

NUS-4516

# SUSQUEHANNA STEAM ELECTRIC STATION

Radiological Environmental Monitoring Program

1983 ANNUAL REPORT

Prepared for  
PENNSYLVANIA POWER AND LIGHT COMPANY  
by  
NUS CORPORATION

MARCH 1984

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## Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
I.	Introduction	I-1
	A. Site and Station Description	I-1
	B. Objectives and Overview of the SSES Monitoring Program	I-2
II.	Program Description	II-1
III.	Sampling Methods and Procedures	III-1
	A. Direct Radiation	III-1
	B. Fish	III-2
	C. Sediment	III-2
	D. Water	III-2
	E. Airborne Particulates/Air Iodine-131/ Precipitation	III-4
	F. Milk/Pasture Grass	III-5
	G. Food Products	III-6
IV.	Summary and Discussion of 1983 Analytical Results	IV-1
	A. Direct Radiation	IV-2
	B. Fish	IV-3
	C. Sediment	IV-4
	D. Water	IV-6
	E. Air Particulates/Air Iodine-131/ Precipitation	IV-11
	F. Milk/Pasture Grass	IV-13
	G. Food Products	IV-14
V.	Deviations from the Program	V-1
VI.	Program Changes	VI-1
VII.	Land Use Census	VII-1
VIII.	Conclusions	VIII-1
IX.	References	IX-1
Appendix A	USEPA Intercomparison Program Results	A-1
Appendix B	Summary of Analytical Methods	B-1
Appendix C	Data Reporting Conventions	C-1

LIST OF TABLES  
(Page 1 of 2)

<u>Table Numbers</u>	<u>Title</u>	<u>Page</u>
1	Annual Analytical Schedule for the Susquehanna Steam Electric Station Radiological Environmental Monitoring Program 1983	T-1
2	Sample Locations and Media for the SSES Radiological Environmental Monitoring Program 1983	T-5
3	Direct Radiation - Thermoluminescent Dosimetry Results	T-11
4	Gamma Spectrometry of Fish	T-16
5	Gamma Spectrometry of Sediment	T-17
6	Gross Alpha in Sediment	T-20
7	Gamma Spectrometry of Water (Surface, Well and Drinking)	T-21
8	Iodine-131 in Water (Surface and Drinking)	T-32
9	Gross Beta in Water (Surface, Well and Drinking)	T-40
10	Gross Alpha in Water (Well and Drinking)	T-52
11	Tritium in Water (Surface, Well, Drinking and Precipitation)	T-56
12	Gross Beta in Air Particulate Filters	T-61
13	Gamma Spectrometry of Composited Air Particulate Filters	T-64
14	Gross Alpha in Composited Air Particulate Filters	T-66
15	Iodine-131 in Charcoal Cartridges	T-67

LIST OF TABLES  
(Page 2 of 2)

<u>Table Numbers</u>	<u>Title</u>	<u>Page</u>
16	Gamma Spectrometry of Precipitation	T-73
17	Gamma Spectrometry of Milk	T-74
18	Iodine-131 in Milk	T-82
19a	Gamma Spectrometry of Pasture Grass - RMC	T-86
19b	Gamma Spectrometry of Pasture Grass - NUS	T-87
20	Gamma Spectrometry of Food Products (Fruits and Vegetables)	T-88
21	Gamma Spectrometry of Game, Poultry and Eggs	T-91
22	Summary of Data for the SSES Operational Radiological Environmental Monitoring Program - 1983	T-92
23	Nearest Gardens and Residences Identified During the 1983 SSES Annual Land Use Survey	T-102
24	Nearest Dairy Animals by Sector, Identified During the 1983 SSES Annual Land Use Survey	T-105
25	Comparison of Data from the NUS-RMC Overlap Period	T-106

## LIST OF FIGURES

<u>Figure Numbers</u>	<u>Title</u>	<u>Page</u>
1	On Site Environmental Sampling Locations SSES	F-1
2	Off Site Environmental Sampling Locations SSES	F-2
3	Average Ambient Radiation Levels in the Vicinity of the SSES - 1973 through 1983	F-3
4	Gross Beta Activity in Air Particulates in the Vicinity of the SSES - 1983	F-4
5	Gross Beta Activity in Air Particulates in the Vicinity of the SSES - 1973 through 1983	F-5
6	Average concentrations of Tritium in Surface Water in the Vicinity of the SSES - 1973 through 1983	F-6

## INTRODUCTION

## 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 of the SSES became critical, thereby initiating 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). In June 1983, NUS Corporation took over the operational REMF. The program is now being conducted by NUS under contract with Pennsylvania Power and Light.

This report covers the period December 31, 1982 through January 07, 1984. In general, the data from the first half of 1983 was generated by RMC and the data from the second half of 1983 was generated by NUS. Data from programs conducted in prior years have been presented in a series of annual reports.<sup>(1-11)</sup>

### A. Site and Station Description

Susquehanna SES will contain 2 BWR generating units, each with a capacity of about 1050 MWe. Unit #1 achieved initial criticality on September 10, 1982. Unit #2 is scheduled for initial criticality in 1984. This site is located on a 1075 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<sup>(12)</sup>, the Safety Analysis Report<sup>(13)</sup> and the Draft Environmental Statement - O.L.<sup>(14)</sup> for Susquehanna SES.

## B. Objectives and Overview of SSES 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 assure that these criteria are met, each license authorizing reactor operation includes technical specifications (10 CFR 50.36a) governing the release of radioactive effluents.

In-plant monitoring will be used to assure 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.

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. 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 Surveillance-Environmental sections of the Environmental 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. (15)

In 1983 the radiological monitoring program included the measurement of ambient gamma radiation by thermoluminescent dosimetry; the determination of gamma emitters and gross alpha in bottom sediments; the determination of gamma emitters 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, and gamma emitters in water; the measurement of iodine-131 and gamma emitters in milk; and, the determination of gamma emitters in game, poultry, eggs, and various fruits and vegetables.



## PROGRAM DESCRIPTION

## II. PROGRAM DESCRIPTION

One-hundred and eighteen (118) locations were included in the Susquehanna SES monitoring program for 1983. 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 1983. This survey located the nearest milk animal, garden and residence in each sector (out to 5 miles) and will be updated annually.

## SAMPLING METHODS AND PROCEDURES

### 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).<sup>(15)</sup>

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.

For the first and second quarter, direct radiation measurements were made using thermoluminescent dosimeters (TLDs) consisting of calcium sulfate doped with thulium ( $\text{CaSO}_4:\text{Tm}$ ).

For the third and fourth quarter, direct radiation measurements were made using TLDs consisting of  $\text{CaSO}_4:\text{Dy}$  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.

Individual dosimeters were calibrated 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 June) and the fall (late September and October) at two 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).

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.

#### C. Sediment

Sediment samples were collected in May and September at five locations in the Susquehanna River. These were Bell Bend (7B), downstream near Hess Island (11C), the old Berwick test track (12F), upstream near Gould Island (2B) and between Shickshinny and the former State Hospital (2F). Samples were analyzed for gamma emitting nuclides, and gross alpha.

#### D. Water

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

## Surface Water

The Susquehanna River was sampled monthly at seven locations. Daily grab samples were collected at 12H1 (Merck Company) then composited into a monthly sample. Monthly samples were also composited from weekly grabs 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). Monthly grab samples were also obtained from Glen Brook Reservoir (13E1). Monthly surface water samples were analyzed for gross beta, gamma emitters and iodine-131. Quarterly composites were analyzed for tritium.

Automatic water samplers were installed at stations 6S6 and 6S7 (see program changes). Weekly sampling at 6S6 and 6S7 was begun during October 1983 and the samples were analyzed for iodine-131. Monthly composites of the weekly samples were analyzed for gross beta and gamma emitters. Quarterly composites (from the monthly composites) were analyzed for tritium.

## 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), were sampled monthly. The Berwick Water Company (12F3) actually draws a portion of its water from the Glen Brook Reservoir (a surface water location 13E1). 12F3 is included here because its sampling regime is that for well water. Gross beta and gamma analyses were performed on the monthly samples. Gross alpha and tritium analyses were performed on quarterly composites of monthly grab samples.

## Drinking Water

During the first two quarters, drinking water was sampled monthly at two locations, the Berwick Water Company (12F3) and the Danville Water Company (12H2). In addition, weekly samples were collected from location 12H2 for iodine-131 analysis. Gross beta and gamma emitters were analyzed monthly. Gross alpha and tritium were analyzed as quarterly composites for location 12F3 and monthly for location 12H2.

During the second two quarters, drinking water was sampled monthly at 12F3 and 12H2 RAW and weekly at 12H2 TREATED until October. In October weekly sampling at 12H2 RAW and 12H2 TREATED was begun. The weekly samples were analyzed for iodine-131. Composites of the 12H2 RAW and 12H2 TREATED samples were made on a monthly basis and analyzed for gross beta, gamma emitters, gross alpha, and tritium. Station 12F3 was analyzed for gross beta, gamma emitters, and iodine-131 monthly and gross alpha, and tritium on a quarterly basis.

## 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.

Precipitation samples were collected monthly in previously unused two gallon plastic containers.

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 Hazeltown 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, 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%. Precipitation samples were collected monthly from locations 5S4, 11S2, 1D2 and 12G1 and composited and analyzed quarterly for tritium and gamma emitters. Precipitation samples were also collected from 12E1, 9B1, 2S2, 3D1, 15S4, and 7G1 (control) beginning with the second quarter.

#### 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 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 closest farm (15A1). Pasture grass samples from location 8D1 were collected 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 farmers within the vicinity of Susquehanna SES. These included apples, honey, corn, cabbage, lettuce, potatoes, squash, spinach, string beans, tomatoes, endive, strawberries, peppers and swiss chard. Locations that were sampled were 11D1, 7S5, 12S4, 7B2, 12B1, and 2H2 (2H2 was a substitution for 2H1).

### Meat

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

### Game

Three deer samples and eight squirrel samples were collected in the fall and the flesh was analyzed for gamma emitters. Stations that were sampled were 1A, 2A, 15A, 16A, 1B, and 16B.

SUMMARY AND DISCUSSION OF 1983 ANALYTICAL RESULTS

#### IV. SUMMARY AND DISCUSSION OF 1983 ANALYTICAL RESULTS

Data from the radiological analyses of environmental media collected during the report period are tabulated and discussed below. The procedures and specifications followed in the laboratory for these analyses are as required in Section 5.0 of the NUS Environmental Services Division Quality Assurance Manual, and are detailed in the NUS Radiological Laboratory Work Instructions. NUS analytical methods are summarized in Appendix B. Analytical methods used by RMC during its portion of the program were the same as those reported previously. (11,19)

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods.<sup>(16)</sup> The use of "LT" in the data tables is the equivalent of the less than symbol (<) and is consistent with the NUS 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. NUS analytical methods meet the LLD requirements addressed in Table 2 of the USNRC Branch Technical Position of Radiological Monitoring (November 1979, Revision 1).<sup>(15)</sup>

Tables 3 through 21 give the radioanalytical results for individual samples. A statistical summary of the results appears in Table 22. The reported averages are based only on concentrations above the limit of detection. In Table 22, 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 two quarters are from RMC and results from the last two quarters are from NUS. In both cases TLD packets or badges of four readout areas each were deployed quarterly at 66 locations. The mean values of four readings (corrected individually for response to a known dose and for in-transit exposure) are reported in this table, unless indicated otherwise. In the individual data table RMC data had been reported as mrad/day while NUS data had been reported as mR/day. RMC's conversion from mR to mrad had been initially made by dividing mR by 0.955. This conversion was incorporated into NUS data for averaging and statistical summaries as well as for the discussion which follows. A description of the TLD system used by NUS is contained in Appendix B.

A statistical summary of the 1983 data is included in Table 22. Individual measurements of external radiation levels in the environs of the Susquehanna SES site ranged from 0.14 to 0.34 mrad/day. The average for all indicator locations,  $0.21 \pm 0.07$  mrad/day, was not distinguishable from the average of the control locations,  $0.20 \pm 0.07$ , and was virtually identical,  $0.21 \pm 0.6$ , if the Allentown location was excluded from the control average. Annual levels ranged from 55 to 100 mrad/year.

Oakley<sup>(4)</sup> 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 77 mrad/year (77 mrem assuming a quality factor of 1) 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 two locations. The collected fish were divided into three classifications for analysis. These were designated predator, forage and catfish species. All samples from May were analyzed by both RMC and NUS. Catfish were not available from the control location during the May sampling effort. Additional sampling was conducted in June and October. The June sample included muskellunge from both indicator and control locations and catfish from the control location. These samples were also split and analyzed by both RMC and NUS. The October samples were from Lake Took-A-While and included catfish and panfish. A total of 24 samples were analyzed, 13 from the indicator location and 11 from the control location.

The results of gamma spectrometric analyses of fish samples collected during 1983 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 24 samples. Cs-137 was detected in 4 of 13 samples from the indicator location, at an average activity of 15 pCi/kilogram (wet). This isotope was also detected in 1 of 11 control samples, at an activity of 11 pCi/kilogram (wet). This isotope has often been reported in fish flesh in other environmental monitoring programs at this level of activity, and was reported in two fish samples in the initial operational report for 1982 at levels of 9 and 14 pCi/kilogram (wet). Since it is present in global fallout, the occasional detection of Cs-137 in environmental media is not unusual. All other nuclides were below the detection limit. No significant differences were noted in the comparative results on the split samples.

### C. Sediment

The processes by which radionuclides and stable elements are concentrated in bottom 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 adsorbed 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. Five locations were sampled, including three indicator and two control locations. Samples collected in May were split and analyzed by both RMC and by NUS. All samples were analyzed by gamma spectrometry, and for gross alpha. A statistical summary of the analytical results including the average, fraction of detectables, and range of radionuclide concentrations are summarized in Table 22.

Results of the gamma isotopic analyses of the sediments sampled from the Susquehanna SES environment are given in Table 5.

A number of man-made and naturally occurring radioisotopes were detected in these samples. The isotope cesium-137 was detected in six of fifteen samples, ranging from 58 to 240 pCi/kg (dry). Cesium-137 was detected in 3 of 9 indicator samples ranging from 58 to 91 pCi/kg (dry). Cs-137 was detected in 3 of 6 control samples. Its range was from 70 to 240 pCi/kg (dry). Only two of the positive values were significantly different from the LLDs reported for the remainder of the analyses. Detectable activities of Co-58 and Mn-54 were reported in a single sample in May by RMC. Activities were 130 and 65 pCi/kg(dry), respectively. These values were of the same order of magnitude as the sensitivity limits reported by NUS for the sample splits.

In addition to the three man-made isotopes discussed above, a number of naturally occurring isotopes were observed in all samples. Potassium-40 was detected in all samples, ranging from 5500 to 13000 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 420 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. RMC data for naturally occurring isotopes in the uranium and thorium chains are reported as the long-lived parents, Ra-226 and Th-232.

The results of the analysis of sediment samples for gross alpha activity are listed in Table 6. Detectable activity was observed in 4 of 9 samples from the indicator location. The range/level of observed activity was 2900 to 8800 pCi/kg(dry). Detectable activity was observed in 4 of 6 samples from the control location. The range/level of observed activity was 3200 to 9900 pCi/kg(dry). The range of gross alpha activities reported in the 1982 operational REMP report was 6000 to 9500 pCi/kg(dry).

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 1983. Surface water was sampled from eleven (11) locations including three control locations. Well water was sampled from eight (8) locations, including one control. Drinking water was sampled from three (3) locations; both treated and untreated samples being obtained from the first downstream drinking water plant. Samples were analyzed variously by gamma spectrometry, and for 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 7. There were a total of 258 analyses performed; including 115 surface water samples, 35 drinking water samples, and 108 well water samples. There was no detectable activity of fission or activation products in any of the drinking or well samples analyzed. With the exception of samples from locations 657 and 558, no gamma emitters were detected in any of the surface water samples.

During the reporting period, approximately half the samples from location 657 contained one or more corrosion products. Detectable Co-58 was found in 6 of 15 samples from this location, varying from 0.91 to 200 pCi/liter. In addition, the isotopes Co-60 and Mn-54 were each detected in 3 of the 15 and 7 of the 15 samples respectively from 657. The observed activity range of Co-60 was from 8.3 to 21 pCi/l, while Mn-54 varied from 0.94 to 130 pCi/liter. A single sample from location 558 contained detectable activity of Co-60. The reported level in this sample was 4.8 pCi/liter. Two samples from location 657 contained detectable levels of Cr-51. The observed levels at the this location were 170 and 92 pCi/l.



Three of the 15 samples from location 6S7 contained detectable activity of Fe-59. The activity levels ranged from 5.8 to 34 pCi/liter. Single samples from location 6S7 contained detectable activities of Zn-65 (4.8 pCi/l) and the fission product Nb-95 (3.2 pCi/l). None of the latter three isotopes were observed in samples from any other locations.

The presence of the observed gamma-emitting nuclides can most be likely be attributed to plant operations. The levels are generally low and in all cases are well below USNRC non-routine reporting limits.

#### Iodine-131

A total of 209 samples were analyzed for iodine-131. These included 132 surface waters, and 77 drinking water samples. Results of the iodine-131 analyses are contained in Table 8.

Of the 80 indicator drinking water samples analyzed, 22 had detectable activity, ranging from 0.053 to 0.35 pCi/liter. Of the 7 drinking water samples from the control location, 1 had detectable activity at a level of 0.10 pCi/liter.

Of the 78 surface water samples from indicator locations which were analyzed for I-131, 26 had detectable activity, ranging from 0.05 to 0.32 pCi/liter. Of the 54 control surface water samples analyzed, 6 had detectable activity, ranging from 0.074 to 0.45 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. Alternate sources of this contamination could be medical uses in the area.

### Gross Beta

A total of 256 samples were analyzed for gross beta activity. These included 115 of surface waters, 105 well waters, and 36 drinking water samples. Results of the gross beta analyses are contained in Table 9. Of the 68 indicator surface water samples analyzed, 57 had detectable gross beta activity, ranging from 1.3 to 79 pCi/liter. Of the 47 control surface water samples analyzed, 30 had detectable gross beta activity, ranging from 1.2 to 26 pCi/liter.

Of the 92 indicator well water samples analyzed, 44 had detectable gross beta activity, ranging from 0.58 to 19 pCi/liter. Of the 13 control well water samples analyzed, 6 had detectable gross beta activity, ranging from 1.4 to 3.4 pCi/liter.

Of the 23 indicator drinking water samples analyzed, 22 had detectable gross beta activity, ranging from 0.38 to 21 pCi/liter. Of the 13 control drinking water samples analyzed, 8 had detectable gross beta activity, ranging from 1.6 to 3.2 pCi/liter.

## Gross Alpha

A total of 62 samples were analyzed for gross alpha activity. These included 35 quarterly well waters, 4 quarterly composite drinking water samples, and 23 monthly drinking water samples. Results of the gross alpha analyses are contained in Table 10.

Of the 28 indicator well water samples analyzed from the routine program, 4 had detectable gross alpha activity, ranging from 1.0 to 2.5 pCi/liter. Of the 4 control well water samples analyzed, 2 had detectable gross alpha activity, ranging from 0.94 to 1.4 pCi/liter. Three special well water samples were sampled in January. One of these samples had detectable gross alpha activity of 3.1 pCi/liter.

Of the 8 treated drinking water samples analyzed, 6 had detectable gross alpha activity, ranging from 1.4 to 24 pCi/liter. Of the 8 raw drinking water samples analyzed, 2 had detectable gross alpha activity, ranging from 1.9 to 25 pCi/liter. The samples with activities of 24 and 25 pCi/liter had high total solids content. None of the quarterly composite drinking water samples had detectable gross alpha activity.

## Tritium

The water samples from each location were also composited quarterly for tritium analysis. A total of 91 samples were analyzed for tritium activity. These included 35 surface waters, 32 well waters, and 24 drinking water samples. Results of the tritium analyses are contained in Table 11. Of the 21 indicator surface water samples analyzed, 4 had detectable tritium activity, ranging from 100 to 730 pCi/liter. Of the 14 control surface water samples analyzed, 1 had detectable tritium activity at 210 pCi/liter. Of the 28 indicator well water samples analyzed, 8 had detectable tritium activity, ranging from 72 to 400 pCi/liter. Of the 4 control well water samples analyzed, 1 had detectable tritium activity at 210 pCi/liter.

Of the 20 indicator drinking water samples analyzed, 3 had detectable tritium activity, ranging from 99 to 270 pCi/liter. Of the 4 control drinking water samples analyzed, 2 had detectable tritium, ranging from 76 to 250 pCi/liter.

Except for a single value (730 pCi/liter in the first quarter sample from the plant discharge, 6S7), all tritium activities which were detected were typical of existing environmental levels.

## 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 by gamma spectrometry, for gross alpha activity.

Results of gross beta analyses on air particulate filters are given in Table 12. The mean gross beta activity for all stations was  $14 \text{ E-03 pCi/m}^3$  and the range of gross beta activity was 3.0 to  $33 \text{ E-03 pCi/m}^3$ . Figure 4 illustrates the variation of beta activity in airborne particulates over the program year. Figure 5 shows the data from the current reporting period in the context of reported measurements for the program over the period 1973 through 1983.

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. Cosmogenic beryllium-7 was detected in all of the samples. The range of Be-7 activity was 30 to  $110 \text{ E-03 pCi/m}^3$ . 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. The mean gross alpha activity for all stations was  $5.1 \pm 3.3 \text{ E-03 pCi/m}^3$  and the range of gross alpha activity was 2.1 to  $8.0 \text{ E-03 pCi/m}^3$ . The average activity in the sample from the indicator locations was  $5.3 \pm 3.4 \text{ E-03 pCi/m}^3$ . The average activity in the sample from the control locations was  $4.6 \pm 2.5 \text{ E-03 pCi/m}^3$ .

### Air Iodine

Results of airborne iodine-131 analyses on charcoal cartridges are presented in Table 15. I-131 was not detected in any of the samples.

### Precipitation

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

The results of the gamma spectrometry analyses are shown in Table 16. Cosmogenic beryllium-7 was detected in 11 of 34 samples. The range of Be-7 activity was 14 to 35 pCi/liter. No other gamma-emitting isotopes were detected in any of the samples. LLDs for Be-7 in samples for which no detectable activities were measured also fell within this range.

Results of the analyses for tritium are contained in Table 11. Tritium was detected in 4 of 27 analyses of samples from indicator locations and in 2 of 7 analyses of samples from the control locations. Values of the activity ranged from 130 to 290 pCi/liter for the indicator samples; and from 120 to 190 pCi/liter for the control location. These values are typical for environmental samples.

## F. Milk/Pasture Grass

### Milk

Monthly and semi-monthly milk samples were analyzed by gamma spectrometry. The results are shown in Table 17. A total of 136 samples were analyzed, 114 from indicator locations and 22 from the control location.

As expected, naturally occurring K-40 was the major detectable activity in the milk samples. Detectable levels of cesium-137 were found in 34 of 114 samples from indicator locations, ranging from 1.2 to 3.1 pCi/liter. Detectable levels of cesium-137 were found in 7 of 22 samples from indicator locations, ranging from 1.1 to 3.3 pCi/liter. Since Cs-137 is present in global fallout, the occasional detection of this isotope in environmental media is not unusual. These levels are very similar to previously reported values for the Susquehanna SES REMP.

The results of iodine-131 analyses of milk samples are presented in Table 17. A total of 136 analyses were performed, 114 from indicator locations and 22 from the control location. No I-131 was detected in any of the milk samples.



### Pasture Grass

A total of 16 pasture grass samples were collected for analysis during this program year. Samples were collected monthly when available. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these samples are contained in Table 19.

Cs-137 was detected in 5 of 16 samples at an average activity of 17 pCi/kilogram (dry). 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 samples; nor were any members of the uranium or thorium decay chains detected in any of the samples.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout, was found in 15 of the samples. Potassium-40, a naturally occurring isotope, was found in all the samples. Table 22 contains the summarized average, fraction of detectables, and range of radionuclide concentrations. The observed values for both Be-7 and K-40 were within the expected range of normal distribution.

### G. Food Products

A total of 62 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 47 edible vegetation samples were collected from various gardens over the period June through October. These samples consisted of lettuce (9 samples); spinach (5 samples); cabbage, tomatoes, Swiss chard white, Swiss chard red (4 samples each); corn, endive and potatoes (3 samples each); beans (2 samples); and, peppers and strawberries (1 sample each). In addition three samples of apples and one sample of honey were collected in early 1984. Data obtained from the analysis of these samples are included in this report, because the samples are products representative of the 1983 growing season. Results of gamma spectrometric analyses of vegetation samples are contained in Table 20.

Detectable activity of cesium-137 was detected in 12 of 47 edible vegetation samples at an average activity of 18 pCi/kilogram (wet). 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 47 samples of edible vegetation analyzed. Naturally occurring members of the uranium and thorium decay chains were not detected in any of the samples.

Cosmogenic beryllium-7, which exists due to its deposition as stratospheric fallout, was found in 22 of the 47 samples. Potassium-40, a naturally occurring isotope, was found in all the samples. Table 22 contains the summarized average, fraction of detectables, and range of radionuclide concentrations. Both Be-7 and K-40 were found at their expected ranges of activity.

The single sample of honey contained  $54 \pm 14$  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 20.

### Game, Poultry and Eggs

In addition to the samples discussed above, a total of 13 non-vegetable food product samples were collected for analysis during this program year. These included 8 squirrel samples, 3 deer samples, and one sample each of poultry and eggs. Squirrels were collected in October, deer in November and December, and poultry and eggs were collected in December. All samples were analyzed by gamma spectrometry. Results of gamma spectrometric analyses of these non-vegetable, food product samples are contained in Table 21.

As expected the samples of squirrel meat contained high levels of Cs-137 relative to all other types of food product samples. These elevated activities have been reported previously in the annual reports on the Susquehanna SES REMP and in other sources. (18) Cs-137 was detected in all squirrel meat samples at an average activity of 1500 pCi/kilogram (wet). This is consistent with previously reported values. Since it is present in global fallout, the occasional detection of Cs-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 all of the deer samples, ranging from 15 to 39 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 22 contains the summarized average, fraction of detectables, and range of radionuclide concentrations.

DEVIATIONS FROM THE PROGRAM

V. DEVIATIONS FROM THE PROGRAM

<u>Month</u>	<u>Medium</u>	<u>Deviation</u>
January	Surface Water	Sample from station 6S5 lost in shipment.
	Well Water	Sample from station 3S5 not collected from January through May since pump was turned off for winter.
	Air Particulates and Air Iodine	Samples from all air stations except 7H1 were lost in shipment.
February	Surface Water	Samples from station 12G2 not collected due to icing conditions.
March	Milk	Samples from station 8D1 were not collected during the first quarter. Pasture grass was substituted.
April	Surface Water	Sample from station 6S7 was not collected during April. Sample was collected in May after a two month period instead of the required one month period.
	Well Water	No sample was collected from 4S2 because the outside spigot had been removed.
May	Surface Water	No sample was collected from 12G2 due to high river level.
	Air Iodine	Sample from station 12G1 was lost in shipment.

V. DEVIATIONS FROM THE PROGRAM (continued)

<u>Month</u>	<u>Medium</u>	<u>Deviation</u>
June	Milk	Duration between samples exceeded defined specifications for this frequency.
June through December	Water and Milk	Sensitivities for Ba-140, La-140, and Fe-59 were not met in many samples analyzed during these months due to delays in counting and analysis. Missed sensitivities are footnoted in the individual data tables.
August	Milk	Duration between samples exceeded defined specifications for this frequency.
September	Air Particulates and Air Iodine	Samples from 7H1 were collected on 09/22/83 after a two week period due to sample collector's error.
	Food Products	The apples and honey collected from stations 7B2, 12B1, and 2H2 were samples from the 1983 growing season. Due to a sample collection error, these samples were not picked up until the first quarter of 1984. Station 2H2 was substituted for Station 2H1 because 2H1 was closed for the season.

V. DEVIATIONS FROM THE PROGRAM (continued)

<u>Month</u>	<u>Medium</u>	<u>Deviation</u>
September	Air Particulates	Third Quarter gross alpha composite sample from 7H1 was destroyed in analysis.
	Milk	Samples from stations 10G1 and 12D2 were not analyzed for I-131 due to laboratory analyst error. Sample was destroyed in analysis.
	Milk	Duration between samples exceeded defined specifications for this frequency.
October	Air Particulates and Air Iodine	Samples were collected from 7H1 on 10/22/83 after a 2 week period due to sample collector's error.
	Precipitation	Sample from station 7G1 was lost in shipment.
	Surface Water	Sample from station 1D5 was not analyzed for I-131. The sample was destroyed in analysis.
	Milk	Sampling frequency was increased to obtain the correct number of samples for program.

V. DEVIATIONS FROM THE PROGRAM (continued)

<u>Month</u>	<u>Medium</u>	<u>Deviation</u>
November	Milk	Sample from station 5E1 was not analyzed for I-131, due to laboratory analyst's error.
	Well Water	Sample from station 3S5 was not collected. The well had been turned off for the winter.
December	Surface Water	Samples from stations 12G2 and 1D5 were not collected due to flooding conditions of river.
	Well Water	Sample from station 3S5 was not collected. The well had been turned off for the winter.
	Precipitation	Samples were not collected from the precipitation stations due to insufficient volume and the changeover from rain collectors to heated snow collectors. Rain water from December 1983 will be composited into the first quarter sample of 1984.

PROGRAM CHANGES



## VI. PROGRAM CHANGES

- Well Water station 2S5 is no longer sampled. Sample collector no longer has access to the premises.
- Goat milk station 7C1 is no longer sampled. Owner disposed of goats.
- Automatic water samplers were installed at stations 6S7, 6S6 and 12H2 RAW. Sampling was initiated at 12H2 RAW for the third quarter 1983, at 6S7 for the first quarter 1983, and at 6S6 for the third quarter 1983.
- Heated snow collectors were installed during mid-December, 1983 at stations 11S2, 9B1 5S4, 12E1, and 7G1. Snow samples will be collected from these stations during 1984.
- Several new precipitation sampling stations were added to the program: 12E1, 9B1, 2S2, 3D1, 15S4, and 7G1.
- TLD location 8H1 was dropped from the program during 1983. This was an TLD location at the RMC offices in Philadelphia.
- The following surface water stations were dropped from the program: 3G5, 3G1, and 3G2. This was due to scheduled discontinuation of a special study.

LAND USE CENSUS

## VII. LAND USE CENSUS

A land use survey was performed in the environs of the SSES during 1983. The purpose of this survey was to identify the potential indicator milk sampling locations as well as the nearest vegetable garden and residence in each of the sixteen standard sampling sectors around the plant. The outer bound of the survey for identifying the "nearest" or potential indicator locations was 5 miles. The vegetable garden and residence survey was conducted from August 3, 1983 to October 17, 1983. The milk survey was conducted during this same time period. The original milk survey report was lost in shipment so a reconstruction of the survey was conducted, by PP&L, NUS and IA personnel. The reconstruction of the report was based on the 1982 survey report, notes from the 1983 survey, and information from the sample collector. Table 28 identifies the nearest garden and residence in each sector for which one could be identified within the 5 mile radius. Table 29 identifies the nearest potential indicator milk sampling location in each sector.

## CONCLUSIONS

### VIII. CONCLUSIONS

Results of the 1983 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. Several man-made isotopes, in particular Cs-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.

Some water samples in the immediate vicinity of the plant discharge contained low activities of a number of corrosion products and one quarterly composite contained levels of tritium higher than expected in environmental samples. These are probably attributable to plant operations. However, observed activities were at very low concentrations and were of no significant dose consequence.

Based on the evidence of the environmental monitoring program the station appears to be operating within regulatory limits without impact on the health or safety parameters of the local environs.

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## IX. REFERENCES

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## TABLES

Table 1  
(Page 1 of 4)

Annual Analytical Schedule for the  
Susquehanna Steam Electric Station (PP&L)  
Radiological Environmental Monitoring Program - 1983

Media(1)	No. of Locations	Sample Freq.(2)	Analysis Required	Anal. Freq.(3)
Airborne Particulates AP	11	W	BAO -Gross Beta(4) AAO -Gross Alpha GPO -Gamma Spec	W 1 QC 1 QC 1
Airborne Iodine AI	11	W	IAO -I-131	W 1
Sediment SE	5	SA	G10 -Gamma spec A10 -Gross Alpha	SA 1 SA 1
Fish FO - F9 FA - FV	2	SA	GZO -Gamma Spec (on edible portion)	SA 1
Surface Water SW	11	W or M	BWO -Gross Beta GWO -Gamma Spec IXO -I-131 HNO -Tritium	M or MC 1 M or MC 1 W or M 1 QC 1

Note 1: Stations 6S6 and 6S7 are sampled weekly and analyzed for IXO on a weekly basis. Individual composites of the 6S6 and 6S7 weekly samples are made on a monthly basis (MC) and analyzed for BWO, and GWO. Individual quarterly composites are made of the monthly composites and analyzed for HNO.

Note: see footnote at end of table.

Table 1  
(Page 2 of 4)

Annual Analytical Schedule for the  
Susquehanna Steam Electric Station (PP&L)  
Radiological Environmental Monitoring Program - 1983

Media(1)	No. of Locations	Sample Freq.(2)	Analysis Required	Anal. Freq.(3)
Well Water GW	8	M	BWO -Gross Beta GWO -Gamma Spec AWO -Gross Alpha HNO -Tritium	M 1 M 1 QC 1 QC 1
Drinking Water PW	3	M or W	BWO -Gross Beta GWO -Gamma Spec IXO -I-131 AWO -Gross Alpha HNO -Tritium	M or MC M or MC M or W MC or QC MC or QC
<p>Note 2: Station 12F3 is sampled monthly and analyzed for BWO, GWO, and IXO on a monthly basis. Station 12F3 is analyzed for AWO, and HNO on a quarterly basis from a composite of the monthly samples (QC). Station 12H2 RAW and 12H2 TREATED are sampled weekly and analyzed for IXO 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 BWO, GWO, AWO and HNO.</p>				
Rain Water PR	10	M	GWO -Gamma Spec HNO -Tritium	QC 1 QC 1
Milk MI	8	M or SM <sup>(5)</sup>	GWO -Gamma Spec INO -I-131	SM or M SM or M

Note: See footnote at end of table.

Table 1  
(Page 3 of 4)

Annual Analytical Schedule for the  
Susquehanna Steam Electric Station (PP&L)  
Radiological Environmental Monitoring Program - 1983

Media(1)	No. of Locations	Sample Freq.(2)	Analysis Required	Anal. Freq.(3)
Goat Milk(6) MI	1	Q	INO -I-131	Q 1
Food Products FR, VE Various fruits and vegetables	11	A	GSO -Gamma Spec	A 1
Game GA	Approx. 6	A	GSO -Gamma Spec	A 1
Meat, Poultry, and Eggs ME, PO , EG	2	A	GSO -Gamma Spec	A 1
Pasture Grass(7) VL	1	M	GDO -Gamma Spec	M 1
Soil (8) SO	14	A	GDO -Gamma Spec	A 1
Direct Radiation TQ	66	Q	DQ -TLD	Q 1

Note: see footnote at end of table.

Table 1  
(Page 4 of 4)

Annual Analytical Schedule for the  
Susquehanna Steam Electric Station (PP&L)  
Radiological Environmental Monitoring Program - 1983

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1. Media codes should be as specific as possible for fish, fruits, and vegetables.
2. W = weekly, M = monthly, SM = semi-monthly, Q = quarterly QC = quarterly composite, SA semi-annual, A = annual, WC = weekly composite, MC = monthly composite.
3. Codes are the same as for sample frequency. Number to the right of the code indicates the number of analyses to be performed.
4. 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 if the gross beta analysis is greater than or equal to 24 hours following filter change.
5. Four samples will be analyzed semi-monthly from April through October.
6. Goat milk will be analyzed quarterly for I-131 only.
7. Pasture grass will be sampled during the quarters goat milk is not available.
8. Soil will be sampled during the summer of 1984.

Table 2  
(Page 1 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

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

Note: See footnote at end of table.

Table 2  
(Page 2 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

Location Code	Description*	Sample Types
11S2	0.4 mile SW, Golomb House	AP, AI, TQ, PR
11S3	0.3 mile SW, Security Fence	TQ
11S5	0.5 mile SW, EOF Building	GW
12S3	0.4 mile WSW, Security Fence	TQ
12S4	0.5 mile WSW, EOF Garden	FR, VE
13S2	0.4 mile W, Security Fence	TQ
14S5	0.5 mile WNW, Site Boundary	TQ
15S3	0.3 mile NW, Security Fence	TQ
15S4	0.6 mile NW, Transmission Corridor	AP, AI, TQ, PR
16S1	0.3 mile NNW, Security Fence	TQ
LAKE-TOOK-A-WHILE ENE, E On site		SW
1A***	0.3-1.0 mile N, Sybert's Hill Area	GA
1A1	0.6 mile N, Thomas Residence	TQ
2A***	0.4-1.0 mile NNE, Sybert's Hill Area	GA
6A3	0.6 mile ESE, State Police	TQ
7A1	0.4 mile SE, Kline Residence	TQ
11A2	0.6 mile SW, Shortz Residence	TQ
15A***	0.3-1.0 mile NW, Sybert's Hill Area	GA
15A1	0.9 mile NW, Serafin Farm	PG
15A3	0.9 mile NW, Serafin Farm	TQ
15A4	0.9 mile NW, Serafin Farm	GW
16A***	0.3-1.0 mile NNW, Sybert's Hill Area	GA
16A2	0.8 mile NNW, Rysinski Farm	TQ
1B***	1.0-1.3 miles N, Sybert's Hill Area	GA

Note: See footnote at end of table.

Table 2  
(Page 3 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

Location Code	Description*	Sample Types
2B***	1.6 miles NNE, Gould Island	SE
2B3	1.3 miles NNE, Luzerne Outerwear	TQ
7B***	1.2 miles SE, Bell Bend	SE
7B2	1.5 miles SE, Heller's Orchard	FR,VE
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,AI,TQ,PR
10B2	2.0 miles SSW, Algatt Residence	TQ
10B3	1.7 miles SSW, Car-Mar	TQ
12B1	1.3 miles WSW, Kisner Farm	EG,FR,PO
12B2	1.7 miles WSW, Shultz Farm	MI
12B3	2.0 miles WSW, Young Farm	MI
12B4	1.7 miles WSW, Shultz Farm	TQ
16B***	1.0-1.3 miles NNW, Sybert's Hill Area	GA
16B1	1.6 miles NNW, Walton Power Line	TQ
6C1	2.7 miles ESE, Moyer Farm	MI
11C***	2.6 miles SW, Hess Island	SE
1D2	4.0 miles N, Near Mocanaqua Substation	AP,AI,TQ,PR
1D3	3.9 miles N, Near Mocanaqua Substation	SW
1D5	3.9 miles N, Shickshinny Sewage Treatment Facility	SW
3D1	3.4 miles NE, Pond Hill	AP,AI,TQ,PR
8D1	3.2 miles SSE, Poltrock Farm	MI,PG
8D2	4.0 miles SSE, Mowry Residence	TQ
9D1	3.6 miles S, Smith Farm	TQ
10D1	3.0 miles SSW, Ross Ryman Farm	MI
10D2	3.0 miles SSW, Ross Ryman Farm	TQ

Note: See footnote at end of table.



Table 2  
(Page 4 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

Location Code	Description*	Sample Types
11D1	3.3 miles SW, Zehner Farm	FR,VE
12D2	3.7 miles WSW, Dogastin Farm	MI
12D3	3.7 miles WSW, Dogastin Residence	TQ
1E1	4.5 miles N, Lane Residence	TQ
4E1	4.8 miles ENE, Pole #46422 N35-197	TQ
5E1	4.5 miles E, Bloss Farm	MI
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 #2	TQ
11E1	4.7 miles SW, Jacobsen Residence	TQ
12E1	4.7 miles WSW, Berwick Hospital	AP, AI, TQ, PR
12E4	4.7 miles WSW, Berwick Hospital	GW
13E1	4.5 miles W, Glen Brook Reservoir	SW
13E3	5.0 miles W, Dent Farm	MI
13E4	4.1 miles W, Kessler Farm	TQ
14E1	4.1 miles WNW, Knouse Farm	TQ
2F***	6.4 miles NNE, Between Shickshinny and former State Hospital	SE
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
12F***	6.9 miles WSW, Old Berwick Test Track	SE
12F1	5.3 miles WSW, Berwick Bridge	SW
12F2	5.2 miles WSW, Berwick Substation	TQ
12F3	5.2 miles WSW, Berwick Water Co.	GW, PW

Note: See footnote at end of table.

Table 2  
(Page 5 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

Location Code	Description*	Sample Types
15F1	5.4 miles NW, Zawatski Farm	TQ
16F1	7.8 miles NNW, Hidlay Residence	TQ
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, AI, TQ, PR
10G1	14 miles SSW, Davis Farm	MI
12G1	15 miles WSW, Bloomsburg, PA	AP, AI, TQ, PR
12G2	17 miles WSW, between Bloomsburg and Berwick, PA	SW
12G4	10 miles WSW, Kinery Residence	TQ
2H***	30 miles NNE, Near Falls, PA	FI
2H1	Greater than 20 miles NNE	FR, VE
2H2	Greater than 20 miles NNE	FR, VE
7H1	47 miles SE, PP&L roof, Allentown	AP, AI, TQ
12H1	26 miles WSW, Merck Co.	SW
12H2****	26 miles WSW, Danville Water Company	PW
12H2RAW	26 miles WSW, Danville Water Company	PW
12H2TREATED	26 miles WSW, Danville Water Company	PW

\* All distances measured from vent.

\*\* 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.

\*\*\* Station code is omitted because no permanent locations exist; samples are taken based on availability.

\*\*\*\* During the first six months of 1983, station 12H2 was not designated as either treated or raw.

Table 2  
(Page 6 of 6)

Sample Locations and Media for the SSES  
Radiological Environmental Monitoring Program 1983

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	E	=	4-5 miles off-site
A	=	0-1 miles off-site	F	=	5-10 miles off-site
B	=	1-2 miles off-site	G	=	10-20 miles off-site
C	=	2-3 miles off-site	H	=	20 miles off-site
D	=	3-4 miles off-site			

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

Sample Type Codes

AP	=	Air Particulate	PR	=	Rain Water
AI	=	Air Iodine	MI	=	Milks
TQ	=	TLD	SE	=	Sediment
SW	=	Surface Water	FI	=	Fish
GW	=	Ground Water	FR	=	Fruits
PW	=	Potable Water	VE	=	Vegetables
EG	=	Eggs	GA	=	Game
PO	=	Poultry			

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

Table 3  
(Page 1 of 5)

Direct Radiation - Thermoluminescent Dosimetry<sup>(1)</sup> Results  
SSES REMP 1983

(All results are in mrad/std. mo, mrad/day, or mR/day  $\pm$  2s)

Station	Quarter 1 <sup>(2)</sup>		Quarter 2 <sup>(2)</sup>		Quarter 3 <sup>(3)</sup>	Quarter 4 <sup>(3)</sup>	Average <sup>(4)</sup>
	a mrad/std. mo	b mrad/day	a mrad/std. mo	b mrad/day	mR/day	mR/day	mrad/day
1S2	5.50 $\pm$ 1.30	0.18 $\pm$ 0.04	7.31 $\pm$ 0.69	0.24 $\pm$ 0.02	0.24 $\pm$ 0.03	0.30 $\pm$ 0.02	0.23 $\pm$ 0.09
1A1	4.97 $\pm$ 0.50	0.16 $\pm$ 0.02	6.65 $\pm$ 0.77	0.22 $\pm$ 0.03	0.26 $\pm$ 0.02	0.36 $\pm$ .15	0.24 $\pm$ 0.15
1D2	5.76 $\pm$ 0.65	0.19 $\pm$ 0.02	6.89 $\pm$ 1.13	0.23 $\pm$ 0.04	0.24 $\pm$ 0.03	0.19 $\pm$ 0.02	0.21 $\pm$ 0.05
1E1	5.57 $\pm$ 0.09	0.18 $\pm$ 0.01	6.14 $\pm$ 0.61	0.20 $\pm$ 0.02	0.20 $\pm$ 0.02	0.23 $\pm$ 0.02	0.20 $\pm$ 0.03
2S3	5.79 $\pm$ 0.59	0.19 $\pm$ 0.02	5.61 $\pm$ 1.01	0.18 $\pm$ 0.03	0.24 $\pm$ 0.03	0.23 $\pm$ 0.02	0.20 $\pm$ 0.05
2S2	5.27 $\pm$ 1.09	0.17 $\pm$ 0.04	5.58 $\pm$ 1.33	0.18 $\pm$ 0.04	0.22 $\pm$ 0.02	0.22 $\pm$ 0.03	0.19 $\pm$ 0.04
2B3	5.47 $\pm$ 0.60	0.18 $\pm$ 0.02	6.23 $\pm$ 1.10	0.20 $\pm$ 0.04	0.21 $\pm$ 0.04	0.24 $\pm$ 0.03	0.20 $\pm$ 0.04
2F1	5.62 $\pm$ 0.31	0.18 $\pm$ 0.01	5.64 $\pm$ 0.54	0.19 $\pm$ 0.02	0.23 $\pm$ 0.02	0.24 $\pm$ 0.02	0.20 $\pm$ 0.05
3S4	5.06 $\pm$ 0.71	0.17 $\pm$ 0.02	6.40 $\pm$ 0.11	0.21 $\pm$ 0.01	0.22 $\pm$ 0.02	0.23 $\pm$ 0.03	0.20 $\pm$ 0.04
3S3	5.65 $\pm$ 0.20	0.19 $\pm$ 0.01	5.58 $\pm$ 0.35	0.18 $\pm$ 0.01	0.21 $\pm$ 0.02	0.22 $\pm$ 0.04	0.20 $\pm$ 0.03
3D1	6.88 $\pm$ 0.25	0.23 $\pm$ 0.01	6.76 $\pm$ 1.40	0.22 $\pm$ 0.05	0.29 $\pm$ 0.02	0.28 $\pm$ 0.03	0.25 $\pm$ 0.06
3F1	5.05 $\pm$ 0.51	0.17 $\pm$ 0.02	6.40 $\pm$ 0.62	0.21 $\pm$ 0.02	0.22 $\pm$ 0.03	0.28 $\pm$ 0.03	0.21 $\pm$ 0.08
3G3	6.36 $\pm$ 0.53	0.21 $\pm$ 0.02	6.62 $\pm$ 0.34	0.22 $\pm$ 0.01	0.26 $\pm$ 0.03	0.26 $\pm$ 0.03	0.23 $\pm$ 0.04
3G4	4.99 $\pm$ 0.15	0.16 $\pm$ 0.01	6.36 $\pm$ 0.42	0.21 $\pm$ 0.01	0.24 $\pm$ 0.03	0.24 $\pm$ 0.02	0.21 $\pm$ 0.07
4S3	5.78 $\pm$ 1.29	0.19 $\pm$ 0.04	6.83 $\pm$ 1.33	0.22 $\pm$ 0.04	0.25 $\pm$ 0.02	0.27 $\pm$ 0.03	0.23 $\pm$ 0.06

Note: See footnote at end of table.

