/84	81 ± 34
		12H2 Raw	11/12/84 to 12/10/84	96 ± 31
		12H2 Treat.	11/12/84 to 12/10/84	120 ± 40

See footnotes at end of table.

Table 11a

Tritium in Water (Surface, Well and Drinking)
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 5 of 5)

Month	Water Type	Station	Collection Date (Period)	Tritium
December	Surface	5S8	12/17/84 to 01/07/85	79 ± 33
		6S5	12/17/84 to 01/07/85	LT 50
		1D3	12/11/84	120 ± 30
		13E1	12/11/84	110 ± 30
		12F1	12/11/84	68 ± 36
		12G2	12/11/84	150 ± 40
		12H1	12/11/84 to 01/07/84	89 ± 44
		1D5	12/11/84	82 ± 31
		LTAW	12/11/84	140 ± 40
		6S6	12/10/84 to 01/07/85	LT 60
		6S7	12/10/84 to 01/07/85	90 ± 43
	Well	2S6	12/11/84	83 ± 36
		3S5	(6)	
		4S2	12/11/84	95 ± 35
		4S4	12/11/84	71 ± 34
		11S5	12/11/84	89 ± 35
		15A4	12/11/84	67 ± 37
		12E4	12/11/84	110 ± 40
		12F3	12/11/84	110 ± 40
	Drinking	12F3	12/11/84	110 ± 40
		12H2 Raw	12/10/84 to 01/07/85	57 ± 36
		12H2 Treat.	12/10/84 to 01/07/85	86 ± 38

(1) LT = Less Than
(2) NS = No Sample
(3) Duplicate sample and analysis.
(4) Not analyzed for tritium.
(5) Samples analyzed by NUS Corporation.
(6) Closed through April

Table 12
(Page 1 of 2)

Gross Beta in Air Particulate Filters
SSES REMP 1984
(Results in E-03 pCi/m^3 ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
Jan (3)	01/03/84 to 01/09/84											15.0±3
	01/03/84 to 01/10/84	16.0±3.0	16.0±3.0	16.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	9.5±2.2	17.0±2.0	NS[1]	NS	
	01/09/84 to 01/17/84											12.0±3.0
	01/10/84 to 01/17/84	13.0±2.0	14.0±2.0	16.0±2.0 stop 1/18	14.0±2.0	16.0±2.0	25.0±4.0	6.0±2.0	16.0±2.0	17.0±2.0	16.0±2.0	
	01/17/84 to 01/23/84											24.0±3.0
	01/17/84 to 01/25/84	22.0±3.0	24.0±3.0	23.0±3.0 start 1/18	23.0±3.0	24.0±3.0	28.0±3.0	19.0±2.0	25.0±3.0	23.0±3.0	25.0±3.0	
	01/23/84 to 01/29/84											8.7±5.3
	01/25/84 to 01/31/84	12.0±3.0	13.0±2.0 stop 1/30	11.0±3.0	14.0±2.0	13.0±3.0 stop 1/30	15.0±3.0	7.9±2.3	12.0±2.0	10.0±2.0	10.0±2.0	
	01/29/84 to 02/03/84											11.0±3.0
Feb (3)	01/31/84 to 02/14/84	8.1±1.4	9.1±1.6 start 1/30	12.0±2.0	11.0±2.0	13.0±2.0 start 1/30	14.0±2.0	9.2±1.3	11.0±2.0	12.0±2.0	9.7±1.5	
	02/03/84 to 02/13/84											11.0±2.0
	02/13/84 to 02/21/84		start 2/15									7.0±1.9
	02/14/84 to 02/21/84	6.6±1.7	9.0±1.8	6.0±2.0	7.3±1.8	8.4±2.1	6.4±2.0	5.4±2.0	7.2±1.8	5.7±2.0	7.9±2.0	
	02/21/84 to 02/28/84	12.0±3.0	9.2±1.6	9.5±2.4	8.8±2.0	11.0±2.0	10.0±2.0	6.5±2.0	10.0±2.0	11.0±2.0	8.4±2.0	
	02/21/84 to 02/27/84											8.0±2.5
Mar (3)	02/28/84 to 03/06/84	5.4±2.1	6.1±1.6	5.9±2.0	5.5±1.8	5.8±2.1	9.2±3.0	3.4±1.6	7.3±1.8	4.4±1.9	4.9±1.8	
	02/27/84 to 03/07/84											5.8±1.6
	03/06/84 to 03/13/84	13.0±2.0	13.0±2.0	15.0±2.0	27.0±4.0	13.0±2.0	25.0±3.0	12.0±2.0	14.0±2.0	NS	12.0±2.0	14.0±2.0
	03/13/84 to 03/20/84	8.1±2.2	7.1±1.9	5.7±1.4	7.9±1.7	8.4±2.1	8.1±1.9	3.6±1.9	7.8±1.8	4.6±2.0 start 3/6	8.5±1.9	
	03/13/84 to 08/21/84											5.2±1.6
	03/21/84 to 03/27/84											8.8±2.0
	03/20/84 to 03/27/84	6.9±2.1	7.4±1.9	6.7±1.7	7.3±2.2	6.9±2.0	7.2±1.9	5.7±1.9	7.9±2.1	7.7±1.9	8.8±1.9	
	03/27/84 to 04/03/84	4.5±2.0	3.6±1.9	5.0±1.8	5.2±2.0	3.1±1.8	5.5±1.9	3.2±1.8	4.7±1.9	4.9±1.8	4.9±1.8	
	03/27/84 to 04/02/84											3.8±1.7
Apr (3)	04/02/84 to 04/09/84											4.9±1.6
	04/03/84 to 04/09/84	7.5±2.0	7.0±1.8	9.0±1.9	7.3±1.9	7.4±1.8	7.6±1.7	5.9±1.7	7.1±1.8	7.3±1.7	7.4±1.7	
	04/09/84 to 04/16/84	LT 3[2]	3.0±2.0	LT 3	LT 3	3.1±2.0	2.7±1.8	LT 3	3.2±2.0	2.1±1.9	LT 3	

See footnotes at end of table

Table 12
(Page 2 of 2)

Gross Beta in Air Particulate Filters
SSES REMP 1984
(Results in E-03 pCi/m^3 ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
(3)	04/09/84 to 04/18/84											3.1±1.4
	04/18/84 to 04/25/84											4.4±1.5
	04/16/84 to 04/23/84	4.5±2.1	4.8±1.9	5.4±1.8	4.7±2.0	6.3±2.0	5.6±1.8	4.0±2.0	5.0±1.9	4.9±1.8	3.4±1.7	
	04/23/84 to 04/30/84	6.9±2.1	6.5±2.0	6.4±1.9	8.1±1.9	6.3±2.0	6.7±1.8	2.2±1.8	6.0±2.0	6.6±1.8	7.4±1.8	
	04/25/84 to 05/01/84											12.0±2.0
May (3)	04/30/84 to 05/07/84	9.3±2.3	8.2±2.1	8.3±2.0	8.3±1.9	8.5±2.1	8.6±2.2	6.2±1.9	8.4±2.1	7.8±1.9	8.5±1.8	
	05/01/84 to 05/08/84											9.9±1.8
	05/07/84 to 05/15/84	6.8±1.9	6.4±1.6	5.3±1.7	7.2±1.8	7.1±1.7	5.0±1.7	4.4±1.5	6.6±1.8	5.8±1.6	6.0±1.7	
	05/08/84 to 05/15/84											7.0±1.8
	05/15/84 to 05/22/84	8.4±2.2	8.4±1.9	11.0±2.0	9.2±2.0	10.0±2.0	11.0±2.0	8.8±1.8	10.0±2.0	9.7±1.9	9.3±2.0	9.1±2.9
	05/22/84 to 05/29/84	8.1±1.8	8.2±1.8	6.2±1.9	6.6±1.9	7.3±1.8	7.7±1.8	6.0±1.5	7.2±2.2	8.4±1.9	6.6±1.9	6.5±2.6
Jun (3)	05/29/84 to 06/05/84	3.9±1.9	3.9±1.9	3.6±2.2	3.9±2.0	4.7±2.0	3.9±2.1	3.4±1.7	4.5±1.8	5.6±1.5	5.4±2.0	4.0±2.6
	06/05/84 to 06/12/84	20.0±2.0	20.0±2.0	18.0±3.0	21.0±3.0	19.0±2.0	20.0±3.0	18.0±2.0	20.0±2.0	21.0±3.0	20.0±3.0	19.0±4.0
	06/12/84 to 06/19/84	5.0±1.8	5.8±2.0	5.4±1.5	4.5±1.6	6.7±1.6	6.5±2.2	5.2±1.9	7.0±2.1	6.0±1.9	6.5±1.9	7.8±2.0
	06/19/84 to 06/26/84	14.0±2.0	14.0±2.0	13.0±2.0	11.0±2.0	13.0±2.0	13.0±2.0	10.0±2.0	14.0±2.0	14.0±2.0	12.0±2.0	13.0±2.0
	06/26/84 to 07/02/84											14.0±2.0
	06/26/84 to 07/03/84	14.0±2.0	14.0±2.0	13.0±2.0	12.0±2.0	13.0±2.0	13.0±2.0	11.0±2.0	12.0±2.0	13.0±2.0	11.0±2.0	
Jul (3)	07/02/84 to 07/10/84											14.0±2.0
	07/03/84 to 07/10/84	13.0±2.0	14.0±2.0	14.0±2.0	13.0±2.0	20.0±3.0	14.0±2.0	12.0±2.0	16.0±2.0	15.0±2.0	14.0±2.0	
	07/10/84 to 07/17/84	22.0±3.0	22.0±3.0	21.0±3.0	23.0±3.0	23.0±3.0	20.0±2.0	17.0±2.0	25.0±3.0	20.0±2.0	25.0±3.0	24.0±3.0

(1) NS = No Sample
(2) LT = Less Than
(3) Samples analyzed by NUS Corporation

Table 12a

Gross Beta in Air particulate Filters
SSES REMP 1984
(Results in E-03 pCi/m^3 ± 2 s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1*
July	07/10/84 to 07/17/84	19.0±2.0	19.0±2.0	21.0±2.0	20.0±2.0	19.0±2.0	19.0±2.0	16.0±2.0	22.0±2.0	19.0±2.0	19.0±2.0	21.0±2.0
	07/17/84 to 07/24/84	11.0±2.0	13.0±2.0	12.0±2.0	12.0±2.0	14.0±2.0	13.0±2.0	12.0±2.0	11.0±2.0	11.0±2.0	12.0±2.0	16.0±2.0
	07/24/84 to 07/31/84	12.0±2.0	9.8±1.6	10.0±2.0	10.0±2.0	9.6±1.5	13.0±2.0	7.8±1.7	9.8±1.7	9.2±1.7	10.0±2.0	11.0±2.0
	07/31/84 to 08/07/84	17.0±2.0	21.0±2.0	20.0±2.0	21.0±2.0	22.0±3.0	21.0±3.0	16.0±2.0	19.0±2.0	19.0±2.0	18.0±2.0	20.0±2.0
Aug.	08/07/84 to 08/14/84	19.0±2.0	18.0±2.0	18.0±2.0	19.0±2.0	20.0±2.0	21.0±2.0	15.0±2.0	21.0±2.0	20.0±2.0	14.0±2.0	19.0±2.0
	08/14/84 to 08/21/84	12.0±2.0	11.0±2.0	12.0±2.0	10.0±2.0	12.0±2.0	11.0±2.0	9.2±1.8	12.0±2.0	14.0±2.0	13.0±2.0	15.0±2.0
	08/21/84 to 08/28/84	16.0±2.0	14.0±2.0	14.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	17.0±2.0	14.0±2.0	13.0±2.0	14.0±2.0	16.0±2.0
	08/28/84 to 09/04/84	18.0±2.0	21.0±2.0	20.0±2.0	20.0±3.0	18.0±2.0	19.0±2.0	16.0±2.0	20.0±2.0	18.0±3.0	19.0±2.0	21.0±3.0
Sept.	09/04/84 to 09/11/84	14.0±2.0	13.0±2.0	14.0±2.0	12.0±2.0	18.0±2.0	17.0±2.0	10.0±2.0	13.0±2.0	14.0±2.0	13.0±2.0	15.0±2.0
	09/11/84 to 09/19/84	15.0±2.0	13.0±2.0	17.0±2.0	14.0±2.0	14.0±2.0	15.0±2.0	12.0±2.0	13.0±2.0	15.0±2.0	14.0±2.0	17.0±2.0
	09/19/84 to 09/25/84	28.0±3.0	26.0±2.0	28.0±3.0	32.0±2.0	28.0±3.0	30.0±3.0	25.0±3.0	31.0±3.0	26.0±2.0	26.0±2.0	25.0±3.0
	09/25/84 to 10/02/84	15.0±2.0	15.0±2.0	16.0±2.0	16.0±2.0	16.0±2.0	17.0±2.0	27.0±3.0	17.0±2.0	14.0±2.0	14.0±2.0	17.0±2.0
Oct.	10/02/84 to 10/09/84	16.0±2.0	15.0±2.0	16.0±2.0	15.0±2.0	17.0±2:0	15.0±2.0	15.0±2.0	16.0±2.0	14.0±2.0	16.0±2.0	15.0±2.0
	10/09/84 to 10/16/84	22.0±2.0	23.0±2.0	24.0±2.0	21.0±2.0	24.0±2.0	22.0±2.0	21.0±2.0	23.0±2.0	23.0±2.0	26.0±2.0	33.0±3.0*
	10/16/84 to 10/23/84	36.0±3.0	22.0±2.0	23.0±2.0	11.0±1.0	21.0±2.0	29.0±2.0	20.0±2.0	24.0±3.0	20.0±2.0	23.0±2.0	14.0±2.0*
	10/23/84 to 10/30/84	18.0±2.0	20.0±2.0	20.0±2.0	19.0±2.0	21.0±2.0	20.0±2.0	26.0±3.0	18.0±2.0	16.0±2.0	12.0±2.0	19.0±2.0
	10/30/84 to 11/06/84	15.0±2.0	17.0±2.0	16.0±2.0	16.0±2.0	15.0±2.0	16.0±2.0	14.0±2.0	17.0±2.0	15.0±2.0	18.0±2.0	16.0±2.0
Nov.	11/06/84 to 11/13/84	14.0±2.0	15.0±2.0	15.0±2.0	13.0±2.0	16.0±2.0	14.0±2.0	12.0±2.0	14.0±2.0	13.0±2.0	13.0±2.0	19.0±2.0
	11/13/84 to 11/20/84	18.0±2.0	19.0±2.0	16.0±2.0	17.0±2.0	17.0±2.0	18.0±2.0	23.0±4.0	16.0±2.0	14.0±2.0	15.0±2.0	20.0±2.0
	11/20/84 to 11/27/84	24.0±2.0	24.0±2.0	28.0±2.0	24.0±2.0	23.0±2.0	24.0±2.0	42.0±4.0	33.0±3.0	22.0±2.0	24.0±2.0	23.0±2.0
	11/27/84 to 12/04/84	17.0±2.0	19.0±2.0	17.0±2.0	17.0±2.0	18.0±2.0	17.0±2.0	23.0±3.0	18.0±2.0	18.0±2.0	16.0±2.0	21.0±2.0
Dec.	12/04/84 to 12/11/84	24.0±3.0	27.0±3.0	28.0±3.0	26.0±3.0	24.0±2.0	23.0±2.0	46.0±5.0	27.0±3.0	23.0±2.0	34.0±3.0	20.0±3.0
	12/11/84 to 12/18/84	24.0±2.0	28.0±2.0	26.0±2.0	25.0±2.0	27.0±2.0	23.0±2.0	26.0±3.0	28.0±3.0	23.0±2.0	23.0±2.0	25.0±3.0
	12/18/84 to 12/24/84	28.0±2.0	27.0±2.0	28.0±2.0	25.0±3.0	26.0±2.0	26.0±2.0	29.0±3.0	28.0±3.0	28.0±2.1	26.0±2.0	28.0±3.0
	12/24/84 to 12/31/84	17.0±2.0	19.0±2.0	24.0±3.0	20.0±2.0	21.0±2.0	19.0±2.0	19.0±2.0	20.0±2.0	18.0±2.0	14.0±2.0	18.0±3.0*
	12/31/84 to 01/08/85	16.0±2.0	17.0±2.0	15.0±2.0	16.0±2.0	15.0±2.0	16.0±2.0	17.0±2.0	17.0±2.0	15.0±2.0	12.0±2.0	16.0±2.0*

* Collection period for 7H1 are the same as above except for: 10/09/84-10/17/84, 10/17/84-10/23/84, 12/24/84-01/02/85, 01/02/85-01/08/85.

Table 13

Gamma Spectrometry of Composited Air Particulate Filters
SSES REMP 1984

(Results in E-03 pCi/m^3 ± 2s)

Quarter	Collection Period	Station	Be-7	Ce-144	Cs-134	Cs-137	Nb-95	Zr-95
1	01/03/83 to 04/03/83 (3)	2S2	48 ± 13	LT 6	LT 1.9	LT 1.9	LT 1.9	LT 4
		5S4	56 ± 12	LT 5	LT 1.0	LT 0.9	LT 1.0	LT 1.8
		11S2	59 ± 12	LT 5	LT 1.0	LT 1.2	LT 1.2	LT 2
		15S4	59 ± 14	LT 9	LT 1.5	LT 2	LT 2	LT 4
		9B1	53 ± 13	LT 5	LT 1.8	LT 1.7	LT 1.9	LT 4
		1D2	52 ± 16	LT 11	LT 2	LT 2	LT 3	LT 5
		3D1	40 ± 11	LT 5	LT 0.9	LT 1.6	LT 1.2	LT 1.9
		12E1	66 ± 15	LT 9	LT 1.2	LT 1.9	LT 3	LT 4
		7G1	47 ± 15	LT 10	LT 1.8	LT 2	LT 2	LT 5
		12G1	61 ± 13	LT 5	LT 1.4	LT 1.3	LT 1.4	LT 3
		7H1(1)	61 ± 17	LT 10	LT 2	LT 2	LT 2	LT 4
2	04/03/84 to 07/03/84 (3)	2S2	43 ± 10	LT 4	LT 0.9	LT 1.1	LT 1.3	LT 2
		5S4	57 ± 12	LT 4	LT 0.9	LT 1.0	LT 0.8	LT 1.7
		11S2	54 ± 13	LT 5	LT 1.6	LT 1.7	LT 2	LT 4
		15S4	71 ± 16	LT 5	LT 1.0	LT 1.0	LT 1.6	LT 2
		9B1	53 ± 13	LT 4	LT 1.0	LT 1.1	LT 1.5	LT 1.6
		1D2	48 ± 12	LT 5	LT 1.2	LT 1.5	LT 1.8	LT 4
		3D1	53 ± 12	LT 5	LT 1.1	LT 0.9	LT 1.5	LT 1.8
		12E1	66 ± 14	LT 5	LT 1.4	LT 1.3	LT 1.5	LT 3
		7G1	63 ± 13	LT 5	LT 1.1	LT 1.7	LT 1.9	LT 3
		12G1	54 ± 12	LT 4	LT 1.0	LT 1.1	LT 1.2	LT 1.6
		7H1(2)	65 ± 8	LT 2	LT 0.6	LT 0.6	LT 0.9	LT 1.4

(1) Collection stop date for 7H1 is 04/02/84.
(2) Collection period for 7H1 is 04/02/84 to 07/02/84.
(3) Samples analyzed by NUS Corporation.

Table 13a

Gamma Spectrometry of Composited Air Particulate Filters
SSES REMP 1984

(Results in E-03 pCi/m^3 ± 2s)

Quarter	Collection Period	Station	Be-7	Ce-144	Cs-134	Cs-137	Nb-95	Zr-95
3	07/03/84 to 10/02/84	2S2	77±5	LT 1	LT 0.2	LT 0.3	LT 0.3	LT 0.6
		5S4	69±5	LT 1	LT 0.2	LT 0.2	LT 0.3	LT 0.4
		11S2	69±4	LT 1	LT 0.3	LT 0.3	LT 0.3	LT 0.6
		15S4	63±6	LT 2	LT 0.5	LT 0.4	LT 0.5	LT 0.9
		9B1	75±6	LT 2	LT 0.4	LT 0.4	LT 0.4	LT 0.9
		1D2	80±5	LT 0.6	LT 0.2	LT 0.2	LT 0.3	LT 0.5
		3D1	55±4	LT 1	LT 0.2	LT 0.2	LT 0.2	LT 0.4
		12E1	74±4	LT 1	LT 0.2	LT 0.2	LT 0.2	LT 0.5
		7G1	83±7	LT 2	LT 0.4	LT 0.4	LT 0.5	LT 1
		12G1	83±6	LT 2	LT 0.3	LT 0.3	LT 0.4	LT 0.7
		7H1(4)	68±7	LT 1	LT 0.3	LT 0.3	LT 0.3	LT 0.7
4	10/02/84 to 01/08/85	2S2	60±6	LT 2	LT 0.4	LT 0.4	LT 0.5	LT 1
		5S4	54±4	LT 1	LT 0.2	LT 0.2	LT 0.3	LT 0.6
		11S2	64±6	LT 1	LT 0.2	LT 0.2	LT 0.2	LT 0.6
		15S4	55±6	LT 1	LT 0.3	LT 0.2	LT 0.3	LT 0.6
		9B1	52±4	LT 2	LT 0.3	LT 0.3	LT 0.3	LT 0.6
		1D2	55±6	LT 1	LT 0.2	LT 0.2	LT 0.2	LT 0.4
		3D1	177±18	LT 2	LT 0.2	LT 0.2	LT 0.6	LT 1
		12E1	62±8	LT 2	LT 0.5	LT 0.4	LT 0.5	LT 0.9
		7G1	57±6	LT 1	LT 0.2	LT 0.2	LT 0.2	LT 0.4
		12G1	63±6	LT 2	LT 0.3	LT 0.4	LT 0.4	LT 0.8
		7H1	59±6	LT 2	LT 0.2	LT 0.3	LT 0.4	LT 0.5

(1) Collection stop date for 7H1 is 04/02/84.
(2) Collection period for 7H1 is 04/02/84 to 07/02/84.
(3) Samples analyzed by NUS Corporation.
(4) Collection period for 7H1 is 07/02/84 to 10/02/84.

Table 14

Gross Alpha in Composited Air Particulate Filters
SSES REMP 1984

(Results in E-03 pCi/m^3 $\pm$ 2s)

Quarter	Station	Collection Period	Alpha Activity
1	2S2	01/03/84 to 04/03/84	5.8 ± 0.6
(1)	5S4	01/03/84 to 04/03/84	5.4 ± 0.6
	11S2	01/03/84 to 04/03/84	5.0 ± 0.5
	15S4	01/03/84 to 04/03/84	6.3 ± 0.7
	9B1	01/03/84 to 04/03/84	5.9 ± 0.6
	1D2	01/03/84 to 04/03/84	7.9 ± 0.8
	3D1	01/03/84 to 04/03/84	4.6 ± 0.5
	12E1	01/03/84 to 04/03/84	5.1 ± 0.6
	7G1	01/03/84 to 04/03/84	5.0 ± 0.5
	12G1	01/03/84 to 04/03/84	5.9 ± 0.6
	7H1	01/03/84 to 04/02/84	7.2 ± 0.8
2	2S2	04/03/84 to 07/03/84	3.1 ± 0.4
(1)	5S4	04/03/84 to 07/03/84	1.4 ± 0.2
	11S2	04/03/84 to 07/03/84	2.8 ± 0.3
	15S4	04/03/84 to 07/03/84	2.9 ± 0.3
	9B1	04/03/84 to 07/03/84	1.5 ± 0.2
	1D2	04/03/84 to 07/03/84	2.6 ± 0.3
	3D1	04/03/84 to 07/03/84	4.2 ± 0.4
	12E1	04/03/84 to 07/03/84	3.2 ± 0.3
	7G1	04/03/84 to 07/03/84	2.9 ± 0.3
	12G1	04/03/84 to 07/03/84	4.0 ± 0.4
	7H1	04/02/84 to 07/02/84	4.0 ± 0.4

(1) Samples analyzed by NUS Corporation.

Table 14 a

Gross Alpha in Composited Air Particulate Filters
SSES REMP 1984

(Results in E-03 pCi/m^3 ± 2s)

Quarter	Station	Collection Period	Alpha Activity
3	2S2	07/03/84 to 10/02/84	2.6 ± 0.4
	5S4	07/03/84 to 10/02/84	3.3 ± 0.5
	11S2	07/03/84 to 10/02/84	3.3 ± 0.5
	15S4	07/03/84 to 10/02/84	2.6 ± 0.4
	9B1	07/03/84 to 10/02/84	3.6 ± 0.5
	1D2	07/03/84 to 10/02/84	2.9 ± 0.5
	3D1	07/03/84 to 10/02/84	2.4 ± 0.4
	12E1	07/03/84 to 10/02/84	2.6 ± 0.4
	7G1	07/03/84 to 10/02/84	2.6 ± 0.5
	12G1	07/03/84 to 10/02/84	2.2 ± 0.4
	7H1	07/02/84 to 10/02/84	3.1 ± 0.5
4	2S2	10/02/84 to 01/08/85	4.5 ± 0.5
	5S4	10/02/84 to 01/08/85	4.8 ± 0.5
	11S2	10/02/84 to 01/08/85	4.5 ± 0.5
	15S4	10/02/84 to 01/08/85	4.8 ± 0.5
	9B1	10/02/84 to 01/08/85	4.3 ± 0.5
	1D2	10/02/84 to 01/08/85	4.9 ± 0.5
	3D1	10/02/84 to 01/08/85	5.2 ± 0.6
	12E1	10/02/84 to 01/08/85	4.6 ± 0.5
	7G1	10/02/84 to 01/08/85	3.7 ± 0.4
	12G1	10/02/84 to 01/08/85	4.9 ± 0.5
	7H1	10/02/84 to 01/08/85	4.4 ± 0.6

(1) Samples analyzed by NUS Corporation.

Table 15
(Page 1 of 2)

Iodine-131 in Charcoal Cartridges
SSES REMP 1984

(Results in pCi/m3 ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
Jan (4)	01/03/84 to 01/10/84	LT 0.016[1]	LT 0.015	LT 0.014	LT 0.016	LT 0.017	LT 0.014	LT 0.014	LT 0.016	NS[2]	NS	
	01/03/84 to 01/09/84											LT 0.02
	01/10/84 to 01/17/84	LT 0.02	LT 0.018	LT 0.015 stop 1/18	LT 0.019	LT 0.02	LT 0.03	LT 0.019	LT 0.02			
	01/03/84 to 01/17/84									LT 0.011	LT 0.011	
	01/09/84 to 01/17/84											LT 0.02
	01/17/84 to 01/25/84	LT 0.02	LT 0.018	LT 0.017 start 1/18	LT 0.017	LT 0.02	LT 0.016	LT 0.013	LT 0.02	LT 0.013	LT 0.016	
	01/17/84 to 01/23/84											LT 0.02
	01/23/84 to 01/29/84											LT 0.03[3]
	01/25/84 to 01/31/84	LT 0.02	LT 0.010 stop 1/30	LT 0.02	LT 0.016	LT 0.02 stop 1/30	LT 0.011	LT 0.010	LT 0.017	LT 0.010	LT 0.010	
Feb (4)	01/29/84 to 02/03/84											LT 0.02
	01/31/84 to 02/14/84	LT 0.007	LT 0.008 start 1/30	LT 0.006	LT 0.005	LT 0.007 start 1/30	LT 0.009	LT 0.009	LT 0.011	LT 0.010	LT 0.012	
	02/03/84 to 02/13/84											LT 0.018
	02/13/84 to 02/21/84											LT 0.02
	02/14/84 to 02/21/84	LT 0.014	LT 0.017 start 2/15	LT 0.016	LT 0.013	LT 0.015	LT 0.016	LT 0.016	LT 0.018	LT 0.02	LT 0.02	
	02/21/84 to 02/28/84	LT 0.018	LT 0.012	LT 0.019	LT 0.015	LT 0.017	LT 0.016	LT 0.016	LT 0.015	LT 0.017	LT 0.016	
	02/21/84 to 02/27/84											LT 0.02
March (4)	02/27/84 to 03/07/84											LT 0.010
	02/28/84 to 03/06/84	LT 0.016	LT 0.012	LT 0.015	LT 0.010	LT 0.016	LT 0.02	LT 0.014	LT 0.014	LT 0.016	LT 0.015	
	03/06/84 to 03/13/84	LT 0.017	LT 0.010	LT 0.016	LT 0.02	LT 0.012	LT 0.02	LT 0.015	LT 0.011	NS	LT 0.010	LT 0.012
	03/13/84 to 03/20/84	LT 0.013	LT 0.017	LT 0.012	LT 0.010	LT 0.018	LT 0.011	LT 0.012	LT 0.016	LT 0.019 start 3/06	LT 0.017	
	03/13/84 to 03/21/84											LT 0.015
	03/20/84 to 03/27/84	LT 0.02	LT 0.018	LT 0.016	LT 0.02	LT 0.018	LT 0.018	LT 0.018	LT 0.018	LT 0.016	LT 0.016	
	03/21/84 to 03/27/84											LT 0.017
	03/27/84 to 04/02/84											LT 0.014
	03/27/84 to 04/03/84	LT 0.018	LT 0.014	LT 0.015	LT 0.018	LT 0.016	LT 0.016	LT 0.016	LT 0.014	LT 0.013	LT 0.013	

See footnotes at end of table.

Table 15
(Page 2 of 2)

Iodine-131 in Charcoal Cartridges
SSES REMP 1984

(Results in pCi/m3 ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
April (4)	04/03/84 to 04/09/84	LT 0.02	LT 0.02	LT 0.019	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.02	
	04/02/84 to 04/09/84											LT 0.006
	04/09/84 to 04/16/84	LT 0.018	LT 0.012	LT 0.015	LT 0.016	LT 0.016	LT 0.015	LT 0.016	LT 0.012	LT 0.011	LT 0.011	
	04/09/84 to 04/18/84											LT 0.016
	04/16/84 to 04/23/84	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.015	LT 0.02	LT 0.02	LT 0.015	LT 0.013	LT 0.014	
	04/18/84 to 04/25/84											LT 0.010
	04/23/84 to 04/30/84	LT 0.02	LT 0.02	LT 0.018	LT 0.02	LT 0.02	LT 0.019	LT 0.02	LT 0.019	LT 0.017	LT 0.017	
	04/25/84 to 05/01/84											LT 0.016
May (4)	04/30/84 to 05/07/84	LT 0.018	LT 0.016	LT 0.015	LT 0.014	LT 0.016	LT 0.018	LT 0.016	LT 0.016	LT 0.014	LT 0.013	
	05/01/84 to 05/08/84											LT 0.012
	05/07/84 to 05/15/84	LT 0.02	LT 0.018	LT 0.02	LT 0.02	LT 0.019	LT 0.02	LT 0.02	LT 0.019	LT 0.017	LT 0.018	
	05/08/84 to 05/15/84											LT 0.017
	05/15/84 to 05/22/84	LT 0.02	LT 0.02	LT 0.011	LT 0.010	LT 0.009	LT 0.02	LT 0.019	LT 0.02	LT 0.007	LT 0.010	LT 0.010
	05/22/84 to 05/29/84	LT 0.013	LT 0.013	LT 0.014	LT 0.014	LT 0.016	LT 0.012	LT 0.010	LT 0.02	LT 0.017	LT 0.018	LT 0.02
June (4)	05/29/84 to 06/05/84	LT 0.016	LT 0.016	LT 0.019	LT 0.017	LT 0.017	LT 0.018	LT 0.014	LT 0.014	LT 0.011	LT 0.016	LT 0.02
	06/05/84 to 06/12/84	LT 0.014	LT 0.013	LT 0.02	LT 0.015	LT 0.016	LT 0.017	LT 0.015	LT 0.017	LT 0.015	LT 0.018	LT 0.02
	06/12/84 to 06/19/84	LT 0.018	LT 0.02	LT 0.015	LT 0.016	LT 0.016	LT 0.02	LT 0.019	LT 0.02	LT 0.019	LT 0.019	LT 0.019
	06/19/84 to 06/26/84	LT 0.02	LT 0.016	LT 0.017	LT 0.02	LT 0.017	LT 0.016	LT 0.015	LT 0.019	LT 0.017	LT 0.018	LT 0.019
	06/26/84 to 07/02/84											LT 0.014
	06/26/84 to 07/03/84	LT 0.02	LT 0.019	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.019	LT 0.02	
July (4)	07/02/84 to 07/10/84											LT 0.016
	07/03/84 to 07/10/84	LT 0.02	LT 0.016	LT 0.013	LT 0.019	LT 0.012	LT 0.018	LT 0.018	LT 0.013	LT 0.014	LT 0.013	
	07/10/84 to 07/17/84	LT 0.014	LT 0.010	LT 0.011	LT 0.013	LT 0.016	LT 0.012	LT 0.012	LT 0.02	LT 0.02	LT 0.017	LT 0.02
	07/17/84 to 07/24/84	LT 0.013	LT 0.011	LT 0.010	LT 0.012	LT 0.018	LT 0.011	LT 0.011	LT 0.02	LT 0.02	LT 0.018	LT 0.02
	07/24/84 to 07/31/84	LT 0.02	LT 0.013	LT 0.02	LT 0.015	LT 0.017	LT 0.017	LT 0.015	LT 0.02	LT 0.02	LT 0.02	LT 0.012

(1) LT = Less Than
(2) NS = No Sample
(3) Lower sensitivity due to insufficient sample volume.
(4) Samples analyzed by NUS Corporation.

Table 15a

Iodine-131 in Charcoal Cartridges
SSES REMP 1984

(Results in pCi/m^3 ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1*
July	07/31/84 to 08/07/84	LT 0.02	LT 0.01	LT 0.008	LT 0.007	LT 0.01	LT 0.02	LT 0.02	LT 0.008	LT 0.004	LT 0.007	LT 0.01
August	08/07/84 to 08/14/84	LT 0.004	LT 0.003	LT 0.004	LT 0.004	LT 0.002	LT 0.002	LT 0.005	LT 0.005	LT 0.005	LT 0.004	LT 0.01
	08/14/84 to 08/21/84	LT 0.01	LT 0.02	LT 0.02	LT 0.01	LT 0.02	LT 0.01	LT 0.01	LT 0.02	LT 0.01	LT 0.009	LT 0.01
	08/21/84 to 08/28/84	LT 0.009	LT 0.02	LT 0.02	LT 0.009	LT 0.007	LT 0.007	LT 0.008	LT 0.01	LT 0.006	LT 0.003	LT 0.01
	08/28/84 to 09/04/84	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.007	LT 0.005	LT 0.005
September	09/04/84 to 09/11/84	LT 0.007	LT 0.008	LT 0.01	LT 0.008	LT 0.01	LT 0.009	LT 0.008	LT 0.009	LT 0.005	LT 0.004	LT 0.007
	09/11/84 to 09/19/84	LT 0.006	LT 0.007	LT 0.009	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.008	LT 0.004	LT 0.004	LT 0.006
	09/19/84 to 09/25/84	LT 0.009	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.009	LT 0.009	LT 0.01	LT 0.005	LT 0.005	LT 0.01
	09/25/84 to 10/02/84	LT 0.008	LT 0.01	LT 0.01	LT 0.009	LT 0.01	LT 0.008	LT 0.009	LT 0.01	LT 0.005	LT 0.005	LT 0.007
October	10/02/84 to 10/09/84	LT 0.008	LT 0.01	LT 0.01	LT 0.009	LT 0.01	LT 0.008	LT 0.01	LT 0.01	LT 0.005	LT 0.005	LT 0.01
	10/09/84 to 10/16/84	LT 0.006	LT 0.008	LT 0.01	LT 0.008	LT 0.01	LT 0.007	LT 0.008	LT 0.01	LT 0.005	LT 0.008	LT 0.006*
	10/16/84 to 10/23/84	LT 0.01	LT 0.009	LT 0.009	LT 0.01	LT 0.008	LT 0.02	LT 0.01	LT 0.009	LT 0.004	LT 0.005	LT 0.006*
	10/23/84 to 10/30/84	LT 0.009	LT 0.01	LT 0.01	LT 0.008	LT 0.01	LT 0.008	LT 0.009	LT 0.01	LT 0.005	LT 0.004	LT 0.005
	10/30/84 to 11/06/84	LT 0.008	LT 0.008	LT 0.009	LT 0.007	LT 0.007	LT 0.006	LT 0.007	LT 0.01	LT 0.004	LT 0.004	LT 0.007
November	11/06/84 to 11/13/84	LT 0.007	LT 0.009	LT 0.009	LT 0.007	LT 0.009	LT 0.007	LT 0.008	LT 0.01	LT 0.004	LT 0.004	LT 0.01
	11/13/84 to 11/20/84	LT 0.01	LT 0.002	LT 0.01	LT 0.01	LT 0.02	LT 0.01	LT 0.02	LT 0.02	LT 0.007	LT 0.007	LT 0.009
	11/20/84 to 11/27/84	LT 0.008	LT 0.01	LT 0.01	LT 0.008	LT 0.01	LT 0.008	LT 0.008	LT 0.01	LT 0.004	LT 0.005	LT 0.005
	11/27/84 to 12/04/84	LT 0.008	LT 0.009	LT 0.008	LT 0.008	LT 0.009	LT 0.007	LT 0.01	LT 0.009	LT 0.004	LT 0.004	LT 0.01
December	12/04/84 to 12/11/84	LT 0.008	LT 0.009	LT 0.01	LT 0.008	LT 0.009	LT 0.007	LT 0.01	LT 0.01	LT 0.004	LT 0.005	LT 0.01
	12/11/84 to 12/18/84	LT 0.008	LT 0.01	LT 0.009	LT 0.009	LT 0.009	LT 0.007	LT 0.009	LT 0.01	LT 0.004	LT 0.004	LT 0.01
	12/18/84 to 12/24/84	LT 0.009	LT 0.01	LT 0.01	LT 0.01	LT 0.01	LT 0.009	LT 0.01	LT 0.01	LT 0.005	LT 0.005	LT 0.02
	12/24/84 to 12/31/84	LT 0.007	LT 0.009	LT 0.01	LT 0.009	LT 0.01	LT 0.008	LT 0.008	LT 0.01	LT 0.005	LT 0.005	LT 0.02*
	12/31/84 to 01/08/85	LT 0.007	LT 0.008	LT 0.008	LT 0.007	LT 0.01	LT 0.007	LT 0.008	LT 0.009	LT 0.004	LT 0.004	LT 0.01*

* Collection periods for 7H1 are the same as above except for 10/09/84-10/17/84, 10/17/84-10/23/84, 12/24/84-01/02/85, 01/02/85-01/08/85.

TABLE 16

Gross Alpha and Gross Beta in Precipitation
SSES REMP 1984

(Results in Units of pCi/l ± 2s)

Quarter	Station	Collection Period	Alpha	Beta
1	12E1(2)	01/01/84 to 03/20/84	1.5 ± 0.7	5.3 ± 1.2
(3)	5S4(2)	01/01/84 to 03/20/84	LT 0.7(1)	4.9 ± 1.2
	11S2(2)	01/01/84 to 03/20/84	1.0 ± 0.7	3.0 ± 1.1
	1D2	11/14/84 to 03/20/84	0.65 ± 0.58	3.6 ± 1.2
	12G1	02/22/84 to 03/20/84	1.8 ± 0.9	7.4 ± 1.4
	9B1(2)	01/01/84 to 03/20/84	0.58 ± 0.57	7.2 ± 1.3
	2S2	11/14/83 to 03/20/84	LT 0.7	5.7 ± 1.3
	3D1	11/14/83 to 03/20/84	0.58 ± 0.56	3.9 ± 1.2
	15S4	11/14/83 to 03/20/84	0.64 ± 0.58	3.3 ± 1.2
	7G1(2)	01/01/84 to 03/20/84	0.78 ± 0.61	6.5 ± 1.3
2	12E1	03/20/84 to 07/10/84	LT 1.3	LT 4
(3)	5S4	03/20/84 to 07/10/84	0.94 ± 0.66	2.7 ± 1.3
	11S2	03/20/84 to 07/10/84	1.4 ± 0.9	2.6 ± 1.3
	1D2	03/20/84 to 07/10/84	LT 1.3	5.2 ± 2.6
	12G1	03/20/84 to 07/10/84	0.76 ± 0.74	3.0 ± 1.4
	9B1	03/20/84 to 07/10/84	0.71 ± 0.61	3.5 ± 1.4
	2S2	03/20/84 to 07/10/84	1.1 ± 0.8	2.8 ± 1.4
	3D1	03/20/84 to 07/10/84	LT 0.8	2.4 ± 1.3
	15S4	03/20/84 to 07/10/84	LT 3	3.0 ± 1.5
	7G1	03/20/84 to 07/10/84	LT 0.8	4.4 ± 1.4

(1) LT = Less Than
(2) Snow Sample
(3) Samples analyzed by NUS.
(4) Split Sample

Table 16a

Gross Alpha and Gross Beta in Precipitation
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Quarter	Station	Collection Period	Alpha	Beta
2	12E1	04/09/84 to 07/10/84	LT 0.5	2.9 ± 0.7
	5S4	04/09/84 to 07/10/84	0.66 ± 0.47	4.2 ± 0.7
	11S2	04/09/84 to 07/10/84	LT 0.5	2.7 ± 0.6
	1D2	04/09/84 to 07/10/84	LT 0.5	3.8 ± 0.7
	12G1	04/09/84 to 07/10/84	0.53 ± 0.45	3.9 ± 0.7
	9B1	04/09/84 to 07/10/84	LT 0.5	3.1 ± 0.7
	2S2	04/09/84 to 07/10/84	0.61 ± 0.46	3.8 ± 0.7
	3D1	04/09/84 to 07/10/84	0.49 ± 0.42	4.1 ± 0.7
	15S4	04/09/84 to 07/10/84	0.55 ± 0.44	3.5 ± 0.7
	7G1	04/09/84 to 07/10/84	LT 0.5	3.1 ± 0.7
3	12E1	07/10/84 to 10/02/84	LT 0.5	3.7 ± 0.7
	5S4	07/10/84 to 10/02/84	0.59 ± 0.49	4.4 ± 0.8
	11S2	07/10/84 to 10/02/84	0.93 ± 0.55	3.1 ± 0.7
	1D2	07/10/84 to 10/03/84	1.0 ± 0.6	5.3 ± 0.8
	12G1	07/10/84 to 10/03/84	1.1 ± 0.6	4.9 ± 0.8
	9B1	07/10/84 to 10/02/84	0.94 ± 0.55	4.0 ± 0.8
	2S2	07/10/84 to 10/02/84	1.4 ± 0.7	5.9 ± 0.9
	3D1	07/10/84 to 10/02/84	LT 0.6	3.9 ± 0.8
	15S4	07/10/84 to 10/02/84	0.76 ± 0.53	4.8 ± 0.8
	7G1	07/10/84 to 10/02/84	0.81 ± 0.54	4.8 ± 0.8
4	12E1	10/02/84 to 01/08/85	LT 0.7	2.7 ± 0.8
	5S4	10/02/84 to 01/08/85	LT 0.7	1.4 ± 0.7
	11S2	10/02/84 to 01/08/85	LT 0.9	3.0 ± 0.9
	1D2(4)	10/03/84 to 01/08/85	LT 0.7	1.6 ± 0.8
	12G1	10/03/84 to 01/08/85	LT 0.8	2.8 ± 0.9
	9B1	10/02/84 to 01/08/85	LT 0.6	1.5 ± 0.7
	2S2	10/02/84 to 01/08/85	LT 0.7	2.5 ± 0.8
	3D1	10/02/84 to 01/08/85	LT 0.7	1.7 ± 0.8
	15S4	10/02/84 to 01/08/85	LT 0.7	2.1 ± 0.8
	7G1	10/02/84 to 01/08/85	1.2 ± 0.8	3.9 ± 0.9
	1D2(4)	10/03/84 to 01/08/85	LT 0.5	2.2 ± 0.6

(1) LT = Less Than
(2) Snow Sample
(3) Samples analyzed by NUS.
(4) Split Sample

Table 17

Gamma Spectrometry of Precipitation
SSES REMP 1984

(Results in pCi/l ± 2s)

Quarter	Collection Period	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
1	11/14/83 to 03/20/84	1D2	LT 12[1]	LT 3	LT 4	LT 4	LT 4	LT 7	LT 6	LT 4	LT 4	LT 8	LT 6	ND[2]
(3)	01/01/84 to 03/20/84 (5)	11S2	LT 13	LT 3	LT 3	LT 3	LT 3	LT 6	LT 7	LT 3	LT 3	LT 7	LT 5	31 ± 14
	01/01/84 to 03/20/84 (5)	5S4	LT 15	LT 3	LT 4	LT 3	LT 3	LT 7	LT 9	LT 3	LT 3	LT 7	LT 6	39 ± 15
	02/22/84 to 03/20/84	12G1	LT 11	LT 3	LT 3	LT 2	LT 3	LT 6	LT 5	LT 3	LT 3	LT 6	LT 5	53 ± 14
	11/14/83 to 03/20/84	15S4	LT 20	LT 6	LT 7	LT 6	LT 6	LT 12	LT 12	LT 6	LT 6	LT 12	LT 10	ND
	01/01/84 to 03/20/84 (5)	9B1	LT 16	LT 3	LT 4	LT 3	LT 3	LT 7	LT 10	LT 3	LT 3	LT 8	LT 6	52 ± 15
	01/01/84 to 03/20/84 (5)	7G1	LT 14	LT 3	LT 3	LT 3	LT 3	LT 6	LT 8	LT 3	LT 3	LT 6	LT 5	44 ± 13
	11/14/83 to 03/20/84	2S2	LT 12	LT 3	LT 4	LT 4	LT 4	LT 7	LT 6	LT 4	LT 3	LT 8	LT 6	34 ± 18
	01/01/84 to 03/20/84 (5)	12E1	LT 12	LT 4	LT 4	LT 4	LT 4	LT 8	LT 7	LT 4	LT 4	LT 8	LT 6	26 ± 19
	11/14/83 to 03/20/84	3D1	LT 12	LT 4	LT 4	LT 4	LT 4	LT 8	LT 7	LT 4	LT 4	LT 8	LT 6	ND
2	03/20/84 to 07/10/84	1D2	LT 11	LT 2	LT 2	LT 1.9	LT 2	LT 5	LT 6	LT 2	LT 2	LT 5	LT 4	20 ± 9
(3)	03/20/84 to 07/10/84	11S2	LT 8	LT 1.4	LT 1.7	LT 1.3	LT 1.4	LT 3	LT 4	LT 1.3	LT 1.4	LT 3	LT 2	24 ± 7
	03/20/84 to 07/10/84	5S4	LT 9	LT 2	LT 3	LT 1.9	LT 1.9	LT 4	LT 6	LT 2	LT 2	LT 5	LT 4	28 ± 9
	03/20/84 to 07/10/84	12G1	LT 8	LT 1.5	LT 1.7	LT 1.4	LT 1.4	LT 3	LT 5	LT 1.6	LT 1.6	LT 3	LT 3	29 ± 8
	03/20/84 to 07/10/84	15S4	LT 7	LT 1.6	LT 1.6	LT 1.4	LT 1.4	LT 3	LT 4	LT 1.4	LT 1.5	LT 3	LT 3	21 ± 7
	03/20/84 to 07/10/84	9B1	LT 7	LT 1.5	LT 1.5	LT 1.3	LT 1.5	LT 3	LT 4	LT 1.5	LT 1.5	LT 3	LT 3	26 ± 7
	03/20/84 to 07/10/84	7G1	LT 7	LT 1.7	LT 1.8	LT 1.6	LT 1.5	LT 3	LT 4	LT 1.6	LT 1.6	LT 3	LT 3	26 ± 8
	03/20/84 to 07/10/84	2S2	LT 6	LT 1.6	LT 1.6	LT 1.3	LT 1.4	LT 3	LT 4	LT 1.4	LT 1.6	LT 3	LT 3	16 ± 7
	03/20/84 to 07/10/84	12E1	LT 9	LT 1.8	LT 1.7	LT 1.6	LT 1.6	LT 4	LT 4	LT 1.7	LT 1.8	LT 4	LT 3	17 ± 9
	03/20/84 to 07/10/84	3D1	LT 6	LT 1.4	LT 1.6	LT 1.3	LT 1.4	LT 3	LT 4	LT 1.2	LT 1.4	LT 3	LT 2	14 ± 7

(1) LT = Less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS.
(4) Split analysis
(5) Snow Sample

Table 17 a
Gamma Spectrometry of Precipitation
SSES REMP 1984

(Results in pCi/ℓ ± 2s)