Table 3  
(Page 2 of 5)

Direct Radiation - Thermoluminescent Dosimetry<sup>(1)</sup> Results  
SSES REMP 1983

(All results are in mrad/std. mo, mrad/day, or mR/day  $\pm$  2s)

Station	Quarter 1 <sup>(2)</sup>		Quarter 2 <sup>(2)</sup>		Quarter 3 <sup>(3)</sup>	Quarter 4 <sup>(3)</sup>	Average <sup>(4)</sup>
	a mrad/std. mo	b mrad/day	a mrad/std. mo	b mrad/day	mR/day	mR/day	mrad/day
4S1	4.53 $\pm$ 1.07	0.15 $\pm$ 0.04	5.70 $\pm$ 1.10	0.19 $\pm$ 0.04	0.21 $\pm$ 0.02	0.24 $\pm$ 0.04	0.19 $\pm$ 0.07
4E1	6.01 $\pm$ 0.62	0.20 $\pm$ 0.02	5.65 $\pm$ 1.11	0.19 $\pm$ 0.04	0.25 $\pm$ 0.02	0.27 $\pm$ 0.02	0.22 $\pm$ 0.06
4G1	5.56 $\pm$ 0.31	0.18 $\pm$ 0.01	6.58 $\pm$ 0.38	0.22 $\pm$ 0.01	0.22 $\pm$ 0.03	0.23 $\pm$ 0.04	0.21 $\pm$ 0.04
5S7	5.94 $\pm$ 0.50	0.20 $\pm$ 0.02	5.97 $\pm$ 0.75	0.20 $\pm$ 0.02	0.23 $\pm$ 0.04	0.24 $\pm$ 0.03	0.21 $\pm$ 0.03
5S1	4.51 $\pm$ 0.93	0.15 $\pm$ 0.03	5.35 $\pm$ 0.57	0.18 $\pm$ 0.02	0.21 $\pm$ 0.02	0.21 $\pm$ 0.02	0.18 $\pm$ 0.05
5S4	5.75 $\pm$ 0.50	0.19 $\pm$ 0.02	5.08 $\pm$ 0.83	0.17 $\pm$ 0.03	0.22 $\pm$ 0.03	0.24 $\pm$ 0.03	0.20 $\pm$ 0.05
5E2	6.41 $\pm$ 1.18	0.21 $\pm$ 0.04	6.13 $\pm$ 1.35	0.20 $\pm$ 0.04	0.24 $\pm$ 0.02	0.30 $\pm$ 0.03	0.23 $\pm$ 0.08
6S4	7.00 $\pm$ 0.92	0.23 $\pm$ 0.03	7.12 $\pm$ 1.29	0.23 $\pm$ 0.04	0.28 $\pm$ 0.03	0.30 $\pm$ 0.04	0.25 $\pm$ 0.06
6A3	6.60 $\pm$ 0.76	0.22 $\pm$ 0.03	6.47 $\pm$ 0.13	0.21 $\pm$ 0.01	0.24 $\pm$ 0.03	0.27 $\pm$ 0.03	0.23 $\pm$ 0.04
6E1	6.48 $\pm$ 0.81	0.21 $\pm$ 0.03	6.82 $\pm$ 0.83	0.22 $\pm$ 0.03	0.27 $\pm$ 0.03	0.33 $\pm$ 0.04	0.25 $\pm$ 0.10
7S3	5.74 $\pm$ 1.08	0.19 $\pm$ 0.04	6.00 $\pm$ 1.53	0.20 $\pm$ 0.05	0.24 $\pm$ 0.02	0.24 $\pm$ 0.02	0.21 $\pm$ 0.04
7S1	5.86 $\pm$ 0.90	0.19 $\pm$ 0.03	5.60 $\pm$ 0.60	0.18 $\pm$ 0.02	0.21 $\pm$ 0.02	0.24 $\pm$ 0.04	0.20 $\pm$ 0.04
7A1	6.00 $\pm$ 0.16	0.20 $\pm$ 0.01	5.33 $\pm$ 0.66	0.18 $\pm$ 0.02	0.24 $\pm$ 0.02	0.27 $\pm$ 0.02	0.22 $\pm$ 0.07
7B3	5.85 $\pm$ 0.20	0.19 $\pm$ 0.01	5.09 $\pm$ 1.55	0.17 $\pm$ 0.05	0.24 $\pm$ 0.02	0.25 $\pm$ 0.02	0.21 $\pm$ 0.06
7E1	6.05 $\pm$ 0.52	0.20 $\pm$ 0.02	5.74 $\pm$ 0.71	0.19 $\pm$ 0.02	0.25 $\pm$ 0.02	0.25 $\pm$ 0.03	0.22 $\pm$ 0.05

Note: See footnote at end of table.

Table 3  
(Page 3 of 5)

Direct Radiation - Thermoluminescent Dosimetry<sup>(1)</sup> Results  
SSES REMP 1983

(All results are in mrad/std. mo, mrad/day, or mR/day  $\pm$  2s)

Station	Quarter 1 <sup>(2)</sup>		Quarter 2 <sup>(2)</sup>		Quarter 3 <sup>(3)</sup>	Quarter 4 <sup>(3)</sup>	Average <sup>(4)</sup>
	a mrad/std. mo	b mrad/day	a mrad/std. mo	b mrad/day	mR/day	mR/day	mrad/day
7F1	6.13 $\pm$ 0.64	0.20 $\pm$ 0.02	4.69 $\pm$ 1.70	0.15 $\pm$ 0.06	NS <sup>(5)</sup>	0.26 $\pm$ 0.02	0.20 $\pm$ 0.10
7G1	6.03 $\pm$ 0.50	0.20 $\pm$ 0.02	6.56 $\pm$ 1.53	0.20 $\pm$ 0.05	0.23 $\pm$ 0.02	0.22 $\pm$ 0.03	0.21 $\pm$ 0.02
8S2	6.23 $\pm$ 0.61	0.20 $\pm$ 0.02	5.65 $\pm$ 0.79	0.19 $\pm$ 0.03	0.22 $\pm$ 0.04	0.24 $\pm$ 0.03	0.21 $\pm$ 0.03
8B1	6.00 $\pm$ 0.63	0.20 $\pm$ 0.02	5.47 $\pm$ 0.69	0.18 $\pm$ 0.02	0.25 $\pm$ 0.03	0.25 $\pm$ 0.03	0.21 $\pm$ 0.06
8D2	5.46 $\pm$ 0.31	0.18 $\pm$ 0.01	5.89 $\pm$ 0.86	0.19 $\pm$ 0.03	0.24 $\pm$ 0.02	0.23 $\pm$ 0.02	0.20 $\pm$ 0.05
9S1	5.06 $\pm$ 0.94	0.17 $\pm$ 0.03	4.86 $\pm$ 1.01	0.16 $\pm$ 0.03	0.20 $\pm$ 0.03	0.22 $\pm$ 0.02	0.18 $\pm$ 0.04
9B1	5.39 $\pm$ 0.52	0.18 $\pm$ 0.02	5.52 $\pm$ 1.19	0.18 $\pm$ 0.04	0.21 $\pm$ 0.02	0.22 $\pm$ 0.03	0.19 $\pm$ 0.03
9D1	5.86 $\pm$ 0.71	0.19 $\pm$ 0.02	6.18 $\pm$ 0.50	0.20 $\pm$ 0.02	0.24 $\pm$ 0.02	0.23 $\pm$ 0.02	0.21 $\pm$ 0.04
10S1	5.44 $\pm$ 0.38	0.18 $\pm$ 0.01	5.69 $\pm$ 1.03	0.19 $\pm$ 0.03	0.21 $\pm$ 0.03	0.24 $\pm$ 0.03	0.20 $\pm$ 0.04
10B2	5.17 $\pm$ 0.31	0.17 $\pm$ 0.01	4.40 $\pm$ 1.08	0.14 $\pm$ 0.04	0.19 $\pm$ 0.02	0.19 $\pm$ 0.02	0.17 $\pm$ 0.04
10B3	4.95 $\pm$ 0.65	0.16 $\pm$ 0.02	4.50 $\pm$ 1.13	0.15 $\pm$ 0.04	0.21 $\pm$ 0.02	0.19 $\pm$ 0.02	0.17 $\pm$ 0.05
10D2	5.90 $\pm$ 0.27	0.19 $\pm$ 0.01	5.88 $\pm$ 0.90	0.19 $\pm$ 0.03	0.23 $\pm$ 0.03	0.23 $\pm$ 0.03	0.20 $\pm$ 0.03
11S3	8.15 $\pm$ 1.36	0.27 $\pm$ 0.04	7.73 $\pm$ 0.94	0.25 $\pm$ 0.03	0.29 $\pm$ 0.03	0.32 $\pm$ 0.03	0.28 $\pm$ 0.05
11S2	5.23 $\pm$ 0.21	0.17 $\pm$ 0.01	4.65 $\pm$ 0.30	0.15 $\pm$ 0.01	0.19 $\pm$ 0.03	0.20 $\pm$ 0.03	0.17 $\pm$ 0.04
11A2	5.14 $\pm$ 0.19	0.17 $\pm$ 0.01	4.88 $\pm$ 0.57	0.16 $\pm$ 0.02	0.21 $\pm$ 0.03	0.21 $\pm$ 0.03	0.18 $\pm$ 0.04
11E1	5.25 $\pm$ 0.43	0.17 $\pm$ 0.01	4.93 $\pm$ 0.89	0.16 $\pm$ 0.03	0.19 $\pm$ 0.03	0.21 $\pm$ 0.02	0.18 $\pm$ 0.03

Note: See footnote at end of table.



Table 3  
(Page 4 of 5)

Direct Radiation - Thermoluminescent Dosimetry<sup>(1)</sup> Results  
SSES REMP 1983

(All results are in mrad/std. mo, mrad/day, or mR/day  $\pm$  2s)

Station	Quarter 1 <sup>(2)</sup>		Quarter 2 <sup>(2)</sup>		Quarter 3 <sup>(3)</sup>	Quarter 4 <sup>(3)</sup>	Average <sup>(4)</sup>
	a mrad/std. mo	b mrad/day	a mrad/std. mo	b mrad/day	mR/day	mR/day	mrad/day
12S3	7.06 $\pm$ 0.23	0.23 $\pm$ 0.01	6.41 $\pm$ 0.30	0.21 $\pm$ 0.01	0.25 $\pm$ 0.03	0.26 $\pm$ 0.04	0.23 $\pm$ 0.03
12B4	5.73 $\pm$ 0.39	0.19 $\pm$ 0.01	4.75 $\pm$ 1.02	0.16 $\pm$ 0.03	0.23 $\pm$ 0.02	0.23 $\pm$ 0.02	0.20 $\pm$ 0.06
12D3	6.39 $\pm$ 0.29	0.21 $\pm$ 0.01	6.40 $\pm$ 0.52	0.21 $\pm$ 0.02	0.24 $\pm$ 0.02	0.26 $\pm$ 0.02	0.22 $\pm$ 0.04
12E1	5.83 $\pm$ 0.45	0.19 $\pm$ 0.01	5.55 $\pm$ 0.79	0.18 $\pm$ 0.03	0.21 $\pm$ 0.03	0.24 $\pm$ 0.03	0.20 $\pm$ 0.04
12F2	6.45 $\pm$ 0.83	0.21 $\pm$ 0.03	5.75 $\pm$ 0.91	0.19 $\pm$ 0.03	0.23 $\pm$ 0.03	0.27 $\pm$ 0.03	0.22 $\pm$ 0.06
12G1	4.65 $\pm$ 0.35	0.15 $\pm$ 0.01	4.62 $\pm$ 0.51	0.15 $\pm$ 0.02	0.17 $\pm$ 0.03	0.21 $\pm$ 0.03	0.17 $\pm$ 0.05
12G4	6.37 $\pm$ 0.63	0.21 $\pm$ 0.02	6.09 $\pm$ 1.03	0.20 $\pm$ 0.03	0.25 $\pm$ 0.02	0.28 $\pm$ 0.03	0.23 $\pm$ 0.06
13S2	7.02 $\pm$ 0.87	0.23 $\pm$ 0.03	5.80 $\pm$ 1.62	0.19 $\pm$ 0.05	0.26 $\pm$ 0.02	0.27 $\pm$ 0.04	0.23 $\pm$ 0.06
13E4	5.92 $\pm$ 1.15	0.19 $\pm$ 0.04	5.62 $\pm$ 1.14	0.18 $\pm$ 0.04	0.23 $\pm$ 0.02	0.27 $\pm$ 0.04	0.21 $\pm$ 0.07
14S5	6.74 $\pm$ 0.34	0.22 $\pm$ 0.01	6.66 $\pm$ 0.43	0.22 $\pm$ 0.01	0.26 $\pm$ 0.02	0.28 $\pm$ 0.03	0.24 $\pm$ 0.05
14E1	6.12 $\pm$ 0.75	0.20 $\pm$ 0.02	5.57 $\pm$ 1.40	0.18 $\pm$ 0.05	0.24 $\pm$ 0.02	0.26 $\pm$ 0.03	0.21 $\pm$ 0.06
15S3	6.70 $\pm$ 0.76	0.22 $\pm$ 0.03	6.50 $\pm$ 0.38	0.21 $\pm$ 0.01	0.24 $\pm$ 0.02	0.26 $\pm$ 0.02	0.23 $\pm$ 0.03
15S4	4.89 $\pm$ 0.37	0.16 $\pm$ 0.01	4.81 $\pm$ 0.74	0.16 $\pm$ 0.02	0.19 $\pm$ 0.03	0.23 $\pm$ 0.02	0.18 $\pm$ 0.06
15A3	6.39 $\pm$ 0.65	0.21 $\pm$ 0.02	5.81 $\pm$ 0.90	0.19 $\pm$ 0.03	0.23 $\pm$ 0.02	0.26 $\pm$ 0.02	0.22 $\pm$ 0.05

Note: See footnote at end of table.

Table 3  
(Page 5 of 5)

Direct Radiation - Thermoluminescent Dosimetry<sup>(1)</sup> Results  
SSES REMP 1983

(All results are in mrad/std. mo, mrad/day, or mR/day  $\pm$  2s)

Station	Quarter 1 <sup>(2)</sup>		Quarter 2 <sup>(2)</sup>		Quarter 3 <sup>(3)</sup>	Quarter 4 <sup>(3)</sup>	Average <sup>(4)</sup>
	a mrad/std. mo	b mrad/day	a mrad/std. mo	b mrad/day	mR/day	mR/day	mrad/day
15F1	7.31 $\pm$ 0.94	0.24 $\pm$ 0.03	5.89 $\pm$ 1.32	0.19 $\pm$ 0.04	NS <sup>(5)</sup>	0.33 $\pm$ 0.03	0.25 $\pm$ 0.13
16S1	6.16 $\pm$ 0.89	0.20 $\pm$ 0.03	6.03 $\pm$ 0.41	0.20 $\pm$ 0.01	0.24 $\pm$ 0.02	0.27 $\pm$ 0.03	0.22 $\pm$ 0.06
16A2	5.37 $\pm$ 0.58	0.18 $\pm$ 0.02	5.16 $\pm$ 0.25	0.17 $\pm$ 0.01	0.21 $\pm$ 0.02	0.22 $\pm$ 0.02	0.19 $\pm$ 0.04
16B1	5.30 $\pm$ 0.54	0.17 $\pm$ 0.02	4.94 $\pm$ 0.39	0.16 $\pm$ 0.01	0.22 $\pm$ 0.02	0.20 $\pm$ 0.02	0.19 $\pm$ 0.04
16F1	5.67 $\pm$ 1.08	0.19 $\pm$ 0.04	4.94 $\pm$ 0.25	0.16 $\pm$ 0.01	0.25 $\pm$ 0.02	0.25 $\pm$ 0.02	0.18 $\pm$ 0.04
7H1	4.42 $\pm$ 0.60	0.15 $\pm$ 0.02	4.55 $\pm$ 1.01	0.15 $\pm$ 0.03	0.15 $\pm$ 0.02	0.18 $\pm$ 0.02	0.15 $\pm$ 0.02
Average <sup>(4)</sup>	5.78 $\pm$ 1.52	0.19 $\pm$ 0.05	5.78 $\pm$ 1.52	0.19 $\pm$ 0.05	0.23 $\pm$ 0.05	0.25 $\pm$ 0.07	0.21 $\pm$ 0.07

- (1) Errors for individual measurements are two standard deviations of the average of four readings per dosimeter.  
 (2) Samples collected and analyzed by Radiation Management Corporation.  
 (3) Samples collected and analyzed by NUS.  
 (4) Errors of row and column averages are two standard deviations calculated from the same row or column data used to generate the average.  
 (5) NS = No Sample. TLD vandalized in field.



Table 4

Gamma Spectrometry of Fish  
SSES REMP 1983(Results in pCi/kg (wet)  $\pm$  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 (2)	Sucker/Redhorse	IND	05/19/83	LT 300 <sup>(1)</sup>	LT 14	LT 15	LT 11	LT 11	LT 40	3200 $\pm$ 400	LT 90	LT 11	LT 20	LT 30	LT 30
	Bass and Walleye	IND	05/19/83	LT 400	LT 16	LT 12	LT 11	15 $\pm$ 8	LT 40	3600 $\pm$ 400	LT 60	LT 13	LT 20	LT 30	LT 30
	Channel Catfish	IND	05/27/83	LT 300	LT 14	LT 12	LT 10	18 $\pm$ 8	LT 40	2900 $\pm$ 300	LT 80	LT 12	LT 20	LT 30	LT 30
	Sucker/Redhorse	2H	05/31/83	LT 400	LT 20	LT 16	LT 15	LT 17	LT 50	3500 $\pm$ 400	LT 70	LT 16	LT 30	LT 40	LT 40
	Bass and Walleye	2H	05/31/83	LT 170	LT 11	LT 10	LT 8	11 $\pm$ 5	LT 30	3300 $\pm$ 400	LT 40	LT 9	LT 14	LT 20	LT 18
June (2)	Muskellunge	2H	06/01/83	LT 300	LT 15	LT 17	LT 10	LT 13	LT 40	3400 $\pm$ 400	LT 50	LT 12	LT 20	LT 30	LT 30
	Channel Catfish	2H	06/01/83	LT 300	LT 18	LT 20	LT 14	LT 15	LT 50	2800 $\pm$ 300	LT 80	LT 16	LT 30	LT 40	LT 40
	Muskellunge	IND	06/14/83	LT 90	LT 9	LT 11	LT 8	17 $\pm$ 7	LT 30	3600 $\pm$ 400	LT 20	LT 9	LT 12	LT 30	LT 18
May (3)	Predator Fish	IND	05/19/83	LT 600	LT 40	LT 40	LT 20	LT 30	LT 160	3600 $\pm$ 500	LT 300	LT 30	LT 40	LT 70	LT 50
	Forage Species	IND	05/19/83	LT 800	LT 60	LT 40	LT 30	LT 40	LT 190	2700 $\pm$ 400	LT 500	LT 40	LT 50	LT 100	LT 90
	Catfish	IND	05/27/83	LT 500	LT 40	LT 30	LT 20	LT 30	LT 140	3100 $\pm$ 500	LT 300	LT 30	LT 30	LT 70	LT 70
	Predator Fish	2H	05/31/83	LT 400	LT 30	LT 20	LT 18	LT 20	LT 100	2800 $\pm$ 300	LT 200	LT 20	LT 30	LT 60	LT 50
	Forage Species	2H	05/31/83	LT 300	LT 40	LT 30	LT 20	LT 30	LT 150	2700 $\pm$ 500	LT 150	LT 30	LT 30	LT 90	LT 60
June (3)	Catfish	2H	06/01/83	LT 300	LT 40	LT 30	LT 20	LT 30	LT 100	2400 $\pm$ 400	LT 140	LT 30	LT 30	LT 80	LT 50
	Muskellunge	2H	06/01/83	LT 4000	LT 50	LT 30	LT 20	LT 20	LT 180	3100 $\pm$ 500	LT 3000	LT 30	LT 50	LT 70	LT 90
	Muskellunge	IND	06/14/83	LT 2000	LT 50	LT 40	LT 20	LT 20	LT 200	3000 $\pm$ 500	LT 1200	LT 30	LT 50	LT 100	LT 110
September (3)	Predator Fish	IND	09/15/83	LT 150	LT 10	LT 9	LT 6	9.2 $\pm$ 3.4	LT 30	3400 $\pm$ 400	LT 80	LT 7	LT 15	LT 20	LT 18
	Forage Species	IND	09/15/83	LT 200	LT 14	LT 12	LT 8	LT 9	LT 50	3600 $\pm$ 400	LT 11	LT 11	LT 20	LT 30	LT 20
	Predator Fish	2H	09/22/83	LT 150	LT 12	LT 11	LT 7	LT 10	LT 40	3100 $\pm$ 400	LT 80	LT 9	LT 18	LT 30	LT 20
	Catfish	IND	09/28/83	LT 100	LT 11	LT 11	LT 7	LT 9	LT 40	3500 $\pm$ 400	LT 40	LT 9	LT 15	LT 30	LT 18
	Forage Species	2H	09/28/83	LT 150	LT 10	LT 9	LT 7	LT 8	LT 30	3400 $\pm$ 400	LT 70	LT 8	LT 11	LT 20	LT 19
	Catfish	2H	09/23/83	LT 140	LT 11	LT 10	LT 7	LT 6	LT 40	3200 $\pm$ 400	LT 80	LT 8	LT 15	LT 20	LT 19
October (3)	Catfish	Lake T-A-W	10/07/83	LT 50	LT 8	LT 8	LT 6	LT 7	LT 20	3100 $\pm$ 400	LT 20	LT 7	LT 10	LT 20	LT 14
	Panfish	Lake T-A-W	10/07/83	LT 70	LT 11	LT 13	LT 9	LT 10	LT 30	3200 $\pm$ 400	LT 30	LT 16	LT 14	LT 30	LT 30

(1) LT = Less Than

(2) Samples collected and analyzed by Radiation Management Corporation.

(3) Samples collected and analyzed by NUS.

Table 5 (1)  
(Page 1 of 3)

Gamma Spectrometry of Sediment  
SSES REMP 1983

(Results in pCi/kg (dry)  $\pm$  2s)

Collection Date: May 26, 1983					
Station					
	11C	2F	12F	7B	2B
Ac-228:	ND <sup>(2)</sup>	ND	ND	ND	ND
Ba-140:	LT 1000 <sup>(3)</sup>	LT 1200	LT 1100	LT 800	LT 1000
Bi-212:	ND	ND	ND	ND	ND
Bi-214:	ND	ND	ND	ND	ND
Co-58:	LT 40	LT 50	130 $\pm$ 40	LT 30	LT 40
Co-60:	LT 40	LT 40	LT 30	LT 30	LT 30
Cs-134:	LT 40	LT 50	LT 40	LT 30	LT 30
Cs-137:	64 $\pm$ 27	240 $\pm$ 40	91 $\pm$ 24	58 $\pm$ 19	70 $\pm$ 24
Fe-59:	LT 110	LT 140	LT 110	LT 90	LT 100
K-40:	7700 $\pm$ 800	11000 $\pm$ 2000	8800 $\pm$ 900	8300 $\pm$ 900	8100 $\pm$ 900
La-140:	LT 300	LT 400	LT 300	LT 200	LT 200
Mn-54:	LT 40	LT 40	65 $\pm$ 28	LT 30	LT 40
Nb-95:	LT 70	LT 80	LT 70	LT 50	LT 70
Pb-212:	ND	ND	ND	ND	ND
Pb-214:	ND	ND	ND	ND	ND
Ra-226:	680 $\pm$ 70	770 $\pm$ 80	690 $\pm$ 70	530 $\pm$ 60	530 $\pm$ 60
Th-232:	720 $\pm$ 100	1100 $\pm$ 200	880 $\pm$ 90	680 $\pm$ 80	680 $\pm$ 80
Tl-208:	ND	ND	ND	ND	ND
Zn-65:	LT 90	LT 120	LT 80	LT 80	LT 80
Zr-95:	LT 80	LT 100	LT 90	LT 60	LT 80

Note: See footnotes at end of table.

Table 5 (4)  
(Page 2 of 3)

Gamma Spectrometry of Sediment  
SSES REMP 1983

(Results in pCi/kg (dry)  $\pm$  2s)

Collection Date: May 26, 1983					
Station					
	11C	2F	12F	7B	2B
Ac-228:	770 $\pm$ 220	1100 $\pm$ 200	900 $\pm$ 180	770 $\pm$ 200	860 $\pm$ 210
Ba-140:	LT 2000	LT 1800	LT 1200	LT 1600	LT 1500
Bi-212:	ND	1100 $\pm$ 600	ND	990 $\pm$ 610	ND
Bi-214:	790 $\pm$ 140	970 $\pm$ 150	820 $\pm$ 120	680 $\pm$ 130	740 $\pm$ 140
Co-58:	LT 140	LT 120	LT 120	LT 110	LT 110
Co-60:	LT 100	LT 90	LT 80	LT 80	LT 80
Cs-134:	LT 100	LT 100	LT 90	LT 90	LT 110
Cs-137:	LT 100	190 $\pm$ 60	LT 90	LT 100	LT 90
Fe-59:	LT 300	LT 300	LT 300	LT 300	LT 300
K-40:	6300 $\pm$ 1000	13000 $\pm$ 2000	6400 $\pm$ 800	8500 $\pm$ 1300	8700 $\pm$ 1300
La-140:	LT 1000	LT 1200	LT 700	LT 800	LT 1000
Mn-54:	LT 100	LT 90	LT 80	LT 80	LT 100
Nb-95:	LT 140	LT 130	LT 100	LT 110	LT 140
Pb-212:	630 $\pm$ 110	780 $\pm$ 90	670 $\pm$ 100	540 $\pm$ 80	470 $\pm$ 70
Pb-214:	730 $\pm$ 130	1100 $\pm$ 200	770 $\pm$ 110	840 $\pm$ 140	850 $\pm$ 130
Ra-226:	760 $\pm$ 140	1000 $\pm$ 200	790 $\pm$ 120	760 $\pm$ 140	790 $\pm$ 140
Tl-208:	780 $\pm$ 170	1100 $\pm$ 200	930 $\pm$ 150	880 $\pm$ 170	800 $\pm$ 170
Zn-65:	LT 300	LT 300	LT 200	LT 300	LT 300
Zr-95:	LT 200	LT 200	LT 190	LT 190	LT 200

Note: See footnote at end of table.

Table 5 (4)  
(Page 3 of 3)

Gamma Spectrometry of Sediment  
SSES REMP 1983

(Results in pCi/kg (dry)  $\pm$  2s)

Collection Date: September 29, 1983					
Station					
	11C	2F	12F	7B	2B
Ac-228:	740 $\pm$ 190	870 $\pm$ 200	590 $\pm$ 200	550 $\pm$ 240	610 $\pm$ 220
Ba-140:	LT 3000	LT 2000	LT 1900	LT 2000	LT 2000
Bi-212:	ND	ND	ND	ND	ND
Bi-214:	600 $\pm$ 130	620 $\pm$ 120	540 $\pm$ 120	450 $\pm$ 130	510 $\pm$ 140
Co-58:	LT 130	LT 130	LT 120	LT 130	LT 120
Co-60:	LT 100	LT 90	LT 80	LT 50	LT 120
Cs-134:	LT 110	LT 110	LT 100	LT 110	LT 120
Cs-137:	LT 100	LT 100	LT 90	LT 90	LT 110
Fe-59:	LT 300	LT 300	LT 300	LT 400	LT 300
K-40:	8600 $\pm$ 1100	8800 $\pm$ 1100	8200 $\pm$ 1200	5500 $\pm$ 1200	6900 $\pm$ 1300
La-140:	LT 1500	LT 1400	LT 1100	LT 1300	LT 1700
Mn-54:	LT 100	LT 90	LT 90	LT 110	LT 110
Nb-95:	LT 140	LT 130	LT 120	LT 160	LT 150
Pb-212:	430 $\pm$ 110	460 $\pm$ 110	490 $\pm$ 12 <sup>r</sup>	420 $\pm$ 120	530 $\pm$ 140
Pb-214:	590 $\pm$ 130	780 $\pm$ 140	620 $\pm$ 110	430 $\pm$ 110	480 $\pm$ 120
Ra-226:	600 $\pm$ 130	700 $\pm$ 130	580 $\pm$ 110	440 $\pm$ 120	500 $\pm$ 130
Tl-208:	710 $\pm$ 160	720 $\pm$ 170	610 $\pm$ 150	540 $\pm$ 180	630 $\pm$ 190
Zn-65:	LT 300	LT 200	LT 300	LT 300	LT 300
Zr-95:	LT 300	LT 200	LT 200	LT 300	LT 300

- (1) Samples collected and analyzed by Radiation Management Corporation.
- (2) ND = Not detected
- (3) LT = Less Than
- (4) Samples collected and analyzed by NUS.

Table 6

Gross Alpha in Sediment  
SSES REMP 1983

(Results in Units of pCi/kg (dry)  $\pm$  2s)

Month	Station	Collection Date	Gross Alpha Activity
May <sup>(2)</sup>	2B	05/26/83	3200 + 2900
	7B	05/26/83	2900 $\pm$ 2900
	11C	05/26/83	LT 4000 <sup>(1)</sup>
	2F	05/26/83	4400 + 3100
	12F	05/26/83	LT 4000
May <sup>(3)</sup>	2B	05/26/83	5400 + 3700
	7B	05/26/83	6800 $\pm$ 3900
	11C	05/26/83	8800 $\pm$ 4200
	2F	05/26/83	9900 $\pm$ 4300
	12F	05/26/83	5500 $\pm$ 3700
September <sup>(3)</sup>	2B	09/29/83	LT 3000
	7B	09/29/83	LT 3000
	11C	09/29/83	LT 3000
	2F	09/29/83	LT 3000
	12F	09/29/83	LT 3000

(1) LT = Less Than

(2) Samples collected and analyzed by Radiation Management Corporation.

(3) Samples collected and analyzed by NUS.

Table 7  
(Page 1 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of 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	Other
Jan. (1)	SW (2)	558	01/04 to 01/25/83	LT 7 (3)	LT 0.6	LT 0.6	LT 0.5	LT 0.5	LT 1.4	LT 2	LT 0.6	LT 0.7	LT 1.2	LT 1.1	
		655	NS												
		103	01/03 to 02/03/83	LT 100 (5)	35 + 4	LT 1.2	LT 1.5	LT 0.9	LT 3	LT 20 (5)	26 + 3	LT 2	LT 1.8	LT 2	
		1381	01/07/83	LT 6	LT 0.8	LT 0.8	LT 0.7	LT 0.8	LT 1.5	LT 1.4	LT 0.7	LT 0.9	LT 1.5	LT 1.4	
		12F1	01/05/83	LT 8	LT 0.6	LT 0.6	LT 0.5	LT 0.5	LT 1.5	LT 2	LT 0.6	LT 0.8	LT 1.1	LT 1.1	
		1262	01/05/83	LT 5	LT 0.5	LT 0.5	LT 0.5	LT 0.6	LT 1.2	LT 1.5	LT 0.5	LT 0.6	LT 1.1	LT 0.9	
		12H1	01/03 to 02/02/83	LT 6	LT 0.6	MD (5)	LT 0.6	LT 0.6	LT 1.4	LT 1.6 (5)	LT 0.5	LT 0.8	LT 1.4	LT 1.1	
				LT 60	LT 0.9	LT 0.8	LT 0.6	LT 0.6	LT 3	LT 20	LT 0.6	LT 1.9	LT 1.7	LT 1.7	
	GW (7)	Orangewille	01/13/84	LT 13	LT 0.8	LT 0.8	LT 0.6	LT 0.7	LT 1.9	LT 3	LT 0.7	LT 1.1	LT 1.3	LT 1.6	
		Muncy Valley	01/13/83	LT 11	LT 0.8	LT 1.0	LT 0.5	LT 0.6	LT 1.9	LT 3	LT 0.6	LT 1.0	LT 1.4	LT 1.5	
		Lee Mount.	01/13/83	LT 11	LT 0.7	LT 0.8	LT 0.5	LT 0.6	LT 1.5	LT 4	LT 0.6	LT 1.0	LT 1.3	LT 1.3	
		256	01/06/83	LT 9	LT 0.7	LT 1.1	LT 0.6	LT 0.7	LT 1.4	LT 2	LT 0.6	LT 0.9	LT 1.3	LT 1.3	
		255	01/06/83	LT 7	LT 0.6	LT 0.7	LT 0.6	LT 0.6	LT 1.5	LT 2	LT 0.6	LT 0.8	LT 1.5	LT 1.1	
		452	01/06/83	LT 7	LT 0.7	LT 0.7	LT 0.5	LT 0.6	LT 1.4	LT 2	LT 0.5	LT 0.8	LT 1.2	LT 1.1	
		454	01/06/83	LT 8	LT 0.7	LT 0.7	LT 0.6	LT 0.6	LT 1.4	LT 3	LT 0.6	LT 0.8	LT 1.3	LT 1.2	
		1155	01/06/83	LT 12	LT 0.8	LT 0.8	LT 0.5	LT 0.6	LT 1.7	LT 4	LT 0.6	LT 1.1	LT 1.5	LT 1.2	
		15A4	01/08/83	LT 8	LT 0.8	LT 1.0	LT 0.6	LT 0.7	LT 1.6	LT 2	LT 0.7	LT 0.9	LT 1.4	LT 1.4	
		12E4	01/06/83	LT 7	LT 0.7	LT 1.0	LT 0.6	LT 0.7	LT 1.5	LT 2	LT 0.6	LT 0.9	LT 1.4	LT 1.4	
		12F3	01/05/83	LT 6	LT 0.6	LT 0.7	LT 0.6	LT 0.6	LT 1.4	LT 2	LT 0.6	LT 0.8	LT 1.5	LT 1.2	
		355	NS												
	PW (8)	12F3	01/05/83	LT 7	LT 0.6	LT 0.6	LT 0.5	LT 0.5	LT 1.3	LT 1.9 (5)	LT 0.5	LT 0.7	LT 1.3	LT 1.1	
		12H2	01/03 to 02/02/83	LT 110 (5)	LT 1.8	LT 1.1	LT 0.9	LT 1.0	LT 4	LT 30 (5)	LT 1.1	LT 3	LT 2	LT 3	

Note: See footnotes at end of table.

Table 7  
(Page 2 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SES REP 1983

(Results of  $pc1/1 + 2s$ )

Month	Water Type	Station	Collection Period	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	Ia-140	Mn-54	Nb-95	Zn-65	Zr-95	Other
Feb.	SW	558	02/01 to 02/22/83	LT 60(5)	LT 1.3	LT 0.8	LT 0.8	LT 0.8	LT 3	LT 13(5)	LT 0.9	LT 2	LT 1.9	LT 2	
		655	02/01 to 02/22/83	LT 80	LT 1.6	LT 1.1	LT 0.9	LT 0.9	LT 4	LT 18	LT 1.1	LT 3	LT 2	LT 3	
		657	02/03 to 03/11/83	LT 30 (5)	120 + 20	8.3 + 0.9	LT 1.4	LT 1.1	13 + 2	LT 4	70 + 7	LT 1.6	LT 2	LT 2	
		103	02/03/83	LT 100(5)	LT 1.7	LT 1.1	LT 0.9	LT 1.0	LT 4	LT 20(5)	LT 1.1	LT 3	LT 3	LT 3	
		13E1	02/03/83	LT 50	LT 0.9	LT 0.6	LT 0.5	LT 0.5	LT 3	LT 16(5)	LT 0.5	LT 1.5	LT 1.2	LT 1.6	
		12F1	02/03/83	LT 60	LT 0.9	LT 0.7	LT 0.5	LT 0.5	LT 3	LT 18	LT 0.6	LT 1.6	LT 1.3	LT 1.6	
		12G2	NS	-	-	-	-	-	-	-	-	-	-	-	
		12H1	02/02 to 03/07/83	LT 30	LT 0.9	LT 1.1	LT 0.6	LT 0.7	LT 3	LT 8	LT 0.8	LT 1.5	LT 1.5	LT 1.8	
		256	02/02/83	LT 100(5)	LT 1.4	LT 0.9	LT 0.8	LT 0.9	LT 3	LT 19(5)	LT 0.9	LT 3	LT 2	LT 3	
		255	02/02/83	LT 60	LT 1.0	LT 0.8	LT 0.6	LT 0.6	LT 3	LT 20(5)	LT 0.7	LT 1.8	LT 1.7	LT 1.3	
		452	02/02/83	LT 110(5)	LT 1.8	LT 1.2	LT 0.9	LT 1.0	LT 5	LT 30(5)	LT 1.1	LT 3	LT 2	LT 3	
		454	02/02/83	LT 60	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 3	LT 18(5)	LT 0.6	LT 1.8	LT 1.2	LT 1.7	
	GW	1155	02/02/83	LT 70 (5)	LT 1.1	LT 0.8	LT 0.6	LT 0.6	LT 3	LT 30(5)	LT 0.6	LT 2	LT 1.6	LT 1.9	
		15A4	02/04/83	LT 110	LT 1.8	LT 1.1	LT 0.9	LT 1.0	LT 4	LT 30(5)	LT 1.1	LT 3	LT 3	LT 3	
		12E4	02/02/83	LT 70 (5)	LT 1.0	LT 0.8	LT 0.6	LT 0.6	LT 3	LT 20(5)	LT 0.6	LT 1.9	LT 1.6	LT 1.9	
		12F3	02/03/83	LT 70 (5)	LT 1.1	LT 1.1	LT 0.6	LT 0.7	LT 3	LT 20(5)	LT 0.8	LT 2	LT 1.6	LT 2	
		355	NS	-	-	-	-	-	-	-	-	-	-	-	
		12F3	02/03/83	LT 100(5)	LT 1.4	LT 0.9	LT 0.8	LT 0.9	LT 4	LT 19(5)	LT 0.9	LT 3	LT 1.9	LT 3	
		12H2	02/02 to 03/07/83	LT 40	LT 1.2	LT 0.8	LT 0.8	LT 0.8	LT 3	LT 8	LT 0.8	LT 1.9	LT 1.7	LT 2	
		558	03/02 to 03/26/83	LT 20	LT 1.3	LT 1.0	LT 0.9	LT 0.9	LT 3	LT 5	LT 1.0	LT 1.6	LT 2	LT 2	
		655	03/02 to 03/28/83	LT 13	LT 0.6	LT 0.7	LT 0.5	LT 0.6	LT 1.6	LT 4	LT 0.5	LT 0.9	LT 1.2	LT 1.2	
		657	03/11 to 04/08/83	LT 60	200 + 20	21 + 2	LT 1.9	LT 1.6	34 + 4	LT 7	130 + 20	3.2 + 1.7	4.8 + 1.8	LT 4	Cr-519 170 + 20
		103	03/09/83	LT 20	LT 0.7	LT 0.6	LT 0.5	LT 0.5	LT 1.9	LT 6	LT 0.5	LT 1.1	LT 1.4	LT 1.3	
		13E1	03/09/83	LT 30	LT 0.9	LT 1.0	LT 0.6	LT 0.7	LT 2	LT 8	LT 0.7	LT 1.4	LT 1.4	LT 1.7	
March	SW	12F1	03/11/83	LT 19	LT 0.8	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 6	LT 0.6	LT 1.2	LT 1.5	LT 1.4	
		12G2	03/07/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 2	LT 7	LT 0.6	LT 1.1	LT 1.2	LT 1.3	
		12H1	03/07 to 04/07/83	LT 40	LT 1.4	LT 1.0	LT 0.9	LT 0.9	LT 3	LT 10	LT 1.1	LT 1.9	LT 2	LT 2	

Note: See footnotes at end of table.



Table 7  
(Page 3 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of 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	Other
March (1) (cont)	GW	2S6	03/09/83	LT 20	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 2	LT 7	LT 0.5	LT 1.1	LT 1.4	LT 1.3	
		2S5	03/09/83	LT 40	LT 1.4	LT 1.1	LT 0.9	LT 0.9	LT 3	LT 10	LT 1.1	LT 1.9	LT 2	LT 2	
		4S2	03/09/83	LT 30	LT 0.9	LT 1.0	LT 0.6	LT 0.7	LT 2	LT 8	LT 0.7	LT 1.4	LT 1.5	LT 1.6	
		4S4	03/09/83	LT 30	LT 0.8	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 8	LT 0.6	LT 1.3	LT 1.5	LT 1.4	
		11S5	03/09/83	LT 40	LT 1.1	LT 0.8	LT 0.8	LT 0.8	LT 3	LT 8	LT 0.9	LT 1.8	LT 1.7	LT 2.1	
		15A4	03/11/83	LT 40	LT 1.4	LT 1.0	LT 0.8	LT 0.9	LT 3	LT 10	LT 1.0	LT 2	LT 2	LT 2	
		12E4	03/09/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.6	LT 2	LT 8	LT 0.5	LT 1.2	LT 1.2	LT 1.5	
		12F3	03/09/83	LT 40	LT 1.0	LT 1.1	LT 0.6	LT 0.7	LT 3	LT 9	LT 0.8	LT 1.7	LT 1.6	LT 2	
		3S5	NS	-	-	-	-	-	-	-	-	-	-	-	
		12F3	03/09/83	LT 20	LT 0.8	LT 0.8	ND	LT 0.6	LT 2	LT 7	LT 0.7	LT 1.3	LT 1.6	LT 1.6	
April (1) SW	PW	12H2	03/07 to 04/07/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.6	LT 2	LT 9	LT 0.5	LT 1.2	LT 1.3	LT 1.4	
		5S8	04/08 to 04/25/83	LT 20	LT 1.1	LT 0.8	LT 0.8	LT 0.9	LT 2	LT 5	LT 0.8	LT 1.5	LT 1.8	LT 2	
		6S5	04/08 to 04/25/83	LT 30	LT 1.3	LT 1.0	LT 0.8	LT 0.9	LT 3	LT 6	LT 1.1	LT 1.6	LT 2	LT 2	
		6S7	(9)	-	-	-	-	-	-	-	-	-	-	-	
		1D3	04/07/83	LT 30	LT 1.2	LT 0.8	LT 0.7	LT 0.9	LT 3	LT 6	LT 0.8	LT 1.6	LT 1.8	LT 2	
		1D3(11)	04/07/83	LT 40	LT 0.9	LT 0.7	LT 0.6	LT 0.6	LT 3	LT 10	LT 0.7	LT 1.4	LT 1.6	LT 1.6	
		13E1	04/07/83	LT 30	LT 1.4	LT 1.0	LT 0.9	LT 0.9	LT 3	LT 8	LT 1.1	LT 1.8	LT 2	LT 2	
		12F1	04/07/83	LT 40	LT 1.4	LT 1.1	LT 0.9	LT 1.0	LT 3	LT 8	LT 1.0	LT 1.9	LT 2	LT 3	
		12G2	04/07/83	LT 20	LT 0.8	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 7	LT 0.6	LT 1.4	LT 1.6	LT 1.4	
		12H1	04/07 to 05/05/83	LT 10	LT 0.7	LT 0.8	LT 0.6	LT 0.6	LT 1.7	LT 3	LT 0.6	LT 1.0	LT 1.5	LT 1.4	
GW	GW	3S5	NS	-	-	-	-	-	-	-	-	-	-	-	
		2S6	04/07/83	LT 50	LT 1.2	LT 0.8	LT 0.8	LT 0.8	LT 3	LT 11	LT 0.9	LT 1.9	LT 1.7	LT 3	
		2S5	04/07/83	LT 40	LT 1.0	LT 1.1	LT 0.7	LT 0.7	LT 2	LT 11	LT 0.7	LT 1.8	LT 1.7	LT 1.9	
		4S2	NS	-	-	-	-	-	-	-	-	-	-	-	
		4S4	04/07/83	LT 50	LT 1.4	LT 1.1	LT 0.9	LT 0.9	LT 4	LT 12	LT 1.1	LT 2	LT 2	LT 3	
		11S5	04/07/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 1.9	LT 9	LT 0.5	LT 1.3	LT 1.3	LT 1.4	
		11S5(11)	04/07/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 2	LT 9	LT 0.5	LT 1.4	LT 1.3	LT 1.5	
		15A4	04/08/83	LT 30	LT 0.9	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 10	LT 0.6	LT 1.4	LT 1.6	LT 1.6	
		12E4	04/07/83	LT 50	LT 1.2	LT 0.8	LT 0.8	LT 0.9	LT 3	LT 11	LT 0.9	LT 2	LT 1.8	LT 2	
		12F3	04/07/83	LT 60	LT 1.5	LT 1.1	LT 0.9	LT 0.9	LT 4	LT 13	LT 1.0	LT 2	LT 2	LT 3	
PW	PW	12F3	04/07/83	LT 30	LT 0.8	LT 0.6	LT 0.5	LT 0.5	LT 1.9	LT 7	LT 0.6	LT 1.2	LT 1.5	LT 1.4	
		12H2	04/07 to 05/05/83	LT 18	LT 1.2	LT 1.1	LT 0.8	LT 1.0	LT 3	LT 4	LT 1.0	LT 1.5	LT 2	LT 2	

Note: See footnotes at end of table.