Quarter	Collection Period	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
2	04/09/84 to 07/10/84	1D2	LT 30	LT 3	LT 3	LT 3	LT 3	LT 8	LT 10	LT 3	LT 4	LT 7	LT 8	LT 40
	04/09/84 to 07/10/84	11S2	LT 30	LT 4	LT 4	LT 4	LT 4	LT 9	LT 10	LT 3	LT 4	LT 8	LT 9	LT 50
	04/09/84 to 07/10/84	5S4	LT 30	LT 4	LT 3	LT 4	LT 3	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8	LT 40
	04/09/84 to 07/10/84	12G1	LT 40	LT 4	LT 3	LT 3	LT 4	LT 9	LT 20	LT 3	LT 4	LT 7	LT 9	LT 50
	04/09/84 to 07/10/84	15S4	LT 30	LT 3	LT 3	LT 3	LT 3	LT 7	LT 10	LT 3	LT 3	LT 6	LT 6	LT 30
	04/09/84 to 07/10/84	9B1	LT 40	LT 4	LT 3	LT 4	LT 4	LT 8	LT 10	LT 4	LT 4	LT 8	LT 10	LT 50
	04/09/84 to 07/10/84	7G1	LT 30	LT 3	LT 3	LT 3	LT 4	LT 8	LT 10	LT 3	LT 4	LT 6	LT 7	LT 40
	04/09/84 to 07/10/84	2S2	LT 30	LT 3	LT 3	LT 3	LT 4	LT 7	LT 10	LT 3	LT 4	LT 7	LT 8	LT 40
	04/09/84 to 07/10/84	12E1	LT 30	LT 4	LT 4	LT 4	LT 4	LT 9	LT 20	LT 3	LT 5	LT 8	LT 9	LT 50
	04/09/84 to 07/10/84	3D1	LT 30	LT 4	LT 3	LT 4	LT 4	LT 9	LT 10	LT 3	LT 4	LT 7	LT 8	LT 40
3	07/10/84 to 10/03/84	1D2	LT 100	LT 7	LT 5	LT 6	LT 6	LT 20	LT 40	LT 6	LT 7	LT 10	LT 20	LT 90
	07/10/84 to 10/02/84	11S2	LT 60	LT 4	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 6	LT 7	LT 10	LT 50
	07/10/84 to 10/02/84	5S4	LT 60	LT 4	LT 3	LT 4	LT 3	LT 10	LT 20	LT 3	LT 5	LT 7	LT 9	LT 50
	07/10/84 to 10/03/84	12G1	LT 70	LT 4	LT 4	LT 4	LT 3	LT 10	LT 30	LT 3	LT 5	LT 7	LT 10	LT 50
	07/10/84 to 10/02/84	15S4	LT 70	LT 4	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 5	LT 9	LT 10	LT 60
	07/10/84 to 10/02/84	9B1	LT 70	LT 5	LT 3	LT 4	LT 4	LT 10	LT 30	LT 4	LT 5	LT 9	LT 10	LT 60
	07/10/84 to 10/02/84	7G1	LT 90	LT 5	LT 4	LT 4	LT 4	LT 10	LT 40	LT 4	LT 6	LT 8	LT 10	LT 60
	07/10/84 to 10/02/84	2S2	LT 60	LT 5	LT 4	LT 4	LT 4	LT 10	LT 20	LT 4	LT 5	LT 9	LT 9	LT 50
	07/10/84 to 10/02/84	12E1	LT 70	LT 5	LT 4	LT 4	LT 4	LT 10	LT 30	LT 4	LT 6	LT 9	LT 10	LT 60
	07/10/84 to 10/02/84	3D1	LT 60	LT 4	LT 3	LT 4	LT 4	LT 10	LT 30	LT 4	LT 5	LT 8	LT 10	LT 50
4	10/03/84 to 01/08/85	1D2 (4)	LT 10	LT 3	LT 3	LT 4	LT 5	LT 7	LT 5	LT 4	LT 4	LT 7	LT 7	LT 30
	10/02/84 to 01/08/85	11S2	LT 10	LT 4	LT 5	LT 4	LT 4	LT 7	LT 6	LT 4	LT 4	LT 10	LT 8	LT 40
	10/02/84 to 01/08/85	5S4	LT 20	LT 5	LT 5	LT 6	LT 6	LT 10	LT 7	LT 5	LT 6	LT 10	LT 10	LT 50
	10/03/84 to 01/08/85	12G1	LT 30	LT 7	LT 7	LT 8	LT 8	LT 10	LT 10	LT 7	LT 7	LT 10	LT 10	LT 70
	10/02/84 to 01/08/85	15S4	LT 20	LT 6	LT 7	LT 7	LT 7	LT 10	LT 8	LT 6	LT 6	LT 10	LT 10	LT 70
	10/02/84 to 01/08/85	9B1	LT 10	LT 4	LT 5	LT 4	LT 5	LT 8	LT 5	LT 4	LT 4	LT 8	LT 8	LT 40
	10/02/84 to 01/08/85	7G1	LT 10	LT 4	LT 4	LT 4	LT 4	LT 7	LT 5	LT 4	LT 4	LT 8	LT 8	LT 40
	10/02/84 to 01/08/85	2S2	LT 10	LT 3	LT 3	LT 3	LT 3	LT 6	LT 4	LT 3	LT 3	LT 5	LT 6	LT 30
	10/02/84 to 01/08/85	12E1	LT 10	LT 4	LT 4	LT 4	LT 4	LT 8	LT 5	LT 4	LT 4	LT 7	LT 8	LT 40
	10/02/84 to 01/08/85	3D1	LT 10	LT 4	LT 5	LT 4	LT 5	LT 8	LT 5	LT 4	LT 4	LT 9	LT 9	LT 40
	10/03/84 to 01/08/85	1D2(4)	LT 10	LT 4	LT 4	LT 4	LT 4	LT 7	LT 6	LT 4	LT 4	LT 8	LT 7	LT 40

(1) LT = less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS
(4) Split analysis
(5) Snow Sample

TABLE 18

Tritium in Precipitation
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Quarter	Station	Collection Period	Tritium Activity
1 (4)	12E1 (2)	01/01/84 to 03/20/84	LT 300(1)
	5S4 (2)	01/01/84 to 03/20/84	LT 300
	11S2 (2)	01/01/84 to 03/20/84	LT 300
	1D2	11/14/83 to 03/20/84	LT 300
	12G1	02/22/84 to 03/20/84	2500 ± 300
	9B1 (2)	01/01/84 to 03/20/84	LT 300
	2S2	11/14/83 to 03/20/84	LT 300
	3D1	11/14/83 to 03/20/84	LT 300
	15S4	11/14/83 to 03/20/84	LT 300
	7G1 (2)	01/01/84 to 03/20/84	LT 300
2 (4)	12E1	03/20/84 to 07/10/84	590 ± 190
	5S4	03/20/84 to 07/10/84	330 ± 200
	11S2	03/20/84 to 07/10/84	LT 300
	1D2	03/20/84 to 07/10/84	LT 300
	12G1	03/20/84 to 07/10/84	LT 300
	9B1	03/20/84 to 07/10/84	LT 300
	2S2	03/20/84 to 07/10/84	LT 300
	3D1	03/20/84 to 07/10/84	LT 300
	15S4	03/20/84 to 07/10/84	310 ± 190
	7G1	03/20/84 to 07/10/84	230 ± 180

(1) LT = Less Than
(2) Snow sample
(3) Activity verified by reanalysis
(4) Samples analyzed by NUS
(5) Split Sample

Table 18a

Tritium in Precipitation
SSES REMP 1984
(Results in pCi/ℓ ± 2s)

Quarter	Station	Collection Period	Tritium
2	12E1	04/09/84 to 07/10/84	73 ± 33
	5S4	04/09/84 to 07/10/84	LT 80
	11S2	04/09/84 to 07/10/84	LT 90
	1D2	04/09/84 to 07/10/84	LT 80
	12G1	04/09/84 to 07/10/84	110 ± 50
	9B1	04/09/84 to 07/10/84	LT 100
	2S2	04/09/84 to 07/10/84	LT 90
	3D1	04/09/84 to 07/10/94	LT 80
	15S4	04/09/84 to 07/10/84	LT 70
	7G1	04/09/84 to 07/10/84	LT 80
3	12E1	07/10/84 to 10/02/84	120 ± 40
	5S4	07/10/84 to 10/02/84	90 ± 33
	11S2	07/10/84 to 10/02/84	170 ± 30
	1D2	07/10/84 to 10/03/84	100 ± 40
	12G1	07/10/84 to 10/03/84	130 ± 40
	9B1	07/10/84 to 10/02/84	120 ± 30
	2S2	07/10/84 to 10/02/84	110 ± 40
	3D1	07/10/84 to 10/02/84	120 ± 40
	15S4	07/10/84 to 10/02/84	190 ± 30
	7G1	07/10/84 to 10/02/84	110 ± 40
4	12E1	10/02/84 to 10/08/85	73 ± 35
	5S4	10/02/84 to 01/08/85	LT 60
	11S2	10/02/84 to 01/08/85	81 ± 39
	1D2 (5)	10/03/84 to 01/08/85	77 ± 40
	12G1	10/03/84 to 01/08/85	100 ± 40
	9B1	10/02/84 to 01/08/85	55 ± 28
	2S2	10/02/84 to 01/08/85	78 ± 39
	3D1	10/02/84 to 01/08/85	61 ± 35
	15S4	10/02/84 to 01/08/85	61 ± 35
	7G1	10/02/84 to 01/08/85	LT 60
	1D2 (5)	10/03/84 to 01/08/85	110 ± 40

(1) LT = Less Than
(2) Snow sample
(3) Activity verified by reanalysis.
(4) Samples analyzed by NUS.
(5) Split sample

Table 19
(Page 1 of 4)

Gamma Spectrometry of Milk
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
January (4)	01/18/84	12B2	LT 15[1]	LT 5	LT 6	LT 4	LT 5	LT 14	1300 ± 200	LT 8	LT 5	LT 5	LT 13	LT 9
	01/18/84	5E1	LT 11	LT 4	LT 5	LT 4	LT 4	LT 10	1200 ± 200	LT 5	LT 4	LT 4	LT 10	LT 7
	01/17/84	13E3	LT 10	LT 3	LT 4	LT 3	LT 4	LT 9	1300 ± 200	LT 5	LT 3	LT 3	LT 9	LT 6
	01/17/84	10G1	LT 10	LT 3	LT 3	LT 2	LT 3	LT 8	2400 ± 300	LT 5	LT 3	LT 3	LT 8	LT 5
	01/17/84	12B3	LT 13	LT 4	LT 4	LT 3	LT 4	LT 9	1200 ± 200	LT 6	LT 4	LT 4	LT 9	LT 6
	01/18/84	6C1	LT 15	LT 5	LT 6	LT 4	LT 5	LT 12	1300 ± 200	LT 9	LT 5	LT 5	LT 12	LT 8
	01/18/84	10D1	LT 13	LT 4	LT 5	LT 4	LT 3	LT 10	1200 ± 200	LT 6	LT 4	LT 4	LT 10	LT 7
	01/17/84	12D2	LT 12	LT 3	LT 4	LT 3	LT 3	LT 8	1400 ± 200	LT 6	LT 3	LT 3	LT 8	LT 6
	01/18/84	12B2[2]	LT 14	LT 4	LT 5	LT 4	LT 5	LT 9	1500 ± 200	LT 6	LT 4	LT 4	LT 10	LT 8
February (4)	02/17/84	12B2	LT 11	LT 4	LT 4	LT 4	LT 4	LT 8	1500 ± 200	LT 5	LT 4	LT 4	LT 9	LT 7
	02/16/84	5E1	LT 15	LT 4	LT 5	LT 4	LT 5	LT 9	1500 ± 200	LT 6	LT 4	LT 4	LT 10	LT 8
	02/17/84	13E3	LT 6	LT 2	LT 3	LT 2	LT 3	LT 6	1400 ± 200	LT 3	LT 2	LT 2	LT 6	LT 4
	02/16/84	10G1	LT 10	LT 4	LT 5	LT 3	LT 4	LT 10	1300 ± 200	LT 6	LT 4	LT 4	LT 10	LT 7
	02/17/84	12B3	LT 14	LT 6	LT 7	LT 5	LT 6	LT 13	1300 ± 200	LT 8	LT 6	LT 6	LT 14	LT 10
	02/16/84	6C1	LT 6	LT 2	LT 3	LT 2	LT 2	LT 6	1400 ± 200	LT 2	LT 2	LT 2	LT 6	LT 4
	02/16/84	10D1	LT 6	LT 2	LT 2	LT 1.9	LT 2	LT 5	1300 ± 200	LT 3	LT 2	LT 1.9	LT 5	LT 3
	02/16/84	12D2	LT 7	LT 3	LT 3	LT 2	LT 3	LT 6	1300 ± 200	LT 3	LT 2	LT 2	LT 7	LT 5
March (4)	03/15/84	12B2	LT 15	LT 3	LT 3	LT 2	LT 3	LT 8	1400 ± 200	LT 7	LT 3	LT 3	LT 7	LT 5
	03/14/84	5E1	LT 15	LT 5	LT 5	LT 4	LT 5	LT 11	1200 ± 200	LT 7	LT 5	LT 4	LT 11	LT 7
	03/15/84	13E3	LT 14	LT 4	LT 6	LT 4	LT 4	LT 12	1300 ± 200	LT 8	LT 5	LT 4	LT 12	LT 8
	03/14/84	10G1	LT 13	LT 4	LT 5	LT 4	LT 4	LT 10	1300 ± 200	LT 6	LT 4	LT 4	LT 10	LT 7
	03/14/84	12B3	LT 13	LT 4	LT 4	LT 3	LT 4	LT 8	1300 ± 200	LT 6	LT 4	LT 4	LT 9	LT 7
	03/14/84	6C1	LT 13	LT 5	LT 6	LT 4	LT 5	LT 13	1300 ± 200	LT 8	LT 5	LT 5	LT 12	LT 8
	03/14/84	10D1	LT 15	LT 5	LT 6	LT 4	LT 5	LT 13	1300 ± 200	LT 7	LT 5	LT 5	LT 12	LT 9
	03/14/84	12D2[2]	LT 14	LT 5	LT 6	LT 4	LT 5	LT 12	1300 ± 200	LT 7	LT 4	LT 5	LT 12	LT 8
	03/14/84	6C1[2]	LT 15	LT 4	LT 5	LT 4	LT 5	LT 11	1500 ± 200	LT 6	LT 4	LT 4	LT 11	LT 8
	03/14/84	12B3[2]	LT 15	LT 4	LT 6	LT 4	LT 5	LT 12	1200 ± 200	LT 8	LT 5	LT 5	LT 12	LT 8

Note: See footnotes at end of table.

Table 19
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Gamma Spectrometry of Milk
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
April (4)	04/20/84	12B2	LT 14	LT 4	LT 5	LT 4	LT 4	LT 11	1300 ± 200	LT 8	LT 4	LT 4	LT 11	LT 8
	04/20/84	5E1	LT 19	LT 5	LT 6	LT 5	LT 5	LT 13	1300 ± 200	LT 9	LT 5	LT 5	LT 13	LT 19
	04/20/84	13E3	LT 16	LT 5	LT 6	LT 4	LT 5	LT 12	1400 ± 200	LT 8	LT 5	LT 5	LT 13	LT 8
	04/10/84	10G1	LT 11	LT 4	LT 4	LT 3	LT 4	LT 9	1300 ± 200	LT 5	LT 4	LT 4	LT 9	LT 6
	04/11/84	12B3	LT 13	LT 4	LT 5	LT 4	LT 5	LT 12	1100 ± 200	LT 7	LT 5	LT 4	LT 11	LT 8
	04/11/84	6C1	LT 16	LT 6	LT 7	LT 5	LT 6	LT 14	1400 ± 200	LT 8	LT 5	LT 6	LT 14	LT 9
	04/11/84	10D1 (2)	LT 11	LT 4	LT 5	LT 4	LT 4	LT 10	1300 ± 200	LT 5	LT 4	LT 4	LT 10	LT 7
	04/11/84	10D1	LT 12	LT 5	LT 6	LT 4	LT 5	LT 11	1200 ± 200	LT 6	LT 4	LT 4	LT 11	LT 8
	04/11/84	12D2 (2)	LT 11	LT 4	LT 4	LT 4	LT 4	LT 9	1400 ± 200	LT 5	LT 4	LT 4	LT 9	LT 7
	04/11/84	12D2	LT 14	LT 5	LT 6	LT 4	LT 5	LT 13	1300 ± 200	LT 7	LT 5	LT 5	LT 12	LT 9
	04/30/84	12B2	LT 6	LT 2	LT 2	LT 1.9	LT 2	LT 5	1300 ± 200	LT 3	LT 2	LT 2	LT 5	LT 4
	04/30/84	5E1	LT 7	LT 2	LT 3	LT 2	LT 2	LT 6	1400 ± 200	LT 3	LT 2	LT 2	LT 6	LT 4
	04/30/84	13E3	LT 15	LT 5	LT 6	LT 5	LT 6	LT 14	1300 ± 200	LT 8	LT 6	LT 6	LT 13	LT 10
	04/26/84	10G1	LT 14	LT 4	LT 5	LT 4	LT 5	LT 11	1300 ± 200	LT 7	LT 5	LT 4	LT 11	LT 8
May (4)	05/15/84	12B2	LT 12	LT 4	LT 5	LT 3	LT 4	LT 9	1300 ± 200	LT 7	LT 3	LT 3	LT 9	LT 6
	05/14/84	5E1	LT 15	LT 4	LT 5	LT 4	LT 4	LT 11	1300 ± 200	LT 8	LT 4	LT 4	LT 11	LT 8
	05/15/84	13E3	LT 13	LT 4	LT 4	LT 3	LT 4	LT 10	1300 ± 200	LT 7	LT 4	LT 4	LT 10	LT 6
	05/14/84	10G1	LT 15	LT 3	LT 4	LT 3	LT 3	LT 9	1200 ± 200	LT 8	LT 3	LT 3	LT 8	LT 6
	05/15/84	12B3	LT 15	LT 4	LT 5	LT 3	LT 4	LT 10	1200 ± 200	LT 7	LT 4	LT 4	LT 10	LT 7
	05/14/84	6C1	LT 14	LT 4	LT 4	LT 3	LT 3	LT 9	1400 ± 200	LT 7	LT 3	LT 3	LT 8	LT 6
	05/14/84	10D1	LT 10	LT 3	LT 3	LT 1.9	LT 2	LT 7	1400 ± 200	LT 5	LT 2	LT 2	LT 6	LT 4
	05/14/84	12D2 (2)	LT 15	LT 4	LT 4	LT 4	LT 4	LT 9	1400 ± 200	LT 6	LT 4	LT 4	LT 9	LT 7
	05/15/84	13E3	LT 13	LT 4	LT 4	LT 3	LT 4	LT 10	1300 ± 200	LT 7	LT 4	LT 4	LT 9	LT 7
	05/28/84	12B2	LT 15	LT 5	LT 6	LT 4	LT 5	LT 12	1200 ± 200	LT 7	LT 4	LT 4	LT 12	LT 8
	05/28/84	5E1	LT 14	LT 4	LT 5	LT 4	LT 4	LT 12	1300 ± 200	LT 7	LT 4	LT 4	LT 12	LT 8
	05/28/84	13E3	LT 11	LT 3	LT 4	LT 3	LT 3	LT 8	1200 ± 200	LT 6	LT 3	LT 3	LT 8	LT 6
	05/28/84	10G1	LT 12	LT 4	LT 5	LT 3	LT 4	LT 10	1300 ± 200	LT 6	LT 4	LT 4	LT 10	LT 7

Note: See footnotes at end of table.

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Gamma Spectrometry of Milk
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
June (4)	06/11/84	12B2	LT 15	LT 5	LT 6	LT 5	LT 5	LT 12	1200 ± 200	LT 7	LT 5	LT 5	LT 13	LT 9
	06/11/84	5E1	LT 15	LT 5	LT 6	LT 5	LT 6	LT 12	1300 ± 200	LT 6	LT 5	LT 5	LT 14	LT 9
	06/11/84	13E3	LT 14	LT 6	LT 7	LT 5	LT 6	LT 15	1300 ± 200	LT 8	LT 5	LT 6	LT 14	LT 9
	06/11/84	10G1	LT 15	LT 5	LT 5	LT 4	LT 5	LT 11	1300 ± 200	LT 7	LT 4	LT 4	LT 11	LT 8
	06/11/84	12B3	LT 14	LT 5	LT 5	LT 4	LT 4	LT 12	1200 ± 200	LT 7	LT 4	LT 4	LT 11	LT 8
	06/11/84	6C1	LT 14	LT 4	LT 5	LT 4	LT 4	LT 9	1500 ± 200	LT 6	LT 4	LT 4	LT 10	LT 7
	06/11/84	10D1	LT 14	LT 5	LT 5	LT 4	LT 5	LT 11	1200 ± 200	LT 6	LT 5	LT 5	LT 11	LT 8
	06/11/84	12D2(2)	LT 15	LT 6	LT 7	LT 5	LT 6	LT 16	1400 ± 200	LT 9	LT 6	LT 5	LT 14	LT 10
	06/11/84	10G1	LT 14	LT 4	LT 4	LT 4	LT 4	LT 9	1300 ± 200	LT 6	LT 4	LT 7	LT 9	LT 7
	06/25/84	12B2	LT 15	LT 6	LT 8	LT 5	LT 6	LT 14	1300 ± 200	LT 7	LT 6	LT 6	LT 14	LT 10
	06/25/84	5E1	LT 13	LT 5	LT 6	LT 4	LT 5	LT 11	1300 ± 200	LT 6	LT 5	LT 5	LT 12	LT 8
	06/25/84	13E3	LT 14	LT 5	LT 8	LT 5	LT 6	LT 14	1400 ± 200	LT 7	LT 6	LT 5	LT 14	LT 10
	06/25/84	10G1	LT 11	LT 4	LT 6	LT 4	LT 5	LT 11	1400 ± 200	LT 6	LT 5	LT 4	LT 12	LT 8
July (4)	07/09/84	12B2	LT 13	LT 5	LT 7	LT 4	LT 5	LT 13	1200 ± 200	LT 7	LT 5	LT 5	LT 13	LT 9
	07/09/84	5E1	LT 14	LT 4	LT 5	LT 4	LT 4	LT 10	1500 ± 200	LT 7	LT 4	LT 4	LT 10	LT 7
	07/09/84	13E3	LT 15	LT 6	LT 6	LT 5	LT 5	LT 13	1400 ± 200	LT 7	LT 5	LT 5	LT 14	LT 9
	07/09/84	10G1	LT 15	LT 4	LT 5	LT 4	LT 4	LT 12	1200 ± 200	LT 8	LT 4	LT 4	LT 12	LT 8
	07/09/84	12B3	LT 14	LT 5	LT 5	LT 5	LT 5	LT 12	1200 ± 200	LT 6	LT 5	LT 5	LT 13	LT 9
	07/09/84	6C1	LT 13	LT 4	LT 4	LT 3	LT 3	LT 10	1300 ± 200	LT 6	LT 4	LT 4	LT 9	LT 6
	07/09/84	10D1	LT 15	LT 4	LT 5	LT 4	LT 4	LT 11	1200 ± 200	LT 7	LT 4	LT 4	LT 11	LT 8
	07/09/84	12D2	LT 12	LT 4	LT 5	LT 3	LT 4	LT 10	1500 ± 200	LT 7	LT 4	LT 4	LT 10	LT 7
	07/23/84	12B2	LT 14	LT 5	LT 5	LT 4	LT 4	LT 11	1400 ± 200	LT 8	LT 4	LT 4	LT 12	LT 8
	07/23/84	5E1	LT 15	LT 4	LT 5	LT 4	LT 5	LT 11	1200 ± 200	LT 8	LT 4	LT 4	LT 11	LT 7
	07/23/84	13E3	LT 12	LT 4	LT 4	LT 3	LT 4	LT 10	1400 ± 200	LT 7	LT 4	LT 4	LT 10	LT 7
	07/23/84	10G1	LT 14	LT 5	LT 5	LT 4	LT 4	LT 11	1300 ± 200	LT 7	LT 4	LT 4	LT 11	LT 7

Note: See footnotes at end of table.

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Gamma Spectrometry of Milk
SSES REMP 1984

(Results in pCi/l ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
August (4)	08/06/84	12B2	LT 14	LT 3	LT 3	LT 2	LT 2	LT 7	1300 ± 200	LT 7	LT 2	LT 3	LT 7	LT 5
	08/06/84	5E1	LT 15	LT 3	LT 3	LT 2	LT 3	LT 8	1200 ± 200	LT 7	LT 3	LT 3	LT 7	LT 6
	08/06/84	13E3	LT 20(3)	LT 2	LT 2	LT 1.6	LT 1.8	LT 6	1400 ± 200	LT 10	LT 1.8	LT 2	LT 5	LT 4
	08/06/84	10G1	LT 14	LT 3	LT 3	TL 2	LT 3	LT 8	1200 ± 200	LT 8	LT 2	LT 3	LT 6	LT 5
	08/06/84	12B3	LT 15	LT 3	LT 3	LT 2	LT 2	LT 8	1200 ± 200	LT 8	LT 2	LT 3	LT 6	LT 5
	08/06/84	6C1	LT 15	LT 3	LT 3	LT 2	LT 3	LT 7	1500 ± 200	LT 7	LT 2	LT 3	LT 6	LT 5
	08/06/84	10D1	LT 15	LT 1.7	LT 1.7	LT 1.3	LT 1.4	LT 5	1400 ± 200	LT 7	LT 1.4	LT 1.8	LT 4	LT 3
	08/06/84	12D2	LT 15	LT 2	LT 2	LT 1.8	LT 2	LT 6	1200 ± 200	LT 7	LT 1.9	LT 2	LT 4	LT 4
	08/06/84	12B2(2)	LT 14	LT 2	LT 2	LT 1.5	LT 1.7	LT 6	1300 ± 200	LT 7	LT 1.7	LT 2	LT 5	LT 4

(1) LT = Less Than
(2) Duplicate sample and analysis
(3) Lower sensitivity due to delay in anlaysis.
(4) Samples analyzed by NUS Corporation.

Table 19a
Gamma Spectrometry of Milk
SSES REMP 1984
(Page 1 of 2)
(Results in pCi/ℓ ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
July	07/23/84	12B2	LT 30	LT 7	LT 7	LT 8	LT 8	LT 20	1240 ± 120	LT 10	LT 7	LT 7	LT 20	LT 10
	07/23/84	5E1	LT 20	LT 6	LT 6	LT 7	LT 6	LT 10	1290 ± 130	LT 8	LT 6	LT 6	LT 10	LT 10
	07/23/84	13E3	LT 10	LT 4	LT 5	LT 4	LT 5	LT 10	1490 ± 150	LT 7	LT 4	LT 8	LT 10	LT 8
	07/23/84	10G1	LT 20	LT 4	LT 5	LT 5	LT 6	LT 10	1080 ± 110	LT 8	LT 4	LT 4	LT 10	LT 9
August	08/06/84	12B2	LT 20	LT 4	LT 5	LT 4	LT 5	LT 10	1480 ± 150	LT 7	LT 5	LT 5	LT 10	LT 10
	08/06/84	5E1	LT 30	LT 7	LT 7	LT 7	LT 8	LT 10	1360 ± 140	LT 10	LT 6	LT 7	LT 20	LT 20
	08/06/84	13E3	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1430 ± 140	LT 6	LT 4	LT 4	LT 9	LT 8
	08/06/84	10G1	LT 20	LT 4	LT 5	LT 5	LT 4	LT 10	1130 ± 110	LT 7	LT 4	LT 4	LT 10	LT 9
	08/06/84	12B3	LT 20	LT 5	LT 5	LT 5	LT 5	LT 9	1180 ± 120	LT 6	LT 4	LT 4	LT 10	LT 9
	08/06/84	6C1	LT 20	LT 5	LT 5	LT 6	LT 6	LT 10	1450 ± 150	LT 7	LT 5	LT 5	LT 10	LT 10
	08/06/84	10D1	LT 20	LT 6	LT 7	LT 7	LT 6	LT 10	1530 ± 150	LT 9	LT 6	LT 7	LT 10	LT 10
	08/06/84	12D2	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1380 ± 140	LT 5	LT 4	LT 8	LT 10	LT 8
	08/21/84	12B2	LT 20	LT 6	LT 6	LT 6	LT 6	LT 10	1470 ± 150	LT 8	LT 6	LT 7	LT 10	LT 10
	08/21/84	5E1	LT 20	LT 5	LT 5	LT 4	LT 5	LT 10	1180 ± 120	LT 7	LT 5	LT 5	LT 10	LT 9
	08/21/84	13E3	LT 30	LT 7	LT 7	LT 7	LT 7	LT 10	1430 ± 140	LT 10	LT 7	LT 7	LT 10	LT 10
	08/21/84	10G1	LT 20	LT 5	LT 5	LT 6	LT 6	LT 10	2300 ± 230	LT 7	LT 5	LT 5	LT 10	LT 10
September	09/03/84	12B2	LT 20	LT 6	LT 7	LT 7	LT 7	LT 10	1280 ± 130	LT 8	LT 6	LT 6	LT 10	LT 10
	09/03/84	5E1	LT 20	LT 4	LT 5	LT 4	LT 5	LT 10	1330 ± 130	LT 6	LT 4	LT 5	LT 10	LT 9
	09/03/84	13E3	LT 10	LT 4	LT 5	LT 5	LT 5	LT 9	1390 ± 140	LT 5	LT 4	LT 4	LT 10	LT 10
	09/03/84	10G1	LT 10	LT 4	LT 5	LT 4	LT 4	LT 9	1320 ± 130	LT 6	LT 4	LT 4	LT 9	LT 7
	09/03/84	12B3	LT 10	LT 4	LT 5	LT 4	LT 5	LT 9	1260 ± 130	LT 6	LT 4	LT 4	LT 9	LT 8
	09/03/84	6C1	LT 20	LT 7	LT 7	LT 8	LT 8	LT 20	1320 ± 130	LT 10	LT 7	LT 7	LT 20	LT 10
	09/03/84	10D1	LT 20	LT 5	LT 5	LT 5	LT 6	LT 10	1390 ± 140	LT 7	LT 5	LT 5	LT 10	LT 10
	09/03/84	12D2	LT 20	LT 4	LT 5	LT 4	LT 5	LT 10	1440 ± 140	LT 7	LT 5	LT 5	LT 10	LT 8
	09/17/84	12B2	LT 30	LT 7	LT 7	LT 8	LT 8	LT 20	1400 ± 140	LT 10	LT 6	LT 10	LT 20	LT 8
	09/17/84	5E1	LT 20	LT 5	LT 5	LT 5	LT 6	LT 10	1140 ± 110	LT 8	LT 5	LT 5	LT 10	LT 10
	09/17/84	13E3	LT 30	LT 7	LT 7	LT 8	LT 8	LT 20	1360 ± 140	LT 10	LT 7	LT 7	LT 20	LT 10
	09/17/84	10G1	LT 20	LT 4	LT 5	LT 4	LT 5	LT 9	1310 ± 130	LT 7	LT 4	LT 4	LT 10	LT 9

See footnotes at end of table.

Table 19a
Gamma Spectrometry of Milk
SSES REMP 1984
(Page 2 of 2)
(Results in pCi/ℓ ± 2s)

Month	Collection Date	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
October	10/08/84	12B2	LT 20	LT 4	LT 4	LT 5	LT 5	LT 9	1500 ± 150	LT 7	LT 4	LT 5	LT 10	LT 9
	10/08/84(2)	5E1	LT 20	LT 5	LT 5	LT 5	LT 5	LT 10	1530 ± 150	LT 6	LT 4	LT 5	LT 10	LT 9
	10/09/84	13E3	LT 30	LT 6	LT 7	LT 7	LT 7	LT 10	1360 ± 140	LT 9	LT 6	LT 6	LT 10	LT 10
	10/08/84	10G1	LT 20	LT 4	LT 4	LT 4	LT 5	LT 9	1340 ± 130	LT 7	LT 4	LT 4	LT 10	LT 8
	10/08/84	12B3	LT 20	LT 5	LT 5	LT 5	LT 5	LT 5	1360 ± 140	LT 5	LT 4	LT 5	LT 10	LT 10
	10/08/84	6C1	LT 20	LT 4	LT 4	LT 4	LO 4	LT 10	1440 ± 140	LT 6	LT 4	LT 4	LT 9	LT 8
	10/09/84	10D1	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1260 ± 130	LT 6	LT 3	LT 4	LT 9	LT 8
	10/08/84	12D2	LT 20	LT 4	LT 5	LT 5	LT 5	LT 9	1300 ± 130	LT 8	LT 4	LT 4	LT 10	LT 8
	10/08/84(2)	5E1	LT 20	LT 4	LT 5	LT 4	LT 5	LT 9	1400 ± 140	LT 6	LT 4	LT 5	LT 9	LT 8
	10/22/84	12B2	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1440 ± 140	LT 5	LT 4	LT 4	LT 10	LT 7
	10/23/84	5E1	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1390 ± 140	LT 5	LT 4	LT 4	LT 8	LT 7
	10/23/84	13E3	LT 20	LT 6	LT 6	LT 7	LT 6	LT 10	1430 ± 140	LT 8	LT 6	LT 7	LT 10	LT 10
	10/22/84	10G1	LT 30	LT 7	LT 7	LT 7	LT 8	LT 20	1250 ± 130	LT 10	LT 7	LT 7	LT 20	LT 10
November	11/12/84	12B2	LT 10	LT 3	LT 3	LT 3	LT 4	LT 8	1490 ± 150	LT 5	LT 3	LT 3	LT 8	LT 7
	11/12/84	5E1	LT 10	LT 3	LT 4	LT 4	LT 4	LT 8	1440 ± 140	LT 5	LT 3	LT 4	LT 8	LT 6
	11/12/84	13E3	LT 10	LT 4	LT 4	LT 4	LT 4	LT 8	1370 ± 140	LT 5	LT 3	LT 4	LT 8	LT 8
	11/12/84	10G1	LT 10	LT 3	LT 3	LT 3	LT 3	LT 7	1210 ± 120	LT 5	LT 3	LT 3	LT 7	LT 6
	11/13/84	12B3	LT 10	LT 3	LT 3	LT 3	LT 3	LT 7	1210 ± 120	LT 5	LT 3	LT 3	LT 7	LT 6
	11/12/84	6C1	LT 20	LT 5	LT 5	LT 5	LT 5	LT 10	1190 ± 120	LT 8	LT 5	LT 5	LT 10	LT 10
	11/12/84	10D1	LT 20	LT 4	LT 4	LT 5	LT 5	LT 10	1280 ± 130	LT 7	LT 4	LT 5	LT 10	LT 9
	11/12/84	12D2	LT 20	LT 6	LT 6	LT 6	LT 6	LT 10	1210 ± 120	LT 9	LT 6	LT 6	LT 10	LT 10
December	12/10/84	12B2	LT 10	LT 3	LT 4	LT 4	LT 4	LT 9	1220 ± 120	LT 6	LT 3	LT 4	LT 8	LT 8
	12/11/84	5E1	LT 10	LT 4	LT 4	LT 4	LT 4	LT 9	1240 ± 120	LT 5	LT 4	LT 4	LT 9	LT 8
	12/10/84	13E3	LT 20	LT 7	LT 6	LT 7	LT 6	LT 10	1410 ± 140	LT 9	LT 6	LT 7	LT 10	LT 10
	12/10/84	10G1	LT 20	LT 5	LT 5	LT 5	LT 6	LT 10	1210 ± 120	LT 8	LT 5	LT 5	LT 10	LT 10
	12/10/84	12B3	LT 20	LT 4	LT 5	LT 4	LT 5	LT 10	1180 ± 120	LT 8	LT 4	LT 5	LT 10	LT 9
	12/10/84	6C1	LT 30	LT 7	LT 7	LT 8	LT 7	LT 10	1420 ± 140	LT 10	LT 7	LT 7	LT 10	LT 10
	12/11/84	10D1	LT 10	LT 3	LT 4	LT 4	LT 4	LT 9	1380 ± 140	LT 6	LT 4	LT 4	LT 8	LT 8
	12/10/84	12D2	LT 20	LT 4	LT 5	LT 4	LT 4	LT 10	1430 ± 140	LT 6	LT 4	LT 4	LT 9	LT 9

(1) LT = Less Than
(2) Duplicate sample and analysis
(3) Lower sensitivity due to delay in analysis.
(4) Samples analyzed by NUS Corporatin.

Table 20
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Iodine - 131 in Milk
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Station	Collection Date	I-131 Activity
January (3)	12B2	01/18/84	LT 0.09(1)
	5E1	01/18/84	LT 0.08
	13E3	01/17/84	LT 0.13
	10G1	01/17/84	LT 0.10
	12B3	01/17/84	LT 0.2
	6C1	01/18/84	LT 0.10
	10D1	01/18/84	LT 0.11
	12D2	01/17/84	LT 0.18
	12B2(2)	01/18/84	LT 0.2
February (3)	12B2	02/17/84	LT 0.08
	5E1	02/16/84	LT 0.07
	13E3	02/17/84	LT 0.10
	10G1	02/16/84	LT 0.11
	12B3	02/17/84	LT 0.07
	6C1	02/16/84	LT 0.10
	10D1	02/16/84	LT 0.07
	12D2	02/16/84	LT 0.07
March (3)	12B2	03/15/84	LT 0.07
	5E1	03/14/84	LT 0.06
	13E3	03/15/84	LT 0.05
	10G1	03/14/84	LT 0.06
	12B3	03/14/84	LT 0.07
	6C1	03/14/84	LT 0.06
	10D1	03/14/84	LT 0.09
	12D2	03/14/84	LT 0.06
	12B3(2)	03/14/84	LT 0.05
	6C1(2)	03/14/84	LT 0.04

Note: See footnotes at end of table.

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Iodine - 131 in Milk
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Station	Collection Date	I-131 Activity
April	8D1(4)	04/01/84	LT 0.15
	12B2	04/20/84	LT 0.09
(3)	5E1	04/20/84	LT 0.11
	13E3	04/20/84	LT 0.10
	10G1	04/10/84	LT 0.08
	12B3	04/11/84	LT 0.08
	6C1	04/11/84	LT 0.13
	10D1	04/11/84	LT 0.09
	12D2	04/11/84	LT 0.08
	10D1(2)	04/11/84	LT 0.08
	12D2(2)	04/11/84	LT 0.07
	12B2	04/30/84	LT 0.05
	5E1	04/30/84	LT 0.06
	13E3	04/30/84	LT 0.05
	10G1	04/26/84	LT 0.07
May	12B2	05/15/84	LT 0.06
(3)	5E1	05/14/84	LT 0.3
	13E3	05/15/84	LT 0.08
	10G1	05/14/84	LT 0.12
	12B3	05/15/84	LT 0.06
	6C1	05/14/84	LT 0.3
	10D1	05/14/84	LT 0.11
	12D2	05/14/84	LT 0.07
	13E3(2)	05/15/84	LT 0.12
	12B2	05/28/84	LT 0.06
	5E1	05/28/84	LT 0.06
	13E3	05/28/84	LT 0.06
	10G1	05/28/84	LT 0.06

Note: See footnotes at end of table

Table 20
(page 3 of 4)

Iodine - 131 in Milk
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Station	Collection Date	I-131 Activity
June (3)	12B2	06/11/84	LT 0.05
	5E1	06/11/84	LT 0.05
	13E3	06/11/84	LT 0.04
	10G1	06/11/84	LT 0.05
	12B3	06/11/84	LT 0.05
	6C1	06/11/84	LT 0.05
	10D1	06/11/84	LT 0.06
	12D2	06/11/84	LT 0.05
	10G1 (2)	06/11/84	LT 0.05
	8D1 (4)	06/15/84	ND (5)
	12B2	06/25/84	LT 0.05
	5E1	06/25/84	LT 0.04
	13E3	06/25/84	LT 0.04
	10G1	06/25/84	LT 0.04
July (3)	12B2	07/09/84	LT 0.11
	5E1	07/09/84	LT 0.12
	13E3	07/09/84	LT 0.11
	10G1	07/09/84	LT 0.15
	12B3	07/09/84	LT 0.09
	6C1	07/09/84	LT 0.18
	10D1	07/09/84	LT 0.08
	12D2	07/09/84	LT 0.12
	12B2	07/23/84	LT 0.07
	5E1	07/23/84	LT 0.08
	13E3	07/23/84	LT 0.07
	10G1	07/23/84	LT 0.08

Note: See footnotes at end of table.

Table 20
(page 4 of 4)

Iodine - 131 in Milk
SSES REMP 1984
(Results in Units of pCi/l ± 2s)

Month	Station	Collection Date	I-131 Activity
August	12B2	08/06/84	LT 0.05
	5E1	08/06/84	LT 0.06
	13E3	08/06/84	LT 0.06
	10G1	08/06/84	LT 0.05
	12B3	08/06/84	LT 0.05
	6C1	08/06/84	LT 0.04
	10D1	08/06/84	LT 0.07
	12D2	08/06/84	LT 0.05
	12B2(2)	08/06/84	LT 0.05

(1) LT = Less Than
(2) Duplicate sample and analysis
(3) Samples analyzed by NUS Corporation.
(4) Goat milk
(5) No data

Table 20a

Iodine - 131 in Milk
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 1 of 2)

Month	Station	Collection Date	I-131 Activity
July	12B2	07/23/84	LT 0.1
	5E1	07/23/84	LT 0.1
	13E3	07/23/84	LT 0.1
	10G1	07/23/84	LT 0.1
August	12B2	08/06/84	LT 0.1
	12B3	08/06/84	LT 0.1
	12D2	08/06/84	LT 0.1
	13E3	08/06/84	LT 0.1
	10D1	08/06/84	LT 0.1
	10G1	08/06/84	LT 0.1
	5E1	08/06/84	LT 0.1
	6C1	08/06/84	LT 0.1
	12B2	08/21/84	LT 0.1
	5E1	08/21/84	LT 0.1
	13E1	08/21/84	LT 0.1
	10G1	08/21/84	LT 0.1
September	12B2	09/03/84	LT 0.2
	5E1	09/03/84	LT 0.1
	13E3	09/03/84	LT 0.1
	10G1	09/03/84	LT 0.1
	12B3	09/03/84	LT 0.2
	6C1	09/03/84	LT 0.2
	10D1	09/03/84	LT 0.2
	12D2	09/03/84	LT 0.2
	8D1 (4)	09/03/84	LT 0.2
	12B2	09/17/84	LT 0.1
	5E1	09/17/84	LT 0.2
	13E3	09/17/84	LT 0.1
	10G1	09/17/84	LT 0.1

See footnotes at end of table.

Table 20a

Iodine - 131 in Milk
SSES REMP 1984
(Results in pCi/ℓ ± 2s)
(Page 2 of 2)

Month	Station	Collection Date	I-131 Activity
October	12B2	10/08/84	LT 0.1
	5E1 (2)	10/08/84	LT 0.1
	13E3	10/08/84	LT 0.1
	10G1	10/08/84	LT 0.2
	12B1	10/08/84	LT 0.2
	6C1	10/08/84	LT 0.2
	10D1	10/08/84	LT 0.1
	12D2	10/08/84	LT 0.1
	5E1 (2)	10/08/84	LT 0.1
	12B2	10/22/84	LT 0.09
	5E1	10/23/84	LT 0.1
	13E3	10/23/84	LT 0.1
	10G1	10/22/84	LT 0.1
November	12B2	11/12/84	LT 0.1
	5E1	11/12/84	LT 0.2
	13E3	11/12/84	LT 0.2
	10G1	11/12/84	LT 0.1
	12B3	11/13/84	LT 0.1
	6C1	11/12/84	LT 0.1
	10D1	11/12/84	LT 0.1
	12D2	11/12/84	LT 0.2
	8D1 (4)	12/08-10/84	LT 0.1
December	12B2	12/10/84	LT 0.07
	5E1	12/10/84	LT 0.1
	13E3	12/10/84	LT 0.1
	10G1	12/10/84	LT 0.1
	12B3	12/10/84	LT 0.1
	6C1	12/10/84	LT 0.2
	10D1	12/11/84	LT 0.2
	12D2	12/10/84	LT 0.1

(1) LT = Less Than
(2) Duplicate sample and analysis
(3) Samples analyzed by NUS Corporation
(4) Goat milk
(5) No data

Table 21

Gamma Spectrometry of Pasture Grass
SSES REMP 1984

(Results in pCi/kg (wet) ± 2s)

Month	Station	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
January(4)	15A1	NS(1)														
February(4)	15A1	02/16/84	LT 60(2)	LT 16	LT 20	LT 17	31 ± 11	LT 40	LT 30	2000 ± 200	LT 30	LT 18	LT 17	LT 40	LT 30	7700 ± 800
March (4)	15A1	NS														
April (4)	15A1	04/25/84	LT 40	LT 13	LT 15	LT 11	LT 13	LT 30	LT 20	3400 ± 400	LT 20	LT 12	LT 12	LT 30	LT 20	5300 ± 600
May(4)	15A1	05/15/84	LT 40	LT 11	LT 12	LT 10	LT 11	LT 30	LT 20	5200 ± 600	LT 17	LT 10	LT 11	LT 30	LT 19	1100 ± 200
June(4)	15A1	06/12/84	LT 30	LT 12	LT 17	LT 11	LT 13	LT 30	LT 14	5400 ± 600	LT 16	LT 12	LT 12	LT 40	LT 20	230 ± 50
July(3)(4)	15A1	07/11/84	LT 90	LT 30	LT 40	LT 30	41 ± 18	LT 80	LT 40	14,000 ± 2000	LT 40	LT 30	LT 30	LT 80	LT 60	3100 ± 400
August(3)(4)	15A1	08/08/84	LT 400	LT 110	LT 110	LT 90	LT 100	LT 200	LT 180	35,000 ± 4000	LT 180	LT 100	LT 100	LT 300	LT 170	1800 ± 500

(1) NS = No Sample
(2) LT = Less Than
(3) Units are pCi/kg(dry) ± 2s
(4) Samples analyzed by NUS Corporation.

Table 21a
Gamma Spectrometry of Pasture Grass
SSES REMP 1984

(Results in pCi/kg (wet) ± 2 s)*

Month	Station	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
July	15A1	07/11/84	LT 100	LT 20	LT 20	LT 20	LT 20	LT 50	LT 90	4570±460	LT 40	LT 20	LT 20	LT 40	LT 40	1080±210
Aug.	15A1	08/08/84	LT 70	LT 20	LT 20	LT 20	LT 30	LT 50	LT 40	5510±550	LT 30	LT 20	LT 20	LT 50	LT 40	571±182
Sept.	15A1	09/04/84	LT 70	LT 20	LT 20	LT 20	LT 20	LT 40	LT 40	5030±500	LT 20	LT 20	LT 20	LT 40	LT 40	689±201
Oct.	15A1	10/10/84	LT 100	LT 20	LT 10	LT 10	LT 20	LT 40	LT 100	5530±550	LT 30	LT 10	LT 20	LT 30	LT 30	3510±350
Nov.	15A1	11/13/84	LT 90	LT 20	LT 20	LT 20	LT 30	LT 40	LT 70	4230±420	LT 30	LT 20	LT 20	LT 40	LT 40	4100±410
Dec.	15A1	12/11/84	LT 100	LT 30	LT 30	LT 30	LT 40	LT 70	LT 70	7110±710	LT 50	LT 30	LT 30	LT 70	LT 70	5250±530

* All pasture grass samples were analyzed wet due to the need for immediate counting.
(1) NS = No Sample
(2) LT = Less than
(3) Results in pCi/kg (Dry) ± 2 s.
(4) Samples analyzed by NUS Corporation.

Table 22

Gamma Spectrometry of Food Products (Fruits and Vegetables)
SSES REMP 1984

(Results in pCi/kg (wet) ± 2s)

Month	Type	Station	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
June (3)	Strawberries	11D1	06/15/84	LT 50(1)	LT 15	LT 15	LT 13	LT 13	LT 30	LT 20	1400 ± 200	LT 30	LT 15	LT 16	LT 30	LT 30	ND(2)
	Swiss Chard	7S5	06/27/84	LT 60	LT 20	LT 30	LT 18	LT 20	LT 50	LT 17	4800 ± 500	LT 20	LT 20	LT 20	LT 60	LT 40	ND
	Lettuce	7S5	06/27/84	LT 60	LT 20	LT 20	LT 20	LT 30	LT 50	LT 20	3100 ± 400	LT 30	LT 20	LT 20	LT 60	LT 40	170 ± 90
	Spinach	7S5	06/27/84	LT 50	LT 20	LT 30	LT 20	LT 20	LT 60	LT 20	6500 ± 600	LT 20	LT 30	LT 20	LT 70	LT 40	120 ± 90
July (3)	Endive	11S6	07/25/84	LT 70	LT 20	LT 30	LT 20	LT 20	LT 60	LT 30	4300 ± 500	LT 30	LT 20	LT 20	LT 60	LT 40	ND
	Lettuce	11S6	07/25/84	LT 60	LT 15	LT 19	LT 14	LT 16	LT 40	LT 30	5000 ± 600	LT 40	LT 15	LT 15	LT 40	LT 30	ND
	Endive	7S5	07/24/84	LT 30	LT 12	LT 10	LT 9	LT 10	LT 20	LT 10	5900 ± 600	LT 15	LT 10	LT 9	LT 20	LT 16	ND
	Beans	7S5	07/24/84	LT 50	LT 12	LT 14	LT 10	LT 11	LT 30	LT 20	2800 ± 300	LT 20	LT 11	LT 12	LT 30	LT 20	ND
	Lettuce	7S5	07/24/84	LT 90	LT 40	LT 30	LT 30	LT 30	LT 80	LT 40	4200 ± 500	LT 30	LT 40	LT 30	LT 90	LT 50	ND
	Swiss Chard	7S5	07/24/84	LT 110	LT 30	LT 30	LT 30	LT 30	LT 70	LT 60	8700 ± 900	LT 40	LT 30	LT 30	LT 70	LT 50	ND
August (3)	Cabbage	2H1	08/04/84	LT 30	LT 8	LT 9	LT 7	LT 8	LT 20	LT 14	1600 ± 200	LT 12	LT 8	LT 8	LT 19	LT 14	ND
	Beans	2H1	08/04/84	LT 50	LT 14	LT 17	LT 13	LT 14	LT 30	LT 30	1600 ± 200	LT 30	LT 14	LT 14	LT 30	LT 30	ND
	Cabbage	11D1	08/04/84	LT 40	LT 15	LT 16	LT 11	LT 13	LT 40	LT 20	1500 ± 200	LT 20	LT 14	LT 13	LT 30	LT 20	ND
	Beans	11D1	08/06/84	LT 80	LT 20	LT 30	LT 19	LT 20	LT 60	LT 40	2900 ± 400	LT 50	LT 20	LT 20	LT 60	LT 40	ND

(1) LT = Less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS Corporation.