Table 7  
(Page 4 of 11)  
Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of 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	Other
May (1)	SW	558	05/06 to 05/31/83	LT 10	LT 0.7	LT 1.0	LT 0.6	LT 0.7	LT 1.9	LT 3	LT 0.7	LT 1.0	LT 1.5	LT 1.5	
		655	05/06 to 05/31/83	LT 12	LT 1.0	LT 0.7	LT 0.7	LT 0.8	LT 1.9	LT 3	LT 0.8	LT 1.1	LT 1.7	LT 1.7	
		657	04/08 to 06/05/83	LT 40	45 + 5	9.2 + 1.2	LT 1.3	LT 1.1	5.8 + 2.2	LT 7	37 + 4	LT 1.9	LT 3	LT 2	
		103	05/06/83	LT 14	LT 1.0	LT 0.7	LT 0.8	LT 0.8	LT 2	LT 3	LT 0.8	LT 1.2	LT 1.7	LT 1.7	
		13E1	05/05/83	LT 16	LT 1.2	LT 1.1	LT 0.9	LT 0.9	LT 3	LT 4	LT 1.0	LT 1.4	LT 2	LT 2	
		12F1	05/05/83	LT 10	LT 0.7	LT 0.6	LT 0.5	LT 0.5	LT 1.6	LT 3	LT 0.5	LT 0.8	LT 1.2	LT 1.1	
		12G2	NS	-	-	-	-	-	-	-	-	-	-	-	
		12H1	05/05 to 06/14/83	LT 12	LT 0.9	LT 0.8	LT 0.8	LT 0.9	LT 2	LT 2	LT 0.8	LT 1.2	LT 1.7	LT 1.8	
	GW	256	05/04/83	LT 11	LT 0.6	LT 0.7	LT 0.5	LT 0.6	LT 1.6	LT 3	LT 0.5	LT 0.9	LT 1.2	LT 1.2	
		255	NS	-	-	-	-	-	-	-	-	-	-	-	
		452	05/04/83	LT 14	LT 0.8	LT 1.1	LT 0.7	LT 0.7	LT 1.7	LT 3	LT 0.7	LT 1.2	LT 1.5	LT 1.5	
		454	05/04/83	LT 14	LT 0.9	LT 1.0	LT 0.7	LT 0.7	LT 1.9	LT 4	LT 0.7	LT 1.1	LT 1.4	LT 1.6	
		1155	05/04/83	LT 12	LT 0.7	LT 0.8	LT 0.6	LT 0.6	LT 1.8	LT 4	LT 0.6	LT 1.0	LT 1.5	LT 1.2	
		15A4	05/06/83	LT 17	LT 1.0	LT 0.8	LT 0.7	LT 0.8	LT 2	LT 4	LT 0.9	LT 1.3	LT 1.7	LT 1.9	
		12E4	05/04/83	LT 20	LT 1.2	LT 1.0	LT 0.8	LT 0.9	LT 3	LT 5	LT 1.1	LT 1.6	LT 2	LT 2	
June (1)	SW	12F3	05/04/83	LT 15	LT 0.7	LT 0.6	LT 0.5	LT 0.6	LT 1.6	LT 4	LT 0.5	LT 1.0	LT 1.3	LT 1.3	
		355	NS	-	-	-	-	-	-	-	-	-	-	-	
		12F3	05/04/83	LT 16	LT 1.0	LT 0.8	LT 0.8	LT 0.8	LT 2	LT 3	LT 0.8	LT 1.3	LT 1.7	LT 1.7	
		12H2	05/05 to 06/14/83	LT 13	LT 1.0	LT 0.8	LT 0.8	LT 0.9	LT 2	LT 3	LT 0.8	LT 1.2	LT 1.6	LT 1.8	
		558	06/08 to 06/27/83	LT 17	LT 0.7	LT 0.7	LT 0.5	LT 0.6	LT 1.7	LT 4	LT 0.5	LT 1.0	LT 1.2	LT 1.3	
		655	06/08 to 06/27/83	LT 14	LT 1.1	0.88 + 0.52	LT 0.8	LT 0.9	LT 2	LT 3	LT 0.9	LT 1.3	LT 1.9	LT 1.9	
		657	06/05 to 07/06/83	LT 8	0.91 + 0.57	LT 0.7	LT 0.6	LT 0.6	LT 1.4	LT 2	0.94 + 0.38	LT 0.8	LT 1.2	LT 1.2	
		103	06/14/83	LT 6	LT 0.6	LT 0.7	LT 0.6	LT 0.6	LT 1.5	LT 1.9	LT 0.6	LT 0.8	LT 1.5	LT 1.2	
		13E1	06/14/83	LT 9	LT 0.9	LT 0.8	LT 0.8	LT 0.9	LT 1.7	LT 1.9	LT 0.8	LT 1.1	LT 1.7	LT 1.6	
		12F1	06/15/83	LT 6	LT 0.6	LT 0.7	LT 0.5	LT 0.6	LT 1.2	LT 1.5	LT 0.6	LT 0.7	LT 1.2	LT 1.1	
		12G2	06/14/83	LT 8	LT 0.6	LT 0.7	LT 0.6	LT 0.6	LT 1.7	LT 2	LT 0.6	LT 0.8	LT 1.5	LT 1.2	
		12H1	06/14 to 07/15/83	LT 7	LT 0.7	LT 1.0	LT 0.7	LT 0.7	LT 1.6	LT 1.5	LT 0.7	LT 0.9	LT 1.6	LT 1.4	

Note: See footnotes at end of table.

Table 7  
(Page 5 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of 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	Other
June (1) (cont)	GW	256	06/15/83	LT 8	LT 0.7	LT 0.6	LT 0.5	LT 0.6	LT 1.5	LT 2	LT 0.6	LT 0.8	LT 1.3	LT 1.2	
		355	06/15/83	LT 11	LT 0.8	LT 1.1	LT 0.6	LT 0.7	LT 1.7	LT 3	LT 0.7	LT 1.1	LT 1.6	LT 1.4	
		452	06/15/83	LT 17	LT 0.7	LT 0.7	LT 0.5	LT 0.6	LT 1.8	LT 5	LT 0.6	LT 1.0	LT 1.4	LT 1.3	
		454	06/15/83	LT 11	LT 0.7	LT 0.7	LT 0.5	LT 0.6	LT 1.6	LT 3	LT 0.5	LT 0.9	LT 1.4	LT 1.2	
		1155	06/15/83	LT 10	LT 0.8	LT 1.1	LT 0.6	LT 0.7	LT 1.7	LT 3	LT 0.7	LT 1.0	LT 1.5	LT 1.5	
		15A4	06/15/83	LT 13	LT 1.0	LT 0.8	LT 0.9	LT 0.9	LT 2	LT 3	LT 0.8	LT 1.3	LT 1.8	LT 1.8	
		12E4	06/14/83	LT 9	LT 0.8	LT 0.7	LT 0.6	LT 0.6	LT 1.6	LT 3	LT 0.6	LT 1.0	LT 1.5	LT 1.2	
		12F3	06/14/83	LT 14	LT 0.9	LT 1.1	LT 0.7	LT 0.7	LT 2	LT 4	LT 0.7	LT 1.2	LT 1.5	LT 1.6	
		255	06/21/83	LT 9	LT 0.7	LT 1.1	LT 0.6	LT 0.7	LT 1.5	LT 1.9	LT 0.7	LT 1.0	LT 1.5	LT 1.4	
		12F3	06/14/83	LT 8	LT 0.7	LT 0.8	LT 0.6	LT 0.6	LT 1.7	LT 3	LT 0.6	LT 1.0	LT 1.6	LT 1.3	
June (10) SW	PW	12H2	06/14 to 07/15/83	LT 5	LT 0.5	LT 0.6	LT 0.5	LT 0.6	LT 1.2	LT 1.3	LT 0.5	LT 0.6	LT 1.2	LT 1.0	
		558	06/08 to 06/27/83	LT 7	LT 0.8	LT 1.4	LT 4	LT 0.8	LT 3	LT 11 (5)	LT 0.7	LT 0.8	LT 2	LT 1.4	
		655	06/08 to 06/27/83	LT 40	LT 7	LT 4	LT 3	LT 4	LT 20	LT 50 (5)	LT 4	LT 7	LT 10	LT 13	
		103	06/14/83	LT 30	LT 9	LT 5	LT 4	LT 4	LT 30	LT 40 (5)	LT 4	LT 10	LT 10	LT 17	
		13E1	06/14/83	LT 20	LT 2	LT 2	LT 1.9	LT 2	LT 5	LT 9	LT 2	LT 2	LT 5	LT 5	
		12F1	06/14/83	LT 19	LT 6	LT 6	LT 5	LT 5	LT 12	LT 11	LT 6	LT 6	LT 11	LT 11	
		12G2	06/14/83	LT 20	LT 5	LT 6	LT 4	LT 4	LT 11	LT 10	LT 6	LT 5	LT 12	LT 9	
		12H1	05/05 to 06/14/83	LT 15	LT 3	LT 4	LT 3	LT 3	LT 7 (5)	LT 10 (5)	LT 3	LT 3	LT 7	LT 5	
		657	04/08 to 06/05/83	LT 60	28 + 12	LT 9	LT 7	LT 7	LT 40 (5)	LT 60 (5)	41 + 7	LT 14	LT 14	LT 20	
		105	06/15/83	LT 60	LT 9	LT 5	LT 4	LT 4	LT 30	LT 60 (5)	LT 4	LT 10	LT 10	LT 17	K-400 LT 40
June	GW	657	06/05 to 07/06/83	LT 20	LT 5	LT 3	LT 2	LT 2	LT 13	LT 20 (5)	LT 3	LT 4	LT 6	LT 8	
		256	06/15/83	LT 20	LT 3	LT 2	LT 2	LT 2	LT 6	LT 10 (5)	LT 2	LT 3	LT 5	LT 5	
		355	06/15/83	LT 19	LT 9	LT 5	LT 4	LT 4	LT 30	LT 19 (5)	LT 4	LT 10	LT 10	LT 17	
		452	06/15/83	LT 12	LT 9	LT 5	LT 4	LT 4	LT 30	LT 12	LT 4	LT 10	LT 10	LT 17	
		454	06/15/83	LT 20	LT 9	LT 5	LT 4	LT 4	LT 30	LT 20 (5)	LT 4	LT 10	LT 10	LT 17	
		1155	06/15/83	LT 14	LT 9	LT 5	LT 4	LT 4	LT 30	LT 14	LT 4	LT 10	LT 10	LT 17	
		15A4	06/15/83	LT 18	LT 2	LT 2	LT 2	LT 2	LT 5	LT 10	LT 2	LT 3	LT 4	LT 4	
June	GW	12E4	06/14/83	LT 19	LT 3	LT 3	LT 3	LT 2	LT 6	LT 11 (5)	LT 2	LT 3	LT 5	LT 5	
		12F3	06/14/83	LT 30	LT 11	LT 5	LT 4	LT 4	LT 4	LT 30 (5)	LT 5	LT 13	LT 11	LT 20	

Note: See footnotes at end of table.

Table 7  
(Page 6 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of pCi/l  $\pm$  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	Other
June (10) (cont)	PW	12F3	06/14/83	LT 30	LT 9	LT 4	LT 3	LT 3	LT 30	LT 30 <sup>(5)</sup>	LT 4	LT 8	LT 10	LT 17	
		12H2 RAW	05/05 to 06/14/83	LT 30	LT 9	LT 5	LT 4	LT 4	LT 30	LT 30 <sup>(5)</sup>	LT 4	LT 10	LT 10	LT 17	
		12H2 RAW	06/14 to 06/27/83	LT 20	LT 7	LT 4	LT 3	LT 4	LT 20	LT 20 <sup>(5)</sup>	LT 4	LT 7	LT 10	LT 13	
		12H2 TREATED	06/14/83	LT 30	LT 9	LT 5	LT 4	LT 4	LT 30	LT 30 <sup>(5)</sup>	LT 4	LT 10	LT 10	LT 17	
		12H2 TREATED	06/14 to 07/05/83	LT 4E05	LT 10	LT 1.6	LT 1.4	LT 1.3	LT 80	LT 3E05 <sup>(5)</sup>	LT 2	LT 12	LT 5	LT 20	
July (10)	SW	5S8	07/05 to 07/25/83	LT 11	LT 9	LT 6	LT 5	LT 5	LT 20	LT 11	LT 6	LT 8	LT 14	LT 14	K-40E LT 130
		6S5	07/05 to 07/25/83	LT 10	LT 9	LT 6	LT 5	LT 5	LT 20	LT 10	LT 6	LT 8	LT 14	LT 14	K-40E LT 130
		6S6	NS												
		103	07/15/83	LT 9	LT 4	LT 3	LT 2	LT 2	LT 12	LT 9	LT 3	LT 4	LT 6	LT 7	
		13E1	07/15/83	LT 8	LT 4	LT 3	LT 2	LT 2	LT 12	LT 8	LT 3	LT 4	LT 6	LT 7	
		12F1	07/17/83	LT 7	LT 4	LT 3	LT 2	LT 2	LT 11	LT 7	LT 3	LT 4	LT 6	LT 7	
	GW	1262	07/15/83	LT 9	LT 4	LT 3	LT 2	LT 2	LT 12	LT 9	LT 3	LT 4	LT 6	LT 7	
		12H1	06/14 to 07/15/83	LT 9	LT 4	LT 3	LT 2	LT 2	LT 12	LT 9 <sup>(5)</sup>	LT 3	LT 4	LT 6	LT 7	K-40E LT 30
		6S7	07/06 to 08/04/83	LT 130	LT 5	LT 3	LT 3	LT 3	LT 12	LT 70	LT 3	LT 4	LT 6	LT 8	
		105	07/15/83	LT 6E05 <sup>(5)</sup>	LT 40	LT 7	LT 7	LT 6	LT 200	LT 3E05 <sup>(5)</sup>	LT 9	LT 40	LT 20	LT 80	
		2S6	07/15/83	LT 13	LT 13	LT 8	LT 7	LT 8	LT 40 <sup>(5)</sup>	LT 13	LT 9	LT 14	LT 18	LT 20	K-40E LT 100
		3S5	07/15/83	LT 10	LT 13	LT 8	LT 7	LT 8	LT 40 <sup>(5)</sup>	LT 10	LT 9	LT 14	LT 18	LT 20	K-40E LT 100
August	PW	4S2	07/15/83	LT 9	LT 4	LT 3	LT 2	LT 2	LT 12	LT 9	LT 3	LT 4	LT 6	LT 7	
		4S4	07/15/83	LT 13	LT 6	LT 4	LT 3	LT 4	LT 17 <sup>(5)</sup>	LT 13	LT 4	LT 6	LT 9	LT 10	
		11S5	07/15-3	LT 10	LT 13	LT 8	LT 7	LT 8	LT 40 <sup>(5)</sup>	LT 10	LT 9	LT 14	LT 18	LT 20	K-40E LT 100
		15A4	07/16/83	LT 11	LT 4	LT 3	LT 2	LT 2	LT 11	LT 11	LT 3	LT 4	LT 6	LT 7	
		12E4	07/15/83	LT 11	LT 13	LT 8	LT 7	LT 8	LT 40 <sup>(5)</sup>	LT 11	LT 9	LT 14	LT 18	LT 20	K-40E LT 100
	PW	12F3	07/15/83	LT 9	LT 4	LT 3	LT 2	LT 2	LT 12	LT 9	LT 3	LT 4	LT 6	LT 7	
		12F3	07/15/83	LT 11	LT 6	LT 4	LT 3	LT 4	LT 17 <sup>(5)</sup>	LT 11	LT 4	LT 6	LT 9	LT 10	
		12H2 RAW	06/27 to 07/15/83	LT 11	LT 13	LT 8	LT 7	LT 8	LT 40 <sup>(5)</sup>	LT 11	LT 9	LT 14	LT 18	LT 20	K-40E LT 100
		12H2 TREATED	07/05 to 08/01/83	LT 9000 <sup>(5)</sup>	LT 7	LT 2	LT 2	LT 1.9	LT 30	LT 5000 <sup>(5)</sup>	LT 2	LT 8	LT 6	LT 14	

Note: See footnotes at end of table.

Table 7  
(Page 7 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of  $p(1/1 \pm 2s)$ )

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	Other
Aug.	(10) SW	558	08/01 to 08/29/83	LT 30	LT 4	4.8 + 1.3	LT 2	LT 2	LT 10	LT 15	LT 3	LT 4	LT 6	LT 6	
		655	08/01 to 08/29/83	LT 30	LT 5	LT 4	LT 3	LT 3	LT 15	LT 15	LT 4	LT 4	LT 8	LT 9	
		656	07/16 to 08/16/83	LT 80	LT 4	LT 2	LT 2	LT 3	LT 10	LT 40(5)	LT 3	LT 4	LT 6	LT 6	K-400 LT 20
		103	08/22/83	LT 50	LT 4	LT 2	LT 2	LT 2	LT 9	LT 30(5)	LT 3	LT 3	LT 6	LT 6	K-400 LT 20
		13E1	08/22/83	LT 50	LT 4	LT 2	LT 2	LT 2	LT 9	LT 30(5)	LT 3	LT 3	LT 6	LT 6	K-400 LT 20
		12F1	08/22/83	LT 50	LT 4	LT 2	LT 2	LT 2	LT 9	LT 30(5)	LT 3	LT 3	LT 6	LT 6	K-400 LT 20
		12G2	08/22/83	LT 50	LT 4	LT 2	LT 2	LT 2	LT 9	LT 30(5)	LT 3	LT 3	LT 6	LT 6	K-400 LT 20
		12H1	07/15 to 08/22/83	LT 50	LT 4	LT 2	LT 2	LT 2	LT 9	LT 30(5)	LT 3	LT 3	LT 6	LT 6	K-400 LT 20
		657	08/04 to 09/07/83	LT 19	LT 10	LT 6	LT 6	LT 6	LT 17	LT 9	7.2 + 0.9	LT 7	LT 14	LT 15	Cr-510 92 + 20
		105	08/22/83	LT 3E04(5)	LT 13	LT 4	LT 3	LT 3	LT 60	LT 18E03(5)	LT 4	LT 15	LT 10	LT 20	
GM		256	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		355	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		452	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		454	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		1155	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		15A4	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		12E4	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		12F3	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12

Note: See footnotes at end of table.

Table 7  
(Page 8 of 11)  
Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of  $pCi/l \pm 2s$ )

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	Other
Aug. (cont)	PW	12F3	08/22/83	LT 30	LT 1.6	LT 1.3	LT 1.1	LT 1.1	LT 4	LT 15	LT 1.2	LT 1.7	LT 3	LT 3	K-400 LT 12
		12H2 RAW	07/15 to 08/16/83	LT 80 (5)	LT 4	LT 2	LT 2	LT 3	LT 10	LT 40 (5)	LT 3	LT 4	LT 6	LT 6	K-400 LT 20
		12H2 TREATED	08/01 to 09/05/83	LT 1700 (5)	LT 6	LT 3	LT 3	LT 3	LT 20	LT 1100 (5)	LT 3	LT 7	LT 6	LT 12	
Sept. (10)	SW	558	09/06 to 09/26/83	LT 600 (5)	LT 5	LT 3	LT 2	LT 2	LT 18	LT 400 (5)	LT 3	LT 6	LT 7	LT 10	
		655	09/06 to 09/26/83	LT 200 (5)	LT 4	LT 2	LT 1.9	LT 2	LT 11	LT 120 (5)	LT 2	LT 4	LT 5	LT 7	
		656	08/16 to 10/07/83	LT 400 (5)	LT 5	LT 3	LT 3	LT 3	LT 18	LT 200 (5)	LT 3	LT 6	LT 7	LT 10	Cr-510 LT 120
		103	09/20/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 7	LT 30 (5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		13E1	09/20/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 7	LT 40 (5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		12F1	09/19/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 8	LT 40 (5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		12G2	09/19/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 8	LT 40 (5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		12H1	08/22 to 09/19/83	LT 200 (5)	LT 13	LT 10	LT 9	LT 9	LT 40 (5)	LT 140 (5)	LT 10	LT 14	LT 20	LT 20	Cr-510 LT 190
		657	09/07 to 10/04/83	LT 4000 (5)	LT 9	LT 4	LT 3	LT 3	LT 40 (5)	LT 2000 (5)	LT 4	LT 10	LT 9	LT 17	
		105	09/21/83	LT 70	LT 3	LT 2	LT 2	LT 1.8	LT 7	LT 40 (5)	LT 2	LT 3	LT 5	LT 5	

Note: See footnotes at end of table.

Table 7  
(Page 9 of 11)  
Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of 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	Other
Sept. (10) <sup>10</sup> (cont)		256	09/20/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 7	LT 30(5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		355	09/20/83	LT 60	LT 3	LT 2	LT 2	LT 2	LT 7	LT 30(5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 40
		452	09/20/83	LT 80(5)	LT 3	LT 2	LT 2	LT 1.8	LT 7	LT 40(5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 50
		454	09/20/83	LT 100(5)	LT 4	LT 3	LT 3	LT 3	LT 11	LT 60(5)	LT 3	LT 4	LT 6	LT 8	Cr-510 LT 70
		1155	09/20/83	LT 110(5)	LT 3	LT 2	LT 2	LT 2	LT 8	LT 60(5)	LT 2	LT 3	LT 5	LT 6	Cr-510 LT 60
Oct. (10) <sup>10</sup> (cont)		1544	09/21/83	LT 180(5)	LT 3	LT 1.6	LT 1.5	LT 1.5	LT 9	LT 100(5)	LT 1.7	LT 3	LT 4	LT 5	Cr-510 LT 50
		1214	09/20/83	LT 80(5)	LT 3	LT 2	LT 2	LT 1.8	LT 7	LT 40(5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 50
		1283	09/19/83	LT 80(5)	LT 3	LT 2	LT 2	LT 1.8	LT 7	LT 40(5)	LT 2	LT 3	LT 5	LT 5	Cr-510 LT 60
		1283	09/19/83	LT 2000(5)	LT 6	LT 3	LT 3	LT 3	LT 30	LT 1300(5)	LT 3	LT 8	LT 7	LT 14	Cr-510 LT 50
		1282 RAW	09/16 to 09/19/83	LT 90	LT 3	LT 2	LT 1.9	LT 1.8	LT 8	LT 50(5)	LT 2	LT 3	LT 4	LT 5	Cr-510 LT 50
Oct. (10) <sup>10</sup> (cont)		1282 TREATED	09/05 to 10/03/83	LT 4004(5)	LT 30	LT 9	LT 7	LT 6	LT 120	LT 2004(5)	LT 10	LT 30	LT 20	LT 50	
		558	10/04 to 10/25/83	LT 120(5)	LT 4	LT 3	LT 2	LT 2	LT 11	LT 70(5)	LT 3	LT 4	LT 6	LT 7	
		655	10/04 to 10/25/83	LT 120(5)	LT 4	LT 3	LT 2	LT 2	LT 11	LT 70(5)	LT 3	LT 4	LT 6	LT 7	
		656	10/07 to 10/17/83	LT 900(5)	LT 4	LT 2	LT 2	LT 2	LT 16	LT 500(5)	LT 2	LT 4	LT 4	LT 8	
		103	10/17 to 10/31/83	LT 2000(5)	LT 8	LT 3	LT 3	LT 3	LT 30	LT 1200(5)	LT 3	LT 9	LT 9	LT 15	
Oct. (10) <sup>10</sup> (cont)		13E1	10/18/83	LT 600(5)	LT 6	LT 3	LT 3	LT 3	LT 18	LT 300(5)	LT 3	LT 6	LT 7	LT 10	
		1281	10/18/83	LT 1600(5)	LT 5	LT 3	LT 2	LT 1.9	LT 19	LT 300(5)	LT 3	LT 6	LT 7	LT 10	
		1262	10/18/83	LT 1900(5)	LT 6	LT 3	LT 3	LT 2	LT 20	LT 800(5)	LT 2	LT 6	LT 6	LT 10	
		1281	10/18/83	LT 1400(5)	LT 6	LT 3	LT 2	LT 2	LT 19	LT 900(5)	LT 2	LT 5	LT 6	LT 10	
		657	10/24 to 10/17/83	LT 2000(5)	LT 8	LT 4	LT 3	LT 3	LT 3	LT 1200(5)	LT 4	LT 9	LT 9	LT 15	
Oct. (10) <sup>10</sup> (cont)		657	10/17 to 11/01/83	LT 700(5)	LT 3	LT 1.6	LT 1.4	LT 1.3	LT 11	LT 400(5)	LT 1.6	LT 3	LT 4	LT 6	
		105	10/19/83	LT 600(5)	LT 6	LT 3	LT 3	LT 3	LT 18	LT 300(5)	LT 3	LT 6	LT 7	LT 10	

Note: See footnotes at end of table.

Table 7  
(Page 10 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of pCi/l  $\pm$  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	Other
Oct. (10) [cont]	GW	256	10/18/83	LT 90 (5)	LT 3	LT 1.9	LT 1.5	LT 1.6	LT 8	LT 50 (5)	LT 1.7	LT 3	LT 4	LT 5	
		355	10/18/83	LT 600 (5)	LT 5	LT 3	LT 3	LT 2	LT 16	LT 300 (5)	LT 3	LT 7	LT 6	LT 10	
		452	10/18/83	LT 600 (5)	LT 5	LT 3	LT 3	LT 2	LT 16	LT 300 (5)	LT 3	LT 7	LT 6	LT 10	
		454	10/18/83	LT 600 (5)	LT 5	LT 3	LT 3	LT 2	LT 16	LT 300 (5)	LT 3	LT 6	LT 6	LT 10	
		1155	10/18/83	LT 600 (5)	LT 5	LT 3	LT 3	LT 2	LT 16	LT 300 (5)	LT 3	LT 6	LT 6	LT 10	
		15A4	10/18/83	LT 90 (5)	LT 3	LT 1.9	LT 1.5	LT 1.6	LT 8	LT 50 (5)	LT 1.7	LT 3	LT 4	LT 5	
		12E4	10/17/83	LT 700 (5)	LT 5	LT 3	LT 3	LT 2	LT 17	LT 300 (5)	LT 3	LT 6	LT 6	LT 10	
		12F3	10/18/83	LT 600 (5)	LT 5	LT 3	LT 3	LT 2	LT 16	LT 300 (5)	LT 3	LT 6	LT 6	LT 10	
	PW	12F3	10/18/83	LT 600 (5)	LT 6	LT 3	LT 3	LT 3	LT 18	LT 400 (5)	LT 3	LT 6	LT 7	LT 10	
		12H2 RAW	09/19 to 10/17/83	LT 700 (5)	LT 6	LT 3	LT 3	LT 3	LT 18	LT 400 (5)	LT 3	LT 6	LT 7	LT 10	
		12H2 TREATED	10/03 to 10/31/83	LT 2E04 (5)	LT 30 (5)	LT 9	LT 7	LT 7	LT 130 (5)	LT 15E03 (5)	LT 10	LT 30 (5)	LT 20	LT 50 (5)	
		12H2 RAW	10/17 to 10/31/83	LT 12E03 (5)	LT 13	LT 5	LT 4	LT 4	LT 60 (5)	LT 7E03 (5)	LT 5	LT 15	LT 12	LT 30	
Nov. (10)	SM	558	11/01 to 11/28/83	LT 170 (5)	LT 3	LT 1.6	LT 1.3	LT 1.3	LT 7	LT 90 (5)	LT 1.5	LT 3	LT 4	LT 5	
		655	11/01 to 11/28/83	LT 170 (5)	LT 3	LT 1.6	LT 1.3	LT 1.3	LT 7	LT 90 (5)	LT 1.5	LT 3	LT 4	LT 5	
		656	10/31 to 11/28/83	LT 400 (5)	LT 5	LT 3	LT 2	LT 2	LT 16	LT 200 (5)	LT 2	LT 4	LT 6	LT 8	
		103	11/14/83	LT 140 (5)	LT 4	LT 3	LT 3	LT 2	LT 11	LT 80 (5)	LT 3	LT 4	LT 6	LT 8	
		13E1	11/15/83	LT 200 (5)	LT 6	LT 3	LT 3	LT 3	LT 17	LT 120 (5)	LT 3	LT 6	LT 8	LT 11	
		12F1	11/15/83	LT 120 (5)	LT 4	LT 2	LT 2	LT 2	LT 11	LT 60 (5)	LT 2	LT 4	LT 6	LT 7	
		12G2	11/16/83	LT 120 (5)	LT 4	LT 2	LT 2	LT 2	LT 10	LT 60 (5)	LT 2	LT 4	LT 6	LT 7	
		12H1	10/17 to 11/14/83	LT 400 (5)	LT 5	LT 3	LT 3	LT 2	LT 13	LT 200 (5)	LT 3	LT 5	LT 7	LT 10	Cr-510 LT 130
		657	11/01 to 12/01/83	LT 140 (5)	LT 3	LT 1.6	LT 1.3	LT 1.3	LT 7	LT 80 (5)	LT 1.5	LT 3	LT 4	LT 5	
		105	11/14/83	LT 500 (5)	LT 6	LT 4	LT 3	LT 3	LT 20	LT 300 (5)	LT 4	LT 7	LT 9	LT 12	
	GW	256	11/14/83	LT 130 (5)	LT 4	LT 2	LT 2	LT 2	LT 11	LT 70 (5)	LT 2	LT 4	LT 6	LT 7	
		355	NS	-	-	-	-	-	-	-	-	-	-	-	
		452	11/14/83	LT 200 (5)	LT 6	LT 3	LT 3	LT 3	LT 17	LT 130 (5)	LT 4	LT 7	LT 8	LT 11	
		454	11/14/83	LT 200 (5)	LT 6	LT 3	LT 3	LT 3	LT 17	LT 130 (5)	LT 4	LT 7	LT 8	LT 11	
		1155	11/14/83	LT 130 (5)	LT 4	LT 2	LT 2	LT 2	LT 11	LT 70 (5)	LT 2	LT 4	LT 6	LT 7	
		15A4	11/16/83	LT 120 (5)	LT 4	LT 2	LT 2	LT 2	LT 10	LT 60 (5)	LT 2	LT 4	LT 6	LT 7	
		12E4	11/14/83	LT 130 (5)	LT 4	LT 2	LT 2	LT 2	LT 11	LT 70 (5)	LT 2	LT 4	LT 6	LT 7	
		12F3	11/15/83	LT 120 (5)	LT 4	LT 2	LT 2	LT 2	LT 11	LT 60 (5)	LT 2	LT 4	LT 6	LT 7	

Note: See footnotes at end of table.



Table 7  
(Page 11 of 11)

Gamma Spectrometry of Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results of  $pCi/l \pm 2s$ )

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	Other
Nov. (10)	PW	12F3	11/15/83	LT 500 <sup>(5)</sup>	LT 6	LT 4	LT 3	LT 3	LT 20	LT 300 <sup>(5)</sup>	LT 4	LT 7	LT 9	LT 13	
(cont)	12H2 RAW		10/31 to 11/29/83	LT 160 <sup>(5)</sup>	LT 3	LT 1.6	LT 1.3	LT 1.3	LT 7	LT 90 <sup>(5)</sup>	LT 1.5	LT 3	LT 4	LT 5	
	12H2 TREATED		10/31 to 11/29/83	LT 160 <sup>(5)</sup>	LT 3	LT 1.6	LT 1.3	LT 1.3	LT 7	LT 90 <sup>(5)</sup>	LT 1.5	LT 3	LT 4	LT 5	
Dec. (10)	SW	558	12/05 to 12/19/83	LT 130 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	LT 80 <sup>(5)</sup>	LT 2	LT 3	LT 6	LT 7	
		655	12/05 to 12/19/83	LT 130 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	LT 80 <sup>(5)</sup>	LT 2	LT 3	LT 6	LT 7	
		656	11/28/83-01/02/84	LT 16	LT 2	LT 2	LT 1.8	LT 1.8	LT 5	LT 8	LT 2	LT 2	LT 4	LT 4	
		103	12/14/83	LT 70 <sup>(5)</sup>	LT 5	LT 4	LT 3	LT 3	LT 12	LT 40 <sup>(5)</sup>	LT 3	LT 4	LT 8	LT 9	
		13E1	12/13/83	LT 30	LT 2	LT 2	LT 1.9	LT 1.9	LT 6	LT 16 <sup>(5)</sup>	LT 1.9	LT 2	LT 4	LT 4	
		12F1	12/13/83	LT 80 <sup>(5)</sup>	LT 5	LT 4	LT 3	LT 3	LT 12	LT 40 <sup>(5)</sup>	LT 3	LT 5	LT 8	LT 9	
		12G2	NS	-	-	-	-	-	-	-	-	-	-	-	
		12H1	11/14 to 12/12/83	LT 30	LT 2	LT 2	LT 1.9	LT 1.9	LT 6	LT 17 <sup>(5)</sup>	LT 1.9	LT 3	LT 4	LT 4	
		657	11/28/83-01/02/84	LT 16	LT 2	LT 1.9	LT 1.8	LT 1.8	LT 5	LT 8	LT 2	LT 2	LT 4	LT 4	
		105	NS	-	-	-	-	-	-	-	-	-	-	-	
	LAKE T-A-W		12/01/83	LT 50	LT 1.6	LT 1.2	LT 1.1	LT 1.0	LT 4	LT 30 <sup>(5)</sup>	LT 1.1	LT 1.7	LT 2	LT 3	
	GW	256	12/14/83	LT 30	LT 3	LT 2	LT 2	LT 2	LT 6	LT 17 <sup>(5)</sup>	LT 2	LT 3	LT 4	LT 4	
		355	NS	-	-	-	-	-	-	-	-	-	-	-	
		452	12/13/83	LT 30 <sup>(5)</sup>	LT 2	LT 2	LT 1.9	LT 1.9	LT 6	LT 16 <sup>(5)</sup>	LT 1.9	LT 2	LT 4	LT 4	
		454	12/13/83	LT 180 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 13	LT 100 <sup>(5)</sup>	LT 2	LT 4	LT 6	LT 7	
		1155	12/14/83	LT 170 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	LT 100 <sup>(5)</sup>	LT 2	LT 4	LT 6	LT 7	
		1544	12/15/83	LT 160 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	LT 90 <sup>(5)</sup>	LT 2	LT 4	LT 6	LT 7	
		17E4	12/14/83	LT 170 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	LT 100 <sup>(5)</sup>	LT 2	LT 4	LT 6	LT 7	
		12F3	12/13/83	LT 180 <sup>(5)</sup>	LT 4	LT 3	LT 2	LT 2	LT 13	LT 100 <sup>(5)</sup>	LT 2	LT 4	LT 6	LT 7	
	PW	12F3	12/13/83	LT 200 <sup>(5)</sup>	LT 6	LT 3	LT 3	LT 3	LT 16	LT 110 <sup>(5)</sup>	LT 3	LT 6	LT 9	LT 10	
	12H2 RAW		11/29/83-01/02/84	LT 16	LT 2	LT 1.9	LT 1.8	LT 1.8	LT 5	LT 8	LT 2	LT 2	LT 4	LT 4	
	12H2 TREATED		11/29/83-01/02/84	LT 16	LT 2	LT 1.9	LT 1.8	LT 1.8	LT 5	LT 8	LT 2	LT 2	LT 4	LT 4	

- (1) Samples collected and analyzed by Radiation Management Corporation.  
 (2) SW = Surface Water  
 (3) LT = Less Than  
 (4) NS = No Sample  
 (5) Lower sensitivity due to delay in counting.  
 (6) ND = Not Detected  
 (7) GW = Ground Water  
 (8) PW = Drinking Water  
 (9) Sample was collected in May, after a two month period.  
 (10) Samples collected and analyzed by NUS.  
 (11) Duplicate sample and analysis.



Table 8  
(Page 1 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
January <sup>(1)</sup>	Surface	558	01/04/83 to 01/25/83	LT 0.3 <sup>(2)</sup>
		655	NS(3)	--
		1D3	01/07/83	LT 0.3
		13E1	01/05/83	LT 0.13
		12F1	01/05/83	LT 0.11
		12G2	01/05/83	LT 0.12
		12H1	01/03/83 to 02/02/83	LT 0.19
		1D5	01/06/83	LT 0.3
		657	(4)	--
	Drinking	12H2	01/03/83 to 01/10/83	LT 0.7
		12H2	01/10/83 to 01/17/83	LT 0.3
		12H2	01/17/83 to 01/24/83	LT 0.3
		12H2	01/24/83 to 01/31/83	LT 0.2
February <sup>(1)</sup>	Surface	657	02/03/83 to 03/11/83	LT 0.10
		558	02/01/83 to 02/22/83	LT 0.12
		655	02/01/83 to 02/22/83	LT 0.11
		1D3	02/03/83	LT 0.14
		13E1	02/03/83	LT 0.17
		12F1	02/03/83	LT 0.16
		12G2	NS	--
		12H1	02/02/83 to 03/07/83	LT 0.14
		1D5	02/03/83	LT 0.2
	Drinking	12H2	01/31/83 to 02/07/83	LT 0.17
		12H2	02/07/83 to 02/14/83	LT 0.8
		12H2	02/14/83 to 02/21/83	LT 0.15
		12H2	02/21/83 to 02/28/83	LT 0.11

Note: See footnote at end of table.

Table 8  
(Page 2 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
March <sup>(1)</sup>	Surface	6S7	03/11/83 to 04/08/83	LT 0.10
		5S8	03/02/83 to 03/28/83	LT 0.09
		6S5	03/02/83 to 03/28/83	LT 0.09
		1D3	03/09/83	LT 0.12
		13E1	03/09/83	LT 0.09
		12F1	03/11/83	LT 0.11
		12G2	03/07/83	LT 0.14
		12H1	03/07/83 to 04/07/83	LT 0.10
		1D5	03/09/83	LT 0.13
	Drinking	12H2	02/28/83 to 03/07/83	LT 0.09
		12H2	03/07/83 to 03/14/83	LT 0.11
		12H2	03/14/83 to 03/21/83	LT 0.09
		12H2	03/21/83 to 03/28/83	LT 0.09
April <sup>(1)</sup>	Surface	6S7	(5)	--
		5S8	04/08/83 to 04/25/83	LT 0.10
		6S5	04/08/83 to 04/25/83	0.34 $\pm$ 0.06
		1D3	04/07/83	LT 0.10
		13E1	04/07/83	LT 0.08
		12F1	04/07/83	LT 0.10
		12G2	04/07/83	LT 0.12
		12H1	04/07/83 to 05/05/83	LT 0.16
		1D5	04/08/83	LT 0.11
	Drinking	12H2	03/28/83 to 04/04/83	LT 0.09
		12H2	04/04/83 to 04/11/83	LT 0.09
		12H2	04/11/83 to 04/18/83	LT 0.12
		12H2	04/18/83 to 04/25/83	LT 0.10
		12H2	04/18/83 to 04/25/83	0.13 $\pm$ 0.04 <sup>(6)</sup>

Note: See footnote at end of table.

Table 8  
(Page 3 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
May <sup>(1)</sup>	Surface	6S7	04/08/83 to 06/05/83	LT 0.3
		5S8	05/06/83 to 05/31/83	LT 0.2
		6S5	05/06/83 to 05/31/83	LT 0.11
		1D3	05/06/83	0.21 $\pm$ 0.05
		13E1	05/05/83	LT 0.14
		12F1	05/05/83	LT 0.18
		12G2	NS	--
		12H1	05/05/83 to 06/14/83	LT 0.12
		1D5	05/05/83	LT 0.17
	Drinking	12H2	04/25/83 to 05/02/83	LT 0.11
		12H2	04/25/83 to 05/02/83	LT 0.16 <sup>(6)</sup>
		12H2	05/02/83 to 05/09/83	LT 0.12
		12H2	05/09/83 to 05/16/83	LT 0.11
		12H2	05/16/83 to 05/23/83	LT 0.12
		12H2	05/23/83 to 05/30/83	0.14 $\pm$ 0.05
June <sup>(1)</sup>	Surface	5S8	06/08/83 to 06/27/83	LT 0.09
		6S5	06/08/83 to 06/27/83	LT 0.08
		1D3	06/14/83	LT 0.08
		13E1	06/14/83	LT 0.09
		12F1	06/15/83	LT 0.09
		12G2	06/14/83	0.17 $\pm$ 0.04
		1D5	06/15/83	LT 0.08
	Drinking	12H2	05/30/83 to 06/06/83	LT 0.13
		12H2	06/06/83 to 06/14/83	LT 0.13
		12H2	06/14/83 to 06/21/83	LT 0.09
		12H2	06/21/83 to 06/27/83	LT 0.09

Note: See footnote at end of table.

Table 8  
(Page 4 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
June (7)	Surface	6S7	04/08/83 to 06/05/83	LT 0.7
		6S7	06/05/83 to 07/06/83	LT 0.4
		5S8	06/08/83 to 06/27/83	LT 0.05
		6S5	06/08/83 to 06/27/83	LT 0.06
		1D3	06/14/83	LT 0.13
		13E1	06/14/83	LT 0.07
		12F1	06/14/83	LT 0.06
		12G2	06/14/83	LT 0.15
		12H1	05/05/83 to 06/14/83	LT 0.07
	Drinking	12F3	06/14/83	LT 0.06
		12H2 RAW	05/05/83 to 06/14/83	LT 0.05
		12H2 TREATED	06/14/83	LT 0.05
		12H2 TREATED	06/14/83 to 06/21/83	0.35 $\pm$ 0.32
		12H2 TREATED	06/21/83 to 06/27/83	LT 0.04
		12H2 TREATED	06/27/83 to 07/05/83	0.080 $\pm$ 0.054
July (7)	Surface	6S7	07/06/83 to 08/04/83	0.16 $\pm$ 0.10
		5S8	07/05/83 to 07/25/83	0.10 $\pm$ 0.05
		6S5	07/05/83 to 07/25/83	LT 0.09
		1D3	07/15/83	LT 0.08
		13E1	07/15/83	LT 0.07
		12F1	07/17/83	0.26 $\pm$ 0.10
		12G2	07/15/83	LT 0.15
		12H1	06/14/83 to 07/15/83	LT 0.07
		1D5	07/15/83	LT 0.10
	Drinking	12F3	07/15/83	LT 0.07
		12H2 RAW	06/27/83 to 07/15/83	LT 0.11
		12H2 TREATED	07/05/83 to 07/11/83	LT 0.14
		12H2 TREATED	07/11/83 to 07/19/83	0.06 $\pm$ 0.03
		12H2 TREATED	07/19/83 to 07/26/83	LT 0.07
		12H2 TREATED	07/26/83 to 08/01/83	0.055 $\pm$ 0.016

Note: See footnote at end of table.

Table 8  
(Page 5 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
August (7)	Surface	6S6	07/16/83 to 08/16/83	0.083 $\pm$ 0.039
		5S8	08/01/83 to 08/29/83	0.45 $\pm$ 0.13
		6S7	08/04/83 to 09/07/83	LT 0.2
		6S5	08/01/83 to 08/29/83	LT 0.2
		1D3	08/22/83	LT 0.08
		13E1	08/22/83	LT 0.04
		12F1	08/22/83	0.20 $\pm$ 0.03
		12G2	08/22/83	0.28 $\pm$ 0.04
		12H1	07/15/83 to 08/22/83	0.060 $\pm$ 0.049
		1D5	08/22/83	LT 0.14
	Drinking	12F3	08/22/83	LT 0.12
		12H2 RAW	07/15/83 to 08/16/83	0.065 $\pm$ 0.062
		12H2 TREATED	08/01/83 to 08/08/83	0.13 $\pm$ 0.11
		12H2 TREATED	08/08/83 to 08/15/83	LT 0.2
		12H2 TREATED	08/15/83 to 08/22/83	0.29 $\pm$ 0.14
		12H2 TREATED	08/22/83 to 08/29/83	LT 0.18
September (7)	Surface	6S6	08/16/83 to 10/07/83	LT 0.07
		6S7	09/07/83 to 10/04/83	0.15 $\pm$ 0.10
		5S8	09/06/83 to 09/26/83	LT 0.1
		6S5	09/06/83 to 09/26/83	LT 0.1
		1D3	09/20/83	0.16 $\pm$ 0.08
		13E1	09/20/83	LT 0.11
		12F1	09/19/83	0.22 $\pm$ 0.08
		12G2	09/19/83	LT 0.11
		12H1	08/22/83 to 09/19/83	LT 0.11
		1D5	(8)	--
	Drinking	12F3	09/19/83	LT 0.13
		12H2 RAW	08/16/83 to 09/19/83	LT 0.11
		12H2 TREATED	08/29/83 to 09/05/83	0.20 $\pm$ 0.13
		12H2 TREATED	09/05/83 to 09/12/83	LT 0.1
		12H2 TREATED	09/12/83 to 09/19/83	0.13 $\pm$ 0.08
		12H2 TREATED	09/19/83 to 09/26/83	LT 0.1

Note: See footnote at end of table.

Table 8  
(Page 6 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
October <sup>(7)</sup>	Surface	6S6	10/07/83 to 10/17/83	0.10 $\pm$ 0.03
		6S7	10/04/83 to 10/17/83	0.18 $\pm$ 0.04
		6S6 <sup>(9)</sup>	10/17/83 to 10/25/83	LT 0.1
		6S7 <sup>(10)</sup>	10/17/83 to 10/25/83	0.13 $\pm$ 0.06
		6S6	10/25/83 to 10/31/83	0.05 $\pm$ 0.03
		6S7	10/25/83 to 11/01/83	0.32 $\pm$ 0.03
		6S7 <sup>(11)</sup>	10/25/83 to 11/01/83	0.26 $\pm$ 0.03
		5S8	10/04/83 to 10/25/83	0.15 $\pm$ 0.05
		6S5	10/04/83 to 10/25/83	0.23 $\pm$ 0.05
		1D3	10/19/83	LT 0.2
		13E1	10/18/83	LT 0.09
		12F1	10/18/83	LT 0.10
		12G2	10/18/83	LT 0.08
		12H1	09/19/83 to 10/17/83	LT 0.08
		1D5	(8)	--
	Drinking	12F3	10/18/83	0.10 $\pm$ 0.10
		12H2 RAW	09/19/83 to 10/17/83	0.15 $\pm$ 0.11
		12H2 TREATED	09/26/83 to 10/03/83	LT 0.1
		12H2 TREATED	10/03/83 to 10/10/83	LT 0.1
		12H2 TREATED	10/10/83 to 10/17/83	LT 0.08
		12H2 RAW (12)	10/17/83 to 10/24/83	0.098 $\pm$ 0.059
		12H2 TREATED	10/17/83 to 10/24/83	0.11 $\pm$ 0.06
		12H2 TREATED	10/24/83 to 10/31/83	LT 0.05
		12H2 RAW	10/24/83 to 10/31/83	0.079 $\pm$ 0.034
November <sup>(7)</sup>	Surface	6S6	10/31/83 to 11/07/83	LT 0.06
		6S7	11/01/83 to 11/07/83	0.13 $\pm$ 0.05
		6S6	11/07/83 to 11/14/83	0.13 $\pm$ 0.03
		6S7	11/07/83 to 11/14/83	0.08 $\pm$ 0.03
		6S6	11/14/83 to 11/21/83	0.12 $\pm$ 0.06
		6S7	11/14/83 to 11/21/83	0.15 $\pm$ 0.07
		6S6	11/21/83 to 11/28/83	LT 0.07
		6S7	11/21/83 to 11/28/83	0.13 $\pm$ 0.07
		5S8	11/01/83 to 11/28/83	LT 0.07
		6S5	11/01/83 to 11/28/83	0.07 $\pm$ 0.06
		1D3	11/14/83	LT 0.05
		13E1	11/15/83	0.074 $\pm$ 0.054

Note: See footnote at end of table.



Table 8  
(Page 7 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
November (cont.) (7)	Surface	12F1	11/15/83	LT 0.08
		12G2	11/16/83	LT 0.07
		12H1	10/17/83 to 11/14/83	LT 0.05
		1D5	11/14/83	LT 0.08
	Drinking	12F3	11/15/83	LT 0.09
		12H2 RAW	10/31/83 to 11/07/83	0.076 $\pm$ 0.040
		12H2 TREATED	10/31/83 to 11/07/83	0.072 $\pm$ 0.037
		12H2 RAW	11/07/83 to 11/14/83	LT 0.04
		12H2 TREATED	11/07/83 to 11/14/83	0.053 $\pm$ 0.030
		12H2 RAW	11/14/83 to 11/21/83	LT 0.02
		12H2 TREATED	11/14/83 to 11/21/83	LT 0.10
		12H2 RAW	11/21/83 to 11/29/83	0.17 $\pm$ 0.06
		12H2 TREATED	11/21/83 to 11/29/83	0.092 $\pm$ 0.050
	December <sup>(7)</sup> Surface	6S6	11/28/83 to 12/05/83	LT 0.12
		6S7	11/28/83 to 12/01/83	LT 0.16
		6S7	12/01/83 to 12/05/83	LT 0.10
		6S6	12/05/83 to 12/12/83	LT 0.11
		6S7	12/05/83 to 12/12/83	LT 0.13
		6S6	12/12/83 to 12/19/83	LT 0.09
		6S7	12/12/83 to 12/19/83	LT 0.08
		6S6	12/19/83 to 12/26/83	LT 0.09
		6S6	12/19/83 to 12/26/83	LT 0.08
		6S7	12/19/83 to 12/26/83	LT 0.10
		6S6	12/26/83 to 01/02/83	0.21 $\pm$ 0.04
		6S7	12/26/83 to 01/02/83	LT 0.06
		5S8	12/05/83 to 12/19/83	LT 0.10
		6S5	12/05/83 to 12/19/83	LT 0.11
		1D3	12/14/83	LT 0.08
		13E1	12/13/83	LT 0.13
		12F1	12/13/83	LT 0.13
		12G2	NS	--
		12H1	11/14/83 to 12/12/83	LT 0.10
		1D5	NS	--

Note: See footnote at end of table.

Table 8  
(Page 8 of 8)

Iodine-131 in Water (Surface and Drinking)  
SSES REMP 1983

(Results in pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Date (period)	I-131 Activity
December (7)	Surface	LAKE T-A-W <sup>(13)</sup>	12/09/83	0.15 $\pm$ 0.07
	Drinking	12F3	12/13/83	LT 0.09
		12H2 RAW	11/29/83 to 12/05/83	LT 0.11
		12H2 TREATED	11/29/83 to 12/05/83	LT 0.11
		12H2 RAW	12/05/83 to 12/12/83	0.17 $\pm$ 0.06
		12H2 TREATED	12/05/83 to 12/12/83	0.10 $\pm$ 0.09
		12H2 RAW	12/12/83 to 12/19/83	LT 0.08
		12H2 TREATED	12/12/83 to 12/19/83	LT 0.08
		12H2 RAW	12/19/83 to 12/26/83	LT 0.09
		12H2 TREATED	12/19/83 to 12/26/83	LT 0.09
		12H2 RAW	12/26/83 to 01/02/84	LT 0.08
		12H2 TREATED	12/26/83 to 01/02/84	0.22 $\pm$ 0.04

- (1) Samples collected and analyzed by Radiation Management Corporation.
- (2) LT = Less Than
- (3) NS = No sample
- (4) No data reported.
- (5) Sample was collected in May after a 2 month period.
- (6) Composite sampler
- (7) Samples collected and analyzed by NUS.
- (8) Sample destroyed in analysis.
- (9) Beginning of weekly collection from 6S6.
- (10) Beginning of weekly collection from 6S7.
- (11) Duplicate sample and analysis.
- (12) Beginning of weekly collection from 12H2 RAW.
- (13) Supplementary water samples taken during 1983.



Table 9  
(Page 1 of 12)

Gross Beta in Water  
(Surface, Well, and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
January <sup>(1)</sup>	Surface	5S8	01/04/83 to 01/25/83	LT 1.9 <sup>(2)</sup>
		6S5	NS(3)	--
		6S7	01/03/83 to 02/03/83	20 $\pm$ 2
		1D3	01/07/83	2.2 $\pm$ 1.0
		13E1	01/05/83	LT 1.4
		12F1	01/05/83	2.2 $\pm$ 1.0
		12G2	01/05/83	3.0 $\pm$ 1.1
		12H1	01/03/83 to 02/02/83	LT 2
	Well	Muncy VLY	01/13/83	1.5 $\pm$ 0.6
		Orangeville	01/13/83	1.1 $\pm$ 0.6
		Lee Mount	01/13/83	0.58 $\pm$ 0.53
		2S6	01/06/83	5.4 $\pm$ 1.3
		3S5	NS	--
		4S2	01/06/83	1.7 $\pm$ 1.0
		4S4	01/06/83	2.5 $\pm$ 1.1
		11S5	01/06/83	1.6 $\pm$ 1.0
		15A4	01/08/83	4.9 $\pm$ 1.2
		12E4	01/06/83	1.3 $\pm$ 1.0
	Drinking	12F3	01/05/83	3.2 $\pm$ 1.1
		12H2	01/03/83 to 02/02/83	1.5 $\pm$ 0.8

Note: See footnotes at end of table.

Table 9  
(Page 2 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
February <sup>(1)</sup>	Surface	5S8	02/01/83 to 02/22/83	1.6 $\pm$ 1.2
		6S5	02/01/83 to 02/22/83	LT 1.8
		6S7	02/03/83 to 03/11/83	49 $\pm$ 5
		1D3	02/03/83	5.2 $\pm$ 1.7
		13E1	02/03/83	1.8 $\pm$ 1.5
		12F1	02/03/83	2.1 $\pm$ 1.5
		12G2	NS	-
		12H1	02/02/82 to 03/07/83	1.5 $\pm$ 1.2
	Well	2S6	02/02/83	LT 2
		3S5	NS	-
		4S2	02/02/83	1.9 $\pm$ 1.5
		4S4	02/02/83	LT 2
		11S5	02/02/83	LT 2
		15A4	02/04/83	5.7 $\pm$ 1.7
		12E4	02/02/83	LT 2
		12F3	02/03/83	LT 2
		2S5	02/02/83	3.2 $\pm$ 1.6
	Drinking	12F3	02/03/83	1.8 $\pm$ 1.5
		12H2	02/02/83 to 03/07/83	3.2 $\pm$ 1.3
March <sup>(1)</sup>	Surface	5S8	03/02/83 to 03/28/83	2.7 $\pm$ 1.2
		6S5	03/02/83 to 03/28/83	1.3 $\pm$ 1.1
		6S7	03/11/83 to 04/08/83	79 $\pm$ 8
		1D3	03/09/83	LT 1.9
		13E1	03/09/83	LT 1.9
		12F1	03/11/83	LT 1.9
		12G2	03/07/83	LT 1.9
		12H1	03/07/83 to 04/07/83	2.8 $\pm$ 1.3

Note: See footnotes at end of table.

Table 9  
(Page 3 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
March (cont.)	Well	2S6	03/09/83	LT 1.8
		3S5	NS	-
		4S2	03/09/83	LT 1.9
		4S4	03/09/83	LT 1.8
		11S5	03/09/83	LT 1.9
		15A4	03/11/83	3.5 $\pm$ 1.3
		12E4	03/09/83	LT 1.8
		12F3	03/09/83	LT 1.9
		2S5	03/09/83	2.1 $\pm$ 1.3
	Drinking	12F3	03/09/83	LT 1.9
		12H2	03/07/83 to 04/07/83	1.2 $\pm$ 0.7
April <sup>(1)</sup>	Surface	5S8	04/08/83 to 04/25/83	2.8 $\pm$ 1.2
		6S5	04/08/83 to 04/25/83	1.4 $\pm$ 1.1
		6S7	(4)	-
		1D3	04/07/83	2.3 $\pm$ 1.3
		1D3 <sup>(5)</sup>	04/07/83	3.1 $\pm$ 1.3
		13E1	04/07/83	1.2 $\pm$ 1.2
		12F1	04/07/83	1.7 $\pm$ 1.3
		12G2	04/07/83	2.1 $\pm$ 1.3
		12H1	04/07/83 to 05/05/83	LT 2

Note: See footnotes at end of table.

Table 9  
(Page 4 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
April (cont.)	Well	2S6	04/07/83	LT 1.9
		3S5	NS	-
		4S2	NS	-
		4S4	04/07/83	LT 1.9
		11S5	04/07/83	LT 1.9
		11S5 <sup>(5)</sup>	04/07/83	LT 1.9
		15A4	04/08/83	4.7 $\pm$ 1.4
		12E4	04/07/83	LT 1.9
		12F3	04/07/83	1.4 $\pm$ 1.2
		2S5	04/07/83	LT 1.9
	Drinking	12F3	04/07/83	1.7 $\pm$ 1.3
		12H2	04/07/83 to 05/05/83	1.1 $\pm$ 0.7
May <sup>(1)</sup>	Surface	5S8	05/06/83 to 05/31/83	LT 2
		6S5	05/06/83 to 05/31/83	1.6 $\pm$ 1.1
		6S7	04/08/83 to 06/05/83	39 $\pm$ 4
		1D3	05/06/83	2.9 $\pm$ 1.4
		13E1	05/05/83	LT 2
		12F1	05/05/83	2.3 $\pm$ 1.2
		12G2	NS	-
		12H1	05/05/83 to 06/14/83	2.2 $\pm$ 1.1
	Well	2S6	05/04/83	LT 2
		3S5	NS	-
		4S2	05/04/83	2.0 $\pm$ 1.4
		4S4	05/04/83	LT 2
		11S5	05/04/83	LT 2
		15A4	05/06/83	3.0 $\pm$ 1.4
		12E4	05/04/83	LT 2
		12F3	05/04/83	LT 2
		2S5	NS	-

Note: See footnotes at end of table.

Table 9  
(Page 5 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
May (cont.)	Drinking	12F3 12H2	05/04/83 05/05/83 to 06/14/83	LT 2 1.7 $\pm$ 0.6
June <sup>(1)</sup>	Surface	5S8 6S5 6S7 1D3 13E1 12F1 12G2 12H1	06/08/83 to 06/27/83 06/08/83 to 06/27/83 06/05/83 to 07/06/83 06/14/83 06/14/83 06/15/83 06/14/83 06/14/83 to 07/15/83	LT 1.8 1.7 $\pm$ 1.2 6.4 $\pm$ 1.4 2.3 $\pm$ 1.1 1.6 $\pm$ 1.0 3.4 $\pm$ 1.1 2.2 $\pm$ 1.1 2.9 $\pm$ 1.2
	Well	2S6 3S5 4S2 4S4 11S5 15A4 12E4 12F3 2S5	06/15/83 06/15/83 06/15/83 06/15/83 06/15/83 06/15/83 06/14/83 06/14/83 06/21/83	1.2 $\pm$ 1.0 1.7 $\pm$ 1.0 LT 1.5 LT 1.5 1.2 $\pm$ 1.0 6.0 $\pm$ 1.3 1.9 $\pm$ 1.0 2.3 $\pm$ 1.3 LT 1.8
	Drinking	12F3 12H2	06/14/83 06/14/83 to 07/15/83	1.6 $\pm$ 1.0 2.3 $\pm$ 0.6

Note: See footnotes at end of table.

Table 9  
(Page 4 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
April (cont.)	Well	2S6	04/07/83	LT 1.9
		3S5	NS	-
		4S2	NS	-
		4S4	04/07/83	LT 1.9
		11S5	04/07/83	LT 1.9
		11S5 <sup>(5)</sup>	04/07/83	LT 1.9
		15A4	04/08/83	4.7 $\pm$ 1.4
		12E4	04/07/83	LT 1.9
		12F3	04/07/83	1.4 $\pm$ 1.2
		2S5	04/07/83	LT 1.9
	Drinking	12F3	04/07/83	1.7 $\pm$ 1.3
		12H2	04/07/83 to 05/05/83	1.1 $\pm$ 0.7
May <sup>(1)</sup>	Surface	5S8	05/06/83 to 05/31/83	LT 2
		6S5	05/06/83 to 05/31/83	1.6 $\pm$ 1.1
		6S7	04/08/83 to 06/05/83	39 $\pm$ 4
		103	05/06/83	2.9 $\pm$ 1.4
		13E1	05/05/83	LT 2
		12F1	05/05/83	2.3 $\pm$ 1.2
		12G2	NS	-
		12H1	05/05/83 to 06/14/83	2.2 $\pm$ 1.1
	Well	2S6	05/04/83	LT 2
		3S5	NS	-
		4S2	05/04/83	2.0 $\pm$ 1.4
		4S4	05/04/83	LT 2
		11S5	05/04/83	LT 2
		15A4	05/06/83	3.0 $\pm$ 1.4
		12E4	05/04/83	LT 2
		12F3	05/04/83	LT 2
		2S5	NS	-

Note: See footnotes at end of table.

Table 9  
(Page 8 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
August (6)	Surface	5S8	08/01/83 to 08/29/83	3.6 $\pm$ 1.8
		6S5	08/01/83 to 08/29/83	2.1 $\pm$ 1.4
		6S6	07/16/83 to 08/16/83	2.7 $\pm$ 1.7
		1D3	08/22/83	LT 3
		13E1	08/22/83	LT 3
		12F1	08/22/83	4.7 $\pm$ 1.5
		12G2	08/22/83	3.1 $\pm$ 1.8
		12H1	07/15/83 to 08/22/83	3.8 $\pm$ 2.1
		6S7	08/04/83 to 09/07/83	9.0 $\pm$ 1.8
		1D5	08/22/83	8.4 $\pm$ 1.5
	Well	2S6	08/22/83	LT 2
		3S5	08/22/83	5.4 $\pm$ 1.8
		4S2	08/22/83	LT 2
		4S4	08/22/83	LT 2
		11S5	08/22/83	LT 2
		15A4	08/22/83	4.4 $\pm$ 1.2
		12E4	08/22/83	LT 1.9
		12F3	08/22/83	3.4 $\pm$ 1.3
	Drinking	12F3	08/22/83	LT 2
		12H2 RAW	07/15/83 to 08/16/83	3.1 $\pm$ 2.0
		12H2 TREATED	08/01/83 to 09/05/83	2.7 $\pm$ 2.5

Note: See footnotes at end of table.

Table 9  
(Page 9 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
September <sup>(6)</sup>	Surface	5S8	09/06/83 to 09/26/83	2.4 $\pm$ 1.5
		6S5	09/06/83 to 09/26/83	1.5 $\pm$ 1.4
		6S6	08/16/83 to 10/07/83	LT 4
		1D3	09/20/83	1.5 $\pm$ 1.4
		13E1	09/20/83	LT 2
		12F1	09/19/83	LT 2
		12G2	09/19/83	2.0 $\pm$ 1.7
		12H1	08/22/83 to 09/19/83	4.4 $\pm$ 1.8
		6S7	09/07/83 to 10/04/83	8.8 $\pm$ 3.1
		1D5	09/21/83	9.8 $\pm$ 1.7
	Well	2S6	09/20/83	LT 2
		3S5	09/20/83	LT 2
		4S2	09/20/83	LT 2
		4S4	09/20/83	1.7 $\pm$ 1.4
		11S5	09/20/83	LT 2
		15A4	09/21/83	5.9 $\pm$ 1.5
		12E4	09/20/83	LT 2
		12F3	09/19/83	LT 2
	Drinking	12F3	09/19/83	2.3 $\pm$ 1.5
		12H2 RAW	08/16/83 to 09/19/83	19 $\pm$ 7
		12H2 TREATED	09/05/83 to 10/03/83	7.9 $\pm$ 6.6

Note: See footnotes at end of table.



Table 9  
(Page 10 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
October (6)	Surface	5S8	10/04/83 to 10/25/83	1.8 $\pm$ 1.5
		6S5	10/04/83 to 10/25/83	3.6 $\pm$ 1.4
		6S6	10/07/83 to 10/17/83	3.7 $\pm$ 1.7
		6S6	10/17/83 to 10/31/83	2.4 $\pm$ 2.1
		1D3	10/19/83	LT 2
		13E1	10/18/83	LT 2
		12F1	10/18/83	4.3 $\pm$ 1.4
		12G2	10/18/83	4.3 $\pm$ 1.4
		12H1	09/19/83 to 10/17/83	3.2 $\pm$ 1.4
		6S7	10/04/83 to 10/17/83	9.6 $\pm$ 3.4
		6S7	10/17/83 to 11/01/83	4.6 $\pm$ 1.9
		1D5	10/19/83	12 $\pm$ 2
	Well	2S6	10/18/83	LT 2
		3S5	10/18/83	1.9 $\pm$ 1.4
		4S2	10/18/83	1.6 $\pm$ 1.4
		4S4	10/18/83	2.2 $\pm$ 1.3
		11S5	10/18/83	2.0 $\pm$ 1.4
		15A4	10/18/83	8.3 $\pm$ 1.6
		12E4	10/17/83	LT 2
		12F3	10/18/83	2.0 $\pm$ 1.3
	Drinking	12F3	10/18/83	LT 2
		12H2 RAW	09/19/83 to 10/17/83	13 $\pm$ 4
		12H2 TREATED	10/03/83 to 10/31/83	2.9 $\pm$ 1.5
		12H2 RAW	10/17/83 to 10/31/83	4.2 $\pm$ 1.5

Note: See footnotes at end of table.

Table 9  
(Page 11 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
November <sup>(6)</sup>	Surface	5S8	11/01/83 to 11/28/83	3.4 $\pm$ 1.5
		6S5	11/01/83 to 11/28/83	1.9 $\pm$ 1.4
		6S6	10/31/83 to 11/28/83	3.3 $\pm$ 1.8
		1D3	11/14/83	12 $\pm$ 2
		13E1	11/15/83	1.5 $\pm$ 1.4
		12F1	11/15/83	2.4 $\pm$ 1.5
		12G2	11/16/83	5.0 $\pm$ 2.4
		12H1	10/17/83 to 11/14/83	3.0 $\pm$ 2.8
		6S7	11/01/83 to 12/01/83	4.5 $\pm$ 2.2
		1D5	11/14/83	11 $\pm$ 2
	Well	2S6	11/14/83	LT 2
		3S5	NS	--
		4S2	11/14/83	2.0 $\pm$ 1.5
		4S4	11/14/83	2.7 $\pm$ 1.5
		11S5	11/14/83	LT 2
		15A4	11/16/83	4.8 $\pm$ 1.5
		12E4	11/14/83	LT 2
		12F3	11/15/83	LT 2
	Drinking	12F3	11/15/83	LT 4
		12H2 RAW	10/31/83 to 11/29/83	0.38 $\pm$ 0.30
		12H2 TREATED	10/31/83 to 11/29/83	7.7 $\pm$ 4.1

Note: See footnotes at end of table.

Table 9  
(Page 12 of 12)

Gross Beta in Water  
(Surface, Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Water Type	Station	Collection Period	Gross Beta Activity
December <sup>(6)</sup>	Surface	5S8	12/05/83 to 12/19/83	5.8 $\pm$ 1.4
		6S5	12/05/83 to 12/19/83	4.5 $\pm$ 1.3
		6S6	11/28/83 to 01/02/83	5.1 $\pm$ 2.0
		1D3	12/14/83	26 $\pm$ 3
		13E1	12/13/83	4.6 $\pm$ 1.7
		12F1	12/13/83	8.9 $\pm$ 2.5
		12G2	NS	--
		12H1	11/14/83 to 12/12/83	4.0 $\pm$ 1.7
		6S7	12/01/83 to 01/02/84	4.3 $\pm$ 2.3
		1D5	NS	--
		LAKE T-A-W	12/09/83	6.3 $\pm$ 1.8
	Well	2S6	12/14/83	LT 2
		3S5	NS	--
		4S2	12/13/83	LT 2
		4S4	12/13/83	LT 2
		11S5	12/14/83	LT 2
		15A4	12/15/83	7.7 $\pm$ 1.6
		12E4	12/14/83	LT 2
		12F3	12/13/83	LT 2
	Drinking	12F3	12/13/83	2.3 $\pm$ 1.5
		12H2 RAW	11/29/83 to 01/02/84	3.7 $\pm$ 3.6
		12H2 TREATED	11/29/83 to 01/02/84	5.5 $\pm$ 2.5

- (1) Samples collected and analyzed by Radiation Management Corporation.
- (2) LT = Less Than
- (3) NS = No sample
- (4) Sample was collected in May, after two month period
- (5) Duplicate analysis
- (6) Samples collected and analyzed by NUS

Table 10  
(Page 1 of 4)

Gross Alpha in Water  
(Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	Gross Alpha Activity
Quarter 1 <sup>(1)</sup>	Well	2S6	01/06/83 to 03/09/83	LT 0.9 <sup>(2)</sup>
		3S5	NS <sup>(3)</sup>	--
		4S2	01/06/83 to 03/09/83	LT 1.9
		4S4	01/06/83 to 03/09/83	LT 2
		11S5	01/06/83 to 03/09/83	2.1 $\pm$ 1.1
		15A4	01/08/83 to 03/11/83	LT 0.8
		12E4	01/06/83 to 03/09/83	LT 0.8
		12F3	01/05/83 to 03/09/83	LT 1.6
		2S5	01/06/83 to 03/09/83	LT 1.2
	Drinking	12F3	01/05/83 to 03/09/83	LT 1.4
January <sup>(1)</sup>	Well	Muncy Vly	01/13/83	3.1 $\pm$ 1.1
		Orangeville	01/13/83	LT 1.0
		Lee Mount.	01/13/83	LT 1.0
	Drinking	12H2	01/03/83 to 02/02/83	LT 0.7
February <sup>(1)</sup>	Drinking	12H2	02/02/83 to 03/07/83	LT 0.7
March <sup>(1)</sup>	Drinking	12H2	03/07/83 to 04/07/83	LT 0.9

Note: See footnotes at end of table.

Table 10  
(Page 2 of 4)

Gross Alpha in Water  
(Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	Gross Alpha Activity
Quarter 2 <sup>(1)</sup>	Well	2S6	04/07/83 to 06/15/83	LT 1.5
		3S5	06/15/83	LT 1.5
		4S2	05/04/83 to 06/15/83	LT 1.3
		4S4	04/07/83 to 06/15/83	1.6 $\pm$ 1.2
		11S5	04/07/83 to 06/15/83	LT 1.1
		15A4	04/08/83 to 06/15/83	LT 1.3
		12E4	04/07/83 to 06/14/83	LT 1.0
		12F3	04/07/83 to 06/14/83	0.94 $\pm$ 0.74
		2S5	04/07/83 to 06/21/83	LT 0.8
	Drinking	12F3	04/07/83 to 06/14/83	LT 0.8
April <sup>(1)</sup>	Drinking	12H2	04/07/83 to 05/05/83	LT 1.0
May <sup>(1)</sup>	Drinking	12H2	05/05/83 to 06/14/83	LT 1.6
June <sup>(1)</sup>	Drinking	12H2	06/14/83 to 07/15/83	LT 1.0
June <sup>(4)</sup>	Drinking	12F3	06/14/83	LT 3
		12H2 RAW	05/05/83 to 06/14/83	LT 4
		12H2 TREATED	06/14/83	LT 4
		12H2 RAW	06/14/83 to 06/27/83	LT 2
		12H2 TREATED	06/14/83 to 07/05/83	2.2 $\pm$ 1.7

Note: See footnotes at end of table.

Table 10  
(Page 3 of 4)

Gross Alpha in Water  
(Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	Gross Alpha Activity
Quarter 3 <sup>(4)</sup>	Well	2S6	07/15/83 to 09/20/83	LT 1.6
		3S5	07/15/83 to 09/20/83	LT 1.6
		4S2	07/15/83 to 09/20/83	LT 2
		4S4	07/15/83 to 09/20/83	LT 4
		11S5	07/15/83 to 09/20/83	2.5 $\pm$ 2.0
		15A4	07/16/83 to 09/21/83	LT 1.6
		12E4	07/15/83 to 09/20/83	LT 1.8
		12F3	07/15/83 to 09/19/83	LT 3
	Drinking	12F3	07/15/83 to 09/19/83	LT 7
July <sup>(4)</sup>	Drinking	12H2 RAW	06/27/83 to 07/15/83	LT 4
		12H2 TREATED	07/05/83 to 08/01/83	8.4 $\pm$ 7.0
August <sup>(4)</sup>	Drinking	12H2 RAW	07/15/83 to 08/16/83	LT 4
		12H2 TREATED	08/01/83 to 09/05/83	24 $\pm$ 20
September <sup>(4)</sup>	Drinking	12H2 RAW	08/16/83 to 09/19/83	25 $\pm$ 18
		12H2 TREATED	09/05/83 to 10/03/83	LT 4

Note: See footnotes at end of table.

Table 10  
(Page 4 of 4)

Gross Alpha in Water  
(Well and Drinking)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	Gross Alpha Activity
Quarter 4	Well	2S6	10/18/83 to 12/14/83	LT 1.1
		3S5	NS	--
		4S2	10/18/83 to 12/13/83	LT 1.9
		4S4	10/18/83 to 12/13/83	LT 1.4
		11S5	10/18/83 to 12/14/83	LT 2
		15A4	10/18/83 to 12/15/83	1.0 $\pm$ 0.9
		12E4	10/17/83 to 12/14/83	LT 1.1
		12F3	10/18/83 to 12/13/83	1.4 $\pm$ 1.4
	Drinking	12F3	10/18/83 to 12/13/83	LT 4
October (4)	Drinking	12H2 RAW	10/17/83 to 10/31/83	1.9 $\pm$ 0.8
		12H2 TREATED	10/03/83 to 10/31/83	1.4 $\pm$ 0.9
November (4)	Drinking	12H2 RAW	10/31/83 to 11/29/83	LT 0.9
		12H2 TREATED	10/31/83 to 11/29/83	10 $\pm$ 7
December (4)	Drinking	12H2 RAW	11/29/83 to 01/02/84	LT 6
		12H2 TREATED	11/29/83 to 01/02/84	7.7 $\pm$ 7.0

- (1) Samples collected and analyzed by Radiation Management Corporation  
 (2) LT = Less Than  
 (3) NS = No sample  
 (4) Samples collected and analyzed by NUS



Table 11  
(Page 1 of 5)

Tritium in Water  
(Surface, Well, Drinking, and Precipitation)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	H-3 Activity
Quarter 1 <sup>(1)</sup>	Surface	6S7	01/03/83 to 04/08/83	730 $\pm$ 80
		5S8	01/04/83 to 03/28/83	LT 120 <sup>(2)</sup>
		6S5	02/01/83 to 03/28/83	LT 120
		1D3	01/07/83 to 03/09/83	LT 120
		13E1	01/05/83 to 03/09/83	LT 120
		12F1	01/05/83 to 03/11/83	LT 120
		12G2	01/05/83 to 03/07/83	LT 120
		12H1	01/03/83 to 04/07/83	LT 120
	Well	2S6	01/06/83 to 03/09/83	LT 120
		3S5	NS <sup>(3)</sup>	--
		4S2	01/06/83 to 03/09/83	LT 120
		4S4	01/06/83 to 03/09/83	LT 120
		11S5	01/06/83 to 03/09/83	LT 120
		15A4	01/08/83 to 03/11/83	LT 120
		12E4	01/06/83 to 03/09/83	LT 120
		12F3	01/05/83 to 03/09/83	LT 120
		2S5	01/06/83 to 03/09/83	LT 120
	Drinking	12F3	01/05/83 to 03/09/83	LT 120
	Precipitation	5S4	01/06/83 to 04/07/83	LT 200
		11S2	01/06/83 to 04/07/83	LT 200
		1D2	01/06/83 to 04/07/83	LT 200
		12G1	01/06/83 to 04/07/83	LT 200
January <sup>(1)</sup>	Drinking	12H2	01/03/83 to 02/02/83	LT 110
February <sup>(1)</sup>	Drinking	12H2	02/02/83 to 03/07/83	LT 120
March <sup>(1)</sup>	Drinking	12H2	03/07/83 to 04/07/83	LT 120

Note: See footnote at end of table.



Table 11  
(Page 2 of 5)

Tritium in Water  
(Surface, Well, Drinking, and Precipitation)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	H-3 Activity
Quarter 2 <sup>(1)</sup>	Surface	6S7	04/08/83 to 06/05/83	LT 1400 <sup>(4)</sup>
		5S8	04/08/83 to 06/27/83	210 $\pm$ 70
		6S5	04/08/83 to 06/27/83	260 $\pm$ 70
		1D3	04/07/83 to 06/14/83	LT 120
		13E1	04/07/83 to 06/14/83	LT 120
		12F1	04/07/83 to 06/15/83	LT 120
		12G2	04/07/83 to 06/14/83	100 $\pm$ 70
		12H1	NS	--
	Well	2S6	04/07/83 to 06/15/83	LT 120
		3S5	06/15/83	LT 120
		4S2	05/04/83 to 06/15/83	88 $\pm$ 71
		4S4	04/07/83 to 06/15/83	160 $\pm$ 70
		11S5	04/07/83 to 06/15/83	220 $\pm$ 70
		15A4	04/08/83 to 06/15/83	180 $\pm$ 70
		12E4	04/07/83 to 06/14/83	200 $\pm$ 70
		12F3	04/07/83 to 06/14/83	210 $\pm$ 70
		2S5	04/07/83 to 06/21/83	72 $\pm$ 71
	Drinking	12F3	04/07/83 to 06/14/83	76 $\pm$ 71
	Precipitation	12E1	04/17/83 to 06/27/83	LT 160
		5S4	04/07/83 to 06/27/83	LT 160
		11S2	04/07/83 to 06/27/83	130 $\pm$ 100
		1D2	04/07/83 to 06/27/83	LT 160
		12G1	04/07/83 to 06/27/83	120 $\pm$ 100
		9B1	04/17/83 to 06/27/83	LT 160
		2S2	04/17/83 to 06/27/83	LT 160
		3D1	04/17/83 to 06/27/83	LT 160
		15S4	04/17/83 to 06/27/83	LT 160
		7G1	04/17/83 to 06/27/83	190 $\pm$ 100
April <sup>(1)</sup>	Drinking	12H2	04/07/83 to 05/05/83	LT 120
May <sup>(1)</sup>	Drinking	12H2	05/05/83 to 06/14/83	LT 120

Note: See footnote at end of table.

Table 11  
(Page 3 of 5)

Tritium in Water  
(Surface, Well, Drinking, and Precipitation)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	H-3 Activity
Quarter 3 <sup>(5)</sup>	Surface	6S6	07/16/83 to 10/07/83	LT 1400
		5S8	07/05/83 to 09/26/83	LT 1400 <sup>(6)</sup>
		6S5	07/05/83 to 09/26/83	LT 1400
		1D3	07/15/83 to 09/20/83	LT 1400
		13E1	07/15/83 to 09/20/83	LT 1400
		12F1	07/17/83 to 09/19/83	LT 1400
		12G2	07/15/83 to 09/19/83	LT 1400
		12H1	06/14/83 to 09/19/83	LT 1400
		1D5	07/15/83 to 09/21/83	LT 1200
		6S7	07/06/83 to 10/04/83	LT 1400
	Well	2S6	07/15/83 to 09/20/83	LT 1200
		3S5	07/15/83 to 09/20/83	LT 1200
		4S2	07/15/83 to 09/20/83	LT 1200
		4S4	07/15/83 to 09/20/83	LT 1200
		11S5	07/15/83 to 09/20/83	LT 1200
		15A4	07/16/83 to 09/21/83	LT 1200
		12E4	07/15/83 to 09/20/83	LT 1200
		12F3	07/15/83 to 09/19/83	LT 1200
	Drinking	12F3	07/15/83 to 09/19/83	LT 1200
	Precipitation	12E1	06/27/83 to 09/19/83	LT 1200
		5S4	06/21/83 to 09/20/83	LT 1200
		11S2	06/27/83 to 09/20/83	LT 1200
		1D2	06/27/83 to 09/20/83	LT 1200
		12G1	06/27/83 to 09/19/83	LT 1200
		9B1	06/27/83 to 09/20/83	LT 1200
		2S2	06/27/83 to 09/20/83	LT 1200
		3D1	06/27/83 to 09/20/83	LT 1200
		15S4	06/27/83 to 09/22/83	LT 1400
		7G1	06/27/83 to 09/22/83	LT 1200

Note: See footnote at end of table.

Table 11  
(Page 4 of 5)

Tritium in Water  
(Surface, Well, Drinking, and Precipitation)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	H-3 Activity
June (5)	Drinking	12H2 RAW	06/14/83 to 06/27/83	LT 300
		12H2 TREATED	06/14/83 to 07/05/83	LT 160
July (5)	Drinking	12H2 RAW	06/27/83 to 07/15/83	LT 130
		12H2 TREATED	07/05/83 to 08/01/83	LT 1400
August (5)	Drinking	12H2 RAW	07/15/83 to 08/16/83	270 + 80
		12H2 TREATED	08/01/83 to 09/05/83	LT 1400 (7)
September (5)	Drinking	12H2 RAW	08/16/83 to 09/19/83	99 + 71
		12H2 TREATED	09/05/83 to 10/03/83	LT 1400
Quarter 4 (5)	Surface	6S6	10/07/83 to 01/02/84	LT 1400
		5S8	10/04/83 to 12/19/83	LT 1200
		6S5	10/04/83 to 12/19/83	LT 1200
		1D3	10/19/83 to 12/14/83	LT 1200
		13E1	10/18/83 to 12/13/83	LT 120
		12F1	10/18/83 to 12/13/83	LT 120
		12G2	10/18/83 to 11/16/83	LT 120
		12H1	09/19/83 to 12/12/83	120 + 70
		1D5	10/19/83 to 11/14/83	LT 120
		6S7	10/04/83 to 01/02/84	LT 1400
	Well	2S6	10/18/83 to 12/14/83	LT 130
		3S5	NS	--
		4S2	10/18/83 to 12/13/83	130 + 90
		4S4	10/18/83 to 12/13/83	LT 130
		11S5	10/18/83 to 12/14/83	LT 130
		15A4	10/18/83 to 12/15/83	400 + 180
		12E4	10/17/83 to 12/14/83	LT 130
		12F3	10/18/83 to 12/13/83	LT 130

Note: See footnote at end of table.

Table 11  
(Page 5 of 5)

Tritium in Water  
(Surface, Well, Drinking, and Precipitation)  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month or Quarter	Water Type	Station	Collection Period	H-3 Activity
Quarter 4 (cont.) (5)	Drinking	12F3	10/18/83 to 12/13/83	250 $\pm$ 80
	Precipitation	12E1	09/19/83 to 11/14/83	LT 110
		5S4	09/20/83 to 11/15/83	260 $\pm$ 100
		11S2	09/20/83 to 11/14/83	140 $\pm$ 100
		1D2	09/20/83 to 11/14/83	LT 110
		12G1	09/19/83 to 11/14/83	LT 110
		9B1	09/20/83 to 11/14/83	290 $\pm$ 100
		2S2	09/20/83 to 11/14/83	LT 1200
		3D1	09/20/83 to 11/14/83	LT 160
		15S4	09/22/83 to 11/14/83	LT 110
		7G1	09/22/83 to 10/18/83	LT 110
October (5)	Drinking	12H2 RAW	09/19/83 to 10/17/83	LT 120
		12H2 TREATED	10/03/83 to 10/31/83	LT 130
		12H2 RAW	10/17/83 to 10/31/83	LT 130
November (5)	Drinking	12H2 RAW	10/31/83 to 11/29/83	LT 130
		12H2 TREATED	10/31/83 to 11/29/83	LT 130
December (5)	Drinking	12H2 RAW	11/29/83 to 01/02/84	LT 160
		12H2 TREATED	11/29/83 to 01/02/84	110 $\pm$ 70

- (1) Samples collected and analyzed by Radiation Management Corporation.
- (2) LT = Less Than
- (3) NS = No sample
- (4) Sample analyzed by NUS. Insufficient sample to analyze from 06/05/83 to 07/06/83.
- (5) Samples collected and analyzed by NUS.
- (6) Insufficient sample to analyze from 09/06/83 to 09/26/83.
- (7) Insufficient sample to analyze from 08/15/83 to 08/22/83.

Table 12  
(Page 1 of 3)

Gross Beta in Air Particulate Filters  
SSES PFMP 1983

(Results in E-03 pCi/m<sup>3</sup> ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
Jan <sup>(1)</sup>	01/02/83 to 01/09/83	16 ± 3	14 ± 3	16 ± 3	14 ± 3	13 ± 3	15 ± 3	10 ± 3	14 ± 3	11 ± 2	7.7 ± 2.2	-
	01/03/83 to 01/10/83	NS <sup>(2)</sup>	NS	NS	NS	NS	NS	NS	NS	NS	NS	14 ± 4
	01/09/83 to 01/16/83	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	15 ± 3
	01/10/83 to 01/17/83	-	-	-	-	-	-	-	-	-	-	-
	01/16/83 to 01/23/83	12 ± 3	15 ± 3	14 ± 3	12 ± 2	9.0 ± 2.4	13 ± 3	6.5 ± 2.1	15 ± 3	-	-	-
	01/16/83 to 01/24/83	-	-	-	-	-	-	-	-	11 ± 2	10 ± 2	-
	01/17/83 to 01/24/83	-	-	-	-	-	-	-	-	-	-	15 ± 4
	01/23/83 to 01/30/83	18 ± 3	17 ± 3	16 ± 3	17 ± 3	17 ± 3	20 ± 3	12 ± 3	19 ± 3	-	-	-
	01/24/83 to 01/30/83	-	-	-	-	-	-	-	-	18 ± 3	14 ± 3	-
Feb <sup>(1)</sup>	01/24/83 to 01/31/83	-	-	-	-	-	-	-	-	-	-	19 ± 4
	01/30/83 to 02/06/83	14 ± 3	11 ± 2	13 ± 2	10 ± 2	13 ± 3	9.8 ± 2.4	11 ± 3	11 ± 2	10 ± 2	6.8 ± 1.8	-
	01/31/83 to 02/07/83	-	-	-	-	-	-	-	-	-	-	15 ± 3
	02/06/83 to 02/14/83	14 ± 3	16 ± 3	16 ± 2	14 ± 2	13 ± 2	12 ± 2	9.0 ± 2.2	15 ± 2	15 ± 2	8.5 ± 1.7	-
	02/07/83 to 02/14/83	-	-	-	-	-	-	-	-	-	-	16 ± 3
	02/14/83 to 02/20/83	24 ± 5	20 ± 5	21 ± 4	20 ± 4	16 ± 3	19 ± 3	15 ± 4	16 ± 3	19 ± 3	15 ± 3	-
	02/14/83 to 02/22/83	-	-	-	-	-	-	-	-	-	-	25 ± 8
Mar <sup>(1)</sup>	02/20/83 to 02/27/83	17 ± 3	15 ± 3	15 ± 3	14 ± 2	15 ± 3	15 ± 3	12 ± 3	16 ± 3	15 ± 3	12 ± 2	-
	02/22/83 to 02/28/83	-	-	-	-	-	-	-	-	-	-	16 ± 4
	02/27/83 to 03/06/83	15 ± 3	14 ± 3	14 ± 3	14 ± 3	15 ± 3	13 ± 2	13 ± 3	13 ± 3	13 ± 3	13 ± 2	-
	02/28/83 to 03/07/83	-	-	-	-	-	-	-	-	-	-	15 ± 4
	03/06/83 to 03/13/83	3.2 ± 2.2	4.2 ± 2.1	5.1 ± 1.9	4.7 ± 1.9	4.9 ± 2.0	3.2 ± 1.9	3.0 ± 2.0	3.8 ± 1.9	4.0 ± 1.8	3.4 ± 1.7	-
	03/07/83 to 03/14/83	-	-	-	-	-	-	-	-	-	-	8.1 ± 2.7
	03/13/83 to 03/20/83	8.7 ± 2.4	9.2 ± 2.2	11 ± 2	8.6 ± 1.7	8.4 ± 1.9	9.7 ± 2.2	6.1 ± 2.0	8.5 ± 2.1	9.1 ± 2.0	5.8 ± 1.8	-
Apr <sup>(1)</sup>	03/14/83 to 03/21/83	-	-	-	-	-	-	-	-	-	-	7.6 ± 2.8
	03/20/83 to 03/28/83	14 ± 3	12 ± 2	13 ± 2	11 ± 2	13 ± 2	13 ± 2	7.8 ± 1.8	13 ± 2	11 ± 2	8.1 ± 1.7	-
	03/21/83 to 03/28/83	-	-	-	-	-	-	-	-	-	-	17 ± 3
	03/28/83 to 04/04/83	16 ± 3	14 ± 3	17 ± 3	15 ± 3	16 ± 3	16 ± 3	9.7 ± 2.3	15 ± 3	14 ± 2	13 ± 2	12 ± 3
	04/04/83 to 04/11/83	7.9 ± 2.3	8.1 ± 2.1	6.1 ± 1.8	7.9 ± 2.1	7.9 ± 2.0	9.0 ± 2.1	5.1 ± 2.0	8.9 ± 2.1	8.7 ± 2.0	2.0 ± 1.4	7.2 ± 2.3
	04/11/83 to 04/18/83	10 ± 3	6.6 ± 2.0	7.4 ± 1.8	7.3 ± 1.9	7.5 ± 2.0	8.9 ± 2.1	3.3 ± 1.8	7.8 ± 2.1	7.4 ± 1.9	7.1 ± 1.9	-
	04/11/83 to 04/19/83	-	-	-	-	-	-	-	-	-	-	6.0 ± 2.1
	04/18/83 to 04/25/83	18 ± 3	13 ± 2	14 ± 2	13 ± 2	15 ± 3	14 ± 2	9.9 ± 2.3	14 ± 3	12 ± 2	13 ± 2	-
	04/19/83 to 04/25/83	-	-	-	-	-	-	-	-	-	-	16 ± 3
	04/25/83 to 05/02/83	18 ± 3	20 ± 3	21 ± 3	18 ± 3	20 ± 3	19 ± 3	13 ± 3	20 ± 3	17 ± 3	16 ± 2	21 ± 4

Note: See footnotes at end of table.

Table 12  
(Page 2 of 3)

Gross Beta in Air Particulate Filters  
SSES REMP 1983

(Results in E-03 pCi/m<sup>3</sup> ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
May <sup>(1)</sup>	05/02/83 to 05/09/83	13 + 3	15 + 3	15 + 2	13 + 2	14 + 2	16 + 3	11 + 3	14 + 3	5.9 + 1.7	11 + 2	13 + 3
	05/09/83 to 05/17/83	9.8 ± 1.4	11 ± 1	10 ± 1	9.7 ± 1.0	11 ± 1	10 ± 1	6.6 ± 1.2	12 ± 1	10 ± 1	7.5 ± 1.0	11 ± 2
	05/17/83 to 05/23/83	22 ± 4	17 ± 3	14 ± 3	13 ± 3	10 ± 2	15 ± 3	13 ± 3	13 ± 3	12 ± 3	11 ± 4	16 ± 3
	05/23/83 to 05/30/83	8.4 ± 2.4	12 ± 3	11 ± 2	7.9 ± 1.9	9.6 ± 1.8	8.6 ± 1.9	7.3 ± 2.2	11 ± 2	8.1 ± 1.8	5.2 ± 3.0	-
	05/23/83 to 05/31/83	-	-	-	-	-	-	-	-	-	-	9.5 ± 2.1
June <sup>(1)</sup>	05/30/83 to 06/05/83	12 ± 3	11 ± 3	11 ± 3	8.6 ± 2.2	12 ± 2	9.8 ± 2.3	7.5 ± 2.5	12 ± 3	8.9 ± 2.7	12 ± 4	-
	05/31/83 to 06/06/83	-	-	-	-	-	-	-	-	-	-	11 ± 3
	06/05/83 to 06/12/83	15 ± 3	17 ± 3	17 ± 2	13 ± 2	15 ± 2	15 ± 2	14 ± 2	15 ± 2	15 ± 3	16 ± 4	-
	06/06/83 to 06/12/83	-	-	-	-	-	-	-	-	-	-	17 ± 3
	06/12/83 to 06/18/83	26 ± 4	31 ± 4	30 ± 4	28 ± 3	27 ± 3	27 ± 3	22 ± 3	26 ± 4	26 ± 4	24 ± 4	33 ± 6
	06/18/83 to 06/24/83	17 ± 3	16 ± 3	14 ± 2	17 ± 3	16 ± 2	15 ± 3	13 ± 2	16 ± 3	16 ± 3	7.6 ± 2.7	17 ± 3
	06/24/83 to 06/30/83	13 ± 3	14 ± 3	15 ± 3	12 ± 3	11 ± 2	10 ± 2	9.5 ± 2.5	15 ± 3	14 ± 3	7.8 ± 2.9	15 ± 3
July <sup>(3)</sup>	06/30/83 to 07/06/83	-	-	-	-	-	-	-	-	-	-	13 ± 4
	06/30/83 to 07/07/83	15 ± 3	13 ± 3	11 ± 3	11 ± 3	13 ± 2	18 ± 3	10 ± 3	13 ± 3	-	5.6 ± 3.4	-
	06/30/83 to 07/08/83	-	-	-	-	-	-	-	-	12 ± 3	-	-
	07/06/83 to 07/14/83	-	-	-	-	-	-	-	-	-	-	11 ± 3
	07/07/83 to 07/14/83	9.8 ± 3.2	14 ± 3	11 ± 3	11 ± 3	14 ± 3	12 ± 3	6.6 ± 3.1	9.8 ± 3.0	-	9.8 ± 4	-
	07/08/83 to 07/14/83	-	-	-	-	-	-	-	-	20 ± 4	-	-
	07/14/83 to 07/21/83	-	23 ± 4	20 ± 4	-	18 ± 4	-	-	18 ± 4	-	-	19 ± 4
	07/14/83 to 07/22/83	21 ± 3	-	-	24 ± 3	-	19 ± 3	11 ± 3	-	19 ± 3	8.6 ± 3.4	-
	07/21/83 to 07/29/83	-	12 ± 3	11 ± 2	-	11 ± 3	-	-	12 ± 3	-	-	11 ± 3
	07/22/83 to 07/29/83	9.6 ± 3.5	-	-	9.7 ± 3.0	-	11 ± 3	6.4 ± 2.6	-	10 ± 3	5.8 ± 3.2	-
Aug <sup>(3)</sup>	07/29/83 to 08/04/83	12 ± 5	13 ± 4	14 ± 3	12 ± 3	16 ± 4	14 ± 4	9.9 ± 3.4	15 ± 4	12 ± 3	LT 7 <sup>(4)</sup>	-
	07/29/83 to 08/05/83	-	-	-	-	-	-	-	-	-	-	7.6 ± 3.4
	08/04/83 to 08/11/83	18 ± 4	17 ± 4	18 ± 3	18 ± 3	19 ± 3	19 ± 3	17 ± 4	18 ± 3	17 ± 3	13 ± 4	-
	08/05/83 to 08/12/83	-	-	-	-	-	-	-	-	-	-	11 ± 4
	08/11/83 to 08/17/83	-	12 ± 4	11 ± 3	-	11 ± 3	-	-	8.6 ± 3.0	8.4 ± 3.0	-	-
	08/11/83 to 08/18/83	17 ± 4	-	-	8.7 ± 2.6	-	LT 4	8.4 ± 2.2	-	-	8.5 ± 3.6	-
	08/12/83 to 08/19/83	-	-	-	-	-	-	-	-	-	-	18 ± 4
	08/17/83 to 08/25/83	-	15 ± 3	17 ± 3	-	18 ± 3	-	-	19 ± 3	18 ± 3	-	-
	08/18/83 to 08/25/83	19 ± 4	-	-	18 ± 4	-	16 ± 3	12 ± 2	-	-	11 ± 5	-
	08/19/83 to 08/26/83	-	-	-	-	-	-	-	-	-	-	17 ± 3
	08/25/83 to 09/01/83	18 ± 4	19 ± 3	16 ± 3	17 ± 3	18 ± 3	16 ± 3	16 ± 4	20 ± 3	18 ± 3	17 ± 4	-
	08/26/83 to 09/02/83	-	-	-	-	-	-	-	-	-	-	19 ± 4

Note: See footnotes at end of table.