Table 22a
Gamma Spectrometry of Food Products (Fruits and Vegetables)
SSES REMP 1984
(Page 1 of 2)
(Results in pCi/kg (wet) ± 2 s)

Sample Type	Sta.	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
July																
Green Beans	7S5	07/24/84	LT 30	LT 9	LT 10	LT 10	LT 10	LT 2	LT 20	2270±230	LT 10	LT 10	LT 10	LT 20	LT 20	LT 100
Curled End.	7S5	07/24/84	LT 50	LT 20	LT 20	LT 20	LT 20	LT 30	LT 30	6510±650	LT 20	LT 20	LT 20	LT 40	LT 30	319±119
Pr. Lettuce	7S5	07/24/84	LT 30	LT 9	LT 9	LT 9	LT 10	LT 20	LT 20	3870±390	LT 10	LT 8	LT 9	LT 20	LT 20	LT 90
Swiss Chard	7S5	07/24/84	LT 40	LT 10	LT 10	LT 10	LT 10	LT 20	LT 20	7250±730	LT 10	LT 10	LT 10	LT 30	LT 20	LT 100
Curled End.	11S6	07/25/84	LT 40	LT 10	LT 10	LT 10	LT 10	LT 30	LT 20	4390±440	LT 20	LT 10	LT 10	LT 30	LT 30	182±96
Pr. Lettuce	11S6	07/25/84	LT 30	LT 7	LT 7	LT 8	LT 8	LT 20	LT 10	2540±250	LT 9	LT 7	LT 7	LT 20	LT 20	101±55
Swiss Chard	11S6	07/25/84	LT 30	LT 8	LT 9	LT 9	LT 8	LT 20	LT 10	6030±600	LT 9	LT 8	LT 8	LT 20	LT 20	182±62
August																
Pr. Cabbage	7S5	08/08/84	LT 30	LT 10	LT 10	LT 10	LT 10	LT 20	LT 20	1800±180	LT 10	LT 10	LT 10	LT 20	LT 20	LT 100
Pr. Cabbage	11S6	08/08/84	LT 40	LT 10	LT 10	LT 10	LT 10	LT 20	LT 20	2280±230	LT 10	LT 10	LT 10	LT 20	LT 20	LT 100
Cabbage	11D1	08/04/84	LT 80	LT 20	LT 20	LT 20	LT 20	LT 30	LT 50	2280±230	LT 30	LT 20	LT 20	LT 30	LT 30	LT 200
Cabbage	2H1	08/04/84	LT 30	LT 7	LT 8	LT 7	LT 8	LT 20	LT 20	2650±270	LT 10	LT 7	LT 8	LT 20	LT 20	LT 70
Green Beans	11D1	08/06/84	LT 30	LT 9	LT 9	LT 9	LT 10	LT 20	LT 20	1890±190	LT 10	LT 7	LT 9	LT 20	LT 20	LT 80
Green Beans	2H1	08/04/84	LT 40	LT 8	LT 8	LT 9	LT 10	LT 20	LT 20	1070±130	LT 10	LT 8	LT 8	LT 20	LT 20	LT 90
Endive	11S6	08/21/84	LT 20	LT 7	LT 6	LT 7	LT 8	LT 20	LT 10	2770±280	LT 10	LT 7	LT 7	LT 20	LT 10	263±56
Lettuce	11S6	08/21/84	LT 20	LT 6	LT 7	LT 7	11.1±5.7	LT 20	LT 10	3780±380	LT 9	LT 6	LT 7	LT 10	LT 10	480±64
Endive	7S5	08/21/84	LT 30	LT 8	LT 9	LT 8	LT 9	LT 20	LT 20	2090±210	LT 10	LT 8	LT 8	LT 20	LT 20	193±68
Potatoes	11D1	08/21/84	LT 30	LT 7	LT 9	LT 9	LT 9	LT 20	LT 10	4030±400	LT 10	LT 8	LT 8	LT 20	LT 20	LT 70
Apples	7B2	08/21/84	LT 30	LT 8	LT 10	LT 8	LT 9	LT 20	LT 20	1200±130	LT 10	LT 8	LT 8	LT 20	LT 20	LT 80
Sweet corn	2H1	08/21/84	LT 20	LT 8	LT 8	LT 9	LT 9	LT 20	LT 10	2990±300	LT 10	LT 8	LT 9	LT 20	LT 20	LT 70
Tomatoes	11D1	08/21/84	LT 40	LT 10	LT 10	LT 10	LT 10	LT 20	LT 20	2240±220	LT 10	LT 10	LT 10	LT 20	LT 20	LT 200
Sweet corn	11S6	08/21/84	LT 20	LT 7	LT 8	LT 8	LT 8	LT 10	LT 10	2490±250	LT 10	LT 7	LT 8	LT 20	LT 10	LT 60
Tomatoes	11S6	08/21/84	LT 20	LT 5	LT 5	LT 5	LT 5	LT 10	LT 10	2160±220	LT 6	LT 5	LT 5	LT 10	LT 10	LT 50
Sweet Corn	7S5	08/21/84	LT 40	LT 9	LT 10	LT 10	LT 10	LT 20	LT 20	2250±230	LT 10	LT 9	LT 10	LT 20	LT 20	LT 90
Tomatoes	7S5	08/21/84	LT 30	LT 8	LT 8	LT 8	LT 9	LT 20	LT 20	2090±210	LT 10	LT 8	LT 9	LT 20	LT 20	LT 80
Sweet Corn	11D1	08/21/84	LT 20	LT 6	LT 6	LT 6	LT 7	LT 10	LT 10	2450±250	LT 9	LT 7	LT 7	LT 20	LT 10	LT 60

See footnotes at end of table.

Table 22a
Gamma Spectrometry of Food Products (Fruits and Vegetables)
SSES REMP 1984
(Page 2 of 2)
(Results in pCi/kg (wet) ± 2 s)

Sample Type	Sta.	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
September																
Potatoes	7S5	09/13/84	LT 20	LT 6	LT 8	LT 7	LT 7	LT 20	LT 10	4470±450	LT 10	LT 7	LT 7	LT 20	LT 10	LT 60
Potatoes	11S6	09/12/84	LT 30	LT 8	LT 9	LT 8	LT 9	LT 20	LT 10	4070±410	LT 9	LT 8	LT 8	LT 20	LT 20	LT 70
Pr. Cabbage	7S5	09/18/84	LT 30	LT 9	LT 9	LT 9	LT 9	LT 20	LT 20	2580±260	LT 10	LT 8	LT 8	LT 20	LT 20	LT 80
Pr. Cabbage	11S6	09/18/84	LT 40	LT 9	LT 10	LT 10	LT 10	LT 20	LT 20	2270±230	LT 10	LT 9	LT 10	LT 20	LT 20	LT 100
Swiss Chard	11S6	09/18/84	LT 80	LT 20	LT 20	LT 20	LT 20	LT 40	LT 50	4530±290	LT 30	LT 20	LT 20	LT 40	LT 40	LT 200
Potatoes	2H1	09/18/84	LT 20	LT 7	LT 8	LT 7	LT 7	LT 20	LT 10	4540±450	LT 8	LT 7	LT 60	LT 20	LT 10	LT 60
October																
Spinach	7S5	10/09/84	LT 100	LT 20	LT 20	LT 20	LT 20	LT 50	LT 90	15700±1600	LT 30	LT 20	LT 20	LT 50	LT 40	567±166
Spinach	11S6	10/09/84	LT 100	LT 20	LT 20	LT 20	LT 20	LT 60	LT 100	16700±1700	LT 50	LT 20	LT 20	LT 50	LT 40	444±154
Swiss Chard	7S5	10/09/84	LT 100	LT 20	LT 20	LT 20	LT 20	LT 50	LT 100	10500±1100	LT 50	LT 20	LT 20	LT 50	LT 40	326±179
Collards	11S6	10/09/84	LT 90	LT 10	LT 10	LT 10	LT 10	LT 30	LT 80	4600±460	LT 30	LT 10	LT 10	LT 30	LT 30	LT 100
Honey	7B2	10/10/84	LT 50	LT 9	LT 9	LT 9	68.7±10.6	LT 20	LT 40	1570±160	LT 20	LT 20	LT 10	LT 20	LT 20	LT 80
Mac. Apples	7B2	10/10/84	LT 70	LT 10	LT 10	LT 10	LT 10	LT 20	LT 60	797±123	LT 30	LT 10	LT 10	LT 20	LT 20	LT 100
Cort. Apples	7B2	10/10/84	LT 70	LT 10	LT 10	LT 10	LT 10	LT 20	LT 70	1080±160	LT 30	LT 10	LT 10	LT 20	LT 20	LT 100
Cort. Apples	12B1	10/10/84	LT 70	LT 10	LT 10	LT 9	LT 10	LT 20	LT 50	854±109	LT 30	LT 9	LT 10	LT 20	LT 20	LT 100

(1) LT = Less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS Corporation.

Table 23

Gamma Spectrometry of Algae
SSES REMP-1984

(Results in pCi/g (dry) ± 2s)

Month	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
June (3)	AG1	05/03-06/11/84	LT 70(1)	LT 20	LT 20	LT 20	LT 20	LT 40	LT 30	390 ± 180	LT 30	LT 20	LT 20	LT 50	LT 40	ND(2)
	AG2	05/03-06/11/84	LT 30	LT 10	LT 12	LT 9	LT 11	LT 20	LT 16	390 ± 90	LT 19	LT 10	LT 10	LT 30	LT 18	ND
	AG3	05/03-06/11/84	LT 40	LT 14	LT 16	LT 15	LT 15	LT 30	LT 20	320 ± 140	LT 30	LT 14	LT 14	LT 30	LT 20	ND
	AG4	05/03-06/11/84	LT 40	LT 14	LT 16	LT 14	LT 13	LT 30	LT 17	430 ± 120	LT 30	LT 13	LT 13	LT 30	LT 20	ND
	AG5	05/03-06/11/84	LT 200	LT 70	LT 90	LT 80	LT 70	LT 150	LT 80	LT 900	LT 120	LT 70	LT 70	LT 150	LT 130	ND
	AG6	05/03-06/11/84	LT 50	LT 20	LT 20	LT 20	LT 20	LT 40	LT 30	LT 300	LT 30	LT 20	LT 19	LT 40	LT 40	ND
July (3)	AG 1	06/11-07/09/84	LT 8	LT 2	LT 2	LT 2	1.8 ± 1.1	LT 5	LT 4	250 ± 30	LT 5	LT 1.9	LT 2	LT 5	LT 4	54 ± 11
	AG 2	06/11-07/09/84	LT 6	LT 2	LT 2	LT 2	LT 2	LT 4	LT 2	220 ± 30	LT 3	LT 2	LT 2	LT 5	LT 4	46 ± 10
	AG 4	06/11-07/09/84	LT 6	LT 2	LT 2	LT 2	0.91 ± 0.79	LT 5	ND	ND	LT 4	LT 2	LT 2	LT 5	LT 4	64 ± 11
	AG 3	(4)														
	AG5, AG6	(5)														
August (3)	AG 3	07/09-08/06/84	LT 30	LT 7	LT 8	LT 6	LT 6	LT 15	LT 19	LT 110	LT 20	LT 7	LT 7	LT 16	LT 12	69 ± 36
	AG 4	07/09-08/06/84	LT 16	LT 4	LT 4	LT 4	LT 4	LT 10	LT 9	180 ± 40	LT 10	LT 5	LT 4	LT 10	LT 7	110 ± 20
	AG 5	06/11-08/06/84	LT 20	LT 6	LT 6	LT 6	LT 6	LT 12	LT 12	170 ± 50	LT 13	LT 6	LT 6	LT 14	LT 11	73 ± 31
	AG 6	06/11-08/06/84	LT 13	LT 4	LT 4	LT 4	LT 4	LT 9	LT 7	150 ± 40	LT 9	LT 4	LT 4	LT 9	LT 6	26 ± 15
	AG1	(4)														
	AG2	(4)														

(1) LT = Less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS Corporation.
(4) Sample missing; not collected.
(5) No sample; high river level.
(6) Last sample for year.

Table 23a

Gamma Spectrometry of Algae
SSES REMP 1984

(Results in pCi/kg (dry) ± 2 s)

Month	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
Sept.	AG1	8/06-09/09/84	LT 900	LT 200	LT 300	LT 300	LT 300	LT 600	LT 500	25600±4200	LT 400	LT 300	LT 300	LT 600	LT 600	3890±1690
	AG2	8/06-09/09/84	LT 600	LT 200	LT 200	LT 200	366±182	LT 400	1390±370	23300±2700	LT 400	LT 200	LT 200	LT 500	LT 400	4200±1500
	AG3	8/06-09/09/84	LT 1000	LT 300	LT 400	LT 300	LT 300	LT 700	LT 600	17800±4400	LT 600	LT 300	LT 300	LT 600	LT 600	4860±2090
	AG4	8/06-09/09/84	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	684±288	17200±2700	LT 300	LT 200	LT 200	LT 400	LT 400	3210±1310
	AG5	8/06-09/10/84	LT 700	LT 200	LT 300	LT 200	419±92	LT 500	743±310	11300±2800	LT 300	LT 200	LT 200	LT 500	LT 500	3110±1460
	AG6	8/06-09/10/84	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	LT 400	10100±2400	LT 300	LT 200	LT 200	LT 500	LT 400	LT 20000
	AG1	9/09-09/24/84	LT 600	LT 200	LT 300	LT 200	LT 200	LT 500	LT 400	19300±3000	LT 400	LT 200	LT 200	LT 500	LT 400	4470±1690
	AG2	9/09-09/24/84	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	431±234	19700±2500	LT 300	LT 200	LT 200	LT 400	LT 300	3290±1380
	AG3	9/09-09/24/84	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	LT 300	24900±3100	LT 300	LT 200	LT 200	LT 500	LT 300	3720±123
	AG4	9/09-09/24/84	LT 600	LT 100	LT 200	LT 200	LT 200	LT 400	LT 300	24500±2800	LT 300	LT 200	LT 200	LT 400	LT 400	3010±1290
Oct.	AG1	9/24-10/07/84	LT 700	LT 200	LT 300	LT 200	512±199	LT 300	LT 400	24400±3100	LT 400	LT 200	LT 200	LT 500	LT 500	7640±1640
	AG2	9/24-10/07/84	LT 500	LT 100	LT 200	LT 100	262±147	LT 300	1470±240	17600±2000	LT 200	LT 100	LT 100	LT 300	LT 300	6720±1050
	AG3	9/24-10/07/84	LT 500	LT 200	LT 200	LT 200	LT 200	LT 400	1690±340	23300±2800	LT 300	LT 200	LT 200	LT 400	LT 400	10300±1500
	AG4	9/24-10/07/84	LT 700	LT 200	LT 300	LT 200	LT 200	LT 400	1830±360	21400±2600	LT 300	LT 200	LT 200	LT 500	LT 400	11100±1700
	AG5	9/10-10/08/84(6)	LT 400	LT 100	LT 200	LT 200	LT 200	LT 300	LT 300	8710±2010	LT 200	LT 100	LT 100	LT 300	LT 300	LT 1000
	AG6	9/10-10/08/84(6)	LT 400	LT 100	LT 100	LT 100	LT 100	LT 300	LT 200	10900±1600	LT 200	LT 100	LT 100	LT 300	LT 200	LT 900
	AG1	10/07-10/22/84(6)	LT 900	LT 200	LT 200	LT 300	533±213	LT 500	LT 500	17200±3100	LT 400	LT 200	LT 300	LT 600	LT 500	8780±2240
	AG2	10/07-10/22/84(6)	LT 700	LT 200	LT 300	LT 200	LT 200	LT 500	LT 500	22200±3000	LT 400	LT 200	LT 200	LT 500	LT 500	8630±1930
	AG3	10/07-10/22/84	LT 900	LT 300	LT 400	LT 300	LT 300	LT 500	1440±400	19300±2900	LT 400	LT 200	LT 300	LT 600	LT 500	4510±1760
	AG4	10/07-10/22/84	LT 600	LT 200	LT 300	LT 200	367±169	LT 400	2090±360	18000±2700	LT 300	LT 200	LT 200	LT 400	LT 400	6340±1380
Nov.	AG3	10/22-11/12/84	LT 900	LT 200	LT 200	LT 300	LT 300	LT 500	LT 500	22200±3100	LT 500	LT 300	LT 300	LT 500	LT 500	9130±2070
	AG4	10/22-11/12/84	LT 600	LT 200	LT 300	LT 200	LT 300	LT 600	LT 300	24700±2800	LT 400	LT 200	LT 200	LT 500	LT 400	6310±1360
Dec.	AG3	11/12-12/10/84	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	516±277	13700±2700	LT 300	LT 200	LT 200	LT 400	LT 400	5540±1460
	AG4	11/12-12/10/84	LT 500	LT 100	LT 200	LT 200	LT 200	LT 300	LT 300	17600±2100	LT 300	LT 100	LT 200	LT 300	LT 300	5110±1180
	AG3	12/10-01/07/85	LT 700	LT 200	LT 300	LT 300	LT 200	LT 400	LT 400	16300±2800	LT 300	LT 200	LT 200	LT 400	LT 400	6920±1850
	AG4	12/10-01/07/85	LT 600	LT 200	LT 200	LT 200	LT 200	LT 400	LT 300	18100±2900	LT 300	LT 200	LT 200	LT 400	LT 400	6830±1520

(1) LT = Less Than
(2) ND = Not Detected
(3) Samples analyzed by NUS Corporation.
(4) Sample missing; not collected.
(5) No sample; high river level.
(6) Last sample for year.

Table 24

Gamma Spectrometry of Game, Poultry, and Eggs
SSES REMP 1984

(Results in pCi/kg (wet) ± 2 s)

Month	Sample Type	Sta	Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Be-7
Sept.	Deer	2A	09/25/84	LT 100	LT 20	LT 10	LT 10	540±54	LT 40	LT 200	3110±310	LT 60	LT 10	LT 20	LT 30	LT 30	LT 200
Oct.	Squirrel	2A	10/20/84	LT 70	LT 10	LT 10	LT 10	1380±140	LT 30	LT 50	3670±370	LT 20	LT 10	LT 10	LT 30	LT 30	LT 200
	Eggs	12B1	10/23/84	LT 40	LT 9	LT 9	LT 10	LT 40	LT 20	LT 10	1020±100	LT 10	LT 9	LT 10	LT 20	LT 9	LT 80
	Chicken	12B1	10/23/84	LT 30	LT 8	LT 8	LT 8	LT 9	LT 20	LT 20	2810±280	LT 10	LT 7	LT 8	LT 20	LT 20	LT 70

Table 25

Gamma Spectrometry of Soil and Vegetation
SSES REMP 1984

(Results in pCi/kg (dry) ± 2 s)

Sta.		Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	Ra-226	Mn-54	Th-228	Zn-65	Zr-95	Be-7
2S4	Veg.	08/20/84	LT 900	LT 90	LT 70	LT 80	LT 90	LT 200	LT 1000	31800±3200	LT 2000	LT 80	LT 200	LT 200	LT 200	9150±1040
	Top	08/20/84	LT 700	LT 70	LT 60	LT 70	119±59	LT 200	LT 700	10100±1000	LT 1000	LT 60	785±79	LT 100	LT 200	LT 600
	Bot.	08/20/84	LT 500	LT 50	LT 30	LT 50	137±43	LT 100	LT 500	12600±1300	940±218	LT 40	1040±100	LT 80	LT 100	LT 400
5S5	Veg.	08/20/84	LT 600	LT 60	LT 50	LT 50	LT 60	LT 200	LT 700	24000±2400	LT 1000	LT 50	LT 100	LT 100	LT 100	8330±830
	Top	08/20/84	LT 700	LT 60	LT 50	LT 60	229±57	LT 200	LT 700	9230±940	2070±910	LT 60	1020±100	LT 100	LT 200	LT 600
	Bot.	08/20/84	LT 400	LT 50	LT 30	LT 40	246±45	LT 100	LT 500	9810±980	1840±670	LT 40	1120±110	LT 100	LT 100	LT 400
11S4	Veg.	08/21/84	LT 700	LT 80	LT 70	LT 60	LT 70	LT 200	LT 800	17700±1800	LT 1000	LT 60	LT 100	LT 100	LT 100	5080±780
	Top	08/21/84	LT 400	LT 30	LT 30	LT 30	596±60	LT 90	LT 500	8760±880	1040±570	LT 30	704±70	LT 70	LT 100	LT 400
	Bot.	08/21/84	LT 500	LT 40	LT 30	LT 40	409±47	LT 100	LT 500	9340±930	1290±540	LT 40	645±65	LT 80	LT 100	LT 400
15S4	Veg.	08/20/84	LT 500	LT 50	LT 50	LT 50	LT 50	LT 100	LT 600	14000±1400	LT 1000	LT 50	LT 100	LT 100	LT 100	8310±830
	Top	08/20/84	LT 700	LT 70	LT 50	LT 70	146±59	LT 200	LT 800	12200±1200	2190±850	LT 60	1460±150	LT 100	LT 200	LT 600
	Bot.	08/20/84	LT 500	LT 50	LT 40	LT 50	109±25	LT 100	LT 600	12900±1300	2460±580	LT 40	946±95	LT 90	LT 100	LT 400
9B2	Veg.	08/21/84	LT 1000	LT 100	LT 100	LT 100	LT 100	LT 300	LT 1000	21700±2200	LT 2000	LT 100	LT 200	LT 300	LT 300	10100±1200
	Top.	08/21/84	LT 600	LT 60	LT 50	LT 60	668±71	LT 100	LT 700	9550±960	1760±840	LT 50	784±78	LT 100	LT 100	LT 600
	Bot.	08/21/84	LT 200	LT 30	LT 30	LT 30	269±37	LT 80	LT 400	8840±880	1480±530	LT 30	725±73	LT 80	LT 100	LT 300

Table 25

Gamma Spectrometry of Soil and Vegetation
SSES REMP 1984

(Results in pCi/kg (dry) ± 2 s)
(Page 2 of 2)

Sta.		Collection Date	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	Ra-226	Mn-54	Th-228	Zn-65	Zr-95	Be-7
1D4	Veg.	08/20/84	LT 600	LT 60	LT 60	LT 50	LT 60	LT 200	LT 700	9170±920	LT 900	LT 50	LT 80	LT 100	LT 100	2900±600
	Top	08/20/84	LT 1000	LT 100	LT 80	LT 100	151±81	LT 300	LT 1000	11300±1200	LT 900	LT 70	527±80	LT 200	LT 300	LT 900
	Bot.	08/20/84	LT 500	LT 40	LT 30	LT 50	189±43	LT 100	LT 600	9970±1000	2030±630	LT 40	1400±140	LT 90	LT 100	LT 400
3D2	Veg.	08/20/84	LT 2000	LT 200	LT 200	LT 200	LT 200	LT 500	LT 2000	51400±5100	LT 3000	LT 200	LT 300	LT 400	LT 400	14100±1900
	Top.	08/20/84	LT 600	LT 50	LT 40	LT 60	987±99	LT 100	LT 700	10300±1000	2840±770	LT 50	1930±190	LT 100	LT 100	LT 500
	Bot.	08/20/84	LT 600	LT 50	LT 30	LT 50	390±47	LT 100	LT 700	10500±1100	3590±720	LT 40	2060±210	LT 100	LT 100	LT 500
12E2	Veg.	08/20/84	LT 500	LT 50	LT 40	LT 50	LT 50	LT 100	LT 600	12400±1200	LT 800	LT 40	LT 80	LT 100	LT 100	7570±760
	Top	08/20/84	LT 400	LT 30	LT 20	LT 30	215±33	LT 90	LT 500	11000±1100	1820±510	LT 30	930±93	LT 70	LT 90	LT 400
	Bot.	08/20/84	LT 500	LT 50	LT 40	LT 40	249±38	LT 100	LT 600	10600±1100	1610±560	LT 40	851±85	LT 100	LT 100	LT 400
7G1	Veg.	08/20/84	LT 900	LT 90	LT 100	LT 80	LT 90	LT 300	LT 1000	21400±2100	LT 2000	LT 80	LT 200	LT 200	LT 200	5300±960
	Top	08/20/84	LT 500	LT 50	LT 40	LT 50	1380±140	LT 100	LT 700	9280±930	1250±620	LT 40	1160±120	LT 90	LT 100	LT 500
	Bot.	08/20/84	LT 600	LT 60	LT 40	LT 50	533±53	LT 100	LT 800	9200±920	1750±540	LT 50	1020±100	LT 90	LT 100	LT 600
12G3	Veg.	08/20/84	LT 1000	LT 100	LT 80	LT 90	LT 100	LT 300	LT 1000	12500±1300	LT 2000	LT 80	LT 200	LT 200	LT 200	17200±1700
	Top	08/20/84	LT 400	LT 30	LT 20	LT 300	168±29	LT 80	LT 400	9980±1000	2550±520	LT 30	1420±140	LT 70	LT 80	LT 300
	Bot.	08/20/84	LT 1000	LT 80	LT 70	LT 80	LT 90	LT 200	LT 900	1290±1300	1630±810	LT 70	1140±110	LT 200	LT 200	LT 800

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Direct Radiation mR/day	TLD 262	-	0.21(234/234) (0.14-0.34)	Station 11S3 0.3 miles SW	0.27(4/4) (0.18-0.34)	0.21(28/28) (0.16-0.27)	0
Fish (pCi/kg (wet))	Gamma Spec 17						
	K-40	-	3480(11/11) (2300-4600)	Station L-T-A-W On site ENE	3660(4/4) (3460-3900)	3360(6/6) (2810-4000)	0
	Cs-134	130	LLD			LLD	
	Cs-137	150	LLD			LLD	
	Co-58	130	LLD			LLD	
	Co-60	130	LLD			LLD	
	Fe-59	260	LLD			LLD	
	Mn-54	130	LLD			LLD	
	Zn-65	260	LLD			LLD	
	Gross Beta 17		3710(11/11) (1400-6300)	Station L-T-A-W On site ENE	4400(4/4) (2700-6300)	2200(6/6) (1000-3600)	0

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Sediment (pCi/kg (dry))	Gamma Spec 13	-					
	K-40		8800(9/9) (5800-12600)	Station LTAW On Site ENE	12300(2/2) (12000-12600)	10300(4/4) (7500-11500)	0
	Ac-228	-	790(5/9) (700-860)	Station 2F 6.4 miles NNE	890(1/2) -	880(2/4) (860-890)	
	Bi-212	-	1000(1/9) -	Station LTAW On Site ENE	1000(1/2) -	LLD	
	Bi-214	-	810(5/9) (520-1200)	Station LTAW on Site ENE	1200(1/2) -	790(2/4) (750-820)	
	Cs-137	180	125(3/9) (78-160)	Station 11C 2.6 miles SW	160(1/2) -	87(2/4) (76-98)	
	Pb-212	-	670(5/9) (540-890)	Station LTAW on Site ENE	890(1/2) -	740(2/4) (640-840)	
	Pb-214	-	774(5/9) (580-1000)	Station 12F 6.9 miles WSW	1000(1/2) -	800(2/4) (690-910)	
	Ra-226	-	1140(8/9) (610-2110)	Station LTAW On Site ENE	1610(2/2) (1100-2110)	1410(4/4) (700-2080)	
	Tl-208	-	860(5/9) (630-1100)	Station 12F On Site ENE	1100(1/1) -	845(2/4) (780-910)	
	Th-228	-	1190(4/9) (802-1600)	Station 11C 2.6 miles SW	1380(1/2) -	1300(2/4) (1290-1380)	
	Gross Alpha 13	-	8530(7/9) (4800-13000)	Station LTAW On Site ENE	13000(1/2) -	10580(4/4) (6600-14000)	0
	Gross Beta 13	-	19700(9/9) (13000-40000)	Station 11C 2.6 miles SW	27000(2/2) (14000-40000)	20500(4/4) (15000-27000)	0

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Surface Water (pCi/ℓ)	Gamma Spec 144						
	Ba-140	60	LLD			LLD	0
	Co-58	15	LLD			LLD	
	Co-60	15	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	LLD			LLD	
	Fe-59	30	LLD			LLD	
	K-40	-	LLD			LLD	
	La-140	15	LLD			LLD	
	Mn-54	15	2.0(1/76) -	Station 6S7 Discharge	2.0(1/12) -	LLD	
	Nb-95	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	
	I-131 227	1.0	0.26(12/118) (0.037-0.77)	Station 6S7 Discharge	0.26(11/51) (0.045-0.77)	0.22(10/109) (0.043-0.41)	0
	Gross Alpha 148*	-	2.5(17/80) (1.2-6.5)	Station 6S7 Discharge	4.1(4/13) (1.3-6.5)	2.0(14/68) (1.1-4.7)	0
	Gross Beta 148	4	4.6(75/80) (1.4-13)	Station 1D5 3.9 miles N	9.4(13/13) (3.6-17)	4.8(63/68) (1.0-17)	0
	Tritium 147	2000	315(46/82) (68-2200)	Station 6S7 Discharge	710(11/12) (90-2200)	212(32/65) (64-1600)	0

* One gross alpha result from station 12H1 with the result of 22 pCi/liter was excluded from this table due to poor counting statistics.