Table 12  
(Page 3 of 3)

Gross Beta in Air Particulate Filters  
SSES REMP 1983

(Results in E-03 pCi/m<sup>3</sup> ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	1D2	3D1	12E1	7G1	12G1	7H1
Sept <sup>(3)</sup>	09/01/83 to 09/08/83	20 ± 4	22 ± 3	19 ± 4	22 ± 4	22 ± 3	26 ± 3	19 ± 3	24 ± 3	20 ± 3	11 ± 4	-
	09/02/83 to 09/09/83	-	-	-	-	-	-	-	-	-	-	23 ± 4
	09/08/83 to 09/15/83	11 ± 2	16 ± 3	15 ± 3	15 ± 3	19 ± 3	17 ± 3	11 ± 2	18 ± 3	15 ± 3	7.7 ± 3.5	-
	09/15/83 to 09/22/83	20 ± 4	13 ± 3	18 ± 3	19 ± 4	19 ± 3	19 ± 3	16 ± 3	21 ± 3	21 ± 3	18 ± 4	-
	09/09/83 to 09/22/83	-	-	-	-	-	-	-	-	-	-	19 ± 3
	09/22/83 to 09/30/83	17 ± 4	24 ± 4	20 ± 3	17 ± 3	23 ± 3	22 ± 3	15 ± 2	26 ± 3	18 ± 3	-	15 ± 3
Oct <sup>(3)</sup>	09/22/83 to 10/01/83	-	-	-	-	-	-	-	-	-	13 ± 5	-
	09/30/83 to 10/08/83	17 ± 3	17 ± 3	18 ± 2	21 ± 3	20 ± 2	19 ± 3	12 ± 2	18 ± 2	18 ± 2	-	-
	10/01/83 to 10/08/83	-	-	-	-	-	-	-	-	-	18 ± 4	-
	09/30/83 to 10/07/83	-	-	-	-	-	-	-	-	-	-	20 ± 3
	10/08/83 to 10/15/83	6.5 ± 3.2	8.6 ± 3.1	6.6 ± 2.6	7.7 ± 2.3	11 ± 3	10 ± 3	5.9 ± 2.7	8.2 ± 2.5	5.4 ± 2.7	3.9 ± 3.4	-
	10/07/83 to 10/22/83	10 ± 2	10 ± 2	13 ± 2	11 ± 2	13 ± 2	12 ± 2	7.1 ± 2.0	9.2 ± 2.3	11 ± 2	11 ± 3	9.4 ± 1.4
Nov <sup>(3)</sup>	10/15/83 to 10/22/83	5.8 ± 2.2	5.9 ± 2.3	6.8 ± 1.9	5.9 ± 1.8	7.0 ± 1.9	6.2 ± 2.1	3.4 ± 1.9	3.7 ± 2.4	5.7 ± 1.9	2.9 ± 2.7	6.7 ± 2.2
	10/22/83 to 10/29/83	-	-	-	-	-	-	-	-	-	-	-
	10/29/83 to 11/05/83	5.5 ± 2.1	4.6 ± 2.1	4.7 ± 1.9	6.5 ± 1.7	7.8 ± 1.9	11 ± 3	5.0 ± 1.8	6.4 ± 2.3	7.8 ± 2.0	LT 4	-
	10/29/83 to 11/04/83	-	-	-	-	-	-	-	-	-	-	6.3 ± 3.5
	11/05/83 to 11/12/83	15 ± 3	12 ± 2	13 ± 2	14 ± 3	13 ± 2	16 ± 3	9.2 ± 2.0	11 ± 2	12 ± 2	14 ± 2	-
	11/04/83 to 11/11/83	-	-	-	-	-	-	-	-	-	-	8.6 ± 3.4
Dec <sup>(3)</sup>	11/12/83 to 11/20/83	10 ± 2	12 ± 2	12 ± 2	25 ± 4	14 ± 2	13 ± 2	6.5 ± 1.6	11 ± 2	13 ± 2	10 ± 2	-
	11/11/83 to 11/26/83	-	-	-	-	-	-	-	-	-	-	13 ± 2
	11/20/83 to 11/27/83	22 ± 3	22 ± 3	21 ± 2	21 ± 2	23 ± 2	20 ± 3	16 ± 2	20 ± 2	20 ± 2	23 ± 3	-
	11/26/83 to 12/02/83	-	-	-	-	-	-	-	-	-	-	16 ± 3
	11/27/83 to 12/04/83	14 ± 3	12 ± 2	13 ± 2	13 ± 2	13 ± 2	17 ± 3	9.4 ± 1.9	13 ± 2	12 ± 2	14 ± 2	-
	12/02/83 to 12/09/83	-	-	-	-	-	-	-	-	-	-	11 ± 2
Dec <sup>(3)</sup>	12/04/83 to 12/12/83	12 ± 2	15 ± 2	14 ± 2	14 ± 2	16 ± 2	-	-	16 ± 2	13 ± 2	12 ± 2	-
	12/04/83 to 12/13/83	-	-	-	-	-	22 ± 3	8.5 ± 1.7	-	-	-	-
	12/09/83 to 12/20/83	-	-	-	-	-	-	-	-	-	-	15 ± 2
	12/12/83 to 12/19/83	13 ± 2	13 ± 2	13 ± 2	15 ± 3	13 ± 2	-	-	14 ± 2	13 ± 2	14 ± 2	-
	12/13/83 to 12/19/83	-	-	-	-	-	15 ± 2	5.7 ± 2.1	-	-	-	-
	12/19/83 to 12/27/83	15 ± 2	14 ± 3	14 ± 2	15 ± 3	14 ± 2	24 ± 3	-	15 ± 2	15 ± 2	11 ± 2	-
	12/20/83 to 12/27/83	-	-	-	-	-	-	10 ± 2	-	-	-	6.7 ± 2.8
	12/27/83 to 01/03/84	20 ± 3	19 ± 3	19 ± 2	21 ± 4	18 ± 3	5.1 ± 0.6	16 ± 2	21 ± 3	19 ± 3	15 ± 2	17 ± 3

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) NS = No sample

(3) Samples collected and analyzed by NUS.

(4) LT = Less Than

Table 13  
(Page 1 of 2)

Gamma Spectrometry of Composited Air Particulate Filters  
SSES REMP 1983

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

Quarter	Collection Period	Station	Be-7	Ce-144	Cs-134	Cs-137	Nb-95	Zr-95	K-40
1 <sup>(1)</sup>	01/02/83	2S2	78 $\pm$ 22	LT 9 <sup>(2)</sup>	LT 1.2	LT 1.3	LT 1.7	LT 3	LT 12
	to	5S4	66 $\pm$ 16	LT 5	LT 0.8	LT 1.1	LT 1.5	LT 2	LT 14
	03/28/83	11S2	70 $\pm$ 12	LT 9	LT 0.9	LT 0.9	LT 1.4	LT 1.7	12 $\pm$ 8
		15S4	61 $\pm$ 13	LT 4	LT 0.9	LT 0.9	LT 1.2	LT 1.8	LT 18
		9B1	72 $\pm$ 16	LT 9	LT 1.2	LT 1.5	LT 2	LT 3	LT 25
		1D2	77 $\pm$ 17	LT 11	LT 1.2	LT 1.6	LT 2	LT 3	LT 30
		3D1	63 $\pm$ 12	LT 9	LT 1.0	LT 0.8	LT 1.7	LT 2	LT 15
		12E1	72 $\pm$ 16	LT 8	LT 0.9	LT 1.2	LT 2	LT 2	LT 20
		7G1	46 $\pm$ 11	LT 4	LT 0.9	LT 1.0	LT 1.3	LT 1.7	LT 14
		12G1	53 $\pm$ 14	LT 7	LT 0.8	LT 1.0	LT 1.8	LT 2	LT 17
		7H1	74 $\pm$ 15	LT 11	LT 1.1	LT 1.4	LT 1.1	LT 2	LT 20
2 <sup>(1)</sup>	03/28/83	2S2	110 $\pm$ 20	LT 8	LT 0.9	LT 1.0	LT 1.2	LT 2	LT 18
	to	5S4	75 $\pm$ 10	LT 4	LT 0.8	LT 0.9	LT 1.1	LT 1.4	LT 12
	06/30/83	11S2	98 $\pm$ 12	LT 7	LT 0.9	LT 1.0	LT 1.2	LT 1.7	LT 18
		15S4	95 $\pm$ 10	LT 6	LT 0.6	LT 0.8	LT 0.8	LT 1.3	LT 10
		9B1	110 $\pm$ 20	LT 6	LT 0.7	LT 0.8	LT 0.6	LT 1.6	LT 10
		1D2	70 $\pm$ 12	LT 3	LT 0.7	LT 0.7	LT 0.8	LT 1.3	LT 11
		3D1	80 $\pm$ 12	LT 8	LT 1.0	LT 1.2	LT 1.3	LT 2	LT 17
		12E1	99 $\pm$ 11	LT 6	LT 0.7	LT 0.8	LT 0.7	LT 1.0	LT 13
		7G1	84 $\pm$ 12	LT 7	LT 0.8	LT 0.9	LT 0.8	LT 1.1	LT 14
		12G1	70 $\pm$ 12	LT 8	LT 1.0	LT 1.2	LT 1.4	LT 1.7	LT 22
		7H1	100 $\pm$ 10	LT 8	LT 0.7	LT 1.2	LT 1.0	LT 1.6	ND <sup>(3)</sup>

Note: See footnotes at end of table.



Table 13  
(Page 2 of 2)

Gamma Spectrometry of Composited Air Particulate Filters  
SSES REMP 1983

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

Quarter	Collection Period	Station	Be-7	Ce-144	Cs-134	Cs-137	Nb-95	Zr-95	K-40
3 <sup>(4)</sup>	06/30/83	2S2	67 $\pm$ 17	LT 5	LT 1.3	LT 1.4	LT 1.9	LT 3	ND
		5S4	72 $\pm$ 16	LT 4	LT 1.2	LT 0.9	LT 1.8	LT 4	ND
	09/30/83	11S2	42 $\pm$ 12	LT 4	LT 1.2	LT 0.8	LT 1.3	LT 3	ND
		15S4	73 $\pm$ 17	LT 6	LT 1.3	LT 1.0	LT 2	LT 4	ND
		9B1	63 $\pm$ 15	LT 4	LT 0.9	LT 1.3	LT 1.2	LT 3	ND
		102	55 $\pm$ 15	LT 4	LT 1.1	LT 0.9	LT 1.8	LT 3	ND
		3D1	45 $\pm$ 14	LT 5	LT 1.2	LT 1.3	LT 1.9	LT 4	ND
		12E1	69 $\pm$ 16	LT 6	LT 1.6	LT 1.4	LT 1.7	LT 3	ND
		7G1	77 $\pm$ 15	LT 4	LT 1.1	LT 1.2	LT 1.7	LT 3	ND
		12G1 <sup>(5)</sup>	42 $\pm$ 14	LT 5	LT 1.6	LT 1.3	LT 3	LT 5	ND
		7H1	56 $\pm$ 17	LT 4	LT 1.2	LT 1.4	LT 3	LT 3	ND
4 <sup>(4)</sup>	09/30/83	2S2	34 $\pm$ 12	LT 5	LT 1.1	LT 1.1	LT 1.3	LT 4	ND
		5S4	52 $\pm$ 12	LT 4	LT 1.1	LT 1.4	LT 1.8	LT 3	ND
	01/03/84	11S2	45 $\pm$ 11	LT 4	LT 1.2	LT 1.0	LT 1.1	LT 2	ND
		15S4	42 $\pm$ 13	LT 4	LT 1.3	LT 1.3	LT 2	LT 4	ND
		9B1	43 $\pm$ 11	LT 4	LT 0.9	LT 1.1	LT 1.8	LT 2	ND
		102	45 $\pm$ 14	LT 6	LT 1.7	LT 1.5	LT 1.1	LT 2	ND
		3D1	30 $\pm$ 11	LT 5	LT 1.3	LT 1.5	LT 1.7	LT 3	ND
		12E1	53 $\pm$ 14	LT 4	LT 1.3	LT 1.0	LT 1.4	LT 2	ND
		7G1	48 $\pm$ 12	LT 4	LT 1.1	LT 1.1	LT 1.8	LT 2	ND
		12G1 <sup>(6)</sup>	41 $\pm$ 12	LT 4	LT 1.1	LT 1.0	LT 1.5	LT 3	ND
		7H1	42 $\pm$ 12	LT 5	LT 1.1	LT 1.3	LT 2	LT 4	ND

(1) Samples collected and analyzed by Radiation Management Corporation

(2) LT = Less Than

(3) ND = Not detected

(4) Samples collected and analyzed by NUS

(5) Collection stop date is 10/01/83

(6) Collection start date is 10/01/83

Table 14  
Gross Alpha in Compositied Air Particulate Filters  
SSES REMP 1983

(Results in E-03 pCi/m<sup>3</sup> ± 2s)

Quarter	Collection Period	252	554	1152	1554	981	102	301	12E1	761	12G1	7H1
1	(1) 01/02/83 to 03/28/83 01/03/83 to 03/28/83	7.5 ± 1.1	4.8 ± 0.7	4.9 ± 0.8	4.6 ± 0.7	8.0 ± 1.0	6.2 ± 0.8	2.8 ± 0.5	6.5 ± 0.9	5.9 ± 0.8	4.7 ± 0.6	- 6.1 ± 1.1
2	(1) 03/28/83 to 06/30/83	5.8 ± 0.8	6.7 ± 0.8	7.7 ± 1.0	5.3 ± 0.6	7.4 ± 0.8	7.0 ± 0.8	5.2 ± 0.7	7.1 ± 0.8	5.8 ± 1.0	5.6 ± 0.7	5.0 ± 0.9
3	(2) 06/30/83 to 09/30/83	3.8 ± 1.8	3.0 ± 1.5	2.4 ± 1.3	3.8 ± 1.6	4.1 ± 1.5	4.2 ± 1.6	2.3 ± 1.3	4.4 ± 1.6	3.6 ± 1.6	2.1 ± 1.8	(3)
4	(2) 09/30/83 to 01/03/84	8.0 ± 2.4	7.0 ± 2.2	4.6 ± 1.7	5.5 ± 2.0	4.6 ± 1.7	6.2 ± 2.0	2.4 ± 1.3	6.3 ± 2.1	4.4 ± 1.7	4.3 ± 1.8	3.1 ± 1.8

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) Samples collected and analyzed by NUS.

(3) Sample destroyed in analysis.

Table 15  
(Page 1 of 6)

Iodine -131 in Charcoal Cartridges  
SSES REMP 1983

(Results in pCi/m3 ± 2s)

Month	Collection Period	252	554	1152	1554	981	102	301	12E1	7G1	12G1	7H1
Jan <sup>(1)</sup>	01/02 -01/09/83	LT 0.05 <sup>(2)</sup>	LT 0.05	LT 0.04	LT 0.04	LT 0.02	LT 0.06	LT 0.05	LT 0.05	LT 0.05	LT 0.02	-
	01/03 -01/10/83	-	-	-	-	-	-	-	-	-	-	LT 0.05
	01/09 -01/16/83	NS <sup>(3)</sup>	NS	NS	NS	NS	NS	NS	NS	NS	-	LT 0.04
	01/10 -01/17/83	-	-	-	-	-	-	-	-	-	-	-
	01/16 -01/23/83	LT 0.02	LT 0.02	LT 0.02	LT 0.02	LT 0.01	LT 0.03	LT 0.03	LT 0.04	-	-	-
	01/16 -01/24/83	-	-	-	-	-	-	-	-	LT 0.02	LT 0.012	-
	01/17 -01/24/83	-	-	-	-	-	-	-	-	-	-	LT 0.03
	01/23 -01/30/83	LT 0.002	LT 0.002	LT 0.001	LT 0.0013	LT 0.002	LT 0.0013	LT 0.002	LT 0.001	-	-	-
	01/24 -01/30/83	-	-	-	-	-	-	-	-	LT 0.001	LT 0.002	-
	01/24 -01/31/83	-	-	-	-	-	-	-	-	-	-	LT 0.002
Feb <sup>(1)</sup>	01/30 -02/06/83	LT 0.002	LT 0.0013	LT 0.0012	LT 0.0008	LT 0.002	LT 0.0013	LT 0.002	LT 0.0008	LT 0.0008	LT 0.0006	-
	01/31 -02/07/83	-	-	-	-	-	-	-	-	-	-	LT 0.0011
	02/06 -02/14/83	LT 0.003	LT 0.004	LT 0.002	LT 0.002	LT 0.002	LT 0.003	LT 0.002	LT 0.0006	LT 0.0010	LT 0.0009	-
	02/07 -02/14/83	-	-	-	-	-	-	-	-	-	-	LT 0.004
	02/14 -02/20/83	LT 0.011	LT 0.012	LT 0.008	NS	LT 0.007	LT 0.006	LT 0.010	LT 0.008	LT 0.008	LT 0.007	-
	02/14 -02/22/83	-	-	-	-	-	-	-	-	-	-	LT 0.03
	02/20 -02/27/83	LT 0.006	LT 0.005	LT 0.005	LT 0.004	LT 0.005	LT 0.006	LT 0.007	LT 0.005	LT 0.008	LT 0.006	-
	02/22 -02/28/83	-	-	-	-	-	-	-	-	-	-	LT 0.009

Note: See footnotes at end of table.

Table 15  
(Page 2 of 6)  
Iodine -131 in Charcoal Cartridges  
SSES REMP 1983

(Results in pCi/m3  $\pm$  2s)

Month	Collection Period	252	554	1152	1554	981	102	301	12E1	761	12G1	7H1
March <sup>(1)</sup>	02/27 -03/06/83	LT 0.008	LT 0.007	LT 0.006	LT 0.008	LT 0.007	LT 0.005	LT 0.008	LT 0.007	LT 0.006	LT 0.006	-
	02/28 -03/07/83	-	-	-	-	-	-	-	-	-	-	LT 0.009
	03/06 -03/13/83	LT 0.008	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.007	LT 0.007	-
	03/07 -03/14/83	-	-	-	-	-	-	-	-	-	-	LT 0.007
	03/13 -03/20/83	LT 0.006	LT 0.005	LT 0.005	LT 0.004	LT 0.005	LT 0.005	LT 0.005	LT 0.006	LT 0.005	LT 0.005	-
	03/14 -03/21/83	-	-	-	-	-	-	-	-	-	-	LT 0.006
	03/20 -03/28/83	LT 0.005	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.004	-
	03/21 -03/28/83	-	-	-	-	-	-	-	-	-	-	LT 0.006
April <sup>(1)</sup>	03/28 -04/04/83	LT 0.006	LT 0.005	LT 0.005	LT 0.006	LT 0.006	LT 0.005	LT 0.006	LT 0.005	LT 0.005	LT 0.005	LT 0.005
	04/04 -04/11/83	LT 0.005	LT 0.004	LT 0.004	LT 0.005	LT 0.004	LT 0.005	LT 0.005	LT 0.005	LT 0.004	LT 0.004	LT 0.005
	04/11 -04/18/83	LT 0.02	LT 0.007	LT 0.006	LT 0.006	LT 0.007	LT 0.007	LT 0.008	LT 0.009	LT 0.006	LT 0.007	-
	04/11 -04/19/83	-	-	-	-	-	-	-	-	-	-	LT 0.003
	04/18 -04/25/83	LT 0.006	LT 0.006	LT 0.005	LT 0.005	LT 0.005	LT 0.005	LT 0.006	LT 0.006	LT 0.006	LT 0.006	-
	04/19 -04/25/83	-	-	-	-	-	-	-	-	-	-	LT 0.007
	04/25 -05/02/83	LT 0.008	LT 0.006	LT 0.007	LT 0.007	LT 0.007	LT 0.008	LT 0.009	LT 0.007	LT 0.008	LT 0.007	LT 0.009

Note: See footnotes at end of table.

Table 15  
(Page 2 of 6)  
Iodine -131 in Charcoal Cartridges  
SSES REMP 1983  
(Results in pCi/m3 + 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	9B1	102	301	12E1	7G1	12G1	7H1
May <sup>(1)</sup>	05/02 -05/09/83	LT 0.006	LT 0.006	LT 0.004	LT 0.004	LT 0.005	LT 0.005	LT 0.006	LT 0.005	LT 0.004	LT 0.004	LT 0.006
	05/09 -05/17/83	LT 0.005	LT 0.005	LT 0.004	LT 0.003	LT 0.003	LT 0.004	LT 0.005	LT 0.004	LT 0.005	LT 0.004	LT 0.005
	05/17 -05/23/83	LT 0.007	LT 0.006	LT 0.005	LT 0.005	LT 0.004	LT 0.005	LT 0.007	LT 0.006	LT 0.006	LT 0.012	LT 0.006
	05/23 -05/30/83	LT 0.005	LT 0.005	LT 0.004	LT 0.004	LT 0.004	LT 0.004	LT 0.005	LT 0.005	LT 0.004	NS	-
	05/23 -05/31/83	-	-	-	-	-	-	-	-	-	-	LT 0.004
June <sup>(1)</sup>	05/30 -06/05/83	LT 0.006	LT 0.006	LT 0.005	LT 0.004	LT 0.004	LT 0.005	LT 0.005	LT 0.004	LT 0.006	LT 0.011	-
	05/31 -06/06/83	-	-	-	-	-	-	-	-	-	-	LT 0.006
June <sup>(4)</sup>	06/05 -06/12/83	LT 0.02	LT 0.02	LT 0.016	LT 0.014	LT 0.012	LT 0.012	LT 0.14	LT 0.012	LT 0.016	LT 0.02	-
	06/06 -06/12/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	06/12 -06/18/83	LT 0.014	LT 0.013	LT 0.016	LT 0.011	LT 0.011	LT 0.010	LT 0.010	LT 0.011	LT 0.012	LT 0.014	LT 0.02
	06/18 -06/24/83	LT 0.02	LT 0.018	LT 0.017	LT 0.018	LT 0.017	LT 0.017	LT 0.016	LT 0.02	LT 0.018	LT 0.02	LT 0.02
	06/24 -06/30/83	LT 0.19	LT 0.015	LT 0.018	LT 0.02	LT 0.015	LT 0.015	LT 0.016	LT 0.018	LT 0.016	LT 0.02	LT 0.02

Note: See footnotes at end of table.

Table 15  
(Page 4 of 6)  
Iodine -131 in Charcoal Cartridges  
SSES REMP 1983

(Results in pCi/m<sup>3</sup> ± 2s)

Month	Collection Period	2S2	5S4	11S2	15S4	981	102	301	12E1	761	12G1	7H1
July <sup>(4)</sup>	06/30 -07/06/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	06/30 -07/07/83	LT 0.019	LT 0.016	LT 0.017	LT 0.018	LT 0.013	LT 0.17	LT 0.02	LT 0.015	-	LT 0.02	-
	06/30 -07/08/83	-	-	-	-	-	-	-	-	LT 0.015	-	-
	07/01 -07/14/83	-	-	-	-	-	-	-	-	-	-	LT 0.016
	07/07 -07/14/83	LT 0.02	LT 0.02	LT 0.014	LT 0.019	LT 0.013	LT 0.015	LT 0.02	LT 0.018	-	LT 0.02	-
	07/08 -07/14/83	-	-	-	-	-	-	-	-	LT 0.02	-	-
	07/14 -07/21/83	-	LT 0.011	LT 0.010	-	LT 0.012	-	-	LT 0.010	-	-	LT 0.012
	07/14 -07/22/83	LT 0.011	-	-	LT 0.011	-	LT 0.010	LT 0.012	-	LT 0.011	LT 0.011	-
	07/21 -07/29/83	-	LT 0.018	LT 0.007	-	LT 0.007	-	-	LT 0.007	-	-	LT 0.019
	07/22 -07/29/83	LT 0.011	-	-	LT 0.010	-	LT 0.02	LT 0.019	-	LT 0.019	LT 0.02	-
Aug <sup>(4)</sup>	07/29 -08/04/83	LT 0.02	LT 0.016	LT 0.011	LT 0.015	LT 0.014	LT 0.014	LT 0.014	LT 0.014	LT 0.015	LT 0.02	-
	07/29 -08/05/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	08/04 -08/11/83	LT 0.02	LT 0.018	LT 0.016	LT 0.017	LT 0.016	LT 0.016	LT 0.014	LT 0.016	LT 0.017	LT 0.02	-
	08/05 -08/12/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	08/11 -08/17/83	-	LT 0.014	LT 0.010	-	LT 0.010	-	-	LT 0.011	LT 0.012	-	-
	08/11 -08/18/83	LT 0.02	-	-	LT 0.017	-	LT 0.017	LT 0.014	-	-	LT 0.02	-
	08/12 -08/19/83	-	-	-	-	-	-	-	-	-	-	LT 0.013
	08/17 -08/25/83	-	LT 0.017	LT 0.014	-	LT 0.017	-	-	LT 0.017	LT 0.010	-	-
	08/18 -08/25/83	LT 0.02	-	-	LT 0.02	-	LT 0.012	LT 0.009	-	-	LT 0.02	-
	08/19 -08/26/83	-	-	-	-	-	-	-	-	-	-	LT 0.009
	08/25 -09/01/83	LT 0.02	LT 0.015	LT 0.018	LT 0.02	LT 0.019	LT 0.015	LT 0.02	LT 0.019	LT 0.016	LT 0.02	-
	08/26 -09/02/83	-	-	-	-	-	-	-	-	-	-	LT 0.019

Note: See footnotes at end of table.

Table 15  
(Page 5 of 6)  
Iodine -131 in Charcoal Cartridges  
SSES REMP 1983  
(Results in pCi/m3  $\pm$  2s)

Month	Collection Period	252	554	1152	1554	981	102	301	12E1	761	12G1	7H1
Sept <sup>(4)</sup>	09/01 -09/08/83	LT 0.014	LT 0.011	LT 0.016	LT 0.014	LT 0.012	LT 0.010	LT 0.009	LT 0.012	LT 0.012	LT 0.017	-
	09/02 -09/09/83	-	-	-	-	-	-	-	-	-	-	LT 0.013
	09/08 -09/15/83	LT 0.013	LT 0.014	LT 0.013	LT 0.015	LT 0.013	LT 0.016	LT 0.011	LT 0.015	LT 0.017	LT 0.02	-
	09/09 -09/22/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	09/15 -09/22/83	LT 0.015	LT 0.02	LT 0.012	LT 0.015	LT 0.012	LT 0.014	LT 0.016	LT 0.014	LT 0.015	LT 0.02	-
	09/22 -09/30/83	LT 0.02	LT 0.02	LT 0.017	LT 0.017	LT 0.015	LT 0.016	LT 0.013	LT 0.017	LT 0.018	-	LT 0.015
	09/22 -10/01/83	-	-	-	-	-	-	-	-	-	LT 0.015	-
Oct <sup>(4)</sup>	09/30 -10/08/83	LT 0.020	LT 0.015	LT 0.016	LT 0.016	LT 0.015	LT 0.013	LT 0.09	LT 0.015	LT 0.012	-	-
	10/01 -10/08/83	-	-	-	-	-	-	-	-	-	LT 0.02	-
	09/30 -10/07/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	10/08 -10/15/83	LT 0.02	LT 0.016	LT 0.015	LT 0.013	LT 0.015	LT 0.014	LT 0.014	LT 0.014	LT 0.014	LT 0.019	-
	10/15 -10/22/83	LT 0.017	LT 0.012	LT 0.014	LT 0.012	LT 0.015	LT 0.010	LT 0.010	LT 0.018	LT 0.014	LT 0.014	-
	10/07 -10/22/83	-	-	-	-	-	-	-	-	-	-	LT 0.014
	10/22 -10/29/83	LT 0.015	LT 0.014	LT 0.012	LT 0.012	LT 0.012	LT 0.013	LT 0.012	LT 0.017	LT 0.012	LT 0.018	LT 0.02

Note: See footnotes at end of table.



Table 15  
(Page 6 of 6)  
Iodine -131 in Charcoal Cartridges  
SSES REMP 1983  
(Results in pCi/m3  $\pm$  2s)

Month	Collection Period	252	554	1152	1554	981	102	301	12E1	761	12G1	7H1
Nov <sup>(4)</sup>	10/29 -11/05/83	LT 0.018	LT 0.019	LT 0.017	LT 0.014	LT 0.016	LT 0.02	LT 0.016	LT 0.02	LT 0.016	LT 0.02	-
	10/29 -11/04/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	11/05 -11/12/83	LT 0.018	LT 0.02	LT 0.015	LT 0.02	LT 0.016	LT 0.02	LT 0.019	LT 0.018	LT 0.02	LT 0.02	-
	11/04 -11/11/83	-	-	-	-	-	-	-	-	-	-	LT 0.02
	11/12 -11/20/83	LT 0.009	LT 0.007	LT 0.006	LT 0.014	LT 0.006	LT 0.006	LT 0.006	LT 0.007	LT 0.007	LT 0.006	-
	11/20 -11/27/83	LT 0.017	LT 0.015	LT 0.014	LT 0.014	LT 0.014	LT 0.016	LT 0.016	LT 0.014	LT 0.016	LT 0.016	-
	11/11 -11/26/83	-	-	-	-	-	-	-	-	-	-	LT 0.013
Dec <sup>(4)</sup>	11/27 -12/04/83	LT 0.009	LT 0.008	LT 0.007	LT 0.007	LT 0.007	LT 0.009	LT 0.006	LT 0.007	LT 0.007	LT 0.006	-
	11/26 -12/02/83	-	-	-	-	-	-	-	-	-	-	LT 0.015
	12/04 -12/12/83	LT 0.013	LT 0.012	LT 0.010	LT 0.010	LT 0.015	-	-	LT 0.014	LT 0.015	LT 0.014	-
	12/04 -12/13/83	-	-	-	-	-	LT 0.019	LT 0.012	-	-	-	-
	12/02 -12/09/83	-	-	-	-	-	-	-	-	-	-	LT 0.018
	12/12 -12/19/83	LT 0.017	LT 0.017	LT 0.011	LT 0.02	LT 0.013	-	-	LT 0.013	LT 0.015	LT 0.013	-
	12/13 -12/19/83	-	-	-	-	-	LT 0.015	LT 0.018	-	-	-	-
	12/09 -12/20/83	-	-	-	-	-	-	-	-	-	-	LT 0.009
	12/19 -12/27/83	LT 0.018	LT 0.019	LT 0.013	LT 0.02	LT 0.016	LT 0.02	-	LT 0.015	LT 0.016	LT 0.013	-
	12/20 -12/27/83	-	-	-	-	-	-	LT 0.014	-	-	-	LT 0.02
	12/27/83 -01/03/84	LT 0.015	LT 0.012	LT 0.011	LT 0.02	LT 0.013	LT 0.04	LT 0.013	LT 0.013	LT 0.016	LT 0.014	LT 0.02

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) Less Than

(3) NS = No sample received.

(4) Samples collected and analyzed by NUS.



Table 16

Gamma Spectrometry of Precipitation  
SSES REMP 1983(Results in pCi/l  $\pm$  2s)

Quarter	Collection Period	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	Be-7
1 <sup>(1)</sup>	01/06-04/07/83	102	LT 60 <sup>(2)</sup>	LT 1.5	LT 1.0	LT 0.9	LT 0.9	LT 3	LT 16	LT 12	LT 1.0	LT 2	LT 2	LT 3	LT 15
	01/06-04/07/83	1152	LT 50	LT 1.3	LT 0.8	LT 0.8	LT 0.8	LT 3	LT 14	LT 12	LT 0.9	LT 2	LT 1.7	LT 2	LT 13
	01/06-04/07/83	554	LT 30	LT 0.9	LT 0.7	LT 0.6	LT 0.6	LT 3	LT 9	LT 12	LT 0.7	LT 1.5	LT 1.6	LT 1.6	14 $\pm$ 7
	01/06-04/07/83	1261	LT 30	LT 0.8	LT 0.6	LT 0.6	LT 0.6	LT 2	LT 8	LT 10	LT 0.6	LT 1.3	LT 1.3	LT 1.4	21 $\pm$ 7
2 <sup>(1)</sup>	04/07-06/27/83	102	LT 17	LT 0.8	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 10	LT 6	LT 0.6	LT 1.2	LT 1.6	LT 1.5	22 $\pm$ 5
	04/07-06/27/83	1152	LT 20	LT 0.9	LT 1.1	LT 0.7	LT 0.8	LT 2	LT 9	LT 6	LT 0.7	LT 1.3	LT 1.7	LT 1.7	27 $\pm$ 7
	04/07-06/27/83	554	LT 19	LT 0.8	LT 0.8	LT 0.6	LT 0.6	LT 2	LT 10	LT 6	LT 0.7	LT 1.2	LT 1.6	LT 1.4	21 $\pm$ 5
	04/07-06/27/83	1261	LT 30	LT 1.3	LT 0.9	LT 0.9	LT 1.0	LT 3	LT 15	LT 6	LT 1.0	LT 1.8	LT 2	LT 2	33 $\pm$ 9
	04/17-06/27/83	1554	LT 18	LT 0.7	LT 0.6	LT 0.5	LT 0.6	LT 1.8	LT 8	LT 4	LT 0.5	LT 1.0	LT 1.4	LT 1.2	27 $\pm$ 7
	04/17-06/27/83	981	LT 20	LT 0.9	LT 1.0	LT 0.7	LT 0.7	LT 2	LT 10	LT 5	LT 0.7	LT 1.3	LT 1.6	LT 1.8	29 $\pm$ 7
	04/17-06/27/83	761	LT 120	LT 6	LT 6	LT 4	LT 5	LT 14	LT 70	LT 30	LT 4	LT 9	LT 11	LT 11	LT 70
	04/17-06/27/83	252	LT 30	LT 1.0	LT 1.1	LT 0.7	LT 0.8	LT 2	LT 8	LT 8	LT 0.7	LT 1.4	LT 1.5	LT 1.9	31 $\pm$ 7
	04/17-06/27/83	1261	LT 20	LT 1.0	LT 1.1	LT 0.7	LT 0.8	LT 2	LT 9	LT 6	LT 0.8	LT 1.4	LT 1.7	LT 1.9	35 $\pm$ 7
	04/17-06/27/83	301	LT 18	LT 0.7	LT 0.7	LT 0.5	LT 0.6	LT 2	LT 8	LT 5	LT 0.6	LT 1.2	LT 1.3	LT 1.3	26 $\pm$ 6
3 <sup>(4)</sup>	06/27-09/20/83	102	LT 1900	LT 5	LT 2	LT 2	LT 1.8	LT 20	ND <sup>(3)</sup>	LT 1300	LT 2	LT 5	LT 5	LT 9	ND
	06/27-09/20/83	1152	LT 600	LT 5	LT 3	LT 3	LT 2	LT 16	ND	LT 300	LT 3	LT 6	LT 7	LT 10	ND
	06/27-09/20/83	554	LT 800	LT 7	LT 3	LT 3	LT 3	LT 20	ND	LT 500	LT 3	LT 7	LT 8	LT 12	ND
	06/27-09/19/83	1261	LT 800	LT 6	LT 3	LT 3	LT 3	LT 20	ND	LT 500	LT 3	LT 6	LT 6	LT 12	ND
	06/27-09/22/83	1554	LT 1700	LT 4	LT 1.7	LT 1.7	LT 1.7	LT 16	ND	LT 1100	LT 1.9	LT 5	LT 5	LT 9	ND
	06/27-09/20/83	981	LT 1900	LT 4	LT 1.8	LT 1.7	LT 1.6	LT 16	ND	LT 1000	LT 1.9	LT 5	LT 4	LT 9	ND
	06/27-09/22/83	761	LT 1400	LT 6	LT 3	LT 3	LT 2	LT 20	ND	LT 700	LT 3	LT 6	LT 6	LT 11	ND
	06/27-09/20/83	252	LT 7000	LT 5	LT 1.5	LT 1.2	LT 1.3	LT 20	ND	LT 4000	LT 1.6	LT 5	LT 4	LT 10	ND
	06/27-09/19/83	1261	LT 1800	LT 4	LT 1.7	LT 1.6	LT 1.4	LT 15	ND	LT 1000	LT 1.7	LT 5	LT 4	LT 8	ND
	06/27-09/20/83	301	LT 1900	LT 5	LT 2	LT 2	LT 2	LT 20	ND	LT 1200	LT 2	LT 6	LT 6	LT 10	ND
4 <sup>(4)</sup>	09/20-11/14/83	102	LT 500	LT 3	LT 1.8	LT 1.6	LT 1.7	LT 12	ND	LT 400	LT 1.8	LT 4	LT 4	LT 7	ND
	09/20-11/14/83	1152	LT 600	LT 4	LT 2	LT 2	LT 1.7	LT 14	ND	LT 300	LT 2	LT 4	LT 5	LT 8	ND
	09/20-10/15/83	554	LT 500	LT 3	LT 1.9	LT 1.6	LT 1.5	LT 12	ND	LT 300	LT 2	LT 4	LT 4	LT 7	ND
	09/19-11/14/83	1261	LT 700	LT 5	LT 3	LT 2	LT 1.9	LT 16	ND	LT 400	LT 2	LT 5	LT 6	LT 9	ND
	09/22-11/14/83	1554	LT 700	LT 5	LT 2	LT 2	LT 1.9	LT 15	ND	LT 400	LT 3	LT 5	LT 5	LT 9	ND
	09/20-11/14/83	981	LT 700	LT 5	LT 3	LT 2	LT 2	LT 18	ND	LT 500	LT 3	LT 6	LT 7	LT 10	ND
	09/22-10/18/83	761	LT 2000	LT 5	LT 2	LT 1.9	LT 1.8	LT 20	ND	LT 1400	LT 2	LT 6	LT 6	LT 10	ND
	09/20-11/14/83	252	LT 900	LT 5	LT 3	LT 2	LT 2	LT 20	ND	LT 500	LT 2	LT 5	LT 7	LT 10	ND
	09/19-11/14/83	1261	LT 800	LT 5	LT 2	LT 2	LT 2	LT 15	ND	LT 500	LT 2	LT 5	LT 6	LT 10	ND
	09/20-11/14/83	301	LT 500	LT 4	LT 2	LT 1.6	LT 1.6	LT 13	ND	LT 300	LT 1.9	LT 4	LT 5	LT 7	ND

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) LT = Less Than

(3) ND = Not detected

(4) Samples collected and analyzed by NUS.

Table 17  
(Page 1 of 1)  
Gamma Spectrometry of Milk  
SSES REMP 1983

(Results in pCi/l  $\pm$  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 <sup>(1)</sup>	01/08/83	1282	LT 300 <sup>(2)</sup>	LT 3 <sup>(3)</sup>	LT 1.9	LT 1.5	LT 1.6	LT 10	1200 $\pm$ 200	LT 50 <sup>(2)</sup>	LT 1.8	LT 6	LT 5	LT 6
	01/07/83	5E1	LT 200 <sup>(2)</sup>	LT 2	LT 1.6	LT 1.0	1.2 $\pm$ 0.7	LT 11	1400 $\pm$ 200	LT 40 <sup>(2)</sup>	LT 1.4	LT 5	LT 5	LT 4
	01/08/83	13E3	LT 18 <sup>(2)</sup>	LT 4	LT 5	LT 5	LT 5	LT 11	1300 $\pm$ 200	LT 8	LT 4	LT 5	LT 11	LT 9
	01/07/83	1061	LT 20 <sup>(2)</sup>	LT 6	LT 7	LT 7	LT 7	LT 13	1400 $\pm$ 200	LT 9	LT 6	LT 7	LT 14	LT 12
	01/08/83	1283	LT 60 <sup>(2)</sup>	LT 1.9	LT 1.7	LT 1.1	LT 1.1	LT 8	1500 $\pm$ 200	LT 15	LT 1.4	LT 3	LT 5	LT 4
	01/07/83	6C1	LT 70 <sup>(2)</sup>	LT 2	LT 1.9	LT 1.1	1.4 $\pm$ 0.8	LT 7	1500 $\pm$ 200	LT 13	LT 1.6	LT 3	LT 5	LT 4
	01/07/83	1001	LT 200 <sup>(2)</sup>	LT 2	LT 1.7	LT 1.1	2.0 $\pm$ 0.8	LT 10	1500 $\pm$ 200	LT 50 <sup>(2)</sup>	LT 1.4	LT 5	LT 5	LT 4
	01/07/83	1202	LT 200 <sup>(2)</sup>	LT 2	LT 1.4	LT 1.0	1.2 $\pm$ 0.7	LT 10	1500 $\pm$ 200	LT 50 <sup>(2)</sup>	LT 1.3	LT 4	LT 5	LT 4
	02/04/83	1282	LT 160 <sup>(2)</sup>	LT 3	LT 1.7	LT 1.3	LT 1.3	LT 8	1300 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.6	LT 5	LT 4	LT 5
	02/05/83	5E1	LT 180 <sup>(2)</sup>	LT 3	LT 1.9	LT 1.4	LT 1.7	LT 10	1300 $\pm$ 200	LT 40 <sup>(2)</sup>	LT 2	LT 5	LT 5	LT 5
February <sup>(1)</sup>	02/04/83	13E3	LT 140 <sup>(2)</sup>	LT 2	LT 1.7	LT 1.1	1.5 $\pm$ 0.9	LT 9	1200 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.5	LT 4	LT 4	LT 4
	02/04/83	1061	LT 140 <sup>(2)</sup>	LT 2	LT 1.7	LT 1.1	3.3 $\pm$ 0.9	LT 9	1300 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.4	LT 4	LT 5	LT 4
	02/04/83	1283	LT 130 <sup>(2)</sup>	LT 2	LT 1.5	LT 1.0	1.2 $\pm$ 0.7	LT 8	1600 $\pm$ 200	LT 20 <sup>(2)</sup>	LT 1.3	LT 4	LT 5	LT 4
	02/05/83	6C1	LT 130 <sup>(2)</sup>	LT 2	LT 1.9	LT 1.1	LT 1.3	LT 9	1400 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.5	LT 4	LT 4	LT 4
	02/05/83	1001	LT 120 <sup>(2)</sup>	LT 2	LT 1.7	LT 1.1	LT 1.1	LT 9	1400 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.4	LT 4	LT 5	LT 4
	02/04/83	1202	LT 170 <sup>(2)</sup>	LT 3	LT 1.9	LT 1.4	LT 1.6	LT 9	1700 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.7	LT 5	LT 5	LT 5

Note: See footnotes at end of table.

Table 17  
(Page 2 of 8)

Gamma Spectrometry of Milk  
SSES REMP 1983

(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
March <sup>(1)</sup>	03/11/83	1282	LT 60(2)	LT 1.9	LT 1.7	LT 1.1	LT 1.1	LT 7	1500 + 200	LT 13	LT 1.4	LT 3	LT 5	LT 4
	03/10/83	5E1	LT 50(2)	LT 1.7	LT 1.6	LT 1.0	1.5 + 0.7	LT 6	1200 + 200	LT 11	LT 1.3	LT 3	LT 4	LT 3
	03/11/83	13E3	LT 60(2)	LT 2	LT 1.5	LT 1.2	LT 1.6	LT 6	1400 + 200	LT 10	LT 1.6	LT 3	LT 4	LT 4
	03/10/83	1061	LT 70(2)	LT 2	LT 1.9	LT 1.3	LT 1.6	LT 7	1200 + 200	LT 15	LT 1.8	LT 3	LT 5	LT 4
	03/11/83	1283	LT 50(2)	LT 2	LT 1.6	LT 1.2	2.3 + 0.8	LT 6	1400 + 200	LT 9	LT 1.5	LT 3	LT 4	LT 4
	03/11/83	6C1	LT 60(2)	LT 3	LT 1.9	LT 1.4	LT 1.6	LT 8	1400 + 200	LT 14	LT 1.9	LT 3	LT 5	LT 4
	03/10/83	1001	LT 40(2)	LT 1.5	LT 1.4	LT 0.9	1.6 + 0.7	LT 6	1300 + 200	LT 10	LT 1.2	LT 2	LT 4	LT 3
	03/10/83	1202	LT 50(2)	LT 1.9	LT 1.8	LT 1.1	LT 1.3	LT 6	1200 + 200	LT 11	LT 1.4	LT 3	LT 4	LT 3
	04/08/83	1282	LT 30(2)	LT 1.5	LT 1.4	LT 0.9	LT 1.1	LT 5	1300 + 200	LT 7	LT 1.1	LT 2	LT 4	LT 3
	04/08/83	5E1	LT 50(2)	LT 2	LT 2	LT 1.4	LT 1.6	LT 7	1500 + 200	LT 10	LT 1.9	LT 3	LT 5	LT 4
	04/09/83	13E3	LT 30(2)	LT 1.5	LT 1.5	LT 1.0	1.4 + 0.8	LT 6	1600 + 200	LT 7	LT 1.3	LT 2	LT 4	LT 3
	04/08/83	1061	LT 40(2)	LT 1.8	LT 1.6	LT 1.1	1.9 + 0.9	LT 7	1500 + 200	LT 8	LT 1.4	LT 2	LT 5	LT 3
	04/09/83	1283	LT 30(2)	LT 1.9	LT 1.8	LT 1.1	2.0 + 0.9	LT 7	1600 + 200	LT 6	LT 1.4	LT 2	LT 5	LT 3
April <sup>(1)</sup>	04/08/83	6C1	LT 50(2)	LT 2	LT 1.9	LT 1.4	LT 1.6	LT 7	1400 + 200	LT 9	LT 1.8	LT 3	LT 5	LT 4
	04/08/83	1001	LT 30(2)	LT 1.6	LT 1.4	LT 0.9	1.5 + 0.7	LT 5	1500 + 200	LT 6	LT 1.2	LT 2	LT 4	LT 3
	04/08/83	1202	LT 30(2)	LT 1.9	LT 1.8	LT 1.1	LT 1.2	LT 6	1500 + 200	LT 8	LT 1.4	LT 3	LT 5	LT 3
	04/09/83	1283(4)	LT 40(2)	LT 2	LT 1.6	LT 1.2	1.6 + 0.9	LT 6	1500 + 200	LT 7	LT 1.5	LT 3	LT 4	LT 4
	04/23/83	1282	LT 30(2)	LT 1.7	LT 1.6	LT 1.0	2.3 + 0.8	LT 6	1200 + 200	LT 6	LT 1.3	LT 2	LT 4	LT 3
	04/23/83	5E1	LT 40(2)	LT 1.9	LT 1.4	LT 1.2	LT 1.5	LT 5	1400 + 200	LT 7	LT 1.5	LT 3	LT 4	LT 3
	04/23/83	13E3	LT 40(2)	LT 2	LT 2	LT 1.4	LT 2	LT 7	1500 + 200	LT 9	LT 1.9	LT 3	LT 5	LT 4
	04/23/83	1061	LT 30(2)	LT 1.8	LT 1.8	LT 1.1	1.5 + 0.7	LT 6	1500 + 200	LT 7	LT 1.4	LT 2	LT 5	LT 3

Note: See footnotes at end of table.

Table 17  
(Page 3 of 8)  
Gamma Spectrometry of Milk  
SSES REMP 1983  
(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
May <sup>(1)</sup>	05/07/83	12B2	LT 30 <sup>(2)</sup>	LT 1.8	LT 1.9	LT 1.2	LT 1.3	LT 5	1500 + 200	LT 6	LT 1.5	LT 2	LT 4	LT 3
	05/06/83	5E1	LT 30 <sup>(2)</sup>	LT 1.8	LT 1.9	LT 1.1	LT 1.4	LT 6	1400 + 200	LT 6	LT 1.4	LT 3	LT 4	LT 3
	05/07/83	13E3	LT 30 <sup>(2)</sup>	LT 1.6	LT 1.6	LT 1.1	1.5 + 0.8	LT 6	1400 + 200	LT 6	LT 1.5	LT 2	LT 5	LT 3
	05/06/83	10G1	LT 30 <sup>(2)</sup>	LT 1.9	LT 1.6	LT 1.3	LT 1.5	LT 6	1400 + 200	LT 6	LT 1.5	LT 3	LT 4	LT 3
	05/07/83	12B3	LT 30 <sup>(2)</sup>	LT 1.8	LT 1.8	LT 1.0	2.7 + 0.9	LT 6	1500 + 200	LT 5	LT 1.3	LT 2	LT 5	LT 3
	05/07/83	6C1	LT 30 <sup>(2)</sup>	LT 1.8	LT 1.6	LT 1.3	1.4 + 0.9	LT 5	1600 + 200	LT 6	LT 1.5	LT 2	LT 4	LT 3
	05/06/83	1001	LT 40 <sup>(2)</sup>	LT 2	LT 1.9	LT 1.4	LT 1.6	LT 7	1500 + 200	LT 8	LT 1.9	LT 3	LT 5	LT 4
	05/06/83	1202	LT 30 <sup>(2)</sup>	LT 1.5	LT 1.5	LT 0.9	2.1 + 0.9	LT 5	1500 + 200	LT 5	LT 1.2	LT 1.9	LT 4	LT 3
	05/20/83	12B2	LT 19 <sup>(2)</sup>	LT 1.5	LT 1.6	LT 1.0	LT 1.5	LT 5	1400 + 200	LT 4	LT 1.3	LT 2	LT 4	LT 3
	05/20/83	5E1	LT 30 <sup>(2)</sup>	LT 2	LT 2	LT 1.4	1.7 + 1.0	LT 6	1400 + 200	LT 6	LT 1.8	LT 3	LT 5	LT 4
	05/20/83	13E3	LT 19 <sup>(2)</sup>	LT 1.4	LT 1.4	LT 0.9	1.6 + 0.8	LT 5	1500 + 200	LT 4	LT 1.2	LT 1.8	LT 4	LT 3
	05/20/83	10G1	LT 20 <sup>(2)</sup>	LT 1.7	LT 1.9	LT 1.1	LT 1.4	LT 5	1400 + 200	LT 5	LT 1.4	LT 2	LT 4	LT 3
June <sup>(1)</sup>	06/15/83 <sup>(5)</sup>	12B2	LT 15	LT 1.5	LT 1.6	LT 1.1	LT 1.3	LT 5	1300 + 200	LT 3	LT 1.3	LT 1.8	LT 4	LT 3
	06/15/83 <sup>(5)</sup>	5E1	LT 20 <sup>(2)</sup>	LT 1.7	LT 1.6	LT 1.2	2.1 + 1.0	LT 5	1400 + 200	LT 4	LT 1.5	LT 2	LT 4	LT 3
	06/15/83 <sup>(5)</sup>	13E3	LT 12	LT 1.5	LT 1.8	LT 1.1	1.6 + 0.9	LT 4	1500 + 200	LT 2	LT 1.4	LT 1.8	LT 4	LT 3
	06/15/83 <sup>(5)</sup>	10G1	LT 10	LT 1.4	LT 1.7	LT 1.1	1.1 + 0.7	LT 4	1300 + 200	LT 3	LT 1.2	LT 1.7	LT 4	LT 2
	06/27/83	12B2	LT 19 <sup>(2)</sup>	LT 1.6	LT 1.9	LT 1.1	1.5 + 0.8	LT 5	1400 + 200	LT 4	LT 1.4	LT 2	LT 4	LT 3
	06/28/83	5E1	LT 17 <sup>(2)</sup>	LT 1.4	LT 1.5	LT 0.9	LT 1.4	LT 4	1400 + 200	LT 3	LT 1.2	LT 1.8	LT 4	LT 2
	06/27/83	13E3	LT 16 <sup>(2)</sup>	LT 1.5	LT 1.7	LT 1.0	1.4 + 0.9	LT 5	1200 + 200	LT 4	LT 1.2	LT 1.9	LT 4	LT 3
	06/27/83	10G1	LT 20 <sup>(2)</sup>	LT 1.9	LT 1.7	LT 1.4	3.2 + 0.9	LT 5	1200 + 200	LT 4	LT 1.5	LT 2	LT 4	LT 3

Note: See footnotes at end of table.

Table 17  
(Page 4 of 8)

Gamma Spectrometry of Milk  
SSES REMP 1983

(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 <sup>(6)</sup>	06/15/83 <sup>(5)</sup>	12B2	LT 20 <sup>(2)</sup>	LT 2	LT 2	LT 1.7	LT 1.9	LT 7	1600 + 200	LT 10	LT 2	LT 2	LT 5	LT 4
	06/15/83 <sup>(5)</sup>	5E1	LT 30 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 2	LT 9	2100 + 300	LT 10	LT 2	LT 3	LT 7	LT 5
	06/15/83 <sup>(5)</sup>	13E3	LT 20 <sup>(2)</sup>	LT 4	LT 4	LT 3	LT 3	LT 12	2200 + 300	LT 10	LT 3	LT 3	LT 9	LT 7
	06/15/83 <sup>(5)</sup>	10G1	LT 40 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 3	LT 12	1800 + 200	LT 18 <sup>(2)</sup>	LT 3	LT 3	LT 8	LT 6
	06/15/83 <sup>(5)</sup>	12B3	LT 18 <sup>(2)</sup>	LT 2	LT 2	LT 1.4	LT 1.7	LT 7	1500 + 200	LT 9	LT 1.8	LT 2	LT 5	LT 4
	06/15/83 <sup>(5)</sup>	6C1	LT 30 <sup>(2)</sup>	LT 2	LT 2	LT 1.8	3.1 + 0.9	LT 8	2100 + 300	LT 11	LT 1.8	LT 2	LT 5	LT 4
	06/15/83 <sup>(5)</sup>	10D1	LT 20 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 3	LT 10	2100 + 300	LT 9	LT 3	LT 3	LT 9	LT 9
	06/15/83 <sup>(5)</sup>	12D2	LT 50 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 2	LT 11	2700 + 300	LT 19 <sup>(2)</sup>	LT 3	LT 4	LT 8	LT 6
	06/27/83	12B2	LT 30 <sup>(2)</sup>	LT 3	LT 2	LT 1.6	LT 1.8	LT 9	1300 + 200	LT 14	LT 2	LT 3	LT 6	LT 5
	06/28/83	5E1	LT 30 <sup>(2)</sup>	LT 2	LT 1.9	LT 1.4	LT 1.6	LT 7	1200 + 200	LT 15	LT 1.7	LT 2	LT 5	LT 4
	06/27/83	13E3	LT 90 <sup>(2)</sup>	LT 3	LT 1.9	LT 1.4	1.7 + 0.8	LT 10	1500 + 200	LT 30 <sup>(2)</sup>	LT 1.7	LT 3	LT 5	LT 5
	06/27/83	10G1	LT 40 <sup>(2)</sup>	LT 2	LT 1.7	LT 1.2	1.4 + 0.8	LT 7	1500 + 200	LT 14	LT 15	LT 2	LT 5	LT 4
July <sup>(6)</sup>	07/16/83	12B2	LT 18 <sup>(2)</sup>	LT 5	LT 5	LT 5	LT 5	LT 12	1300 + 200	LT 7	LT 5	LT 5	LT 13	LT 9
	07/16/83	5E1	LT 12	LT 3	LT 3	LT 2	LT 2	LT 7	1300 + 200	LT 5	LT 2	LT 3	LT 6	LT 5
	07/16/83	13E3	LT 11	LT 3	LT 3	LT 2	LT 2	LT 7	1400 + 200	LT 5	LT 3	LT 3	LT 7	LT 5
	07/16/83	10G1	LT 700 <sup>(2)</sup>	LT 4	LT 2	LT 1.5	1.6 + 0.7	LT 20	1300 + 200	LT 300 <sup>(2)</sup>	LT 2	LT 11	LT 7	LT 8
	07/16/83	12B3	LT 20 <sup>(2)</sup>	LT 4	LT 5	LT 4	3.1 + 2.5	LT 10	1200 + 200	LT 9	LT 4	LT 5	LT 10	LT 7
	07/16/83	6C1	LT 900 <sup>(2)</sup>	LT 5	LT 3	LT 2	LT 2	LT 20	1300 + 200	LT 400 <sup>(2)</sup>	LT 3	LT 14	LT 8	LT 11
	07/16/83	10D1	LT 700 <sup>(2)</sup>	LT 4	LT 2	LT 1.6	LT 1.7	LT 19	1500 + 200	LT 300 <sup>(2)</sup>	LT 2	LT 11	LT 6	LT 8
	07/16/83	12D2	LT 300 <sup>(2)</sup>	LT 2	LT 1.0	LT 0.7	LT 0.8	LT 10	1100 + 200	LT 140 <sup>(2)</sup>	LT 1.0	LT 5	LT 3	LT 4
	07/30/83	12B2	LT 300 <sup>(2)</sup>	LT 3	LT 1.8	LT 1.3	LT 1.4	LT 13	1300 + 200	LT 90 <sup>(2)</sup>	LT 1.6	LT 6	LT 5	LT 5
	07/30/83	5E1	LT 500 <sup>(2)</sup>	LT 5	LT 3	LT 3	LT 3	LT 20	1400 + 200	LT 200 <sup>(2)</sup>	LT 3	LT 12	LT 9	LT 10
	07/30/83	13E3	LT 300 <sup>(2)</sup>	LT 3	LT 1.8	LT 1.5	LT 1.6	LT 12	1000 + 100	LT 110 <sup>(2)</sup>	LT 1.8	LT 7	LT 5	LT 6
	07/30/83	10G1	LT 400 <sup>(2)</sup>	LT 5	LT 3	LT 2	LT 2	LT 18	1300 + 200	LT 190 <sup>(2)</sup>	LT 3	LT 10	LT 7	LT 9

Note: See footnotes at end of table.

Table 17  
(Page 5 of 8)

Gamma Spectrometry of Milk  
SSES REMP 1983

(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 <sup>(6)</sup>	08/16/83	12B2	LT 14	LT 2	LT 3	LT 2	LT 2	LT 7	1300 + 200	LT 7	LT 2	LT 3	LT 6	LT 5
	08/17/83	5E1	LT 12	LT 3	LT 3	LT 3	LT 3	LT 7	1300 + 200	LT 5	LT 3	LT 3	LT 7	LT 6
	08/16/83	13E3	LT 18 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 3	LT 8	1400 + 200	LT 8	LT 3	LT 3	LT 7	LT 6
	08/16/83	10G1	LT 80 <sup>(2)</sup>	LT 1.7	LT 1.3	LT 0.8	1.9 + 0.5	LT 7	1200 + 200	LT 30 <sup>(2)</sup>	LT 1.1	LT 3	LT 3	LT 3
	08/22/83 <sup>(5)</sup>	12B3	LT 60 <sup>(2)</sup>	LT 1.7	LT 1.3	LT 0.9	2.4 + 0.6	LT 7	1100 + 200	LT 30 <sup>(2)</sup>	LT 1.1	LT 3	LT 3	LT 3
	08/22/83 <sup>(5)</sup>	6C1	LT 60 <sup>(2)</sup>	LT 1.8	LT 1.4	LT 0.9	1.8 + 0.6	LT 7	1200 + 200	LT 30 <sup>(2)</sup>	LT 1.2	LT 3	LT 4	LT 3
	08/22/83 <sup>(5)</sup>	1001	LT 130 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 2	LT 14	1196 + 200	LT 60 <sup>(2)</sup>	LT 3	LT 7	LT 7	LT 7
	08/22/83 <sup>(5)</sup>	12D2	LT 120 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 2	LT 16	1500 + 200	LT 50 <sup>(2)</sup>	LT 3	LT 7	LT 9	LT 8
	09/06/83 <sup>(5)</sup>	12B2	LT 60 <sup>(2)</sup>	LT 3	LT 2	LT 1.9	LT 2	LT 10	1100 + 200	LT 30 <sup>(2)</sup>	LT 2	LT 5	LT 7	LT 6
	09/06/83 <sup>(5)</sup>	5E1	LT 40 <sup>(2)</sup>	LT 2	LT 1.9	LT 1.1	LT 1.4	LT 8	1300 + 200	LT 18 <sup>(2)</sup>	LT 1.5	LT 3	LT 5	LT 4
	09/06/83 <sup>(5)</sup>	13E3	LT 50 <sup>(2)</sup>	LT 2	LT 2	LT 1.4	1.6 + 0.8	LT 9	1500 + 200	LT 18 <sup>(2)</sup>	LT 1.8	LT 4	LT 5	LT 4
	09/06/83 <sup>(5)</sup>	10G1	LT 90 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 2	LT 12	1200 + 200	LT 40 <sup>(2)</sup>	LT 3	LT 6	LT 7	LT 7

Note: See footnotes at end of table.



Table 17  
(Page 6 of 8)

Gamma Spectrometry of Milk  
SSES NEMP 1983

(Results in pCi/l  $\pm$  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
September (6)	09/20/83	12B2	LT 40 <sup>(2)</sup>	LT 2	LT 2	LT 1.4	LT 1.5	LT 8	1400 $\pm$ 200	LT 16 <sup>(2)</sup>	LT 1.8	LT 2	LT 5	LT 4
	09/20/83	5E1	LT 70 <sup>(2)</sup>	LT 4	LT 3	LT 2	LT 2	LT 11	1300 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 2	LT 3	LT 7	LT 6
	09/20/83	13E3	LT 40 <sup>(2)</sup>	LT 2	LT 1.8	LT 1.3	LT 1.5	LT 8	1200 $\pm$ 200	LT 20 <sup>(2)</sup>	LT 1.6	LT 2	LT 5	LT 4
	09/21/83	10G1	LT 200 <sup>(2)</sup>	LT 4	LT 2	LT 1.9	LT 2	LT 14	920 $\pm$ 100	LT 110 <sup>(2)</sup>	LT 2	LT 4	LT 7	LT 7
	09/20/83	12B3	LT 40 <sup>(2)</sup>	LT 2	LT 2	LT 1.3	3.0 $\pm$ 0.8	LT 8	1300 $\pm$ 200	LT 18 <sup>(2)</sup>	LT 1.6	LT 2	LT 5	LT 2
	09/20/83	6C1	LT 60 <sup>(2)</sup>	LT 3	LT 2	LT 1.9	2.2 $\pm$ 1.1	LT 10	1400 $\pm$ 200	LT 20 <sup>(2)</sup>	LT 2	LT 3	LT 6	LT 5
	09/20/83	10D1	LT 60 <sup>(2)</sup>	LT 3	LT 2	LT 1.6	LT 1.8	LT 10	1200 $\pm$ 200	LT 30 <sup>(2)</sup>	LT 1.9	LT 3	LT 3	LT 5
	09/21/83	12D2	LT 3000 <sup>(2)</sup>	LT 8	LT 3	LT 2	LT 3	LT 40	1600 $\pm$ 200	LT 1400 <sup>(2)</sup>	LT 3	LT 8	LT 9	LT 15
	10/12/83 <sup>(5)</sup>	12B2	LT 700 <sup>(2)</sup>	LT 5	LT 3	LT 1.8	LT 2	LT 20	1200 $\pm$ 200	LT 300 <sup>(2)</sup>	LT 2	LT 5	LT 8	LT 9
	10/12/83 <sup>(5)</sup>	5E1	LT 1500 <sup>(2)</sup>	LT 8	LT 4	LT 3	LT 3	LT 30	1200 $\pm$ 200	LT 700 <sup>(2)</sup>	LT 4	LT 9	LT 13	LT 15
	10/12/83 <sup>(5)</sup>	13E3	LT 1400 <sup>(2)</sup>	LT 8	LT 4	LT 3	LT 4	LT 30	1600 $\pm$ 200	LT 600 <sup>(2)</sup>	LT 4	LT 8	LT 11	LT 14
	10/12/83 <sup>(5)</sup>	10G1	LT 900 <sup>(2)</sup>	LT 6	LT 3	LT 2	1.8 $\pm$ 1.2	LT 3	1300 $\pm$ 200	LT 400 <sup>(2)</sup>	LT 3	LT 6	LT 9	LT 11

Note: See footnotes at end of table.

Table 17  
(Page 7 of 8)

Gamma Spectrometry of Milk  
SSES REMP 1983

(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	Pr-95
October <sup>(6)</sup>	10/19/83 <sup>(5)</sup>	12B2	LT 300 <sup>(2)</sup>	LT 4	LT 2	LT 1.6	LT 1.7	LT 16	1400 + 200	LT 100 <sup>(2)</sup>	LT 2	LT 4	LT 7	LT 7
	10/19/83 <sup>(5)</sup>	5E1	LT 700 <sup>(2)</sup>	LT 5	LT 3	LT 2	LT 2	LT 30	1300 + 200	LT 300 <sup>(2)</sup>	LT 3	LT 6	LT 10	LT 11
	10/19/83 <sup>(5)</sup>	13E3	LT 600 <sup>(2)</sup>	LT 4	LT 2	LT 1.7	LT 1.9	LT 20	1400 + 200	LT 300 <sup>(2)</sup>	LT 2	LT 5	LT 7	LT 8
	10/18/83 <sup>(5)</sup>	10G1	LT 700 <sup>(2)</sup>	LT 5	LT 2	LT 1.8	LT 2	LT 20	1300 + 200	LT 300 <sup>(2)</sup>	LT 2	LT 5	LT 7	LT 9
	10/19/83 <sup>(5)</sup>	12B3	LT 300 <sup>(2)</sup>	LT 4	LT 2	LT 1.7	LT 2	LT 15	1200 + 200	LT 140 <sup>(2)</sup>	LT 2	LT 4	LT 6	LT 7
	10/19/83 <sup>(5)</sup>	6C1	LT 600 <sup>(2)</sup>	LT 5	LT 2	LT 1.7	1.4 + 1.0	LT 20	1400 + 200	LT 200 <sup>(2)</sup>	LT 2	LT 5	LT 8	LT 9
	10/19/83 <sup>(5)</sup>	10D1	LT 800 <sup>(2)</sup>	LT 6	LT 3	LT 2	LT 2	LT 20	1400 + 200	LT 400 <sup>(2)</sup>	LT 3	LT 6	LT 10	LT 10
	10/19/83 <sup>(5)</sup>	12D2	LT 1000 <sup>(2)</sup>	LT 6	LT 3	LT 3	LT 3	LT 30	1300 + 200	LT 400 <sup>(2)</sup>	LT 3	LT 7	LT 9	LT 12
	10/30/83	12B2	LT 500 <sup>(2)</sup>	LT 5	LT 3	LT 2	LT 2	LT 20	1200 + 200	LT 300 <sup>(2)</sup>	LT 3	LT 5	LT 8	LT 9
	10/30/83	5E1	LT 20 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 2	LT 9	1200 + 200	LT 13	LT 3	LT 3	LT 7	LT 5
	10/30/83	5E1(4)	LT 500 <sup>(2)</sup>	LT 5	LT 3	LT 2	LT 2	LT 20	1300 + 200	LT 190 <sup>(2)</sup>	LT 3	LT 5	LT 9	LT 9
	10/30/83	13E3	LT 30 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 3	LT 9	1400 + 200	LT 13	LT 3	LT 3	LT 7	LT 6
	10/30/83	13E3(4)	LT 600 <sup>(2)</sup>	LT 6	LT 3	LT 2	LT 3	LT 20	1300 + 200	LT 300 <sup>(2)</sup>	LT 3	LT 6	LT 9	LT 11
	10/30/83	10G1	LT 700 <sup>(2)</sup>	LT 6	LT 4	LT 3	LT 3	LT 30	1400 + 200	LT 400 <sup>(2)</sup>	LT 3	LT 7	LT 10	LT 11
November <sup>(6)</sup>	11/16/83	12B2	LT 11	LT 2	LT 2	LT 1.9	LT 2	LT 5	1200 + 200	LT 5	LT 2	LT 2	LT 5	LT 4
	11/16/83	5E1	LT 13	LT 3	LT 3	LT 2	LT 3	LT 8	1300 + 200	LT 7	LT 3	LT 3	LT 7	LT 5
	11/16/83	13E3	LT 15	LT 3	LT 3	LT 2	LT 2	LT 7	1300 + 200	LT 8	LT 2	LT 3	LT 6	LT 5
	11/17/83	10G1	LT 20 <sup>(2)</sup>	LT 3	LT 3	LT 2	LT 3	LT 8	1300 + 200	LT 11	LT 3	LT 3	LT 7	LT 5
	11/17/83	10G1(4)	LT 30 <sup>(2)</sup>	LT 4	LT 4	LT 3	LT 3	LT 11	1300 + 200	LT 15	LT 3	LT 4	LT 8	LT 6
	11/16/83	12B3	LT 15	LT 3	LT 3	LT 2	LT 3	LT 8	1300 + 200	LT 7	LT 3	LT 3	LT 7	LT 6
	11/16/83	6C1	LT 13	LT 3	LT 3	LT 2	LT 3	LT 7	1500 + 200	LT 6	LT 2	LT 3	LT 7	LT 5
	11/16/83	10D1	LT 18 <sup>(2)</sup>	LT 3	LT 4	LT 3	LT 3	LT 9	1400 + 200	LT 9	LT 3	LT 3	LT 8	LT 6
	11/16/83	12D2	LT 18 <sup>(2)</sup>	LT 4	LT 4	LT 3	LT 3	LT 9	1400 + 200	LT 10	LT 3	LT 4	LT 8	LT 6

Note: See footnotes at end of table.



Table 17  
(Page 8 of 8)

Gamma Spectrometry of Milk  
SSES REMP 1983

(Results in pCi/l  $\pm$  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
December <sup>(6)</sup>	12/14/83	12B2	LT 13	LT 4	LT 5	LT 4	LT 4	LT 11	1200 $\pm$ 200	LT 7	LT 4	LT 4	LT 11	LT 7
	12/14/83	5E1	LT 9	LT 2	LT 2	LT 1.9	LT 2	LT 5	1300 $\pm$ 200	LT 4	LT 2	LT 2	LT 5	LT 4
	12/15/83	13E3	LT 20 <sup>(2)</sup>	LT 4	LT 5	LT 4	LT 4	LT 12	1400 $\pm$ 200	LT 10	LT 4	LT 4	LT 10	LT 8
	12/14/83	10G1	LT 20 <sup>(2)</sup>	LT 4	LT 5	LT 3	LT 4	LT 11	1300 $\pm$ 200	LT 10	LT 4	LT 4	LT 10	LT 7
	12/14/83	12B3	LT 9	LT 2	LT 3	LT 1.9	1.6 $\pm$ 1.2	LT 6	1400 $\pm$ 200	LT 4	LT 2	LT 2	LT 6	LT 4
	12/14/83	6C1	LT 16 <sup>(2)</sup>	LT 4	LT 4	LT 3	LT 4	LT 10	1500 $\pm$ 200	LT 7	LT 4	LT 4	LT 9	LT 7
	12/15/83	10D1	LT 30 <sup>(2)</sup>	LT 6	LT 7	LT 5	LT 6	LT 16	1300 $\pm$ 200	LT 14	LT 6	LT 6	LT 14	LT 11
	12/15/83	12D2	LT 15	LT 4	LT 5	LT 3	LT 4	LT 10	1500 $\pm$ 200	LT 8	LT 4	LT 4	LT 10	LT 6

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) Lower sensitivity due to delay in analysis.

(3) LT = Less Than

(4) Duplicate sample and analysis.

(5) Duration between samples did not meet defined specifications for this frequency.

(6) Samples collected and analyzed by NUS.

Table 18  
(Page 1 of 4)

Iodine-131 in Milk  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Station	Collection Date	I-131 Activity
January <sup>(1)</sup>	12B2	01/08/83	LT 0.14 <sup>(2)</sup>
	5E1	01/07/83	LT 0.14
	13E3	01/08/83	LT 0.16
	10G1	01/07/83	LT 0.14
	12B3	01/08/83	LT 0.15
	6C1	01/07/83	LT 0.14
	10D1	01/07/83	LT 0.14
	12D2	01/07/83	LT 0.15
February <sup>(1)</sup>	12B2	02/04/83	LT 0.2
	5E1	02/05/83	LT 0.2
	13E3	02/04/83	LT 0.3
	10G1	02/04/83	LT 0.2
	12B3	02/04/83	LT 0.3
	6C1	02/05/83	LT 0.2
	10D1	02/05/83	LT 0.2
	12D2	02/04/83	LT 0.2
March <sup>(1)</sup>	12B2	03/11/83	LT 0.11
	5E1	03/10/83	LT 0.18
	13E3	03/11/83	LT 0.14
	10G1	03/10/83	LT 0.15
	12B3	03/11/83	LT 0.15
	6C1	03/11/83	LT 0.12
	10D1	03/10/83	LT 0.13
	12D2	03/10/83	LT 0.13
April <sup>(1)</sup>	12B2	04/08/83	LT 0.12
	5E1	04/08/83	LT 0.11
	13E3	04/09/83	LT 0.13
	10G1	04/08/83	LT 0.13
	12B3	04/09/83	LT 0.10
	6C1	04/08/83	LT 0.08
	10D1	04/08/83	LT 0.14
	12D2	04/08/83	LT 0.12
	12B3	04/09/83	LT 0.10 <sup>(3)</sup>
	12B2	04/23/83	LT 0.10
	5E1	04/23/83	LT 0.11
	13E3	04/23/83	LT 0.13
	10G1	04/23/83	LT 0.11

Note: See footnotes at end of table.

Table 18  
(Page 2 of 4)

Iodine-131 in Milk  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Station	Collection Date	I-131 Activity
May <sup>(1)</sup>	12B2	05/07/83	LT 0.12
	5E1	05/06/83	LT 0.14
	13E3	05/07/83	LT 0.13
	10G1	05/06/83	LT 0.13
	12B3	05/07/83	LT 0.09
	6C1	05/07/83	LT 0.14
	10D1	05/06/83	LT 0.10
	12D2	05/06/83	LT 0.12
	8D1(4)	05/06/83	LT 0.14
	12B2	05/20/83	LT 0.13
	5E1	05/20/83	LT 0.11
	13E3	05/20/83	LT 0.10
	10G1	05/20/83	LT 0.12
June <sup>(1)</sup>	12B2	06/15/83 <sup>(5)</sup>	LT 0.10
	5E1	06/15/83 <sup>(5)</sup>	LT 0.09
	13E3	06/15/83 <sup>(5)</sup>	LT 0.11
	10G1	06/15/83 <sup>(5)</sup>	LT 0.12
	12B2	06/27/83	LT 0.07
	5E1	06/28/83	LT 0.07
	13E3	06/27/83	LT 0.09
	10G1	06/27/83	LT 0.09
June <sup>(6)</sup>	12B2	06/15/83 <sup>(5)</sup>	LT 0.08
	5E1	06/15/83 <sup>(5)</sup>	LT 0.08
	13E3	06/15/83 <sup>(5)</sup>	LT 0.07
	10G1	06/15/83 <sup>(5)</sup>	LT 0.09
	12B3	06/15/83 <sup>(5)</sup>	LT 0.07
	6C1	06/15/83 <sup>(5)</sup>	LT 0.09
	10D1	06/15/83 <sup>(5)</sup>	LT 0.05
	12D2	06/15/83 <sup>(5)</sup>	LT 0.09
	8D1(4)	06/15/83	LT 0.18
	12B2	06/27/83	LT 0.04
	5E1	06/28/83	LT 0.05
	13E3	06/27/83	LT 0.03
	10G1	06/27/83	LT 0.05

Note: See footnotes at end of table.

Table 18  
(Page 3 of 4)

Iodine-131 in Milk  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Station	Collection Date	I-131 Activity
July (6)	12B2	07/16/83	LT 0.08
	5E1	07/16/83	LT 0.08
	13E3	07/16/83	LT 0.08
	10G1	07/16/83	LT 0.10
	12B3	07/16/83	LT 0.09
	6C1	07/16/83	LT 0.09
	10D1	07/16/83	LT 0.09
	12D2	07/16/83	LT 0.07
	8D1(4)	07/16/83	(7)
	12B2	07/30/83	LT 0.1
	5E1	07/30/83	LT 0.2
	13E3	07/30/83	LT 0.08
	10G1	07/30/83	LT 0.03
August (6)	12B2	08/16/83	LT 0.07
	5E1	08/17/83	LT 0.07
	13E3	08/16/83	LT 0.09
	10G1	08/16/83	LT 0.10
	12B3	08/22/83 <sup>(5)</sup>	LT 0.06
	6C1	08/22/83 <sup>(5)</sup>	LT 0.03
	10D1	08/22/83 <sup>(5)</sup>	LT 0.08
	12D2	08/22/83 <sup>(5)</sup>	LT 0.05
	12B2	09/06/83 <sup>(5)</sup>	LT 0.3
	5E1	09/06/83 <sup>(5)</sup>	LT 0.3
	13E3	09/06/83 <sup>(5)</sup>	LT 0.2
	10G1	09/06/83 <sup>(5)</sup>	LT 0.3
September (6)	12B2	09/20/83	LT 0.11
	5E1	09/20/83	LT 0.4
	13E3	09/20/83	LT 0.14
	10G1	09/21/83	(7)
	12B3	09/20/83	LT 0.12
	6C1	09/20/83	LT 1.1 <sup>(8)</sup>
	10D1	09/20/83	LT 0.2
	12D2	09/21/83	(7)
	12B2	10/12/83 <sup>(5)</sup>	LT 0.1
	5E1	10/12/83 <sup>(5)</sup>	LT 0.1
	13E3	10/12/83 <sup>(5)</sup>	LT 0.1
	10G1	10/12/83 <sup>(5)</sup>	LT 0.1

Note: See footnotes at end of table.

Table 18  
(Page 4 of 4)

Iodine-131 in Milk  
SSES REMP 1983

(Results in Units of pCi/l  $\pm$  2s)

Month	Station	Collection Date	I-131 Activity
October (6)	12B2	10/19/83 <sup>(5)</sup>	LT 0.07
	5E1	10/19/83 <sup>(5)</sup>	LT 0.09
	13E3	10/19/83 <sup>(5)</sup>	LT 0.07
	10G1	10/18/83 <sup>(5)</sup>	LT 0.07
	12B3	10/19/83 <sup>(5)</sup>	LT 0.05
	6C1	10/19/83 <sup>(5)</sup>	LT 0.11
	10D1	10/19/83 <sup>(5)</sup>	LT 0.12
	12D2	10/19/83 <sup>(5)</sup>	LT 0.15
	12B2	10/30/83	LT 0.06
	5E1	10/30/83	LT 0.08
	13E3	10/30/83	LT 0.06
	10G1	10/30/83	LT 0.07
	5E1(3)	10/30/83	LT 0.06
	13E3(3)	10/30/83	LT 0.06
November (6)	12B2	11/16/83	LT 0.07
	5E1	11/16/83	(7)
	13E3	11/16/83	LT 0.08
	10G1	11/17/83	LT 0.04
	12B3	11/16/83	LT 0.07
	6C1	11/16/83	LT 0.08
	10D1	11/16/83	LT 0.07
	12D2	11/16/83	LT 0.08
	8D1(4)	11/17/83	LT 0.2
	10G1	11/17/83	LT 0.07
December (6)	12B2	12/14/83	LT 0.08
	5E1	12/14/83	LT 0.08
	13E3	12/15/83	LT 0.10
	10G1	12/14/83	LT 0.08
	12B3	12/14/83	LT 0.08
	6C1	12/14/83	LT 0.08
	10D1	12/15/83	LT 0.10
	12D2	12/15/83	LT 0.11

- (1) Samples collected and analyzed by Radiation Management Corporation.
- (2) LT = Less Than
- (3) Duplicate sample and analysis.
- (4) Goat Milk
- (5) Duration between samples did not meet defined specifications for this frequency.
- (6) Samples collected and analyzed by NUS.
- (7) Sample destroyed in analysis.
- (8) Lower sensitivity due to delay in counting.

Table 19a

Gamma Spectrometry of Pasture Grass  
SSES NEMP 1983(Results in pCi/kg (dry)  $\pm$  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
Jan	(1) Pasture Grass	801	01/08/83	LT 1000(2)	LT 200	LT 300	LT 190	LT 200	LT 400	LT 300	7500 $\pm$ 2500	LT 300	LT 200	LT 200	LT 500	LT 400	5100 $\pm$ 1400
		15A1	01/08/83	LT 1400	LT 300	LT 300	LT 200	LT 300	LT 500	LT 400	11000 $\pm$ 2000	LT 400	LT 300	LT 300	LT 500	LT 500	7100 $\pm$ 2000
Feb	(1) Pasture Grass	801	02/05/83	LT 900	LT 200	LT 300	LT 170	LT 200	LT 400	LT 300	2000 $\pm$ 600	LT 200	LT 190	LT 200	LT 400	LT 300	7500 $\pm$ 1300
		15A1	02/04/83	LT 1200	LT 200	LT 300	LT 200	LT 300	LT 500	LT 300	LT 3000	LT 400	LT 200	LT 300	LT 600	LT 400	9500 $\pm$ 1800
Mar	(1) Pasture Grass	15A1	03/11/83	LT 1100	LT 170	LT 190	LT 170	LT 200	LT 400	LT 300	LT 3000	LT 200	LT 180	LT 200	LT 400	LT 300	3500 $\pm$ 1200
Apr	(1) Pasture Grass	801	04/09/83	LT 700	LT 120	LT 160	LT 120	LT 140	LT 300	LT 190	3700 $\pm$ 2100	LT 300	LT 120	LT 140	LT 300	LT 300	7900 $\pm$ 1100
		15A1	04/08/83	LT 3000	LT 600	LT 600	LT 500	LT 500	LT 1000	LT 900	LT 9000	LT 800	LT 500	LT 600	LT 1100	LT 900	13000 $\pm$ 3000
		15A1(3)	04/08/83	LT 800	LT 150	LT 200	LT 130	LT 160	LT 300	LT 200	6800 $\pm$ 1900	LT 200	LT 140	LT 150	LT 300	LT 300	10000 $\pm$ 2000
May	(1) Pasture Grass	15A1	05/06/83	LT 1100	LT 190	LT 200	LT 170	LT 200	LT 400	LT 300	30000 $\pm$ 3000	LT 300	LT 190	LT 200	LT 500	LT 400	2600 $\pm$ 1100
June	(1) Pasture Grass	801	06/15/83	LT 1000	LT 180	LT 180	LT 150	LT 180	LT 300	LT 300	13000 $\pm$ 2000	LT 200	LT 160	LT 180	LT 400	LT 300	LT 1600
		15A1	06/15/83	LT 600	LT 110	LT 130	LT 100	LT 120	LT 300	LT 160	8100 $\pm$ 1600	LT 170	LT 100	LT 130	LT 300	LT 190	1200 $\pm$ 600

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) Less Than

(3) Replicate

Table 19b

Gamma Spectrometry of Pasture Grass  
SSES REMP 1983(Results in pCi/kg (wet)  $\pm$  2s)

Month	Type	Station	Collection		P1-140	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
			Date															
July <sup>(1)</sup>	Pasture Grass	15A1	07/16/83	LT 30 <sup>(2)</sup>	LT 10	LT 13	LT 9	13 + 6	LT 30	LT 12	9300 + 1400	LT 13	LT 10	LT 10	LT 30	LT 18	630 + 100	
Aug <sup>(1)</sup>	Pasture Grass	15A1	08/16/83	LT 40	LT 8	LT 9	LT 7	23 + 4	LT 20	LT 20	5300 + 600	LT 16	LT 7	LT 8	LT 20	LT 13	1300 + 200	
Sept <sup>(1)</sup>	Pasture Grass	15A1	09/21/83	LT 30	LT 7	LT 7	LT 6	11 + 4	LT 17	LT 20	2800 + 300	LT 15	LT 6	LT 8	LT 16	LT 12	1100 + 200	
Oct <sup>(1)</sup>	Pasture Grass(3)	15A1	10/18/83	LT 200	LT 60	LT 60	LT 5	30 + 3	LT 140	LT 100	28000 + 3000	LT 100	LT 50	LT 60	LT 150	LT 100	8000 + 800	
Nov <sup>(1)</sup>	Pasture Grass	15A1	11/16/83	LT 70	LT 11	LT 12	LT 9	9.8 + 5.4	LT 30	LT 50	2600 + 300	LT 30	LT 10	LT 11	LT 30	LT 20	1800 + 200	
Dec (4)																		

(1) Samples collected and analyzed by NUS.

(2) Less Than

(3) Dry Weight

(4) Sample was not available due to heavy snow and ice cover.



Table 20  
(Page 1 of 3)  
Gamma Spectrometry of Food Products (Fruits and Vegetables)  
SSES REMP 1983

(Results in pCi/kg (wet)  $\pm$  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	Ba-7
June <sup>(1)</sup>	Spinach	755	06/28/83	LT 110	LT 19	LT 20	LT 16	LT 19 <sup>(2)</sup>	LT 40	LT 30	4900 $\pm$ 500	LT 20	LT 17	LT 20	LT 40	LT 30	LT 170
	Lettuce	755	06/28/83	LT 120	LT 20	LT 30	LT 20	LT 20	LT 50	LT 40	3800 $\pm$ 400	LT 40	LT 20	LT 30	LT 60	LT 40	LT 190
	Endive	755	06/28/83	LT 70	LT 11	LT 16	LT 11	LT 14	LT 30	LT 20	3900 $\pm$ 400	LT 19	LT 12	LT 13	LT 30	LT 20	190 $\pm$ 70
June <sup>(3)</sup>	Strawberries	1101	06/15/83	LT 15	LT 4	LT 4	LT 3	LT 3	LT 10	LT 9	1600 $\pm$ 200	LT 9	LT 4	LT 4	LT 10	LT 6	26 $\pm$ 13
	Spinach	755	06/28/83	LT 12	LT 3	LT 4	LT 3	2.3 $\pm$ 1.6	LT 10	LT 6	4200 $\pm$ 500	LT 5	LT 3	LT 3	LT 10	LT 6	160 $\pm$ 20
	Lettuce	755	06/28/83	LT 17	LT 4	LT 4	LT 3	4.8 $\pm$ 1.8	LT 11	LT 10	2600 $\pm$ 300	LT 8	LT 3	LT 4	LT 11	LT 7	120 $\pm$ 20
	Endive	755	06/28/83	LT 20	LT 4	LT 4	LT 4	14 $\pm$ 2	LT 11	LT 12	4100 $\pm$ 500	LT 9	LT 4	LT 4	LT 11	LT 7	210 $\pm$ 30
July <sup>(3)</sup>	Lettuce	755	07/12/83	LT 20	LT 7	LT 8	LT 6	LT 7	LT 18	LT 10	1900 $\pm$ 200	LT 12	LT 7	LT 7	LT 20	LT 13	LT 50
	Lettuce	755	07/12/83	LT 20	LT 7	LT 9	LT 6	LT 7	LT 20	LT 10	4600 $\pm$ 400	LT 11	LT 7	LT 7	LT 20	LT 12	LT 50
	Lettuce	755	07/12/83	LT 30	LT 7	LT 8	LT 6	6.0 $\pm$ 2.1	LT 18	LT 12	3700 $\pm$ 400	LT 11	LT 7	LT 7	LT 19	LT 12	43 $\pm$ 33
	Beans	755	07/12/83	LT 18	LT 5	LT 5	LT 5	LT 5	LT 13	LT 9	2100 $\pm$ 300	LT 8	LT 5	LT 5	LT 13	LT 9	LT 40
	Beans	1254	07/25/83	LT 20	LT 6	LT 7	LT 6	LT 6	LT 17	LT 10	3400 $\pm$ 400	LT 9	LT 6	LT 7	LT 18	LT 11	ND <sup>(4)</sup>
	Lettuce	1254	07/25/83	LT 19	LT 6	LT 7	LT 5	LT 5	LT 16	LT 9	6300 $\pm$ 700	LT 8	LT 5	LT 6	LT 17	LT 10	290 $\pm$ 30
	Endive	1254	07/25/83	LT 19	LT 6	LT 8	LT 6	LT 6	LT 18	LT 8	5700 $\pm$ 600	LT 9	LT 7	LT 6	LT 20	LT 11	230 $\pm$ 30
Aug <sup>(3)</sup>	Cabbage	755	08/02/83	LT 19	LT 4	LT 6	LT 3	12 $\pm$ 2	LT 14	LT 10	2700 $\pm$ 300	LT 9	LT 4	LT 4	LT 12	LT 7	ND
	Lettuce	755	08/02/83	LT 30	LT 10	LT 13	LT 10	13 $\pm$ 6	LT 20	LT 10	3700 $\pm$ 400	LT 11	LT 10	LT 10	LT 30	LT 17	200 $\pm$ 50
	Lettuce	1254	08/02/83	LT 19	LT 5	LT 6	LT 4	LT 4	LT 15	LT 9	4300 $\pm$ 500	LT 9	LT 5	LT 5	LT 15	LT 9	190 $\pm$ 20
	Spinach	1254	08/02/83	LT 20	LT 6	LT 8	LT 5	LT 6	LT 18	LT 10	7900 $\pm$ 800	LT 9	LT 6	LT 6	LT 19	LT 11	340 $\pm$ 40
	Spinach	755	08/02/83	LT 19	LT 5	LT 5	LT 4	20 $\pm$ 3	LT 14	LT 10	6700 $\pm$ 300	LT 7	LT 5	LT 5	LT 14	LT 8	230 $\pm$ 30

Note: See footnote at end of table.

Table 20  
(Page 2 of 3)

Gamma Spectrometry of Food Products (Fruits and Vegetables)  
SSES REP 1983

(Results in pCi/kg (wet)  $\pm$  2s)

Month	Type	Station	Collection Date	Pb-140	Cu-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	De-7
Aug	Corn	755	08/10/83	LT 20	LT 4	LT 4	LT 3	LT 3	LT 11	LT 14	1900 $\pm$ 200	LT 11	LT 3	LT 4	LT 9	LT 7	ND
	Potatoes	755	08/15/83	LT 20	LT 3	LT 4	LT 3	LT 3	LT 10	LT 13	2800 $\pm$ 300	LT 9	LT 3	LT 3	LT 8	LT 6	ND
	Peppers	1101	08/17/83	LT 16	LT 4	LT 5	LT 4	LT 4	LT 12	LT 9	1700 $\pm$ 200	LT 7	LT 4	LT 4	LT 11	LT 5	ND
	Cabbage	1101	08/17/83	LT 20	LT 5	LT 6	LT 4	LT 5	LT 13	LT 10	2500 $\pm$ 300	LT 10	LT 5	LT 5	LT 15	LT 8	ND
	Potatoes	1101	08/17/83	LT 20	LT 5	LT 5	LT 4	LT 4	LT 13	LT 10	3500 $\pm$ 400	LT 9	LT 5	LT 5	LT 12	LT 9	ND
	Corn	1101	08/17/83	LT 20	LT 5	LT 5	LT 4	LT 5	LT 12	LT 10	1900 $\pm$ 200	LT 10	LT 5	LT 4	LT 12	LT 8	ND
Sept	Tomatoes	755	09/01/83	LT 8	LT 1.9	LT 2	LT 1.4	LT 1.6	LT 5	LT 5	1700 $\pm$ 200	LT 4	LT 1.7	LT 1.8	LT 5	LT 3	ND
	Tomatoes	1254	09/01/83	LT 20	LT 3	LT 3	LT 1.6	LT 1.9	LT 8	LT 18	2600 $\pm$ 300	LT 9	LT 2	LT 2	LT 6	LT 5	ND
	Cabbage	1254	09/07/83	LT 30	LT 4	LT 4	LT 3	LT 3	LT 12	LT 30	2500 $\pm$ 300	LT 13	LT 4	LT 4	LT 10	LT 8	ND
	Swiss Chard Red	755	09/07/83	LT 40	LT 6	LT 6	LT 5	LT 5	LT 18	LT 30	5400 $\pm$ 600	LT 16	LT 5	LT 6	LT 16	LT 11	60 $\pm$ 26
	Swiss Chard White	1254	09/07/83	LT 18	LT 4	LT 4	LT 3	LT 3	LT 10	LT 12	4700 $\pm$ 500	LT 7	LT 4	LT 4	LT 10	LT 7	39 $\pm$ 16
	Corn	1254	09/01/83	LT 18	LT 4	LT 5	LT 4	LT 4	LT 11	LT 9	1200 $\pm$ 200	LT 10	LT 4	LT 4	LT 10	LT 7	ND
	Swiss Chard Red	1254	09/07/83	LT 20	LT 6	LT 7	LT 4	LT 5	LT 17	LT 10	6200 $\pm$ 700	LT 10	LT 5	LT 5	LT 17	LT 9	71 $\pm$ 20
	Potatoes	1254	09/07/83	LT 16	LT 4	LT 5	LT 4	LT 4	LT 12	LT 8	3800 $\pm$ 400	LT 7	LT 4	LT 4	LT 12	LT 8	ND
	Swiss Chard White	755	09/07/83	LT 20	LT 4	LT 4	LT 3	LT 3	LT 12	LT 15	6400 $\pm$ 700	LT 8	LT 3	LT 4	LT 11	LT 6	56 $\pm$ 14
	Cabbage	1101	09/13/83	LT 20	LT 7	LT 8	LT 5	LT 6	LT 17	LT 10	2700 $\pm$ 300	LT 10	LT 7	LT 7	LT 17	LT 12	ND
	Spinach	755	09/22/83	LT 18	LT 4	LT 5	LT 3	16 $\pm$ 2	LT 13	LT 10	6400 $\pm$ 700	LT 8	LT 4	LT 5	LT 13	LT 8	65 $\pm$ 15

Note: See footnote at end of table.