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Well Water (pCi/ℓ)	Gamma Spec 99						
	Ba-140	60	LLD			LLD	0
	Co-58	15	LLD			LLD	
	Co-60	15	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	LLD			LLD	
	Fe-59	30	LLD			LLD	
	K-40	-	LLD			LLD	
	La-140	15	LLD			LLD	
	Mn-54	15	LLD			LLD	
	Nb-95	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	
	Gross Alpha 99	-	1.5(10-85) (0.72-3.5)	Station 4S2 0.5 miles ENE	3.5(1/13) -	2.7(1/14) -	0
	Gross Beta 99	-	2.7(53/85) (1.1-6.4)	Station 15A4 0.9 miles NW	4.5(13/13) (3.3-6.2)	1.9(10-14) (1.5-2.6)	0
	Tritium 99	2000	145(41/85) (55-470)	Station 12F3 5.2 miles WSW	260(7/14) (85-840)	260(7/14) (85-840)	0

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Potable Water (pCi/ℓ)	Gamma Spec 40						
	Ba-140	60	LLD			Only Indicator Stations sampled for this medium.	0
	Co-58	15	LLD				
	Co-60	15	LLD				
	Cs-134	15	LLD				
	Cs-137	18	LLD				
	Fe-59	30	LLD				
	K-40	-	LLD				
	La-140	15	LLD				
	Mn-54	15	LLD				
	Nb-95	15	LLD				
	Zn-65	30	LLD				
	Zr-95	30	LLD				
	I-131 124	1.0	0.18(10/110) (0.037-0.50)	Station 12H2 Raw 26 miles WSW	0.18(10/110) (0.037-0.50)		0
	Gross Alpha 40	-	2.6(6/26) (0.95-5.6)	Station 12H2 Raw 26 miles WSW	3.3(3/13) (1.7-5.6)		0
	Gross Beta 40	-	3.9(22/26) (1.3-12)	Station 12H2 Raw 26 miles WSW	4.2(12/14) (2.1-9.3)		0
	Tritium 38	2000	220(15/25) (54-710)	Station 12H2 Treated 26 miles WSW	220(15/25) (54-710)		0

Control drinking water stations are the same as the surface water control stations. This is because there are no public upstream drinking water facilities.

Note: See footnotes at end of table.

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SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Precipitation (pCi/ℓ)	Gross Alpha 51	-	0.85(20/41 (0.49-1.5)	Station 12E1 4.7 miles WSW	1.5(1/4) -	1.0(6/10) (0.53-1.8)	0
	Gross Beta 51	-	3.5(40/41) (1.4-7.2)	Station 7G1 14 miles SE	4.5(5/5) (3.1-6.5)	4.5(10/10) (2.8-7.4)	0
	Tritium 51	2000	150(20/41) (55-590)	Station 12G1 15 miles WSW	710(4/5) (100-2500)	530(6/10) (100-2500)	0
	Gamma Spec 51						
	Be-7	-	27(13/41) (14-52)	Station 12G1 15 miles NSW	41(2/5) (29-53)	38(4/10) (26-53)	0
	Ba-140	60	LLD			LLD	
	Co-58	15	LLD			LLD	
	Co-60	15	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	LLD			LLD	
	Fe-59	30	LLD			LLD	
	K-40	-	LLD			LLD	
	La-140	15	LLD			LLD	
	Nb-95	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	
	Mn-54	15	LLD			LLD	

Note: See footnotes at end of table.

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SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

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Air Particulates (E-03 pCi/m^3)	Gamma Spec 44 Be-7	-	63(32/32) (40-177)	Station 3D1 3.4 miles NE	81(4/4) (40-177)	64(12/12) (54-83)	0
	Ce-144	-	LLD			LLD	
	Cs-134	50	LLD			LLD	
	Cs-137	60	LLD			LLD	
	Nb-95	-	LLD			LLD	
	Zr-95	-	LLD			LLD	
	K-40	-	LLD			LLD	
	Gross Alpha 44	-	4.0(32/32) (1.4-7.9)	Station 7H1 47 miles SE	4.7(4/4) (2.6-7.2)	4.2(12/12) (2.2-7.2)	0
	Gross Beta 570	10	14.51(412/416) (2.2-46.0)	Station 7H1 47 miles SE	14.40(53/53) (11.0-33.0)	13.95(153-154) (2.1-33.0)	0
Air Iodine (pCi/m^3)	I-131 571	0.07	LLD			LLD	0
Milk (pCi/ℓ)	I-131 147	1.0	LLD			LLD	0
	Gamma Spec 145 Ba-140	15	LLD			LLD	0
	Co-58	-	LLD			LLD	
	Co-60	-	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	LLD			LLD	
	La-140	-	LLD			LLD	

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 31 December 1983 to January 8, 1985
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Pasture Grass (pCi/kg (wet))	Gamma Spec 12						
	Cs-137	80	36(2/12) (31-41)	Station 15A1 0.9 miles NW	36(1/12) (31-41)	Only Indicator stations sampled for this	0
	K-40	-	8080(12/12) (2000-35000)	Station 15A1 0.9 miles NW	8080(12/12) (2000-35000)		
	Be-7	-	2870(12/12) (230-7700)	Section 15A1 0.9 miles NW	2870(12/12) (230-7700)		
	Ba-140	-	LLD				
	Co-58	-	LLD				
	Co-60	-	LLD				
	Cs-134	60	LLD				
	Fe-59	-	LLD				
	I-131	60	LLD				
	La-140	-	LLD				
	Nb-95	-	LLD				
	Mn-54	-	LLD				
	Zn-65	-	LLD				
	Zr-95	-	LLD				

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 31 December 1983 to January 8, 1985
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Food Products (pCi/kg (wet))	Gamma Spec 53						
	Cs-137	80	40(2/47) (11.1-68.7)	Station 7B2 1.5 miles SE	68.7(1/5) -	LLD	0
	K-40	-	4100(46/47) (797-167000)	Station 7S5 0.4 miles SE	5130(19/19) (1800-15700)	2410(6/6) (1060-4540)	
	Be-7	-	280(12/47) (101-567)	Section 7S5 0.4 miles SE	283(6/19) (120-567)	LLD	
	Ba-140	-	LLD			LLD	
	Co-58	-	LLD			LLD	
	Co-60	-	LLD			LLD	
	Cs-134	60	LLD			LLD	
	Fe-59	-	LLD			LLD	
	I-131	60	LLD			LLD	
	La-140	-	LLD			LLD	
	Nb-95	-	LLD			LLD	
	Mn-54	-	LLD			LLD	
	Zn-65	-	LLD			LLD	
	Zr-95	-	LLD			LLD	

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 31 December 1983 to January 8, 1985
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Algae (pCi/kg (dry))	Gamma Spec 39 K-40	-	89700(18/20) (10100-430000)	Station AG1 Above Wilkes Barre Sewage Treatment Plant	121100(6/6) (17200-390000)	80800(17/19) (8710-390000)	0
	Cs-137	-	476(4/20) (262-910)	Station AG1 Above Wilkes-Barre Sewage Treatment Plant	950(3/6) (512-1800)	816(4/19) (419-1800)	0
	I-131	-	1316(6/20) (431-2090)	Section AG4 Below SSES Discharge	1530(3/10) (684-2090)	1097(4/19) (516-1690)	0
	Be-7	-	20720(15/20) (3010-110000)	Station AG4 Below SSES Discharge	6590(9/10) (3010-110000)	18927(15/19) (3110-73000)	0

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 31 December 1983 to January 8, 1985
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Game, Poultry and Eggs (pCi/kg (wet))	Gamma Spec 4						
	Cs-137	80	960(2/4) (540-1380)	Station 2A 0.4-1.0 miles NNW	960(2/2) (540-1380)	Only Indicator locations sampled for this medium.	0
	K-40	-	2650(4/4) (1020-3670)	Station 2A 0.4-1.0 miles NNW	3390(2/2) (3110-3670)		
	Ba-140	-	LLD				
	Co-58	-	LLD				
	Co-60	-	LLD				
	Cs-134	60	LLD				
	Fe-59	-	LLD				
	I-131	60	LLD				
	La-140	-	LLD				
	Mn-54	-	LLD				
	Nb-95	-	LLD				
	Zn-65	-	LLD				
	Zr-95	-	LLD				

Note: See footnotes at end of table.

TABLE 26

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1984

Name of Facility: Susquehanna Steam Electric Station
Location of Facility: Luzerne County, Pennsylvania

Reporting Period: 31 December 1983 to January 8, 1985
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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD) (1)	ALL INDICATOR LOCATIONS MEAN (f) (RANGE)	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST MEAN MEAN(f)(2) (RANGE)	CONTROL LOCATION MEAN(f)(2) (RANGE)	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Soil and Vegetation (pCi/kg (dry))	Gamma Spec 30						
	Cs-137	-	319(16/24) (109-987)	Station 7G1 14 miles SE	956(2/3) (533-1380)	693(3/6) (168-1380)	0
	K-40	-	13000(24/24) (8760-31800)	Station 2S4 0.9 miles NNW	18200(3/3) (10100-31800)	10608(6/6) (1290-21400)	
	Ra-226	-	(1930(14/24) (940-3590)	Station 3D2 3.4 miles NE	3220(2/3) (2840-3590)	1800(4/6) (1250-2550)	
	Th-228	-	1060(16/24) (527-2060)	Station 3D2 3.4 miles NE	1995(2/3) (1930-2060)	1185(4/6) (1020-1420)	
	Be-7	-	8190(8/24) (2900-14100)	Station 12G3 15 miles WSW	17200(1/3) -	11250(2/6) (5300-17200)	

Note: See footnotes at end of table.

(1) LLD is lower limit of detection as defined and required in PP&L Technical Specifications. Actual LLD values can be found in the appropriate tables, 4 through 25, in this report.

(2) (f) is the ratio of positive results to the number of samples analyzed for the parameter of interest. Means are of positive results only. Also given are the minimum and maximum values of detectable activity during the reporting period (RANGE).

Table 27
(Page 1 of 3)

Nearest Gardens and Residences by Sector
SSES Annual Land Use Survey, 1984

Sector	Direction	Nearest Residence (Distance/Address)	Nearest Garden (Distance/Address)
1	N	0.6 miles Thomas Residence R. D. 1 Berwick	Same
2	NNE	1.0 miles Robbins Residence R. D. 1 Berwick	1.1 miles Gordon Residence R. D. 1 Berwick
3	NE	2.3 miles Reinhimer Residence R.D. 1, Box 34B Wapwallopen	Same
4	ENE	2.1 miles Knouse Residence R. D. 1, Box 357A Wapwallopen	2.4 miles Rennensnyder Residence R. D. 1, Box 354 Wapwallopen
5	E	1.4 miles Yanulewicz Residence R. D. 1, Box 25 Berwick	Same
6	ESE	0.5 miles Zwolinski Residence R. D. 1 Berwick	2.5 miles Peters Residence R. D. 2 Wapwallopen
7	SE	0.4 miles Kline Residence R. D. 1, Box 310 Berwick	Same

Table 27
(Page 2 of 3)

Nearest Gardens and Residences by Sector
SSES Annual Land Use Survey, 1984

Sector	Direction	Nearest Residence (Distance/Address)	Nearest Garden (Distance/Address)
8	SSE	0.7 miles Naunczek Residence R. D. 1, Bell Bend Road Berwick	Same
9	S	1.1 miles Campbell Residence R. D. 1, Box 280 Berwick	Same
10	SSW	1.5 miles Rehrig Residence R. D. 1 Berwick	Same
11	SW	0.8 miles Sink Residence R. D. 1, Box 247 Berwick	Same
12	WSW	1.2 miles Kisner Residence R. D. 1 Berwick	Same
13	W	0.8 miles Johnson Residence R. D. 1, Box 240 Berwick	1.3 miles Hummel Residence R. D. 1, Box 230 Berwick
14	WNW	0.8 miles Folk Residence R. D. 1, Box 241 Berwick	Same

Table 27
(Page 3 of 3)

Nearest Gardens and Residences by Sector
SSES Annual Land Use Survey, 1984

Sector	Direction	Nearest Residence (Distance/Address)	Nearest Garden (Distance/Address)
15	NW	0.9 miles Serafin Residence R. D. 1 Berwick	2.1 miles Shultz Residence R. D. 4 Berwick
16	NNW	0.7 miles Metzler Residence R. D. 1, Box 353A Berwick	2.5 miles Brobst Residence R. D. 1 Berwick

Table 28

Nearest Dairy Animals by Sector
SSES Annual Land - Use Survey, 1984

Sector	Direction	Nearest Dairy Animals
1	N	>5 miles
2	NNE	>5 miles
3	NE	>5 miles
4	ENE	Leroy Hess 2.7 miles
5	E	Wilbur Bloss (1) 4.5 miles
6	ESE	Luther Travelpiece 2.4 miles
7	SE	Joseph Zajac 2.6 miles
8	SSE	Poltrock Farm (1,2) 3.2 miles
9	S	Thomas, Guy; Morris, S. 2.4 miles
10	SSW	Ross Ryman (1) 3.0 miles
11	SW	Walter Ryman 3.5 miles
12	WSW	Frederick Shultz (1) 1.7 miles
13	W	Jack Dent (1) 5.0 miles
14	WNW	>5 miles
15	NW	>5 miles
16	NNW	Harold Shoemaker 4.2 miles

(1) Participant in SSES REMP

(2) Goat milk

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984
(Page 1 of 6)

Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Surface Water (pCi/ℓ ± 2s)	5S8	07/16/84 to 08/06/84	Iodine	I-131	LT 0.1	0.043±0.027
			Gross Beta	-	3.9±1.0	2.0±1.4
	5S8	07/16/84 to 08/06/84	Tritium	H-3	160±40	290±190
	6S6	07/02/84 to 08/06/84	Gross Beta	-	3.5±0.5	2.7±2.5
		07/16/84 to 07/23/84	Iodine	I-131	0.36±0.12	LT 0.10
		07/02/84 to 08/06/84	Tritium	H-3	450±70	LT 300
	6S7	07/02/84 to 08/06/84	Gross Beta	-	7.4±0.7	3.8±2.7
		07/16/84 to 07/23/84	Iodine	I-131	0.34±0.1	LT 0.08
		07/23/84 to 07/30/84	Iodine	I-131	0.21±0.11	LT 0.05
		07/02/84 to 08/06/84	Tritium	H-3	1000±100	530±190
	6S5	07/16/84 to 08/06/84	Gross Beta	-	3.0±0.9	LT 4
			Tritium	H-3	130±40	LT 300
	1D3	08/07/84	Gross Beta	-	3.5±1.0	4.3±2.6
			Tritium	H-3	150±40	LT 300
	13E1	08/08/84	Gross Beta	-	1.3±0.6	1.5±1.2
			Tritium	H-3	110±30	LT 300
	12F1	08/08/84	Gross Beta	-	4.1±1.0	LT 4
			Tritium	H-3	130±40	LT 300
	12G2	08/08/84	Gross Beta	-	3.3±0.9	2.0±1.4
			Tritium	H-3	340±50	LT 300
	12H1	08/07/84	Gross Beta	-	4.3±1.0	ND
			Tritium	H-3	170±40	LT 300
			Iodine	I-131	LT 0.1	.037±.033
	1D5	08/07/84	Gross Beta	-	17±2.0	13±3
			Tritium	H-3	150±40	LT 300
	LTAW	08/07/84	Gross Beta	-	5.0±1.2	5.0±2.7
			Tritium	H-3	140±40	LT 300

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984

Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Well Water (pCi/ℓ ± 2s)	3S5	08/08/84	Gross Beta	-	1.7±1.0	LT 2
	4S4	08/07/84	Gross Beta	-	1.5±1.0	LT 2
			Tritium	H-3	50±30	LT 300
	11S5	08/07/84	Gross Alpha	-	1.4±1.1	LT 3
			Gross Beta	-	3.4±1.4	LT 2
			Tritium	H-3	120±40	LT 300
	15A4	08/08/84	Gross Beta	-	4.0±0.9	3.5±1.4
			Tritium	H-3	110±40	LT 300
	12E4	08/08/84	Gross Beta	-	1.6±0.9	3.3±1.4
			Tritium	H-3	81±38	LT 300
	12F3	08/08/84	Gross Beta	-	2.3±1.1	LT 2
			Tritium	H-3	85±37	LT 300
	2S6	08/07/84	Tritium	H-3	56±31	LT 300
	4S2	08/08/84	Tritium	H-3	LT 60	200±190
Drinking Water	12H2	07/30/84 to 08/06/84	Iodine	I-131	LT 0.1	0.037±0.033
	Treated	07/02/84 to 08/06/84	Tritium	H-3	610±120	LT 300
		07/02/84 to 08/06/84	Gross Alpha	-	LT 0.8	0.95±0.93
		07/02/84 to 08/06/84	Gross Beta	-	2.8±0.4	1.4±1.3
	12H2 Raw	07/09/84 to 08/06/84	Gross Beta	-	3.3±0.5	2.6±2.5
	12F3	08/08/84	Gross Beta	-	4.0±1.2	LT 2
	12F3	08/08/84	Tritium	H-3	200±40	200±190

All other overlapping results 2 (water samples for Gross Beta) were LLD's.
All other overlapping results 19 (water samples for Gross Alpha) were LLD's.
All other overlapping results 2 (water samples for Tritium) were LLD's.
All other overlapping results 22 (water samples for Gamma Spec) were LLD's.
All other overlapping results 16 (water samples for Iodine-131) were LLD's.

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984
(Page 3 of 6)

Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Precipitation (pCi/ℓ ± 2s)	1D2	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 40	20±9
			Gross Beta	-	3.8±0.7	5.2±2.6
	11S2	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 50	24±7
			Gross Alpha	-	LT 0.5	1.4±0.9
			Gross Beta	-	2.7±0.6	2.6±1.3
	5S4	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 40	28±9
			Tritium	H-3	LT 80	330±200
			Gross Alpha	-	0.66±0.47	0.94±0.66
			Gross Beta	-	4.2±0.7	2.7±1.3
	12G1	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 50	29±8
			Tritium	H-3	110±50	LT 300
			Gross Alpha	-	0.53±0.45	0.76±0.74
			Gross Beta	-	3.9±0.7	3.0±1.4
	15S4	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 30	21±7
			Tritium	H-3	LT 70	310±190
			Gross Alpha	-	0.55±0.44	LT 3
			Gross Beta	-	3.5±0.7	3.0±1.5
	9B1	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 50	26±7
			Tritium	H-3	LT 100	LT 300
			Gross Alpha	-	LT 0.5	0.71±0.61
			Gross Beta	-	3.1±0.7	3.5±1.4
	7G1	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 40	26±8
			Gross Beta	-	3.1±0.7	4.4±1.4

* All samples analyzed at TI started on 04/09/84.

All other overlapping results (10 precipitation samples for Gamma Spec) were LLDs.
All other overlapping results (5 precipitation samples for Tritium) were LLDs.
All other overlapping results (3 precipitation samples for Gross Alpha) were LLDs.

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984
(Page 4 of 6)

Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Precipitation (pCi/ℓ ± 2s)	2S2	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 40	16±7
			Gross Alpha	-	0.61±0.46	1.1±0.8
			Gross Beta	-	3.8±0.7	2.8±1.4
	12E1	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 50	17±9
			Tritium	H-3	73±33	590±190
			Gross Beta	-	2.9±0.7	LT 4
	3D1	*03/20/84 to 07/10/84	Gamma Spec	Be-7	LT 40	14±7
			Gross Alpha	-	0.49±0.42	LT 0.8
			Gross Beta	-	4.1±0.7	2.4±1.3

* All samples analyzed at TI started on 04/09/84.

All other overlapping results (10 precipitation samples for Gamma Spec) were LLDs.
All other overlapping results (5 precipitation samples for Tritium) were LLDs.
All other overlapping results (3 precipitation samples for Gross Alpha) were LLDs.