Table 20  
(Page 3 of 3)  
Gamma Spectrometry of Food Products (Fruits and Vegetables)  
SSES REMP 1983

(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
Oct (3)	Tomatoes	755	10/05/83	LT 20	LT 7	LT 8	LT 6	LT 6	LT 19	LT 10	1900 + 200	LT 11	LT 6	LT 7	LT 18	LT 12	ND
	Tomatoes	1254	10/05/83	LT 30	LT 7	LT 9	LT 6	LT 7	LT 20	LT 10	2400 + 300	LT 12	LT 7	LT 8	LT 20	LT 13	ND
	Swiss Chard Red	755	10/05/83	LT 12	LT 3	LT 4	LT 3	3.5 + 1.6	LT 10	LT 6	3800 + 400	LT 6	LT 3	LT 4	LT 10	LT 6	57 + 13
	Swiss Chard Red	1254	10/05/83	LT 30	LT 8	LT 9	LT 6	LT 7	LT 20	LT 10	4700 + 500	LT 13	LT 7	LT 8	LT 20	LT 13	67 + 26
	Swiss Chard	755	10/05/83	LT 20	LT 5	LT 5	LT 3	3.5 + 1.8	LT 14	LT 13	3800 + 400	LT 9	LT 4	LT 6	LT 13	LT 8	56 + 16
	White																
Mar (3.5) 1984	Lettuce	755	10/05/83	LT 30	LT 5	LT 6	LT 4	6.8 + 2.7	ND	LT 17	3300 + 400	LT 14	LT 5	LT 6	LT 15	LT 9	110 + 20
	Swiss Chard	1254	10/05/83	LT 30	LT 7	LT 7	LT 5	LT 6	LT 20	LT 20	5100 + 600	LT 16	LT 6	LT 8	LT 18	LT 12	54 + 25
	White																
	Apples	782	03/08/84	LT 30	LT 10	LT 13	LT 11	LT 11	LT 20	LT 11	830 + 720	LT 17	LT 11	LT 11	LT 30	LT 19	ND
	Apples	2H	03/08/84	LT 40	LT 14	LT 15	LT 16	LT 16	LT 30	LT 16	1200 + 200	LT 16	LT 14	LT 13	LT 30	LT 20	ND
	Honey	782	03/08/84	LT 50	LT 19	LT 20	LT 19	54 + 14	LT 40	LT 30	1700 + 200	LT 20	LT 20	LT 18	LT 50	LT 40	ND
Mar (3.5) 1984	Apples	1281	03/08/84	LT 30	LT 10	LT 13	LT 10	LT 12	LT 20	LT 12	880 + 110	LT 14	LT 10	LT 10	LT 30	LT 18	ND

(1) Samples collected and analyzed by Radiation Management Corporation.

(2) LT = Less Than

(3) Samples collected and analyzed by NUS.

(4) ND = Not detected

(5) Samples were collected in March 1984 but they represent the 1983 growing season.

Table 21

Gamma Spectrometry of Game, Poultry, and Eggs  
SSES REMP 1983(Results in pCi/kg. (wet)  $\pm$  2s)

Month	Sample 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
Oct (1)	Squirrel	A-15	10/19/83	LT 1400	LT 40	LT 30	LT 20	1200 $\pm$ 200	LT 120	ND (2)	3200 $\pm$ 400	LT 700	LT 30	LT 40	LT 70	LT 70	LT 500 (3)
	Squirrel	A-16	10/15/83	LT 700	LT 13	LT 9	LT 8	1400 $\pm$ 200	LT 40	ND	3500 $\pm$ 400	LT 300	LT 9	LT 14	LT 20	LT 20	LT 200
	Squirrel	A-2	10/15/83	LT 2000	LT 40	LT 30	LT 30	3600 $\pm$ 400	LT 120	ND	3200 $\pm$ 400	LT 900	LT 30	LT 40	LT 70	LT 70	LT 700
	Squirrel	A-16	10/19/83	LT 1200	LT 40	LT 30	LT 20	770 $\pm$ 80	LT 120	ND	3500 $\pm$ 400	LT 700	LT 20	LT 40	LT 60	LT 70	LT 400
	Squirrel	A-1	10/15/83	LT 600	LT 14	LT 11	LT 9	810 $\pm$ 90	LT 50	ND	2500 $\pm$ 300	LT 300	LT 9	LT 15	LT 20	LT 30	LT 200
	Squirrel	A-1	10/19/83	LT 800	LT 20	LT 18	LT 13	1500 $\pm$ 200	LT 80	ND	3000 $\pm$ 300	LT 400	LT 15	LT 20	LT 40	LT 30	LT 300
	Squirrel	B-16	10/15/83	LT 500	LT 10	LT 7	LT 6	1900 $\pm$ 200	LT 30	ND	3300 $\pm$ 400	LT 180	LT 6	LT 10	LT 18	LT 17	LT 170
	Squirrel	B-1	10/15/83	LT 4000	LT 70	LT 50	LT 40	1200 $\pm$ 200	LT 200	ND	3300 $\pm$ 500	LT 1700	LT 40	LT 70	LT 100	LT 130	LT 900
Nov (1)	Deer	A-16	11/30/83	LT 500	LT 15	LT 11	LT 8	39 $\pm$ 7	LT 50	LT 1100	2500 $\pm$ 300	LT 200	LT 10	LT 15	LT 30	LT 30	ND
	Eggs	12B1	12/30/83	LT 50	LT 15	LT 17	LT 15	LT 16	LT 30	LT 20	990 $\pm$ 200	LT 20	LT 15	LT 14	LT 40	LT 30	LT 120
Dec (1)	Poultry	12B1	12/30/83	LT 50	LT 11	LT 13	LT 10	LT 11	LT 30	LT 30	2600 $\pm$ 300	LT 30	LT 11	LT 12	LT 30	LT 20	ND
	Deer	A-2	12/14/83	LT 400	LT 20	LT 17	LT 12	19 $\pm$ 7	LT 60	LT 700	3100 $\pm$ 400	LT 200	LT 13	LT 20	LT 40	LT 40	ND
	Deer	A-2	12/10/83	LT 300	LT 17	LT 13	LT 9	15 $\pm$ 6	LT 50	LT 500	3000 $\pm$ 300	LT 150	LT 12	LT 17	LT 30	LT 30	ND

(1) ND = Not Detected

(2) LT = Less Than

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 1 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Fish (pCi/kg (wet))	Gamma Spec - 24 K-40	-	3300 (13/13) (2700-3600)	Station IND 0.9-1.4 miles ESE	3300 (11/11) (2700-3600)	3100 (11/11) (2400-3500)	0
	Cs-134	130	LLD			LLD	
	Cs-137	150	15 (4/13) (9.2-18)	Station IND 0.9-1.4 miles ESE	15 (4/11) (9.2-18)	11 (1/11) (11-11)	
	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	
Direct Radiation (mrad/day)	TLD - 262	-	0.21 (234/234) (0.14-0.34)	Station 11S3 0.3 miles SW	0.28 (4/4) (0.25-0.32)	0.20 (28/28) (0.15-0.28)	0

Note: See footnotes at end of table.



Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 2 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Sediment (pCi/kg (dry))	Gamma Spec - 15						0
	K-40	-	7600 (9/9) (5500-8800)	Station 12F 6.9 miles WSW	7800 (3/3) (6400-8800)	9400 (6/6) (6900-13000)	
	Ac-228	-	720 (6/9) (550-900)	Station 11C 2.6 miles SW	760 (2/3) (740-770)	860 (4/6) (610-1100)	
	Bi-212	-	990 (1/9) (990-990)	Station 7B 12 miles SE	990 (1/3) (990-990)	1100 (1/6) (1100-1100)	
	Bi-214	-	650 (6/9) (450-820)	Station 11C 2.6 miles SW	700 (2/3) (600-790)	710 (4/6) (510-970)	
	Cs-134	150	LLD			LLD	
	Cs-137	180	71 (3/9) (58-91)	Station 12F 6.9 miles WSW	91 (1/3) (91-91)	170 (3/6) (70-240)	
	Pb-212	-	530 (6/9) (420-670)	Station 12F 6.9 miles WSW	580 (2/3) (490-670)	560 (4/6) (460-780)	
	Pb-214	-	660 (6/9) (430-840)	Station 12F 6.9 miles WSW	700 (2/3) (620-770)	800 (4/6) (480-1100)	
	Ra-226	-	650 (9/9) (440-790)	Station 12F 6.9 miles WSW	690 (3/3) (580-790)	720 (6/6) (500-1000)	
	Tl-208	-	740 (6/9) (540-930)	Station 12F 6.9 miles WSW	770 (2/3) (610-930)	810 (4/6) (630-1100)	
	Th-232	-	760 (3/9) (680-880)	Station 12F 6.9 miles WSW	880 (1/3) (880-880)	890 (2/6) (680-1100)	
	Gross Alpha - 15	-	6000 (4/9) (2900-8800)	Station 11C 2.6 miles SW	8800 (1/3) (8800-8800)	5700 (4/6) (3200-9900)	

Note: See footnotes at end of table.

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 3 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Potable Water (pCi/l)	Gross Beta - 36	4	5.4 (22/23) (0.38-21)	Station 12H2 RAW <sup>(3)</sup> 26 miles WSW	7.9 (9/9) (0.38-21)	2.1 (8/13) (1.6-3.2)	0
	I-131 - 87	1.0	0.12 (22/80) (0.053-0.35)	Station 12H2 TREATED <sup>(3)</sup> 26 miles WSW	0.14 (14/30) (0.053-0.35)	0.10 (1/7) (0.10-0.10)	0
	Gross Alpha - 27	-	10 (8/22) (1.4-25)	Station 12H2 RAW <sup>(3)</sup> 26 miles WSW	13 (2/8) (1.9-25)	LLD	0
	H-3 - 24	2000	160 (3/20) (99-270)	Station 12H2 RAW <sup>(3)</sup> 26 miles WSW	180 (2/8) (99-270)	160 (2/4) (76-250)	0
	Gamma Spec - 35						
	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	

Note: See footnotes at end of table.



Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 4 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean Name, Distance and Direction	Mean (f) (2) (Range)	Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
Surface Water (pCi/l)	Gross Beta - 115	4	7.7 (57/68) (1.3-79)	Station 6S7 Discharge	19 (14/14) (4.3-79)	3.9 (30/47) (1.2-26)	0
	I-131 - 132	1.0	0.17 (26/78) (0.05-0.32)	Station 12F1 5.3 miles WSW	0.23 (3/13) (0.20-0.26)	0.19 (6/54) (0.074-0.45)	0
	H-3 - 35	2000	300 (4/21) (100-730)	Station 6S7 Discharge	730 (1/4) (730-730)	210 (1/14) (210-210)	0
	Gamma Spec - 115						0
	Ba-140	60	LLD			LLD	
	Co-58	15	71 (6/68) (0.91-200)	Station 6S7 Discharge	71 (6/15) (0.91-200)	LLD	
	Co-60	15	9.8 (4/68) (0.88-21)	Station 6S7 Discharge	12.8 (3/15) (8.3-21)	4.8(1/47) (4.8-4.8)	
	Cs-134	15	LLD			LLD	
	Cs-137	18	LLD			LLD	
	Fe-59	30	18 (3/68) (5.8-34)	Station 6S7 Discharge	18 (3/15) (5.8-34)	LLD	
	K-40	-	LLD			LLD	
	La-140	15	LLD			LLD	
	Mn-54	15	45 (7/68) (0.94-130)	Station 6S7 Discharge	45 (7/15) (0.94-130)	LLD	
	Nb-95	15	3.2 (1/68) (3.2-3.2)	Station 6S7 Discharge	3.2 (1/15) (3.2-3.2)	LLD	
	Zn-65	30	4.8 (1/68) (4.8-4.8)	Station 6S7 Discharge	4.8 (1/15) (4.8-4.8)	LLD	
	Cr-51	-	130 (2/68) (92-170)	Station 6S7 Discharge	130 (2/15) (92-170)	LLD	
	Zr-95	30	LLD			LLD	

Note: See footnotes at end of table.

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 5 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Well Water (pCi/l)	Gross Beta - 105	4	3.7 (44/92) (0.58-19)	Station 2S6 0.9 mile NNE	8.5 (3/13) (1.2-19)	2.4 (6/13) (1.4-3.4)	0
	Gross Alpha - 35	-	2.1 (5/31) (1.0-3.1)	Muncy Valley	3.1 (1/1) (3.1-3.1)	1.2 (2/4) (0.94-1.4)	0
	H-3 - 32	2000	180 (8/28) (72-400)	Station 15A4 0.9 miles NW	290 (2/4) (180-400)	210 (1/4) (210-210)	0
	Gamma Spec - 108						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	
	Mn-54	15	LLD			LLD	
	Zn-65	30	LLD			LLD	
	Zr-95	30	LLD			LLD	

Note: See footnotes at end of table.

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 6 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Air Particulates (E-03 pCi/m3)	Gross Beta - 559	10	13 (407/408) (3.0-31)	Station 2S2 0.9 miles NNE	15 (51/51) (3.2-26)	12 (149/151) (2.0-33)	0
	Gross Alpha - 43	-	5.3 (32/32) (2.3-8.0)	Station 2S2 0.9 miles NNE	6.3 (4/4) (3.8-8.0)	4.6 (11/11) (2.1-6.1)	0
	Gamma Spec - 44	-	66 (32/32) (30-110)	Station 12E1 4.7 miles WSW	73 (4/4) (53-99)	62 (12/12) (41-100)	0
	Be-7	-	LLD			LLD	
	Ce-144	-	LLD			LLD	
	Cs-134	50	LLD			LLD	
	Cs-137	60	LLD			LLD	
	Nb-95	-	LLD			LLD	
	Zr-95	-	LLD			LLD	
	K-40	-	12 (1/32) (12-12)	Station 11S2 0.4 miles SW	12 (1/4) (12/12)	LLD	
Air Iodine - (pCi/m3)	I-131 - 567	0.07	LLD			LLD	0
Milk (pCi/l)	I-131 - 136	1.0	LLD			LLD	0
	Gamma Spec - 136	-	LLD			LLD	0
	Ba-140	15	LLD			LLD	
	Co-58	-	LLD			LLD	
	Co-60	-	LLD			LLD	
	Cs-134	15	LLD			LLD	
	Cs-137	18	1.8 (34-114) (1.2-3.1)	Station 12B3 2.0 miles WSW	2.2 (9/13) (1.2-3.1)	2.0 (7/22) (1.1-3.3)	
	La-140	-	LLD			LLD	

Note: See footnotes at end of table.

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 7 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Precipitation (pCi/l)	H-3 - 34	2000	200 (4/27) (130-290)	Station 9B1 1.3 miles S	290 (1/4) (290-290)	160 (2/7) (120-190)	0
	Gamma Spec - 34						0
	Be-7	-	26 (9/30) (14-35)	Station 12E1 4.7 miles WSW	(1/3) (35-35)	27 (2/4) (21-33)	
	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	
Food Products (pCi/kg, wet)	Gamma Spec - 47						0
	Cs-137	80	18 (12/47) (2.3-54)	Station 7B2 1.5 miles SE	54 (1/2) (54-54)	Only indicator locations sampled for this medium	
	K-40	-	4200 (47/47) (830-7900)	Station 12S4 0.5 miles WSW	4300 (14/14) (1200-7900)		
	Be-7	-	180 (22/47) (26-340)	Station 12S4 0.5 miles WSW	160 (8/14) (39-340)		

Note: See footnotes at end of table.

Table 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 8 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Food Products (pCi/kg, wet) (cont)	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				
Pasture Grass (pCi/kg, dry)	Gamma Spec - 16						0
	Cs-137	80	17 (5/16) (9.8-30)	Station 15A1 0.9 miles NW	(5/12) (9.8-30)	Only indicator locations sampled for this medium	
	K-40	-	10000 (13/16) (2000-30000)	Station 15A1 0.9 miles NW	12000 (9/12) (2600-30000)		
	Be-7	-	5300 (15/16) (630-13000)	Station 8D1 3.2 miles SSE	6800 (3/4) (5100-7900)		
	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 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 9 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

Medium or Pathway Sampled (Units of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (1)	All Indicator Locations Mean (f) (Range)	Location with Highest Annual Mean		Control Locations Mean (f) (2) (Range)	Number of Nonroutine Reported Measurements
				Name, Distance and Direction	Mean (f) (2) (Range)		
Game (Flesh) (pCi/kg (wet))	Gamma Spec - 13						
	Cs-137	80	1100 (11/11) (15-3600)	Station 16B 1.0-1.3 miles NNW	1900 (1/1) (1900-1900)	Only indicator locations sampled for this medium	0
	K-40	-	3100 (11/11) (2500-3500)	Stations 1B and 16B 1.0-1.3 miles NNW & N	3300 (2/2) (3300-3300)		
	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				
Eggs & Poultry (Flesh) (pCi/kg (wet))	Gamma Spec - 2						
	K-40	-	1800 (2/2) (990-2600)	Only one indicator location was sampled (12B1 1.3 miles WSW).		Only indicator locations sampled for this medium	0
	Ba-140	-	LLD				
	Co-58	-	LLD				
	Co-60	-	LLD				
	Cs-134	60	LLD				
	Cs-137	80	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 22

SUMMARY OF DATA FOR THE SSES OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - 1983  
(Page 10 of 10)

Name of Facility: Susquehanna Steam Electric Station Docket Nos. 50-387 & 50-388  
Location of Facility: Luzerne County, Pennsylvania  
Reporting Period: 31 December 1982 to 07 January 1984

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- (1) LLD is lower limit of detection as defined and required in PP&L Technical Specifications.
- (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.
- (3) Station 12H2 was not designated as being Raw or Treated during the first 6 months of 1983. Means were calculated for 12H2 (January - June), 12H2 Raw (June - December), and 12H2 Treated (June - December).



Table 23  
(Page 1 of 3)

Nearest Gardens and Residences Identified  
During the 1983 SSES Annual Land Use Survey

<u>Sector</u>	<u>Direction</u>	<u>Nearest Residence (Distance/Address)</u>	<u>Nearest Garden (Distance/Address)</u>
1	N	0.6 miles Thomas Residence R. D. 1 Berwick	0.6 miles Thomas Residence R. D. 1 Berwick
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	2.3 miles Reinhimer Residence R. D. 1, Box 34B Wapwallopen
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	0.5 miles Walter's Residence * R. D. 1 Berwick	0.5 miles Walter's Residence * R. D. 1 Berwick
6	ESE	0.5 miles Zwolinski Residence R. D. 1 Berwick	1.4 miles Woodcrest Farm R. D. 1, Box 20 Wapwallopen

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Note: See footnote at end of table.

Table 23  
(Page 2 of 3)

Nearest Gardens and Residences Identified  
During the 1983 SSES Annual Land Use Survey

<u>Sector</u>	<u>Direction</u>	<u>Nearest Residence (Distance/Address)</u>	<u>Nearest Garden (Distance/Address)</u>
7	SE	0.4 miles Kline Residence R. D. 1 Berwick	0.4 mile Kline Residence R. D. 1 Berwick
8	SSE	0.7 miles Naunczek Residence R. D. 1, Bell Bend Road Berwick	0.7 miles Naunczek Residence R. D. 1, Bell Bend Road Berwick
9	S	1.1 miles Bower Residence R. D. 1 Berwick	1.2 miles Cope Residence R. D. 1, Box 274 Berwick
10	SSW	1.5 miles Rehrig Residence R. D. 1 Berwick	1.5 miles Rehrig Residence R. D. 1 Berwick
11	SW	0.6 miles Shortz Residence * R. D. 1 Berwick	0.6 miles Shortz Residence * R. D. 1 Berwick
11	SW	0.8 miles Sink Residence R. D. 1 Berwick	0.8 miles Sink Residence R. D. 1, Box 247 Berwick

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Note: See footnote at end of table.

Table 23  
(Page 3 of 3)

Nearest Gardens and Residences Identified  
During the 1983 SSES Annual Land Use Survey

<u>Sector</u>	<u>Direction</u>	<u>Nearest Residence (Distance/Address)</u>	<u>Nearest Garden (Distance/Address)</u>
12	WSW	1.2 miles Kisner Residence R. D. 1 Berwick	1.2 miles Kisner Residence R. D. 1 Berwick
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	0.8 miles Folk Residence R. D. 1, Box 241 Berwick
15	NW	0.9 miles Serafin Residence R. D. 1 Berwick	0.9 miles Serafin Residence R. D. 1 Berwick
16	NNW	0.7 miles Metzler Residence R. D. 1 Berwick	1.4 miles Vogt Residence R. D. 1, Box 96 Berwick

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\* PP&L property.

Table 24

Nearest Dairy Animals by sector, Identified During  
the 1983 SSES Annual Land Use Survey

<u>Sector</u>	<u>Direction</u>	<u>Nearest Dairy Animals</u>
1	N	>5 miles
2	NNE	>5 miles
3	NE	>5 miles
4	ENE	2.7 miles Leroy Hess
5	E	4.5 miles Wilbur Bloss *
6	ESE	2.4 miles Luther Travelpiece
7	SE	2.6 miles Joseph Zajac
8	SSE	3.2 miles Poltrack Farm *
9	S	2.4 miles Guy Thomas, S. Morris
10	SSW	3.0 miles Ross Ryman *
11	SW	3.5 miles Walter Ryman
12	WSW	1.7 miles Frederick Shultz
13	W	5.0 miles Jack Dent *
14	WNW	>5 miles
15	NW	0.9 miles Michael Serafin *
16	NNW	4.2 miles Harold Shoemaker

---

\* Milk sampling location.

Table 25  
(Page 1 of 4)

Comparison of Data from the NUS-RMC Overlap Period<sup>(1)</sup>  
SSES REMP 1983

Medium	Station	Collection Date	Analysis	Nuclide	NUS Data <sup>(2)</sup>	RMC Data <sup>(3)</sup>
Fish (pCi/kg (wet))	IND	05/19/83	Gamma	K-40	2700 $\pm$ 400	3200 $\pm$ 400
	IND	05/19/83	Gamma	K-40	3600 $\pm$ 500	3600 $\pm$ 400
				Cs-137	LT 30 <sup>(4)</sup>	15 $\pm$ 8
	IND	05/27/83	Gamma	K-40	3100 $\pm$ 500	2900 $\pm$ 300
				Cs-137	LT 30	18 $\pm$ 8
	2H	05/31/83	Gamma	K-40	2700 $\pm$ 500	3500 $\pm$ 400
	2H	05/31/83	Gamma	K-40	2800 $\pm$ 300	3300 $\pm$ 400
				Cs-137	LT 20	11 $\pm$ 5
	2H	06/01/83	Gamma	K-40	2400 $\pm$ 400	2800 $\pm$ 300
	2H	06/01/83	Gamma	K-40	3100 $\pm$ 500	3400 $\pm$ 400
Sediment (pCi/kg, (dry))	IND	06/14/83	Gamma	K-40	3000 $\pm$ 500	3600 $\pm$ 400
				Cs-137	LT 20	17 $\pm$ 7
				Ac-228	860 $\pm$ 210	ND <sup>(5)</sup>
				Bi-214	740 $\pm$ 140	ND
				K-40	8700 $\pm$ 1300	8100 $\pm$ 900
				Pb-212	470 $\pm$ 70	ND
				Pb-214	850 $\pm$ 130	ND
				Ra-226	790 $\pm$ 140	530 $\pm$ 60
				Tl-208	800 $\pm$ 170	ND
				Cs-137	LT 90	70 $\pm$ 24
				Th-232	ND	680 $\pm$ 80
	7B			Ac-228	770 $\pm$ 200	ND
				Bi-212	990 $\pm$ 610	ND
				Bi-214	680 $\pm$ 130	ND
				Cs-137	LT 100	58 $\pm$ 19
				K-40	8500 $\pm$ 1300	8300 $\pm$ 900
				Pb-212	540 $\pm$ 80	ND
				Pb-214	840 $\pm$ 140	ND
				Ra-226	760 $\pm$ 140	530 $\pm$ 60
				Tl-208	800 $\pm$ 170	ND
				Th-232	ND	680 $\pm$ 80

Note: See footnote at end of table.

Table 25  
(Page 2 of 4)

Comparison of Data from the NUS-RMC Overlap Period<sup>(1)</sup>  
SSES REMP 1983

Medium	Station	Collection Date	Analysis	Nuclide	NUS Data <sup>(2)</sup>	RMC Data <sup>(3)</sup>
Sediment (pCi/kg, (dry)) (cont.)	11C			Ac-228	770 $\pm$ 220	ND
				Bi-214	790 $\pm$ 140	ND
				Cs-137	LT 100	64 $\pm$ 27
				K-40	6300 $\pm$ 1000	7700 $\pm$ 800
				Pb-212	630 $\pm$ 110	ND
				Pb-214	730 $\pm$ 130	ND
				Ra-226	760 $\pm$ 140	680 $\pm$ 70
				Tl-208	780 $\pm$ 170	ND
				Th-232	ND	720 $\pm$ 100
	2F	05/26/83	Gamma	Ac-228	1100 $\pm$ 200	ND
				Bi-212	1100 $\pm$ 600	ND
				Bi-214	970 $\pm$ 150	ND
				Cs-137	190 $\pm$ 60	240 $\pm$ 40
				K-40	13000 $\pm$ 2000	11000 $\pm$ 2000
				Pb-212	780 $\pm$ 90	ND
				Pb-214	1100 $\pm$ 200	ND
				Ra-226	1000 $\pm$ 200	770 $\pm$ 80
				Tl-208	1100 $\pm$ 200	ND
				Th-232	ND	1100 $\pm$ 200
	12F			Ac-228	900 $\pm$ 180	ND
				Bi-212	820 $\pm$ 120	ND
				Co-58	LT 120	130 $\pm$ 40
				Cs-137	LT 90	91 $\pm$ 24
				K-40	6400 $\pm$ 800	8800 $\pm$ 900
				Mn-54	LT 80	65 $\pm$ 28
				Pb-212	670 $\pm$ 100	ND
				Pb-214	770 $\pm$ 110	ND
				Ra-226	790 $\pm$ 120	690 $\pm$ 70
				Tl-208	930 $\pm$ 150	ND
				Th-232	ND	880 $\pm$ 90
	2B	05/26/83	Gross Alpha	NA	5400 $\pm$ 3700	3200 $\pm$ 2900
	7B			NA	6800 $\pm$ 3900	2900 $\pm$ 2900
	11C			NA	8800 $\pm$ 4200	LT 4000
	2F			NA	9900 $\pm$ 4300	4400 $\pm$ 3100
	12F			NA	5500 $\pm$ 3700	LT 4000

Note: See footnote at end of table.

Table 25  
(Page 3 of 4)

Comparison of Data from the NUS-RMC Overlap Period<sup>(1)</sup>  
SSES REMP 1983

Medium	Station	Collection Date	Analysis	Nuclide	NUS Data <sup>(2)</sup>	RMC Data <sup>(3)</sup>
Water SW <sup>(6)</sup> (pCi/l)	6S7	04/08/83 to 06/05/83	Gamma	Co-58	28 ± 12	45 ± 5
				Co-60	LT 9	9.2 ± 1.2
				Fe-59	LT 40 <sup>(7)</sup>	5.8 ± 2.2
				Mn-54	41 ± 7	37 ± 4
	6S7	06/05/83 to 07/06/83	Gamma	Co-58	LT 5	0.91 ± 0.57
				Mn-54	LT 3	0.94 ± 0.38
	6S5	06/08/83 to 06/27/83	Gamma	Co-60	LT 4	0.88 ± 0.52
(All other overlapping results (16 water samples for gamma spec analysis) were LLD's)						
SW	6S5	06/08/83 to 06/27/83	Gross Beta	NA	LT 2	1.7 ± 1.2
	6S7	06/05/83 to 07/06/83		NA	5.2 ± 3.4	6.4 ± 1.4
	1D3	06/14/83		NA	4.3 ± 1.5	2.3 ± 1.1
	13E1	06/14/83		NA	LT 2	1.6 ± 1.0
	12F1	06/14/83 (8)		NA	LT 2	3.4 ± 1.1
	12G2	06/14/83		NA	LT 5	2.2 ± 1.1
	6S7	04/08/83 to 06/05/83		NA	28 ± 4	39 ± 4
	12H1	05/05/83 to 06/14/83		NA	LT 2	2.2 ± 1.1
GW <sup>(9)</sup>	2S6	06/15/83	Gross Beta	NA	LT 2	1.2 ± 1.0
	3S5	06/15/83		NA	LT 2	1.7 ± 1.0
	4S2	06/15/83		NA	3.9 ± 1.5	LT 1.5
	4S4	06/15/83		NA	4.0 ± 1.5	LT 1.5
	11S5	06/15/83		NA	LT 2	1.2 ± 1.0
	15A4	06/15/83		NA	6.0 ± 1.5	6.0 ± 1.3
	12E4	06/14/83		NA	LT 2	1.9 ± 1.0
	12F3	06/14/83		NA	LT 2	2.3 ± 1.3
PW <sup>(10)</sup>	12F3	05/05/83 to 06/14/83	Gross Beta	NA	2.0 ± 1.4	1.6 ± 1.0
SW	12G2	06/14/83	Iodine		LT 0.15	0.17 ± 0.04

Note: See footnote at end of table.



Table 25  
(Page 4 of 4)

Comparison of Data from the NUS-RMC Overlap Period<sup>(1)</sup>  
SSES REMP 1983

Medium	Station	Collection Date	Analysis	Nuclide	NUS Data <sup>(2)</sup>	RMC Data <sup>(3)</sup>
Milk (pCi/l)	12B2	06/15/83	Gamma	K-40	1600 $\pm$ 200	1300 $\pm$ 200
	5E1	06/15/83		K-40	2100 $\pm$ 300	1400 $\pm$ 200
				Cs-137	LT 2	2.1 $\pm$ 1.0
	13E3	06/15/83		K-40	2200 $\pm$ 300	1500 $\pm$ 200
				Cs-137	LT 3	1.6 $\pm$ 0.9
	10G1	06/15/83		K-40	1800 $\pm$ 200	1300 $\pm$ 200
				Cs-137	LT 3	1.1 $\pm$ 0.7
	12B2	06/27/83		K-40	1300 $\pm$ 200	1400 $\pm$ 200
				Cs-137	LT 1.8	1.5 $\pm$ 0.8
	5E1	06/28/83		K-40	1200 $\pm$ 200	1400 $\pm$ 200
	13E3	06/27/83		K-40	1500 $\pm$ 200	1200 $\pm$ 200
				Cs-137	1.7 $\pm$ 0.8	1.4 $\pm$ 0.9
	10G1	06/27/83		K-40	1500 $\pm$ 200	1200 $\pm$ 200
				Cs-137	1.4 $\pm$ 0.8	3.2 $\pm$ 0.9
Food Products (pCi/kg, wet) (Lettuce)  (Endive)	7S5	06/28/83	Gamma	K-40	4200 $\pm$ 500	4900 $\pm$ 500
	(Spinach)			Be-7	160 $\pm$ 20	LT 170
				Cs-137	2.3 $\pm$ 1.6	LT 19
	7S5	06/28/83		K-40	2600 $\pm$ 300	3800 $\pm$ 400
	(Lettuce)			Be-7	120 $\pm$ 20	LT 190
				Cs-137	4.8 $\pm$ 1.8	LT 22
	7S5	06/28/83		K-40	4100 $\pm$ 500	3900 $\pm$ 400
	(Endive)			Be-7	210 $\pm$ 30	190 $\pm$ 70
				Cs-137	14 $\pm$ 2	LT 14

- (1) Data in this table is limited to the results of the analyses of replicate samples which were analyzed by both RMC and NUS and for which a non LLD result was reported by either NUS, RMC, or both.  
 (2) Samples collected and analyzed by NUS  
 (3) Samples collected and analyzed by Radiation Management Corporation  
 (4) LT = Less Than  
 (5) ND = Not Detected  
 (6) SW means surface water.  
 (7) Lower sensitivity due to delay in counting.  
 (8) RMC lists collection date as 06/15/83.  
 (9) GW means ground water.  
 (10) PW means potable water.

## FIGURES

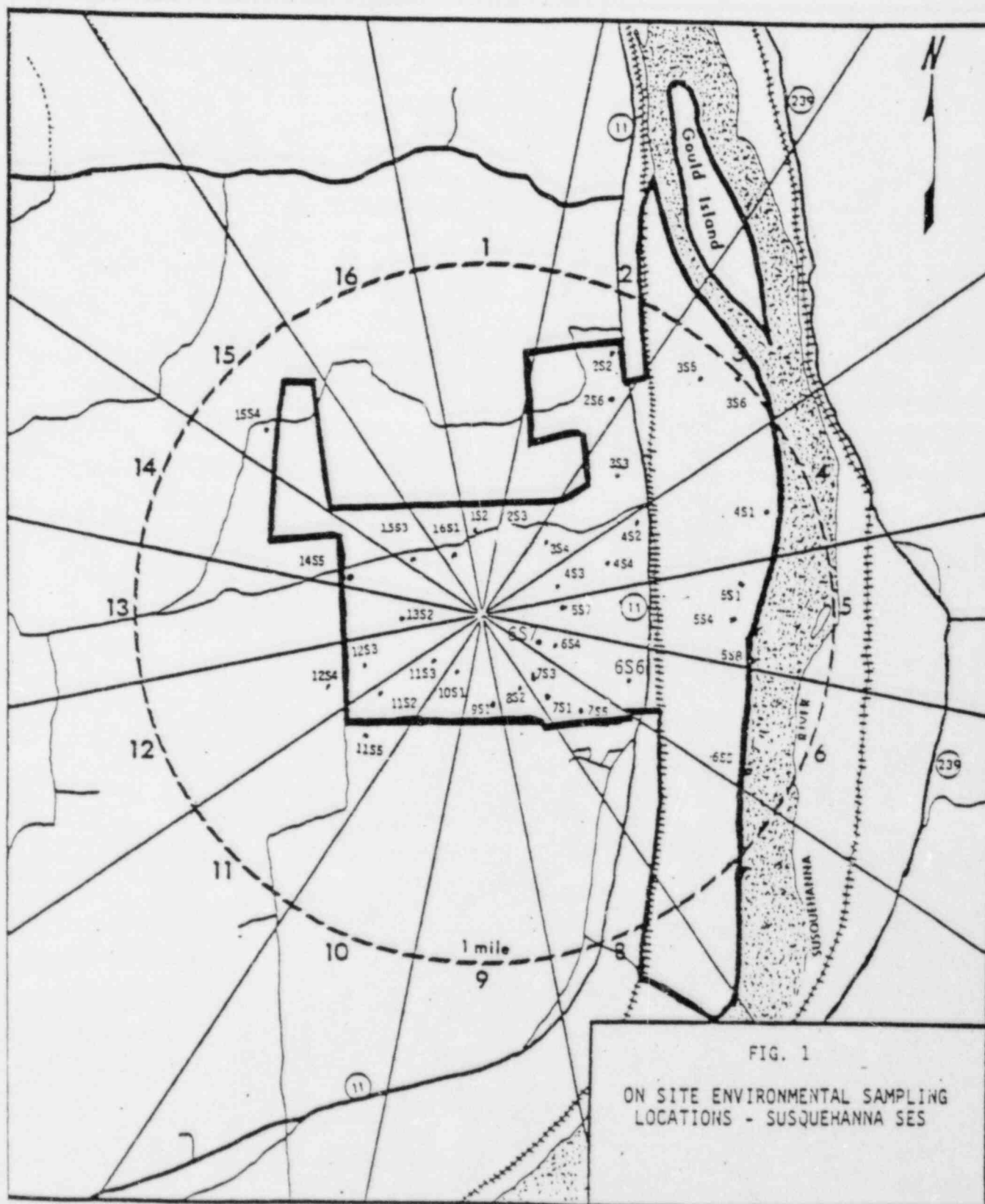


FIG. 2  
OFF SITE ENVIRONMENTAL SAMPLING LOCATIONS - SUSQUEHANNA SES

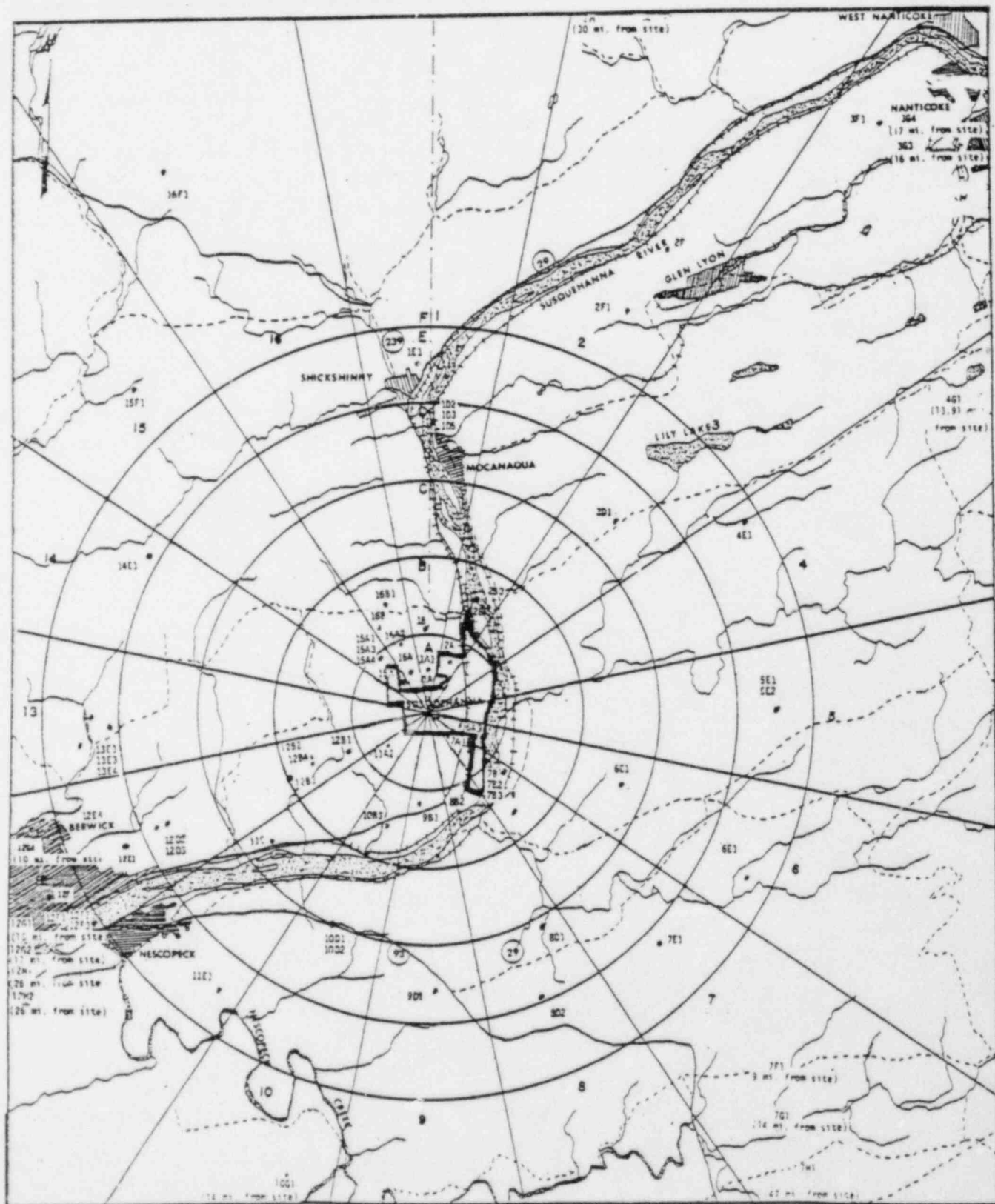


FIG. 3. AVERAGE AMBIENT RADIATION LEVELS  
IN THE VICINITY OF THE SSES  
1973 THROUGH 1983

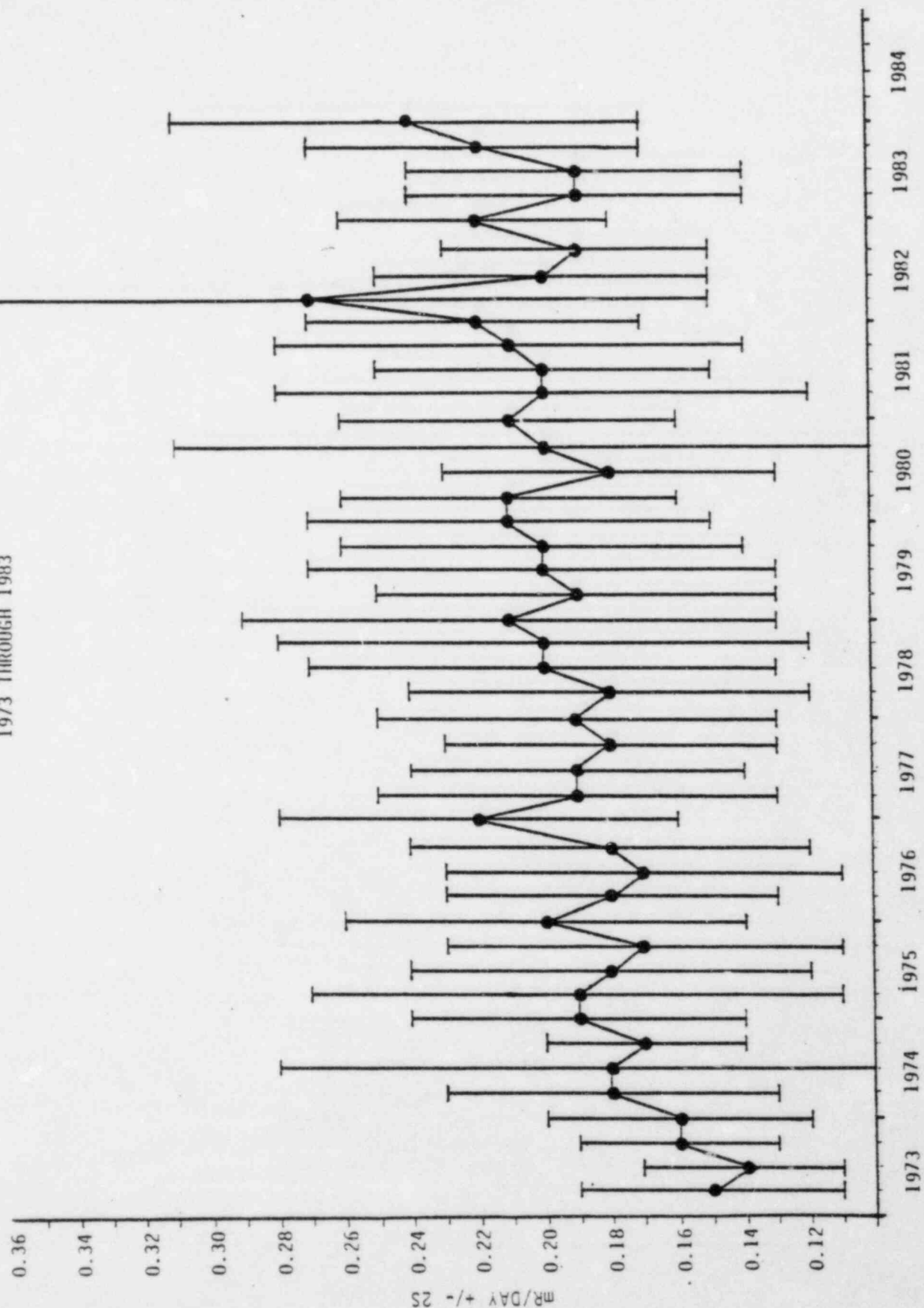
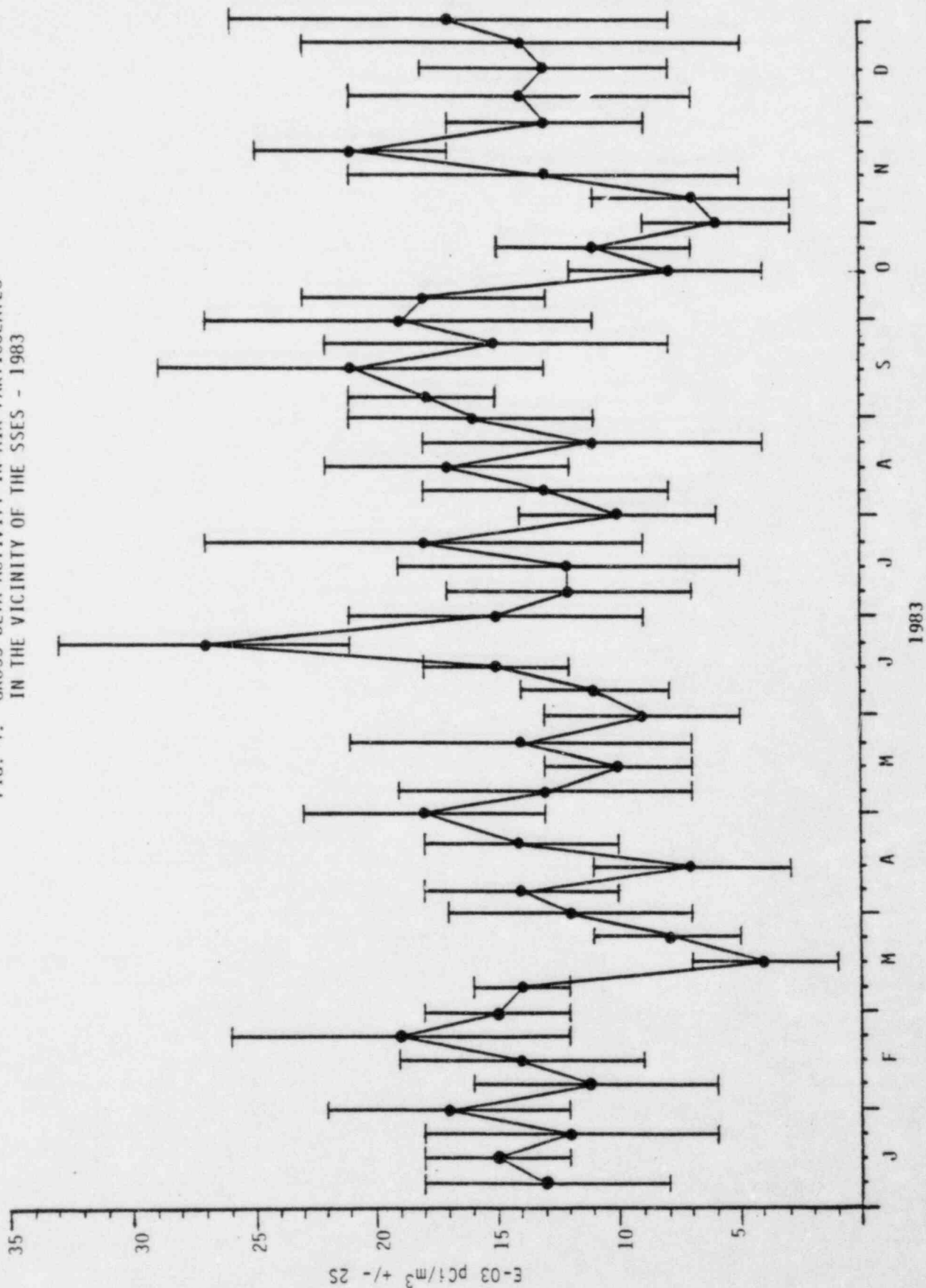


FIG. 4. GROSS BETA ACTIVITY IN AIR PARTICULATES  
IN THE VICINITY OF THE SSES - 1983





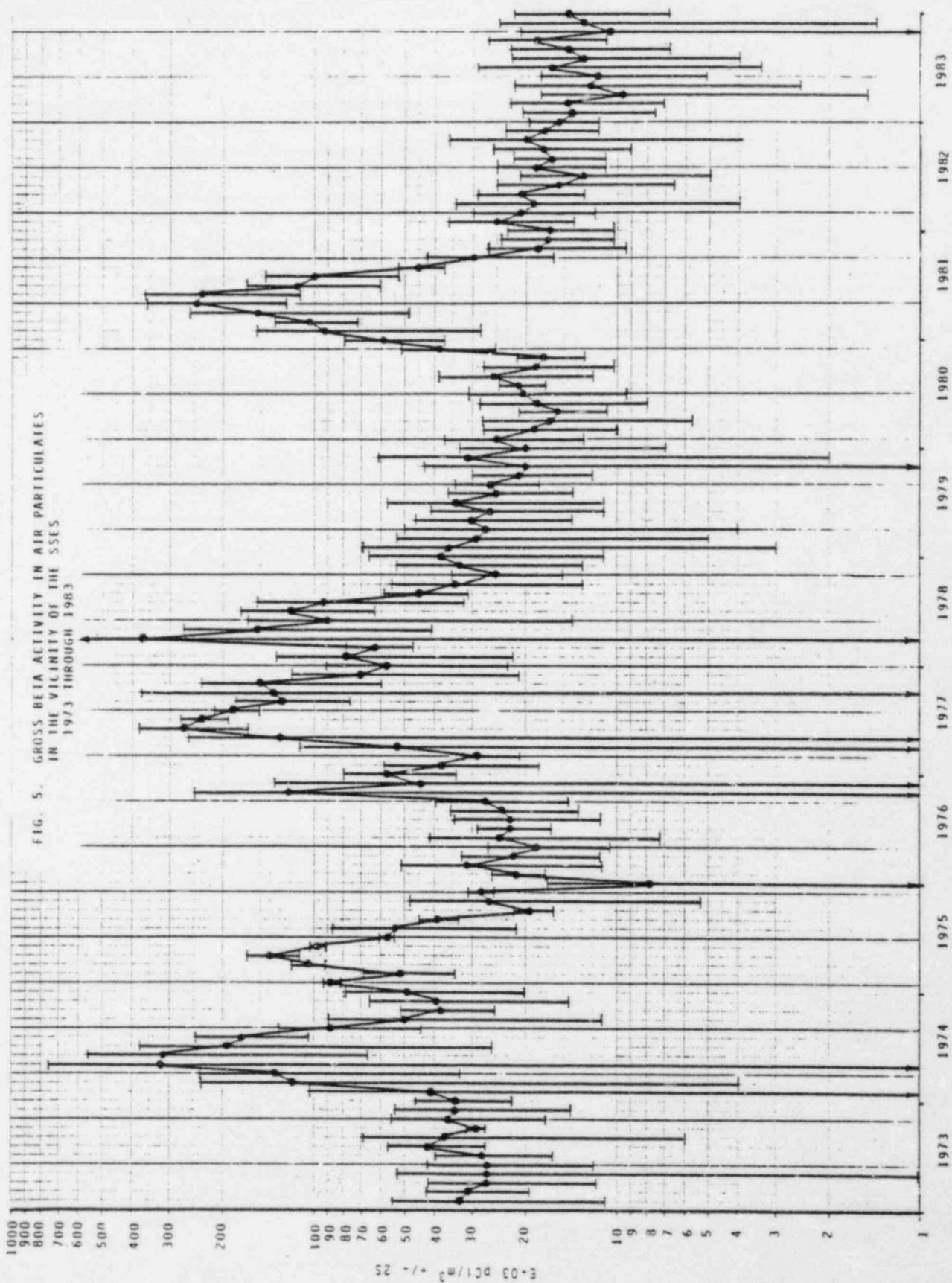
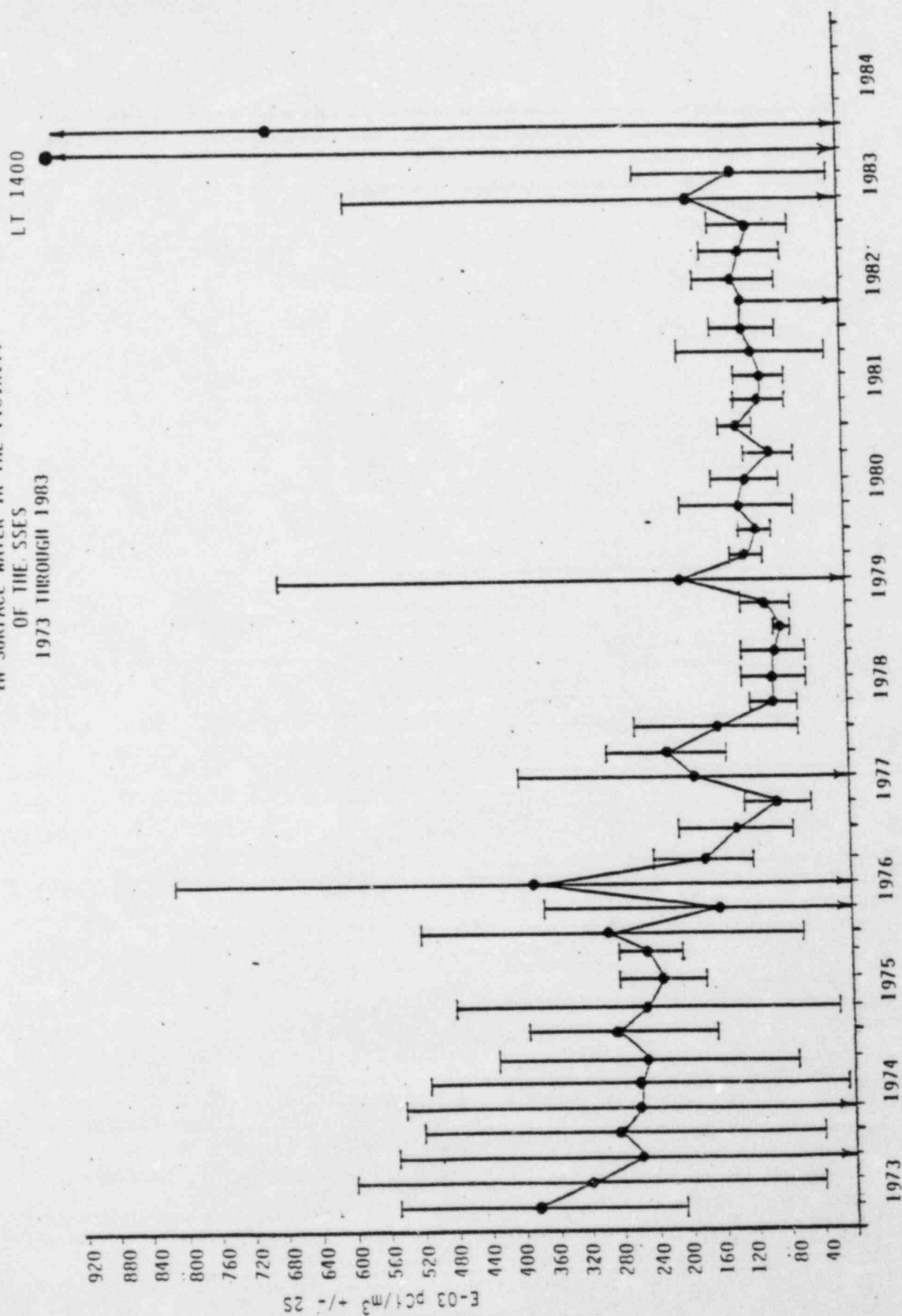


FIG. 5. GROSS BETA ACTIVITY IN AIR PARTICULATES  
IN THE VICINITY OF THE SSES  
1973 THROUGH 1983



FIG. 6. AVERAGE CONCENTRATIONS OF TRITIUM  
IN SURFACE WATER IN THE VICINITY  
OF THE SSES  
1973 THROUGH 1983



Appendix A

USEPA Intercomparison Program Results

## APPENDIX A

### USEPA INTERCOMPARISON PROGRAM RESULTS

The quality assurance procedures employed in the conduct of radiological monitoring programs by the Environmental Services Division Radiological Laboratory are as required in Section 5.0 of the NUS Environmental Services Division Quality Assurance Manual, 9019-XX, and are detailed in the NUS Radiological Laboratory Work Instruction. These procedures include the requirement for laboratory analysis of samples distributed by appropriate government or other standards-maintaining agencies in the laboratory intercomparison program.

Tables are also included which list the results of Radiation Management Corporation's participation in the program. RMC data is drawn from its Quality Control Data Report from June 1983, RMC-QA-83-06. Presentation varies slightly between the two tables. In both cases the laboratory data is compared to the expected EPA result. However, the RMC tables give the expected laboratory precision as the one standard deviation value calculated by the EPA for a single determination. NUS tables present the EPA's expected one standard deviation of three determinations. This value is generally lower (ie. tighter distribution about the mean) than that given by RMC. For comparison purposes, LLD's listed in the table should be treated as the value  $\pm 100\%$  (2s).

The NUS Radiological Laboratory participates in the U. S. Environmental Protection Agency Radioactivity Intercomparison Studies (Cross-check) Program. The NUS results of analyses performed on samples pertinent to the Susquehanna SES program during 1983, and the known values are listed in Table A-1 through H-1.

## RESULTS OF 1983 EPA INTERCOMPARISON PROGRAM

- A. Gross Alpha Analysis
  - 1. Water - NUS
  - 2. Water and Air Particulates  
(Gross Alpha and Gross Beta) - RMC
- B. Gross Beta Analysis
  - 1. Water - NUS
- C. Gamma Spectral Analysis
  - 1. Milk - NUS
  - 2. Water - NUS
  - 3. Water, Milk, Food Products and  
Air Particulate Filters - RMC
- D. Iodine-131
  - 1. Milk - NUS
  - 2. Water - NUS
  - 3. Water - RMC
- E. Tritium
  - 1. Water - NUS
  - 2. Water and Urine - RMC
- F. Radionuclides on Air Particulate - NUS
- G. EPA "Blind" Analysis (water) - NUS
- H. Results of Sixth International Intercomparison of  
Environmental Dosimeters - NUS

A-1

GROSS ALPHA IN WATER - NUS  
USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
01/21/83	29 $\pm$ 4	30 $\pm$ 1
03/18/83	31 $\pm$ 4	31 $\pm$ 2
05/20/83	11 $\pm$ 3	16 $\pm$ 2
07/15/83	7.0 $\pm$ 2.9	11 $\pm$ 1
11/18/83	14 $\pm$ 5	11 $\pm$ 0 (1)

(1) Value not reported to EPA in time to be included in report.

Gross Alpha and Gross Beta in Water  
and Air Particulate Filters - RMC

USEPA Intercomparison Program - 1983

Date	RMC #	Isotopes	Unit	RMC Mean $\pm$ s.d.	EPA Mean $\pm$ s.d.	All Particulate Mean $\pm$ s.d.
Jan 1983	92776 Water	$\alpha$ $\beta$	pCi/l pCi/l	15 $\pm$ 1 (a) 30 $\pm$ 0	29 $\pm$ 7 31 $\pm$ 5	26 $\pm$ 6 32 $\pm$ 5
Mar 1983	95367 Water	$\alpha$ $\beta$	pCi/l pCi/l	8 $\pm$ 1 (a) 9 $\pm$ 2 (a)	31 $\pm$ 8 28 $\pm$ 5	27 $\pm$ 8 28 $\pm$ 4
Mar 1983	96530 APT	$\alpha$ $\beta$	pCi/filter pCi/filter	26 $\pm$ 1 69 $\pm$ 1	26 $\pm$ 11 68 $\pm$ 9	* *
May 1983	97241 Water	$\alpha$ $\beta$	pCi/l pCi/l	29 $\pm$ 2 87 $\pm$ 2	* *	* *
May 1983	97490 Water	$\alpha$ $\beta$	pCi/l pCi/l	2.9 $\pm$ 0.1 19 $\pm$ 1	11 $\pm$ 9 57 $\pm$ 9	* *

\* Full reports are not available from the EPA, and will be included as soon as they are received.

(a): Under investigation.

B-1

GROSS BETA IN WATER - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
01/21/83	31 $\pm$ 3	33 $\pm$ 1
03/18/83	28 $\pm$ 3	24 $\pm$ 2
05/20/83	57 $\pm$ 6	46 $\pm$ 5
07/15/83	22 $\pm$ 3	27 $\pm$ 2
11/18/83	16 $\pm$ 5	14 $\pm$ 1 (1)

(1) Value not reported to EPA in time to be included in report.



C-1

GAMMA SPECTRAL OF MILK - NUS  
USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	Nuclide	EPA Results $\pm 1s$ (pCi/l)	NUS Results $\pm 1s$ (pCi/l)
02/25/83	Cs-137	26 $\pm$ 3.0	28 $\pm$ 1
	Ba-140	0.0 $\pm$ 0.0	LT 15
	K-40	1512 $\pm$ 40(mg/l)	1530 $\pm$ 200(mg/l)
06/10/83	Cs-137	47 $\pm$ 3	46 $\pm$ 3
	K-40	1486 $\pm$ 43(mg/l)	1500 $\pm$ 100(mg/l)
10/28/83	Cs-137	33 $\pm$ 5.8	32 $\pm$ 2
	K-40	1550 $\pm$ 90( mg/l)	1633 $\pm$ 57

LT = Less Than

## GAMMA SPECTRAL OF WATER - NUS

## USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	Nuclides	EPA Results + 1s (pCi/l)	NUS Results + 1s (pCi/l)
02/04/83	Cr-51	45 $\pm$ 3	LT 40
	Co-60	22 $\pm$ 3	22 $\pm$ 2
	Zn-65	21 $\pm$ 3	19 $\pm$ 1
	Ru-106	48 $\pm$ 3	41 $\pm$ 8
	Cs-134	20 $\pm$ 3	20 $\pm$ 1
	Cs-137	19 $\pm$ 3	20 $\pm$ 0
06/03/83	Cr-51	60 $\pm$ 3	LT 80
	Co-60	13 $\pm$ 3	14 $\pm$ 1
	Zn-65	36 $\pm$ 3	37 $\pm$ 5
	Ru-106	40 $\pm$ 3	LT 50
	Cs-134	47 $\pm$ 3	42 $\pm$ 2
	Cs-137	26 $\pm$ 3	26 $\pm$ 2
10/07/83	Cr-51	51 $\pm$ 5	35 $\pm$ 6(1)
	Co-60	19 $\pm$ 5	19 $\pm$ 1
	Zn-65	40 $\pm$ 5	39 $\pm$ 1
	Ru-106	52 $\pm$ 5	40 $\pm$ 3
	Cs-134	15 $\pm$ 5	13 $\pm$ 1
	Cs-137	22 $\pm$ 5	22 $\pm$ 1

---

 LT - Less Than

(1) Average counting error for these analyses was  $\pm$  14 which overlap the EPA warning and control limits.

Gamma Spectrometry of Water, Milk,  
Food Products and Air Particulate Filters - RMC

USEPA Intercomparison Program - 1983

Date	RMC #	Isotope	Unit	RMC Mean $\pm$ s.d.	EPA Mean $\pm$ s.d.	All Participants Mean $\pm$ s.d.
Feb 1983	93729 G09 Water	Cr-51	pCi/l	<100	45 $\pm$ 5 (a)	48 $\pm$ 10
		Co-60	pCi/l	20 $\pm$ 2	22 $\pm$ 5	23 $\pm$ 3
		Zn-65	pCi/l	26 $\pm$ 2	21 $\pm$ 5	22 $\pm$ 5
		Ru-106	pCi/l	53 $\pm$ 3	48 $\pm$ 5	47 $\pm$ 10
		Cs-134	pCi/l	20 $\pm$ 1	20 $\pm$ 5	20 $\pm$ 3
		Cs-137	pCi/l	18 $\pm$ 3	19 $\pm$ 5	19 $\pm$ 3
Feb 1983	94233 G69 Milk	I-131	pCi/l	56 $\pm$ 8	55 $\pm$ 5	55 $\pm$ 5
		Cs-137	pCi/l	27 $\pm$ 1	26 $\pm$ 5	26 $\pm$ 4
		Ba-140	pCi/l	<63	0	-
		K	mg/l	1643 $\pm$ 117	1512 $\pm$ 76	1517 $\pm$ 162
Mar 1983	94568 G69 Food	I-131	pCi/kg	37 $\pm$ 2	37 $\pm$ 6	37 $\pm$ 4
		Cs-137	pCi/kg	36 $\pm$ 1	31 $\pm$ 5	33 $\pm$ 3
		Ba-140	pCi/kg	<60	0	-
		K	mg/kg	2934 $\pm$ 0	2592 $\pm$ 130	2649 $\pm$ 280
Mar 1983	96530 GB9 APT	Cs-137	pCi/filter	39 $\pm$ 3	27 $\pm$ 9	*
May 1983	97241 G09 Water	Co-60	pCi/l	31 $\pm$ 4	*	*
		Cs-134	pCi/l	32 $\pm$ 1	*	*
		Cs-137	pCi/l	25 $\pm$ 0	*	*
June 1983	97810 G09 Water	Cr-15	pCi/l	<54	*	*
		Co-60	pCi/l	14 $\pm$ 1	*	*
		Zn-65	pCi/l	34 $\pm$ 6	*	*
		Ru-106	pCi/l	40 $\pm$ 4	*	*
		Cs-134	pCi/l	42 $\pm$ 1	*	*
		Cs-137	pCi/l	25 $\pm$ 2	*	*
June 1983	97824 G69 Milk	I-131	pCi/l	29 $\pm$ 1	*	*
		Cs-137	pCi/l	46 $\pm$ 3	*	*
		K	mg/l	1408 $\pm$ 0	*	*

\* Full reports are not available from the EPA, and will be included as soon as they are received.

(a): Positive activity was not detected due to the low sensitivity of the analysis for Cr-51.

D-1

IODINE IN MILK - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
02/25/83	55 $\pm$ 3	56 $\pm$ 6
06/10/83	30 $\pm$ 3	43 $\pm$ 0(1)
10/28/83	40 $\pm$ 6.93	27 $\pm$ 1.7

(1) Only one number reported due to improper preparation of sample.  
Insufficient data to determine statistics.

D-2

IODINE-131 IN WATER - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	EPA Results $\pm 1s$ (pCi/l)	NUS Results $\pm 1s$ (pCi/l)
12/03/82	37 $\pm$ 3	35 $\pm$ 3
04/01/83	27 $\pm$ 3	25 $\pm$ 3
08/05/83	14 $\pm$ 6	11 $\pm$ 1
12/16/83	20 $\pm$ 6	16 $\pm$ 1

## Iodine in Water - RMC

USEPA Intercomparison Program - 1983

Date	RMC #	Unit	RMC Mean $\pm$ s.d.	EPA Mean $\pm$ s.d.	All Participants Mean $\pm$ s.d.
Apr 1983	95633 Water	pCi/l	23 $\pm$ 4	27 $\pm$ 6	27 $\pm$ 5

E-1

TRITIUM IN WATER - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	EPA Results $\pm$ 1s (pCi/l)	NUS Results $\pm$ 1s (pCi/l)
02/11/83	2560 $\pm$ 204	2530 $\pm$ 140
04/08/83	3330 $\pm$ 210	3500 $\pm$ 0
06/10/83	1529 $\pm$ 194	1333 $\pm$ 58
08/12/83	1836 $\pm$ 198	1900 $\pm$ 200
10/14/83	1210 $\pm$ 190	1167 $\pm$ 58
12/09/83	2389 $\pm$ 203	2333 $\pm$ 58



## Tritium in Water and Urine - RMC

USEPA Intercomparison Program - 1983

Date	RMC #	Unit	RMC Mean $\pm$ s.d.	EPA Mean $\pm$ s.d.	All Participants Mean $\pm$ s.d.
Feb 1983	93757 Water	pCi/l	2527 $\pm$ 136	2560 $\pm$ 353	2534 $\pm$ 273
Mar 1983	95221 Urine	pCi/l	2600 $\pm$ 115	2470 $\pm$ 352	2349 $\pm$ 367
Apr 1983	96405 Water	pCi/l	3257 $\pm$ 50	3330 $\pm$ 362	3298 $\pm$ 241
June 1983	98042 Water	pCi/l	1600 $\pm$ 87	*	*
June 1983	97807 Urine	pCi/l	1403 $\pm$ 49	*	*

\* Full reports are not available from the EPA, and will be included as soon as they are received.

## RADIONUCLIDES ON AIR PARTICULATE - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	Radionuclide	EPA Value +1s (pCi/filter)	NUS Value +1s (pCi/filter)
03/25/83	Alpha	26 $\pm$ 3.7	27.3 $\pm$ 2 (1)
	Beta	68 $\pm$ 3	68 $\pm$ 1
	Sr-90	20 $\pm$ 1	22 $\pm$ 2
	Cs-137	27 $\pm$ 3	29 $\pm$ 6
08/26/83	Alpha	13 $\pm$ 5	10 $\pm$ 2
	Beta	36 $\pm$ 5	35 $\pm$ 5
	Sr-90	10 $\pm$ 1.5	125 $\pm$ 5 (2)
	Cs-137	15 $\pm$ 5	13 $\pm$ 5
11/25/83	Alpha	19 $\pm$ 2.9	26.7 $\pm$ 1.5
	Beta	50 $\pm$ 2.9	53.7 $\pm$ 1.2

- (1) Value from original EPA report was incorrect. Report value is recalculated with correct efficiency.
- (2) Anomalous results under investigation.

G-1

## EPA "Blind" Analysis (water) - NUS

USEPA INTERCOMPARISON PROGRAM 1983

Collection Date	Nuclide	EPA Value + 1s (pCi/l)	NUS Value + 1s (pCi/l)
05/09/83	Alpha	64 $\pm$ 16	57 $\pm$ 4 (1)
	Beta	149 $\pm$ 7.5	123 $\pm$ 6 (1)
	Sr-89	24 $\pm$ 3	27 $\pm$ 3
	Sr-90	13 $\pm$ 1	17 $\pm$ 1
	Ra-226	8.5 $\pm$ 0.8	9.2 $\pm$ 0.1
	Ra-228	4.7 $\pm$ 0.4	3.3 $\pm$ 0.4
	Co-60	30 $\pm$ 3	31 $\pm$ 1
	Cs-134	33 $\pm$ 3	29 $\pm$ 2
	Cs-137	27 $\pm$ 3	25 $\pm$ 2
	U	25 $\pm$ 3	25 $\pm$ 2
11/14/83	Alpha	22 $\pm$ 5.5	21 $\pm$ 2
	Beta	63 $\pm$ 5	58 $\pm$ 4
	Sr-89	17 $\pm$ 5	25 $\pm$ 3
	Sr-90	8 $\pm$ 1.5	10.57 $\pm$ 2.21
	Ra-226	5.1 $\pm$ 0.8	5.5 $\pm$ 0.3
	Ra-228	2.8 $\pm$ 0.4	1.73 $\pm$ .23
	Co-60	11 $\pm$ 5	15.33 $\pm$ 3.1 (2)
	Cs-137	15 $\pm$ 5	9.17 $\pm$ 3.0
	Cs-134	15 $\pm$ 5	9.9 $\pm$ 1.82
	U	11 $\pm$ 6	12 $\pm$ 0

- (1) Original EPA report was incorrect, corrected EPA value did not include an error
- (2) NUS value is average of one positive value and two LLD's which were reported.

## H-1

Results of Sixth International Intercomparison  
of Environmental Dosimeters - NUS

	Expected Value <u>+1s</u> (mR)	NUS Value <u>+1s</u> (mR)
Field Exposure	43.5 <u>±</u> 2.2	51.2 <u>±</u> 7.9
Field Exposure (pre-irradiated)	202 <u>±</u> 10	218 <u>±</u> 13
Lab Exposure	158 <u>±</u> 8	161 <u>±</u> 11

## Appendix B

### Summary of Analytical Methods

## APPENDIX B

### SUMMARY OF ANALYTICAL METHODS

This appendix summarizes the methods used by NUS for sample analysis in the conduct of the Susquehanna SES REMP. Data reporting conventions are discussed in Appendix C.

All SSES REMP samples received by RMC during 1983 were analyzed in accordance with pertinent "Controlled Copy" procedures. In addition, the procedure summaries presented in the 1982 SSES Annual Report would be applicable to the 1983 samples analyzed by RMC (11, 19).

#### ANALYSIS FOR GROSS ALPHA AND GROSS BETA ACTIVITIES

##### Determination of Gross Alpha and Gross Beta Activity in Water

A distilled water blank and the current reference standard are processed with each batch of samples.

A 200 milliliter aliquot of each sample is measured into an appropriate glass beaker. A proportionately smaller volume is used if the sample is known to contain solids in excess of 500 mg/l. The aliquot is evaporated to near dryness on a hot plate, utilizing caution as sample approaches dryness to insure sample does not spatter out of the beaker. A 5 milliliter portion of 16 N  $\text{HNO}_3$  is added and evaporated to dryness.

The walls of the beaker are rinsed with a few milliliters of 1 N  $\text{HNO}_3$  and swirled to loosen the residue. The aliquot concentrate is quantitatively transferred in small portions (not more than 5 milliliters at a time) to a tared, stainless steel planchet. Each portion is evaporated to dryness under an infrared lamp or in a drying oven set to 105°C.

The planchet is cooled in a desiccator and weighed. The sample residue is stored in a desiccator until ready for counting. The planchet is counted on a gas-flow proportional counter for 200 minutes.

#### Determination Of Gross Alpha Activity In Sediment

Aggregate material from a sediment sample is broken up and any rocks are retained for future weighing. The sample is dried in a drying oven at about 105°C until dry, usually 24 hours. After grinding with a mortar and pestle, the sample is sieved through a No. 10 standard sieve. If there is any uncrushable, unsievable material, it is removed, weighed with the rocks from the initial sorting and all are discarded. After sieving, the sample is blended and stored for use in the appropriate analyses.

For gross alpha and/or beta analysis, a 100 milligram aliquot of dried, well-blended sample is accurately weighed into a tared 2-inch stainless steel planchet. The sample is slurried with a few drops of water to distribute it uniformly on the planchet and dried under a heat lamp. The planchet is cooled in a desiccator and weighed. The sample residue is stored in a desiccator until ready for counting.

The planchet is counted in a low-background gas proportional counter for 100 minutes. An empty, clean stainless steel planchet is used as the background sample for this analysis.

#### Determination of Gross Beta Activity On Air Filters

The air filter is placed in a 2 inch stainless steel planchet with the dirty side of the filter face up. If the filter edges curl or otherwise present a 'nonflat' surface, the filter is fixed to bottom of planchet.

The background/blank is determined by counting an unused filter of the same type as used to collect the samples. This should be from the same vendor's batch if at all possible. A filter of the same material (glass fiber, paper, membrane, etc.) is a reasonable substitute.

Each filter is counted for 40 minutes in a low-background gas proportional counter. After counting is completed, the filter is returned to its original envelope to be retained for future analyses.

The efficiency used for this calculation is that for a weightless source.



### Determination of Gross Alpha Activity In Composited Air Filters

Composited air filters are transferred to a beaker. A 100 milliliter aliquot of 6 N HCl is slowly added while stirring. The filters are leached by stirring overnight or by heating on a hot plate at medium heat for several hours.

After the filters have been leached, the acid solution is filtered through a glass-fiber filter. The filter is washed with 6 N HCl and again with hot deionized water. The combined filtrates are diluted to a known volume and stored for subsequent analyses.

For gross alpha analysis a known, appropriately sized aliquot is transferred to a glass beaker. Aliquot size is determined by the sensitivity required and the numbers of additional analyses to be performed on the composite. The aliquot is evaporated to near dryness on a hot plate. Several 5 milliliter portion of 16 N HNO<sub>3</sub> are added and evaporated to dryness.

The beaker is rinsed with a few milliliters of 1 N HNO<sub>3</sub> and the aliquot concentrate is quantitatively transferred in small portions to a tared, stainless steel planchet. The sample is evaporated to dryness under an infrared lamp or drying oven set to 105°C.

The planchet is cooled in a desiccator and weighed. The sample residue is stored in a desiccator until ready for counting. The planchet is counted on a gas-flow proportional counter for  $\geq 3$  minutes.

### Calculation of Gross Alpha and Beta Activities

Activities, errors and sensitivities are calculated from the following equations:

$$\begin{aligned} \text{ACT} &= \frac{\text{SC} - \text{BC}}{\text{E} * \text{TF} * \text{V} * \text{T} * 2.22} \\ \text{ERR} &= \frac{2 * \text{SQRT}(\text{SC} + \text{BC})}{\text{E} * \text{TF} * \text{V} * \text{T} * 2.22} \\ \text{LLD} &= \frac{4.66 * \text{SQRT}(\text{BC})}{\text{E} * \text{TF} * \text{V} * \text{T} * 2.22} \end{aligned}$$

where

ACT = Activity measured in the sample in pCi per unit mass or volume

ERR = the two standard deviation error of the analysis, in pCi per unit mass or volume, as calculated from counting statistics

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

SC = sample counts accumulated in "T" minutes

BC = blank counts accumulated in "T" minutes

E = counting efficiency in counts per disintegration for a weightless sample

TF = number of disintegrations from a sample of appreciable weight which are counted by the system, divided by the number of disintegrations from a weightless sample of the same activity which would be counted by the same system

V = sample size in units of mass or volume

T = time in minutes for which the sample was counted

2.22 = number of disintegrations per minute per picocurie

All data analysis is performed on a DEC PDP 11/44 computer system. The programs used for the computation of results, errors and LLDs for non-spectrometric analyses were written inhouse and are documented as required by the ESD QA manual.

## GAMMA SPECTROMETRY OF ENVIRONMENTAL SAMPLES

### Analysis of Water Samples By Gamma Spectrometry

The aliquot for analysis is poured into a 4-liter beaker and the initial volume is recorded. The sample is evaporated until there are 30 to 40 milliliters in the bottom of the beaker. The sample is then quantitatively transferred into a 60 milliliter bottle. Small quantities of 12N nitric acid are used to loosen any residue on the sides or bottom of the beaker. A wet rubber policeman and irrigation with deionized water are used to return the residue to solution and to transfer it to the concentrate bottle.

The aliquot concentrate is diluted to the standard volume in the 60 milliliter bottles.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

### Analysis of Milk Samples By Gamma Spectrometry

A 3 liter aliquot of milk is weighed into an appropriate tared beaker. Glacial acetic acid (15-20 milliliter) is added to the sample with stirring. The beaker is covered with a clean watchglass and the sample is boiled gently until the volume has been reduced to about 200 milliliter. After cooling, the sample is quantitatively transferred to a clean, tared stainless steel container. The container is placed in a muffle furnace and ashed at a temperature of not over 450°C for about 4-5 hours. After cooling, the container is weighed. The sample is transferred to a mortar and pestle, ground and thoroughly blended. The sample is transferred to a clean, tared 2" or 3" plastic dish (depending on the volume of the sample residue) and reweighed.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

### Analysis of Air Filter Composites By Gamma Spectrometry

The filters are arranged in the order in which they were collected in each composite. The filters are placed in order, dirty side up, in the bottom of a stainless steel planchet. A second planchet is placed, bottom side down, on top of the stack of filters. The filters are compressed into the depth of the first planchet and the two planchets are sealed together with vinyl tape.

Single filters are counted for gamma spectrometry in the same geometry as they are prepared for gross beta analysis.

Filter composites are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

### Analysis of Sediment Samples By Gamma Spectrometry

When sediment is received for analysis the aggregate material is broken up and any rocks are retained for future weighing.

The sample is dried in a drying oven at about 100°C until dry, usually 24 hours. After grinding with a mortar and pestle, the sample is sieved through a No. 10 standard sieve. If there is any uncrushable, unsieveable material, it is removed, weighed with the rocks from the initial sorting and all are discarded. After sieving, the sample is blended and stored for use in the appropriate analyses.

The dried and sieved sediment sample is thoroughly blended. A clean, tared 3-inch dish is filled with the sample. Filling is accomplished in several increments, followed by shaking and lightly tapping the bottom of the dish on the bench top to help settle the soil between additions. The dish is filled to within 7 mm of the top and reweighed to calculate the net weight. The dish is sealed with vinyl tape and heat sealed in a plastic bag before analysis by gamma spectrometry.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

## Analysis of Vegetation And Food Product Samples By Gamma Spectrometry

For animal feeds or human foods, the portion of the sample that is prepared and analyzed is that portion which is consumed. The edible portion is separated from the inedible portion (e.g. bones, etc.). The weight of the inedible and edible portions are obtained and recorded. The aliquot of the sample to be analyzed is transferred to a clean, tared container and dried in a drying oven for 24 hours at about 110° C.

After reweighing to obtain the net dry weight, the sample is ground and blended to obtain a homogenous sample. Depending on the total amount of sample available, a tared 2-inch or 3-inch dish is filled with the sample. Filling is accomplished in several increments, followed by shaking and lightly tapping the bottom of the dish on the bench top to help settle the sample between additions. The dish is filled to within 7 mm of the top and reweighed to calculate the net weight. The dish is sealed with vinyl tape and heat sealed in a plastic bag before analysis by gamma spectrometry.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

## Preparation of Special Vegetation Samples for I-131 Analysis By Gamma Spectrometry

Sample preparation for I-131 analysis is begun immediately on receipt of the sample due to the short half-life of I-131.

About 1 kg of sample is weighed into a clean, tared 4 liter beaker. One liter of a solution containing 33g of sodium hydroxide and 19.5 milligrams of NaI carrier is added to the vegetation. If the solution does not cover the sample, sufficient deionized water is added to completely immerse the sample. The beaker is covered with a watch glass and the sample is allowed to soak for at least 16 hours.

After standing for the required length of time, the beaker is placed on a hot plate and most of the liquid is evaporated. When nearly dry, the contents are transferred to a tared stainless steel beaker and placed in a muffle furnace. The temperature is slowly brought to 350° C and ashed for at least 4 hours. After cooling, the beaker is weighed to obtain the net ash weight.

The ashed sample is ground thoroughly with a mortar and pestle and blended. Depending on the total amount of ash recovered, a tared 2 inch or 3 inch plastic dish is filled with the blended sample. The filled plastic dish is weighed and the aliquot weight recorded. The plastic dish containing the sample is sealed with vinyl tape and heat sealed in a plastic bag before analysis by gamma spectrometry.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Detectors are individually calibrated for each geometry. Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

#### Analysis of Fish Samples By Gamma Spectrometry

Only the edible portions of fish samples are analyzed by gamma spectrometry. Samples are filleted and the inedible portions discarded. The aliquot of the sample to be analyzed is transferred to a clean, tared container and dried in a drying oven for 24 hours at about 110° C.

After reweighing to obtain the net dry weight, the sample is ground and blended to obtain a homogenous sample. A clean, tared 3-inch dish is filled with the sample. Filling is accomplished in several increments, followed by shaking and lightly tapping the bottom of the dish on the bench top to help settle the sample between additions. The dish is filled to within 7 mm of the top and reweighed to calculate the net weight. The dish is sealed with vinyl tape and heat sealed in a plastic bag before analysis by gamma spectrometry.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

#### Calculation of Gamma Emitters

Activities, errors and sensitivities are calculated from the following equations:

$$\begin{aligned} \text{ACT} &= \frac{\text{SC} - \text{BC}}{\text{E} * \text{V} * \text{T} * 2.22 * \text{AB} * \exp(-\lambda * \text{dt})} \\ \text{ERR} &= \frac{2 * \text{SQRT}(\text{SC} + \text{BC})}{\text{E} * \text{V} * \text{T} * 2.22 * \text{AB} * \exp(-\lambda * \text{dt})} \\ \text{LLD} &= \frac{4.66 * \text{SQRT}(\text{BK})}{\text{E} * \text{V} * \text{T} * 2.22 * \text{AB} * \exp(-\lambda * \text{dt})} \end{aligned}$$



where

- ACT = Activity measured in the sample in pCi per unit mass or volume
- ERR = the two standard deviation error of the analysis, in pCi per unit mass or volume, as calculated from counting statistics
- LLD = lower limit of detection in pCi per unit mass or volume
- SC = gross counts accumulated in the photopeak of interest in "T" minutes
- BC = background counts accumulated under the photopeak of interest in "T" minutes, estimated from the countrate in four baseline channels on each side of the photopeak and the width of the photopeak
- BK = background counts accumulated at the energy of interest in "T" minutes, estimated for the number of baseline channels expected for a photopeak at that energy
- E = counting efficiency in counts per disintegration at the energy of the photopeak
- V = sample size in units of mass or volume
- T = time in minutes for which the sample was counted
- 2.22 = number of disintegrations per minute per picocurie
- AB = number of gamma photons with the energy of the photopeak produced per disintegration of the parent isotope
- $\lambda$  = radioactive-decay constant for the particular radionuclide in the reciprocal of the units of dt
- dt = elapsed time between sample collection and counting

All data analysis is performed on a DEC PDP 11/44 computer system. High resolution gamma spectra are analyzed utilizing Spectran F, the calculation model developed by Canberra Industries, Inc. for the analysis of GeLi and HpGe spectra.



### Analysis of Charcoal Adsorption Cartridges for I-131

Charcoal cartridges are screened in a custom geometry. Samples are inserted in the holder with the intake side against the detector. Analysis is by high resolution gamma spectrometry. A multiple cartridge spectrum is accumulated as part of the initial screening. If no I-131 activity is observed then all of the charcoal cartridge I-131 values are LLDs. These values are individually calculated for each cartridge using its own collection volume.

If any I-131 activity is observed in the screening spectrum, then each cartridge is counted and analyzed separately by high resolution gamma spectrometry.

Samples are counted on high-resolution gamma spectrometry detectors and 4,096-channel spectra are accumulated on Canberra Series 85 multichannel analyzers (MCAs). Spectral analysis is performed on a PDP 11/44 computer using the Spectran-F data analysis software.

### Determination of Tritium in Water by Liquid Scintillation Counting

A distilled water blank and current reference standard are processed with each batch of samples.

A clean dry distillation flask is prepared and the flask is rinsed with the sample. Approximately 50 milliliters of the sample are poured into the flask and distillation is begun. The first 5 milliliters of the distillate is discarded. Approximately 25 milliliters are then distilled into a new polyethylene bottle.

The samples are prepared for counting under dim incandescent, preferably red light, not under fluorescent light. Exactly 8 milliliters of the distilled unknown sample are pipetted into a scintillation vial. At least two HTO standard spiked samples and two blanks are prepared with each batch of samples. One of each is counted before and after the unknown samples.

Eleven milliliters of the liquid scintillation cocktail are added and the vial contents are well mixed. The samples are stored in the dark 24 hours before counting to minimize chemiluminescence and to obtain better reproducibility. Samples may be loaded immediately and the first 24 hours of counting data rejected. Samples are counted in a liquid scintillation counter for 1200 minutes.

### Calculation of Tritium Activities

Activities, errors and sensitivities are calculated from the following equations:

$$ACT = \frac{SC - BC}{E * V * T * 2.22 * \exp(-0.05635 * dt)}$$

$$ERR = \frac{2 * \text{SQRT}(SC + BC)}{E * V * T * 2.22 * \exp(-0.05635 * dt)}$$

$$LLD = \frac{4.66 * \text{SQRT}(BC)}{E * V * T * 2.22 * \exp(-0.05635 * dt)}$$

where

ACT = Activity measured in the sample in pCi per liter

ERR = the two standard deviation error of the analysis, in pCi per liter, as calculated from counting statistics

LLD = lower limit of detection, as defined above, in pCi per liter

SC = sample counts accumulated in "T" minutes

BC = blank counts accumulated in "T" minutes

E = counting efficiency in counts per disintegration, determined from standards counted in the same batch

V = sample size in liters

T = time in minutes for which the sample was counted

2.22 = number of disintegrations per minute per picocurie

0.05635 = radioactive-decay constant for tritium in units of reciprocal years

dt = elapsed time between sample collection and counting in years

All data analysis is performed on a DEC PDP 11/44 computer system. The programs used for the computation of results, errors and LLDs for non-spectrometric analyses were written inhouse and are documented as required by the ESD QA manual.

### Determination of I-131 in Milk or Water by Gas Proportional Counting

A one liter powdered milk or water blank and the current reference standard in milk or water is processed with each batch of samples.

A four liter aliquot of the sample is transferred to a suitably sized container, and standardized iodide carrier are added. After stirring for a minimum of 5 minutes, 5 grams of sodium bisulphite is added to each aliquot for analysis.

A water-slurried, anion exchange resin (100 milliliters) in chloride form is added to each container. The samples are then stirred vigorously overnight. After stirring for a minimum of 12 hours, the stirring bars are removed and the resin allowed to settle to the bottom of the beaker for ten minutes. The milk/water samples are carefully decanted and retained for possible use in other analyses. Blank and reference solutions are discarded directly. The resins are washed with distilled water and transferred to an appropriately sized beaker and saved.

While stirring, a 100 milliliter aliquot of 4-6% NaOCl is added to the resin. Stirring is continued vigorously for 15 minutes. Then the resin is filtered and the filtrate is saved. This is repeated with a second 100 milliliters aliquot of NaOCl. The filtrates are combined and the resin is discarded.

The filtrates are transferred to separatory funnels, acidified, and hydroxylamine hydrochloride added. The solutions are extracted twice with 100 milliliters of CCl<sub>4</sub>. Both CCl<sub>4</sub> phases are combined and the aqueous phase is discarded.

The combined organic phases are back-extracted with deionized water and NaHSO<sub>3</sub>. After separation, the organic phase is discarded, and the aqueous phase is transferred to a clean 50 milliliters centrifuge tube.

CuI is precipitated by adding CuCl and adjusting the pH to between 2.5 and 2.7 with dilute HCl or dilute NH<sub>4</sub>OH. The precipitate is centrifuged and rinsed twice with deionized water. It is then quantitatively transferred to a tared, 2 inch diameter, ringed, stainless steel planchet.

The planchet is dried; reweighed to determine the chemical recovery; and counted on a gas proportional counter for 300 minutes.

### Calculation of Iodine-131 Activities

Activities, errors and sensitivities are calculated from the following equations:

$$ACT = \frac{SC - BC}{E * V * T * 2.22 * Y * \exp(-0.08621 * dt)}$$

$$ERR = \frac{2 * \text{SQRT}(SC + BC)}{E * V * T * 2.22 * Y * \exp(-0.08621 * dt)}$$

$$LLD = \frac{4.66 * \text{SQRT}(BC)}{E * V * T * 2.22 * Y * \exp(-0.08621 * dt)}$$

where

ACT = Activity measured in the sample in pCi per unit mass or volume

ERR = the two standard deviation error of the analysis, in pCi per unit mass or volume, as calculated from counting statistics

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

SC = sample counts accumulated in "T" minutes

BC = blank counts accumulated in "T" minutes

E = counting efficiency in counts per disintegration

V = sample size in units of mass or volume

T = time in minutes for which the sample was counted

2.22 = number of disintegrations per minute per picocurie

Y = fractional radiochemical yield

0.08621 = radioactive-decay constant for iodine-131 in units of reciprocal days

dt = elapsed time between sample collection and counting in days

All data analysis is performed on a DEC PDP 11/44 computer system. The programs used for the computation of results, errors and LLDs for non-spectrometric analyses were written inhouse and are documented as required by the ESD QA manual.

#### Preparation and Analysis of $\text{CaSO}_4(\text{Dy})$ TLDs

Dosimeters are kept as clean as possible and properly stored between exposures. Before use in a field cycle, dosimeters are checked for physical damage and cleanliness. Damaged or badly stained TLDs are not used.

The dosimeters are placed on a glass dish and inserted into a preheated oven for annealing. TLDs are annealed for at least 1 hour. After removal from the oven the dosimeters are cooled to room temperature. During cooling and packaging the annealed dosimeters are not exposed to fluorescent light.

Individual dosimeters are placed in black polyethylene pouches and sealed. Each individual bag is labeled with the dosimeter number(s). Two dosimeters may be placed in the bag to obtain a duplicate exposure rate measurement. The plastic bag is inserted into a PB-2 badge with readout area one at the top. The PB-2 badges are closed and labeled with the customer name or code, the sampling location, and the exposure period for which the TLD is being placed.

On their return, TLDs are read immediately. If they cannot be read the same day, the TLDs are stored in a lead shield. If possible, all TLDs from a given set are read on the same day.

TLDs are read in a model 8300 TLD reader after performance of required calibration checks and gain adjustments to ensure that standard readout conditions are present.

Each of the TLD readings are corrected for the individually obtained calibration factors, and for intransit exposure. The intransit exposure is obtained from a set of TLDs prepared and shipped with the field dosimeters and stored in a lead pig for the duration of the field exposure.



TLD exposures are calculated from the following equations:

$$EXT = \frac{\sum_{n=1}^4 E_n CR_n - NIT}{4}$$

$$NIT = \frac{\sum_{n=1}^x [GIT_n CR_n - (LP * TP)]}{x}$$

$$EXR = EXT/TD$$

$$ERT = 2 \sqrt{\frac{\sum_{n=1}^4 (E_n CR_n - EXT)^2}{3} + \frac{\sum_{n=1}^x [GIT_n CR_n - (LP * TP) - NIT]^2}{x-1}}$$

$$ERR = ERT/TD$$

where:

EXT = integrated net exposure for the exposure period in mR

ERT = two standard deviation of integrated exposure in mR

EXR = net exposure rate to the TLD in mR/day

ERR = two standard deviation error in mR/day

$E_n$  = exposure readout of area, n

$CR_n$  = calibration factor of area, n

NIT = net intransit exposure after correction for exposure in the lead pig

$GIT_n$  = exposure readout of area n for the intransit TLD

LP = known exposure rate in lead pig in mR/day

TP = number of days the intransit TLDs were in the lead pig

TD = number of days the samples TLDs were in the field

Appendix C  
Data Reporting Conventions



APPENDIX C  
DATA REPORTING CONVENTIONS

All results from RMC 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, unless the first figure is a one. If the first figure is a one, the detection limit is rounded to two significant figures.

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

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--

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

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

$\lambda$  = radioactive-decay constant for the particular radionuclide in units of reciprocal time

$\Delta t$  = elapsed time between sample collection and counting

The following 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:

$$\bar{X} = (X_1 + X_2 + \dots + X_n)/n = \sum_{i=1}^n X_i/n$$

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:

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

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,  $s/\bar{X}$ . It is sometimes multiplied by 100 and expressed as a percentage.
- 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.