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984
(Page 5 of 6)

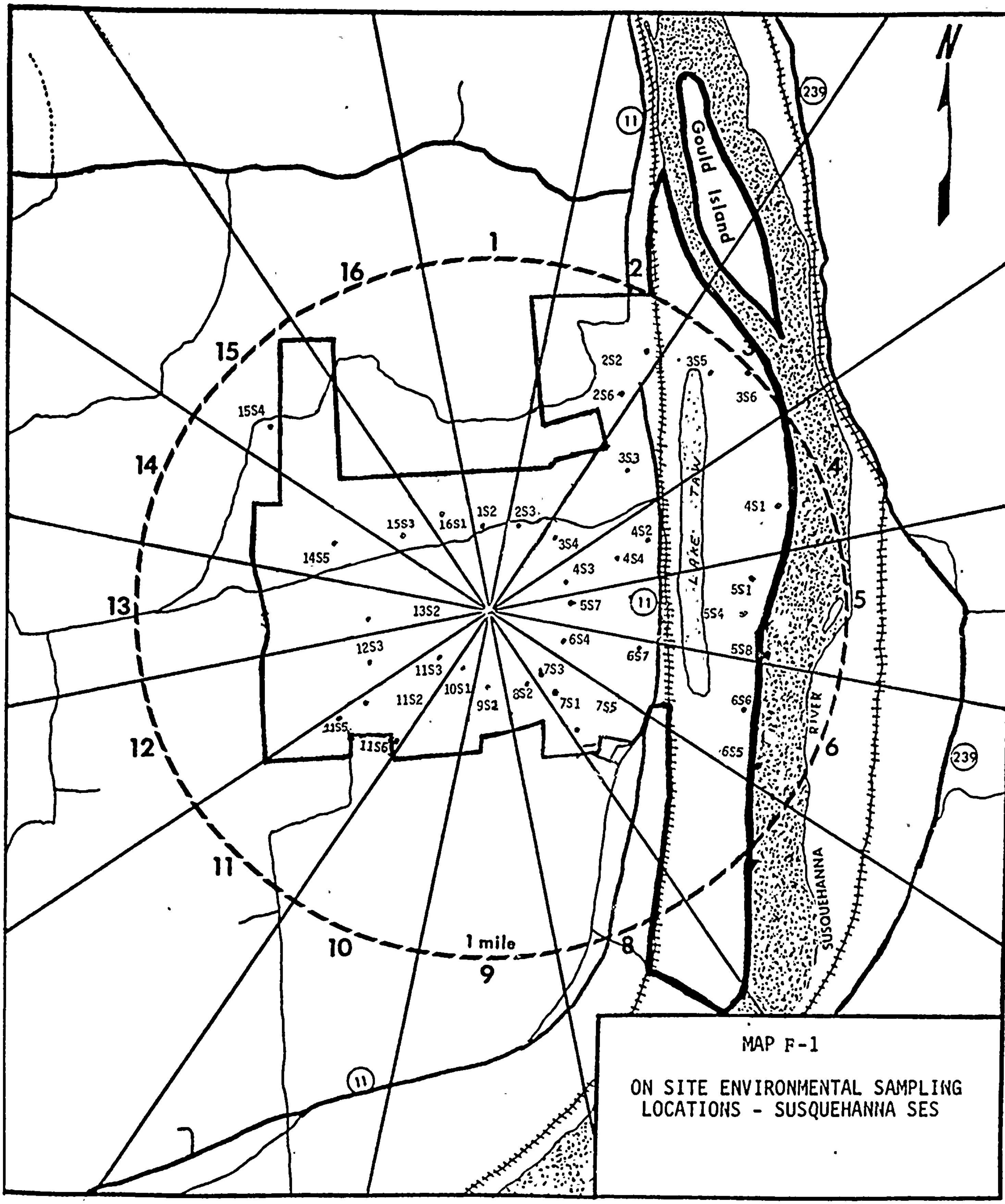
Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Milk (pCi/ℓ ± 2s)	12B2	07/23/84	Gamma	K-40	1240±120	1400±200
		08/06/84	Gamma	K-40	1480±150	1300±200
	5E1	07/23/84	Gamma	K-40	1290±130	1200±200
		08/06/84	Gamma	K-40	1360±140	1200±200
	13E3	07/23/84	Gamma	K-40	1490±150	1400±200
		08/06/84	Gamma	K-40	1430±140	1400±200
	10G1	07/23/84	Gamma	K-40	1080±110	1300±200
		08/06/84	Gamma	K-40	1130±110	1200±200
	12B3	08/06/84	Gamma	K-40	1180±120	1200±200
	6C1	08/06/84	Gamma	K-40	1450±150	1500±200
	10D1	08/06/84	Gamma	K-40	1530±150	1400±200
	12D2	08/06/84	Gamma	K-40	1380±140	1200±200
*Green Beans	7S5	07/24/84	Gamma	K-40	2270±230	2800±300
*Curled Endive	7S5	07/24/84	Gamma	K-40	6510±650	5900±600
				Be-7	319±119	ND
*Prize Lettuce	7S5	07/24/84	Gamma	K-40	3870±390	4200±500
*Swiss Chard	7S5	07/24/84	Gamma	K-40	7250±730	8700±900
*Curled Endive	11S6	07/25/84	Gamma	K-40	4390±440	4300±500
				Be-7	182±96	ND
*Prize Lettuce	11S6	07/25/84	Gamma	K-40	2540±250	5000±600
				Be-7	101±55	ND
*Cabbage	2H1	08/04/84	Gamma	K-40	2650±270	1600±200
*Beans	2H1	08/04/84	Gamma	K-40	1070±130	1600±200
*Cabbage	11D1	08/04/84	Gamma	K-40	2280±230	1500±200
*Beans	11D1	08/06/84	Gamma	K-40	1890±190	2900±400

All other overlapping results (10 Food samples for gamma spec) were LLDs.
* Vegetables - The results are in units of (pCi/kg wet ± 2s).

Table 29

Comparison of Data from the TI - NUS Overlap Period
SSES REMP 1984
(Page 6 of 6)

Medium	Station	Collection Date	Analysis	Nuclide	TI Data	NUS Data
Air Particulate	2S2	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	22.0±3.0
(E-03 pCi/m^3 ± 2s)	5S4	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	22.0±3.0
	11S2	07/10/84 to 07/17/84	Gross Beta	-	21.0±2.0	21.0±3.0
	15S4	07/10/84 to 07/17/84	Gross Beta	-	20.0±2.0	23.0±3.0
	9B1	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	23.0±3.0
	1D2	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	20.0±2.0
	3D1	07/10/84 to 07/17/84	Gross Beta	-	16.0±2.0	17.0±2.0
	12E1	07/10/84 to 07/17/84	Gross Beta	-	22.0±2.0	25.0±3.0
	7G1	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	20.0±2.0
	12G1	07/10/84 to 07/17/84	Gross Beta	-	19.0±2.0	25.0±3.0
	7H1	07/10/84 to 07/17/84	Gross Beta	-	21.0±2.0	24.0±3.0

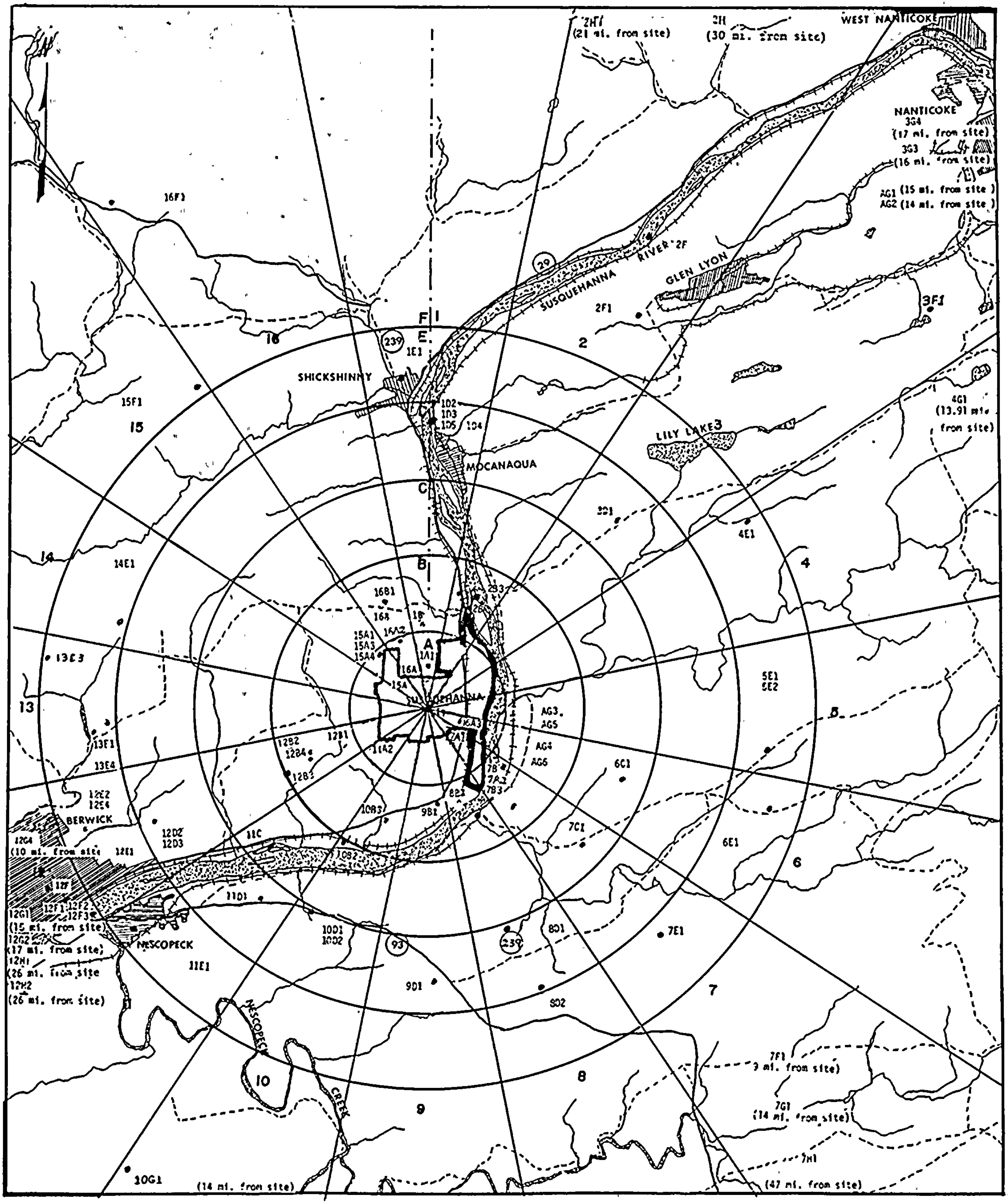


MAP F-1

ON SITE ENVIRONMENTAL SAMPLING LOCATIONS - SUSQUEHANNA SES

MAP F-2

OFF SITE ENVIRONMENTAL SAMPLING LOCATIONS - SUSQUEHANNA SES



AVERAGE CONCENTRATION OF ALL SAMPLES

AVERAGE LLD VALUE

FIGURE 3

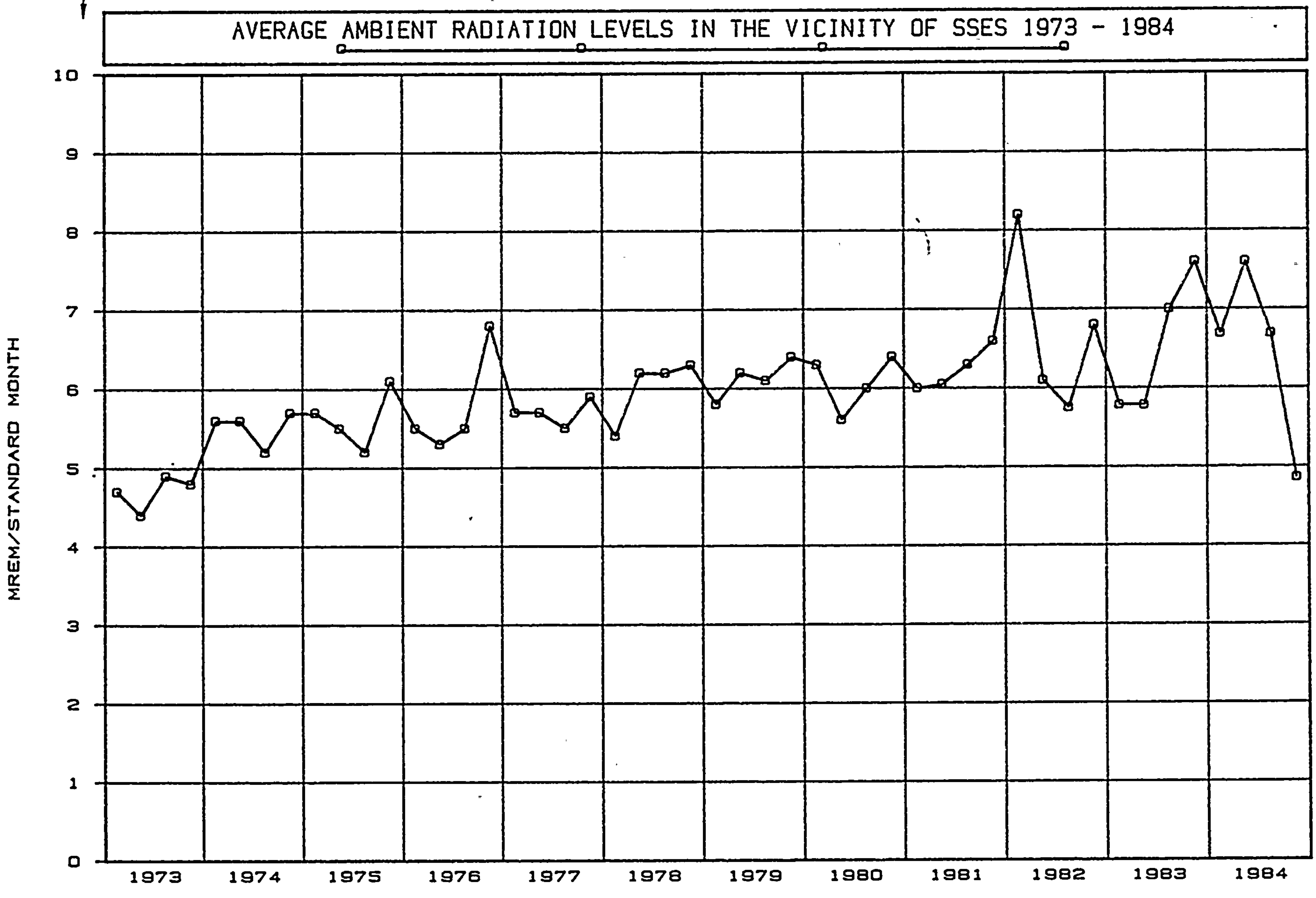
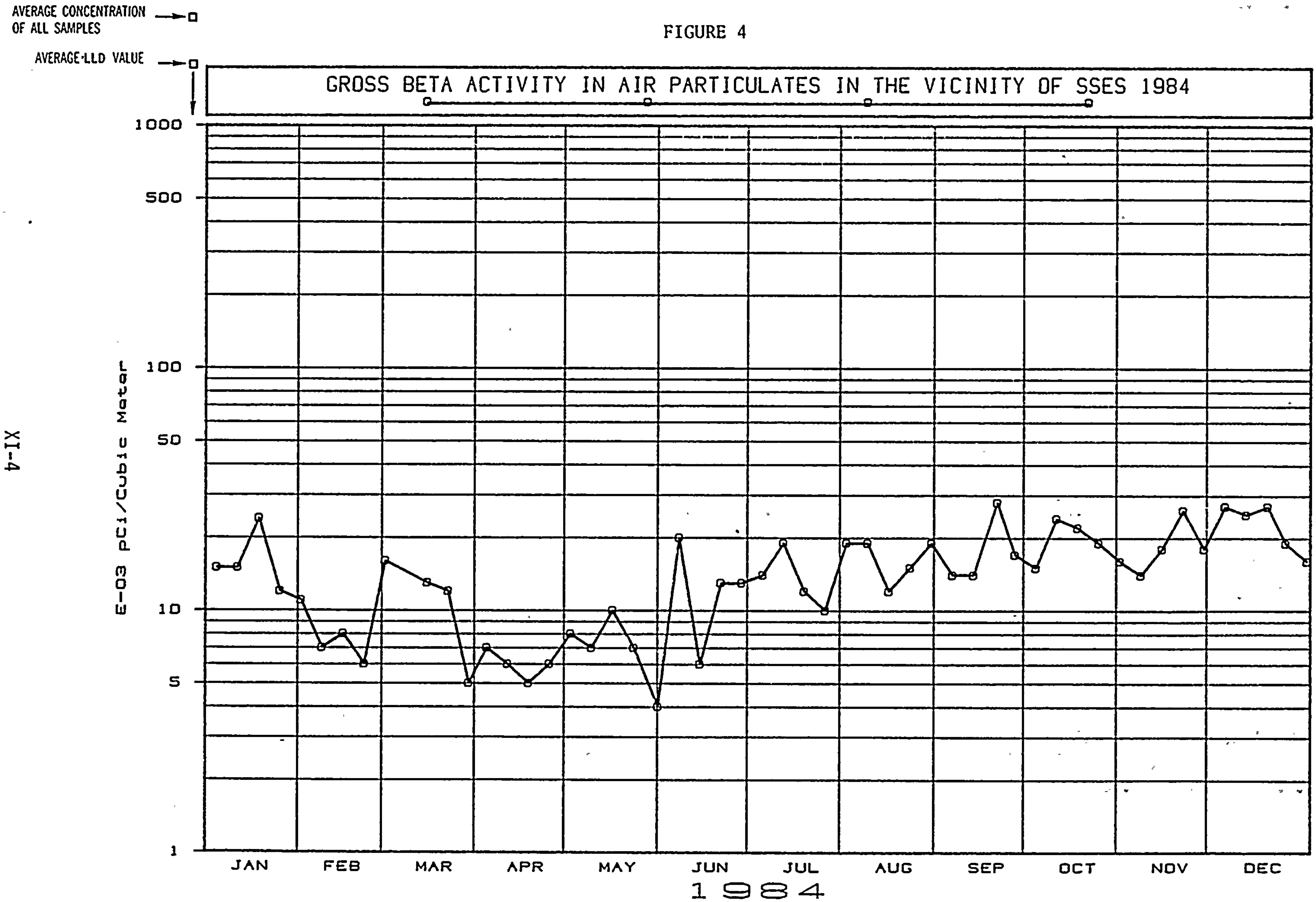


FIGURE 4



AVERAGE CONCENTRATION OF ALL SAMPLES
AVERAGE LLD VALUE
GROSS BETA ACTIVITY IN AIR PARTICULATES IN THE VICINITY OF SSES 1984
E-03 pCi/Cubic Meter
1000
500
100
50
10
5
1
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
1984

XI-4

FIGURE 5

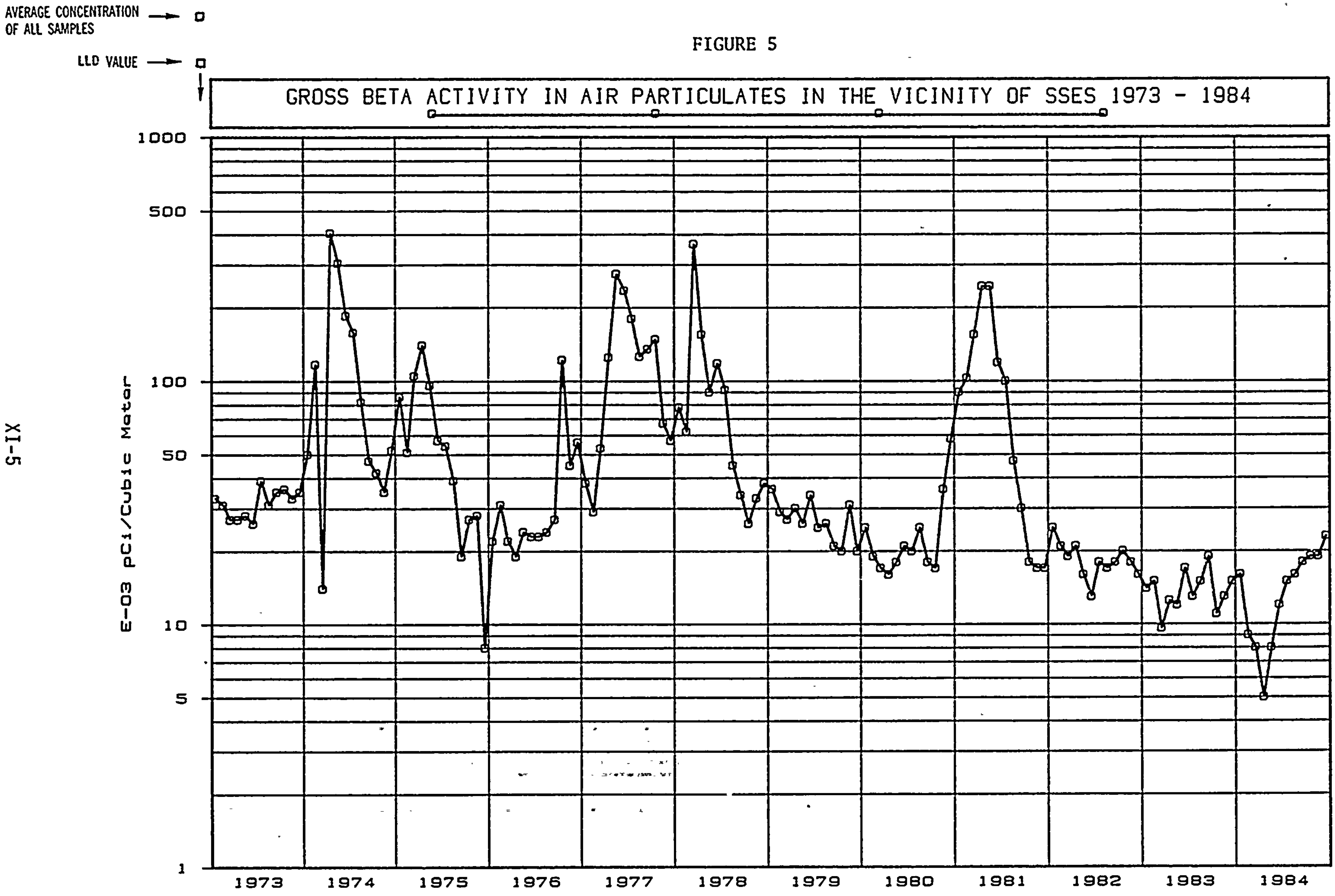
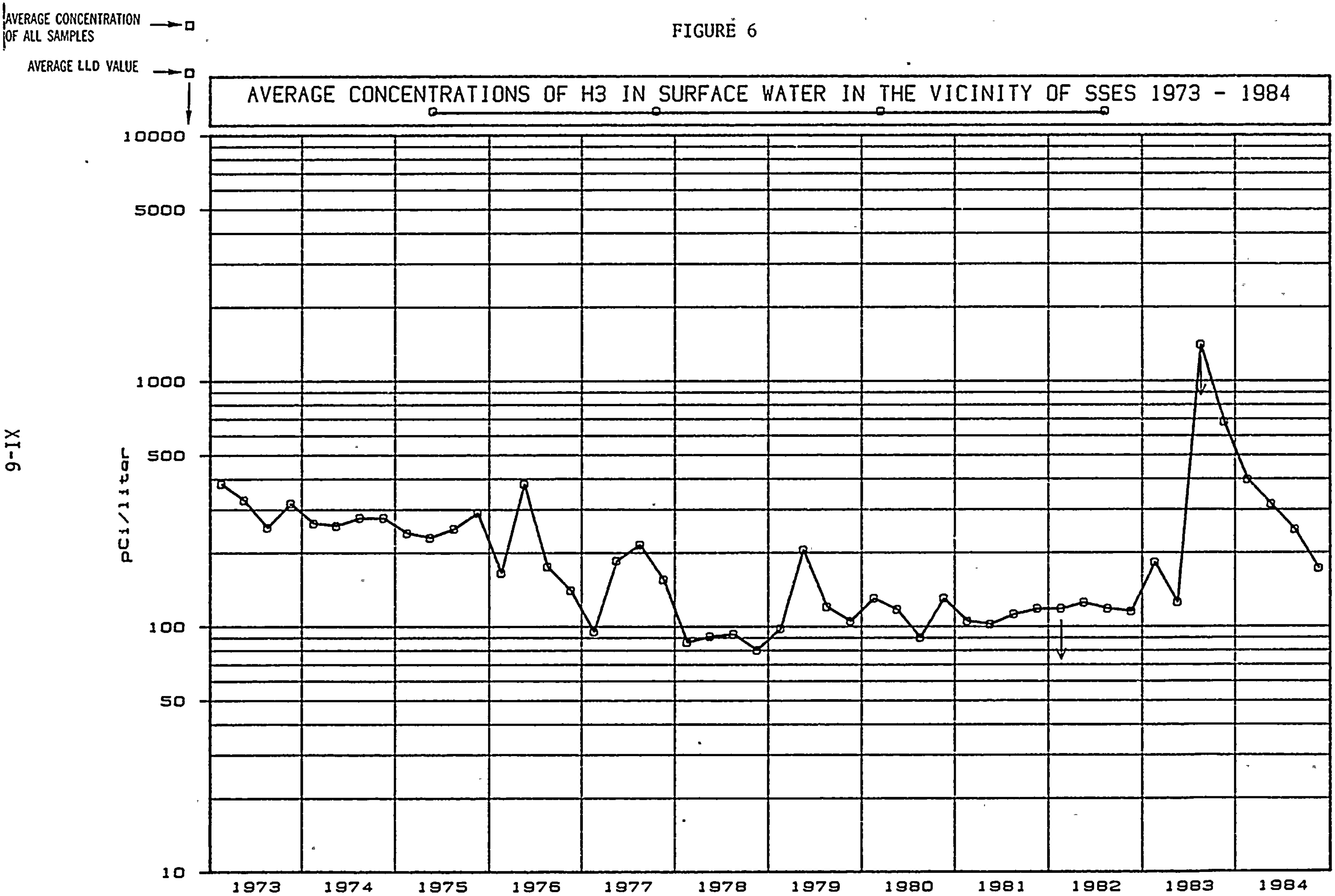

AVERAGE CONCENTRATION OF ALL SAMPLES
LLD VALUE
GROSS BETA ACTIVITY IN AIR PARTICULATES IN THE VICINITY OF SSES 1973 - 1984
E-03 pCi/Cubic Meter
1000
500
100
50
10
5
1
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984

FIGURE 6



AVERAGE CONCENTRATION OF ALL SAMPLES
AVERAGE LLD VALUE
AVERAGE CONCENTRATIONS OF H3 IN SURFACE WATER IN THE VICINITY OF SSES 1973 - 1984
10000
5000
1000
500
100
50
10
pCi/liter
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984

APPENDIX A

US EPA INTERCOMPARISON PROGRAM RESULTS

1. Introduction

The quality assurance program of the Radiological Laboratory of TI is briefly described in this appendix.

Information on each incoming sample is entered in a permanent log book. A sample number is assigned to each sample at the time of receipt. This sample number uniquely identifies each sample.

Laboratory counting instruments are calibrated, using radionuclide standards obtained from the National Bureau of Standards, the EPA, and reliable commercial suppliers, such as Amersham-Searle. Calibration of counting instruments is maintained by regular counting of radioactive reference sources. Background counting rates are measured regularly on all counting instruments. Additional performance checks for the gamma-ray scintillation spectrometer include regular checks and adjustment, when necessary, of energy calibration.

Blank, spiked (known quantities of radioactivity added), and replicate samples are processed periodically to determine analytical precision and accuracy.

2. Laboratory Analyses for Quality Assurance

Both Teledyne Isotopes and NUS participate in the U.S. Environmental Protection Agency Radioactivity Intercomparison Studies (Cross-check) Program. The TI results are listed in Table A-0. The NUS results of analyses performed on samples pertinent to the SSES program and the known values are listed in Tables A-1 through I-1.

APPENDIX A

EPA INTERCOMPARISION PROGRAM — Page

TABLE A-0

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
01/06	Water	Sr-89	36. ± 8.7	29.3 ± 8.7	36. ± 9.
		Sr-90	24. ± 2.6	23. ± 3.	23. ± 3.
01/20	Water	Gross Alpha	10. ± 8.7	8. ± 3.	10. ± 3.
		Gross Beta	12. ± 8.7	12. ± 3.	13. ± 3.
01/27	Food	Sr-89	34. ± 8.7	33.3 ± 1.7	31. ± 5.
		Sr-90	20. ± 8.7	21.7 ± 1.7	21. ± 3.
		I-131	20. ± 10.4	16.3 ± 1.7	20. ± 4.
		Cs-137	20. ± 8.7	24.1 ± 0.6	21. ± 3.
		K	2720. ±235.	2503. ±555.	2665. ±246.
02/03	Water	Cr-51	40. ± 8.7	L.T. 80.	40. ± 8.
		Co-60	10. ± 8.7	15. ± 7.9	11. ± 2.
		Zn-65	50. ± 8.7	53.3 ± 16.5	50. ± 8.
		Ru-106	61. ± 8.7	58.7 ± 33.	55. ± 9.
		Cs-134	31. ± 8.7	33.3 ± 3.	29. ± 3.
		Cs-137	16. ± 8.7	19.3 ± 1.7	16. ± 3.
02/10	Water	H-3	2383. ±607.	2270. ±786.	2366. ±247.
03/02	Milk	I-131	6. ± 1.6	5.7 ± 1.7	6. ± 1.
03/16	Water	Gross Alpha	5. ± 8.7	5. ± 1.3	6. ± 2.
		Gross Beta	20. ± 8.7	20. ± 3.	20. ± 3.
03/23	Air Filter	Gross Alpha	15. ± 8.7	19. ± 1.7	16. ± 3.
		Gross Beta	51. ± 8.7	45. ± 3.0	56. ± 6.
		Sr-90	21. ± 2.6	20. ± 6.0	19. ± 2.
		Cs-137	10. ± 8.7	11. ± 3.5	12. ± 3.
04/06	Water	I-131	6. ± 1.5	5.5 ± 0.4	6. ± 2.
04/13	Water	H-3	3508. ±728.	2660. ±342.	3461. ±288.

TABLE A-0 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
04/20	Water (Sample A)	Gross Alpha	35. ± 15.2	22. ± 4.6	(D)
		Ra-226	4.0 ± 1.04	5.4 ± 3.3	(D)
		Ra-228(E)	8.3 ± 2.16	2.9 ± 0.6	(D)
04/20	Water (Sample B)	Gross Beta	147. ± 12.7	117. ± 17.3	(D)
		Sr-89	23. ± 8.7	18. ± 7.5	(D)
		Sr-90	26. ± 2.6	22. ± 3.5	(D)
		Co-60	30. ± 8.7	29. ± 6.2	(D)
		Cs-134	30. ± 8.7	29. ± 4.6	(D)
		Cs-137	26. ± 8.7	29. ± 6.0	(D)
05/04	Water	Sr-89	25. ± 8.7	23. ± 5.	24. ± 4.
		Sr-90	5. ± 2.6	5.0 ± 0.5	5. ± 1.
05/18	Water	Gross Alpha	3. ± 8.7	2.7 ± 0.8	3. ± 1.
		Gross Beta	6. ± 8.7	6.9 ± 4.0	7. ± 2.
06/01	Water	Cr-51	66. ± 8.7	L.T. 90.	64. ± 13.
		Co-60	31. ± 8.7	33. ± 3.5	31. ± 4.
		Zn-65	63. ± 8.7	68. ± 15.	63. ± 9.
		Ru-106	29. ± 8.7	L.T. 50.	30. ± 11.
		Cs-134	47. ± 8.7	46. ± 5.	44. ± 6.
		Cs-137	37. ± 8.7	39. ± 1.7	37. ± 4.
06/08	Water	H-3	3051. ±622.	3210. ±834.	3039. ±235.
06/22	Milk	Sr-89	25. ± 8.7	22. ± 1.7	21. ± 5.
		Sr-90	17. ± 2.6	17. ± 4.6	15. ± 2.
		I-131	43. ± 10.4	40. ± 9.6	43. ± 4.
		Cs-137	35. ± 8.7	37. ± 3.	36. ± 3.
		K	1496. ±130.	1653. ± 46.	1560. ± 97.
07/20	Water	Gross Alpha	6. ± 8.7	3.8 ± 2.4	(D)
		Gross Beta	13. ± 8.7	11.3 ± 3.5	(D)

TABLE A-0 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
07/27	Food (C)	Sr-89	25.0 ± 8.7	17. ± 9.	(D)
		Sr-90	20.0 ± 2.6	20. ± 9.	(D)
		I-131(F)	39.0 ± 10.4	19. ± 3.5	(D)
		Cs-137	25.0 ± 8.7	26. ± 11.	(D)
		K	2605.0 ±226.0	3027. ±1183.	(D)
08/03	Water	I-131	34.0 ± 10.4	31. ± 3.0	36. ± 5.
08/10	Water	H-3	2817. ±617.	2930. ± 127.	2842. ±251.
08/24	Air Filter	Gross Alpha	17. ± 8.7	16. ± 1.7	17. ± 3.
		Gross Beta	51. ± 8.7	47. ± 3.	52. ± 6.
		Sr-90	18. ± 2.4	18. ± 1.7	17. ± 2.
		Cs-137	15. ± 8.7	17. ± 4.6	17. ± 4.
09/07	Water	Sr-89	34. ± 8.7	29. ± 4.5	30. ± 8.
		Sr-90	19. ± 2.6	19. ± 1.0	18. ± 3.
09/21	Water	Gross Alpha	5.0 ± 8.7	6. ± 0.0	5. ± 2.
		Gross Beta	16.0 ± 8.7	14. ± 3.	15. ± 3.
10/05	Water	Cr-51	40. ± 8.7	L.T. 107.	38. ± 8.
		Co-60	20. ± 8.7	23. ± 10.4	20. ± 3.
		Zn-65	147. ± 8.7	155. ± 17.6	149. ± 12.
		Ru-106	47. ± 8.7	L.T. 53.	45. ± 9.
		Cs-134	31. ± 8.7	34. ± 12.	29. ± 3.
		Cs-137	24. ± 8.7	28. ± 10.	25. ± 3.
10/12	Water	H-3	2810. ±356.	2720. ± 531.	2814. ±213.
10/22	Water (Sample A)	Gross Alpha	14. ± 8.7	11. ± 1.7	13. ± 4.
	Water (Sample B)	Gross Beta	64. ± 8.7	65. ± 10.	60. ± 7.
		Sr-89	11. ± 8.7	9. ± 3.5	11. ± 4.
		Sr-90	12. ± 2.6	13. ± 3.	13. ± 3.
		Co-60	14. ± 8.7	19. ± 3.5	16. ± 2.
		Cs-134	2. ± 8.7	L.T. 5.	3. ± 2.
		Cs-137	14. ± 8.7	17. ± 7.5	16. ± 2.

TABLE A-0 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
10/26	Milk	Sr-89	22. ± 8.7	15. ± 1.7	19. ± 4.
		Sr-90	16. ± 2.6	14. ± 3.	15. ± 2.
		I-131	42. ± 10.4	34. ± 9.6	40. ± 5.
		Cs-137	32. ± 8.7	32. ± 12.	32. ± 3.
		K	1517. ±131.	1370. ± 52.7	1498. ±143.
11/16	Water	Gross Alpha	7.0 ± 8.7	7.3 ± 1.7	7. ± 2.
		Gross Beta	20.0 ± 8.7	21.7 ± 1.7	21. ± 3.
11/23	Air Filter	Gross Alpha	15. ± 8.7	15. ± 1.7	(D)
		Gross Beta	52. ± 8.7	54. ± 3.5	(D)
		Sr-90	21. ± 2.6	23. ± 3.	(D)
		Cs-137	10. ± 8.7	9. ± 4.6	(D)
12/07	Water	I-131	36. ± 10.4	36. ± 6.9	36. ± 5.
12/14	Water	H-3	3182. ±624.	3523. ±868.	3206. ±236.

Notes

(A) EPA Results-Expected laboratory precision (3 sigma). Units are pCi/ℓ for water, urine, and milk except K is in mg/l. Units are total pCi for air particulate filters.

(B) Teledyne Results - Average ± three sigma. Units are pCi/ℓ for water, urine, and milk except K is in mg/ℓ. Units are total pCi for air particulate filters.

(C) Units for food analysis are pCi/kg.

(D) Results were not released at time of report.

(E) Due to the interference of Ra-226 and Ra-228 a new procedure is being developed.

(F) There was a high decay factor due to delay in receipt of sample from EPA. Since results are mostly accurate, no further action was planned.

A-1

GROSS ALPHA IN WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
01/20/84	10 ± 5	11 ± 0
03/18/84	5 ± 5	6.9 ± 0.2(1)

(1) The EPA mistakenly listed the NUS 01/20/84 data in the 03/18/84 EPA report. The results that appear here are correct.

GROSS BETA IN WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
01/20/84	12 $\pm$ 5	14 $\pm$ 1
03/18/84	20 $\pm$ 5	15 $\pm$ 2(1)

(1) The EPA mistakenly listed the NUS 01/20/84 data in the 03/18/84 EPA report. The results that appear here are correct.

C-1

GAMMA SPECTROMETRY OF WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	Nuclide	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
02/03/84	Cr-51	40 ± 5	LT 47(1)(2)
	Co-60	10 ± 5	9.9 ± 0.2(1)
	Zn-65	50 ± 5	48 ± 2(1)
	Ru-106	61 ± 5	60 ± 14(1)
	Cs-134	31 ± 5	26 ± 1(1)
	Cs-137	16 ± 5	15 ± 1(1)
06/01/84	Cr-51	66 ± 8.7	69 ± 3
	Co-60	31 ± 8.7	30 ± 1
	Zn-65	63 ± 8.7	62 ± 4
	Ru-106	29 ± 8.7	41 ± 9
	Cs-134	47 ± 8.7	43 ± 2
	Cs-137	37 ± 8.7	37 ± 2

(1) Results that were submitted to the EPA were calculated with an incorrect conversion factor (0.125).
The results that appear in this table are correct (conversion factor = 1)

(2) LT = Less Than

D-1

IODINE IN MILK

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
03/02/84	6.0 ± 0.9	5.0 ± 1.0

D-2

IODINE-131 IN WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
04/06/84	6.0 ± 0.5	5.0 ± 0.3

E-1

TRITIUM IN WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
02/10/84	2383 ± 351	1933 ± 115
04/13/84	3508 ± 364	3367 ± 58

E-2

TRITIUM IN URINE

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
04/27/84	4496 $\pm$ 372	4600 $\pm$ 140

F-1

URANIUM IN WATER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
02/17/84	15 $\pm$ 6	15 $\pm$ 1

G-1

RADIONUCLIDES ON AIR FILTER

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	Radionuclide	EPA Value $\pm$ 1s (pCi/filter)	NUS Value $\pm$ 1s (pCi/filter)
08/24/84	Cs-137	15 $\pm$ 8.7	12 $\pm$ 1

H-1

RADIONUCLIDES IN FOOD

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	Nuclide	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
01/27/84	I-131	20 ± 6	18 ± 4
	Cs-137	20 ± 5	21 ± 1
	K-40	2720 ± 136	3054 ± 117

EPA "Blind" Analysis (water)

USEPA INTERCOMPARISON PROGRAM 1984

Collection Date	Nuclide	EPA Results ± 1s (pCi/l)	NUS Results ± 1s (pCi/l)
04/22/84	Alpha	35 ± 15.2	36 ± 1
	Beta	147 ± 12.7 (1)	127 ± 6
	Co-60	30 ± 8.7	31 ± 1
	Cs-134	30 ± 8.7	28 ± 2
	Cs-137	26 ± 8.7	24 ± 3

(1) This result is under investigation by the EPA due to a negative bias obtained from the participating laboratories' results.

APPENDIX B

SUMMARY OF ANALYTICAL METHODS

The following section contains a description of the analytical laboratory procedures along with an explanation of the analytical calculation methods used by Teledyne Isotopes for sample analysis. A further discussion on data reporting conventions can be found in Appendix C.

All SSES REMP samples received by NUS during 1984 were analyzed in accordance with pertinent "controlled copy" procedures. In addition, the procedure summaries presented in the 1983 SSES Annual Report would be applicable to the 1984 samples analyzed by NUS.

DETERMINATION OF GROSS ALPHA AND/OR GROSS BETA ACTIVITY IN WATER SAMPLES, AIR PARTICULATE FILTERS, COMPOSITED AIR PARTICULATE FILTERS OR SEDIMENTS

TELEDYNE ISOTOPES

This describes the process used to measure the overall alpha and/or beta radioactivity of water samples, air particulate filters, composited air particulate filters or sediments without identifying the radioactive species present. No chemical separation techniques are involved. One liter of the water sample is evaporated on a hot plate. The evaporated sample is rinsed into a 2-inch diameter stainless steel planchet which is stamped with a concentric ring pattern to distribute residue evenly. Final evaporation to dryness takes place under heat lamps. Residue mass is determined by weighing the planchet before and after mounting the sample. In the case of an air particulate sample, the filter is mounted directly on a 2-inch stainless steel planchet. Composited air filter samples are leached with nitric acid to bring the deposit into solution. The solution is filtered and a aliquot is evaporated and then mounted on a 2-inch stainless steel planchet. Sediment samples are dried and a 1 gram aliquot is mounted directly on a 2-inch stainless steel planchet.

The planchets are then counted for alpha and/or beta activity in a low-background gas flow proportional counter. Calculation of activity includes an empirical self-absorption correction curve which allow for the change in effective counting efficiency caused by the residue mass. Self absorption is not considered in the case of air particulate filters because of the impracticality of accurately weighing the deposit and because the penetration depth of the deposit into the filter is unknown.

Alpha/Beta (Cont.)

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE LLD

$$\frac{\text{Net pCi on collection date}}{\text{unit volume or wt.}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22\ (v)\ (y)\ (DF)\ (\varepsilon)}}_{\text{net activity}} \pm \underbrace{\frac{\sigma m \sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\ (v)\ (y)\ (DF)\ (\varepsilon)}}_{\text{counting error}}$$

where:

N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

2.22 = $\frac{dpm}{pCi}$

$v(w)$ = volume or weight of sample analyzed

y = chemical yield of the mount or sample counted

DF = decay factor from the collection to the counting date

ε = efficiency of the counter

σm = multiples of counting error

For gross alpha and gross beta calculations set $y = 1$ and DF = 1.

If the net activity $\left(\frac{N}{\Delta t} - \beta\right)$ is equal to or is less than the counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "lower limit of detection" (LLD).

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

TELEDYNE ISOTOPES

Gamma emitting radioisotopes are determined with the use of a lithium-drifted germanium (Ge(Li)) and high purity germanium detectors with high resolution spectrometry in specific media, for example, air particulate filters, charcoal filters, milk, water, vegetation, soil/sediments, biological media, etc. Each sample to be assayed is prepared and counted in standard geometries such as one liter wrap-around Marinelli containers, 300 mℓ or 150 mℓ bottles, or two-inch filter paper source geometries.

Samples are counted on large (>55 cc volume) Ge(Li) detectors connected to Nuclear Data 6620 data acquisition and computation systems. All resultant spectra are stored on magnetic tape.

The analysis of each sample consists of calculating the specific activities of all detected radionuclides or the detection limits from a standard list of nuclides. The Ge(Li) systems are calibrated for each standard geometry using certified radionuclide standards traceable to the National Bureau of Standards.

DETERMINATION OF I-131 IN MILK AND WATER SAMPLES
BY RADIOCHEMISTRY AND LIQUID PHASE BY ANALYSIS

TELEDYNE ISOTOPES

This describes the radiochemical methods for determining I-131 activity in milk and water samples by coincidence counting in the liquid phase.

Four liters of sample are first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin is used to remove iodide from the sample. The iodine is then stripped from the resin with sodium hypochlorite solution, is reduced with hydroxylamine hydrochloride, and is extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution.

The iodide sample solution is oxidized to the free state using $NaNO_2$ reagent and is extracted several times into a total of 15 ml of toluene. A 200 μl aliquot is taken for determining chemical yield by spectrophotometer. A decolorizing agent (2-methyl-2-butene) is added to the toluene-iodine solution to form an inert molecule and to minimize liquid scintillation quenching. A toluene-based liquid scintillation counting solution is added to the sample, which is then analyzed by a beta-gated gamma-coincidence counting system.

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE MDL

The Sample Activity and the 2-sigma Counting Error are Calculated as Follows:

$$\frac{\text{Net pCi on collection date}}{\text{liter}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22(v)(y)(DF)(\mathcal{E})}}_{\text{net activity}} \pm \underbrace{\frac{2\sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\,(v)(y)(DF)(\mathcal{E})}}_{\text{counting error}}$$

where: N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

$2.22 = \frac{\text{dpm}}{\text{pCi}}$

v = volume of sample analyzed (liters)

y = chemical yield of the mount or sample counted

DF = decay factor from the collection to the mid count time

$\mathcal{E}$ = efficiency of the counter for I-131

Note: Efficiency is determined by counting an I-131 standard. Consequently, the branching intensity (abundance) of the I-131 gamma does not appear in the above equation.

Calculation of the MDL

If the net activity (previously defined) is equal to or is less than a specified multiple of the background counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

The L.T. value can be specified by stating only the counting error at a predetermined multiple (σm) of the one sigma statistics. A sigma multiple (σm) of 4.66 is used for calculation of the L.T. values unless another multiple such as 2.83 is specified.

$$\text{thus L.T.} = \frac{\sigma m\sqrt{\frac{\beta}{\Delta t}}}{(2.22(v)(y)(DF)(\mathcal{E})}$$

DETERMINATION OF TRITIUM BY GAS COUNTING

TELEDYNE ISOTOPES

A 2 ml aliquot is changed into hydrogen gas and collected in an activated charcoal trap. The hydrogen is then transferred into a previously evacuated one liter proportional counter. Non tritiated hydrogen and ultra-high purity methane is added and then counted. Backgrounds and standards are counted in the same gas mixture as the samples.

Calculation of the sample activity or the MDL:

$$\frac{\text{Net pCi}}{\text{unit vol.}} = \frac{3.234x(TU)_N \times V_N}{CPM_N \times V_s} \left[(CPM)_G - BKG \pm \sigma m \sqrt{\sigma G^2 + \sigma B^2} \right]$$

where: $(TU)_N$ = the tritium units of the standard

V_N = volume of the standard used to calibrate the efficiency of the detector - in psia

V_s = volume of the sample loaded into the detector - in psia

$(CPM)_N$ = the cpm activity of the standard of volume V_N

$(CPM)_G$ = the gross activity of the sample of volume V_s and the detector background

BKG = the background of the detector in cpm

3.234 = conversion factor changing TU to pC/ℓ

Δt = counting time for the sample

σm = multiple of the counting error

σG = standard deviation of the gross activity of the sample and the detector background, in cpm

σB = standard deviation of the background, in cpm

Tritium (cont.)

If the net activity $(CPM)_G$ - BKG is equal to or is less than twice the counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

$$\text{thus L.T.} = \frac{2 \times 3.234 \times (TU)_N \times V_N \times \sqrt{\sigma_G^{\ 2} + \sigma_\beta^{\ 2}}}{(CPM)_N \times V_s}$$

where: σ_G = standard deviation of the gross activity of the sample and the detector background, in cpm

σ_β = standard deviation of the background, in cpm

TLD MEASUREMENTS

For the fourth quarter of 1984, a PP&L dosimetry system was used which consists of a Panasonic UD-710 reader and UD-801 badges. The UD-801 badges have two elements of lithium borate (Cu) and two elements of calcium sulfate (Tm). Only the calcium sulfate (Tm) elements are used for environmental measurements. This phosphor was chosen for its characteristic high light output, minimal thermally induced signal loss (fading) and negligible self-dosing.

In handling, the badges are kept clean, and the element phosphors are not touched. The badges are stored and transported in plastic bags or other containers.

Before going to the field, the dosimeters are read twice (separated by one hour) in which the second reading is used as an inherent (background) reading for each element. After the inherent read, the badges are placed in sealed plastic bags (to aid in preventing moisture contacting the TLDs) labeled with the sampling location and taken immediately out to the field. Upon removal from the field, the TLDs are inspected for any damage and readout immediately.

An element correction factor has been calculated for each element, and the reader is calibrated using a cesium-137 source.

APPENDIX C

DATA REPORTING CONVENTIONS

All results from TI analyses and NUS analyses are reported to two significant figures. Errors are reported to the same decimal place as the result. If the error has no digit before the third figure in the result, the error is rounded up to the second significant figure. If the error is less than 10% of the result, an error of 10% of the result is reported. Detection limits are rounded to one significant figure.

In the tables presenting analytical measurements, the calculated value is reported with the counting error of 2 standard deviations (2s) derived from a statistical analysis of both the sample and background count rates. The precision of the results is influenced by the size of the sample, the background count rate, and the method used to round off the value obtained to reflect its degree of significance. For the results of gamma spectrometric analysis, the precision is also influenced by the composition and concentrations of the radionuclides in the sample, the size of the sample, and the assumptions used in selecting the radionuclides to be quantitatively determined. The 2s error for the net counting rate is--

$$2s = 2\sqrt{\frac{R_s}{t_s} + \frac{R_b}{t_b}}$$

where

R_s = sample counting rate

R_b = background counting rate

t_s = sample counting time

t_b = background counting time

For analyses performed by NUS, if any radioactivity measurement on a given sample is not statistically significant (i.e., the 2s counting error is equal to or greater than the net measured value), then that form of radioactivity is defined as "not detected" in the sample.

Results reported as less than (LT) are below the lower limit of detection (LLD). The LLD is defined as the smallest concentration of radioactive material in a sample that will yield a net count (above system background) with a 95 percent probability of detection and with only a 5 percent probability of falsely concluding that a blank observation represents a "real" signal.

For a measurement system that may include radiochemical separation--

$$LLD = \frac{4.66 s_b}{(E)(V)(2.22)(Y)\ (\exp(-\lambda\ \Delta t))}$$

where

LLD = lower limit of detection, as defined above, in pCi per unit mass or volume

s_b = standard deviation of the background counting rate or of the counting rate of a blank sample, as appropriate, in counts per minute

E = counting efficiency in counts per disintegration

V = sample size in units of mass or volume

2.22 = number of disintegrations per minute per picocurie

Y = fractional radiochemical yield, when applicable

λ = radioactive-decay constant for the particular radionuclide in units of reciprocal time

Δt = elapsed time between sample collection and counting

The folowing are definitions of statistical terms used in analyses and reporting of environmental-monitoring results:

1. Mean (or average or arithmetic mean) A measure of the central value of a set; the sum of all values in a set divided by the number of values in that set. The mean is expressed as follows:

$$\overline{X} = (X_1 + X_2 + \ldots X_n)/n = \sum_{i=i}^{n} X_i/n$$

2. Precision The reproducibility of measurements within a set; the scatter or dispersion of a set about its central value.

3. Measures of precision with a set

   a. Standard deviation The precision with which the values of a set are measured; the square root of the value yielded by division of the sum of squares of deviations of individual values from the mean by one less than the number of values in the set. The standard deviation, s, is expressed as follows:

$$s = \sqrt{\sum_{i=i}^{n} (X_i - \overline{X})^2/(n-1)}$$

   The standard deviation has the same units as the result. It becomes a more reliable expression of precision as n becomes larger. When the measurements are independent and normally distributed, the most useful statistics are the mean for the central value and the standard deviation for the dispersion.

   b. Relative standard deviation The standard deviation expressed as a fraction of the mean, $x/\overline{X}$. It is sometimes multiplied by 100 and expressed as a precentage.

   c. Range The difference in magnitude between the highest and the lowest values in a set. Instead of a single value, the actual limits (i.e., minimum value/maximum value) are sometimes expressed.