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2003 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
SALEM AND HOPE CREEK GENERATING STATIONS
DOCKET NOS. 50-272, 50-311 AND 50-354

As required by Section 6.9.1.7 of Appendix A to Facility Operating Licenses DPR-70 and DPR-75 for Salem Generating Station, Unit Nos. 1 and 2, and Section 6.9.1.6 of Appendix A to Facility Operating License NPF-57 for Hope Creek Generating Station, PSEG Nuclear hereby transmits one copy of the 2003 Annual Radiological Environmental Operating Report. This report summarizes the results of the radiological environmental surveillance program for 2003 in the vicinity of the Salem and Hope Creek Generating Stations. The result of this program for 2003 was specifically compared to the result of the pre-operational program.

If you have any questions or comments on this transmittal, please contact Michael Mosier at (856) 339-5434.

Sincerely,

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RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

For

Salem Generating Station, Unit 1: Docket No. 50-272
Salem Generating Station, Unit 2: Docket No. 50-311
Hope Creek Generating Station : Docket No. 50-354

2003 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

JANUARY 1 TO DECEMBER 31, 2003

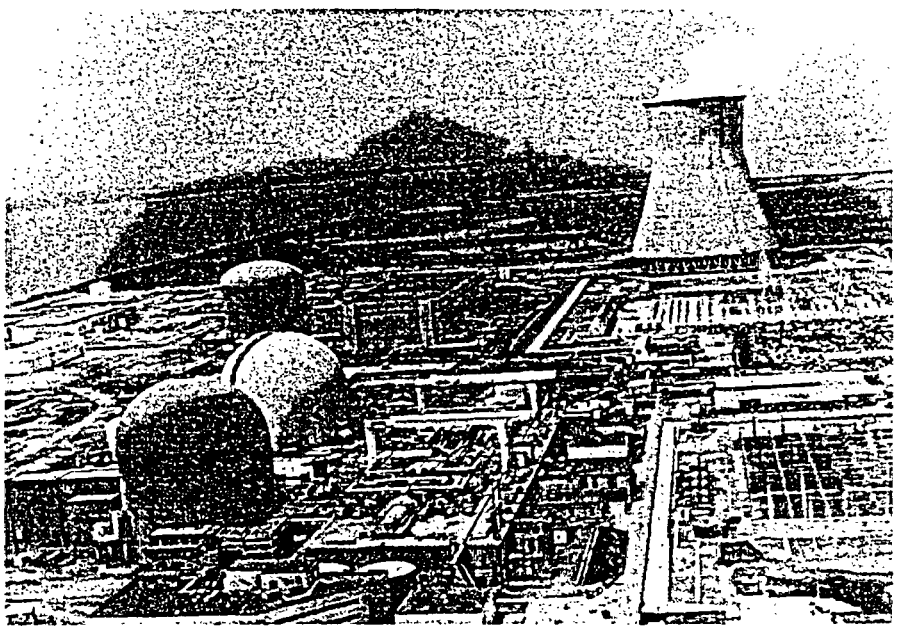
Prepared by

PSEG SERVICE CORPORATION

MAPLEWOOD TESTING SERVICES

APRIL 2004

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM



SALEM & HOPE CREEK
GENERATING STATIONS

2003 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

JANUARY 1 TO DECEMBER 31, 2003

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SUMMARY

During normal operations of a nuclear power generating station there are releases of small amounts of radioactive material to the environment. To monitor and determine the effects of these releases a Radiological Environmental Monitoring Program (REMP) has been established for the environment around Artificial Island where the Salem Generating Stations (SGS) and Hope Creek Generating Station (HCGS) are located. The results of the REMP are published annually, providing a summary and interpretation of the data collected.

PSEG's Maplewood Testing Services (MTS) has been responsible for the collection and analysis of environmental samples during the period of January 1, 2003, through December 31, 2003, and the results are discussed in this report. The REMP for SGS/HCGS was conducted in accordance with the SGS and HCGS Technical Specifications/Offsite Dose Calculation Manual. The Lower Limit of Detection (LLD) values required by the Technical Specifications/ODCM were achieved for this reporting period. The objectives of the program were also met during this period. The data collected assists in demonstrating that SGS and HCGS were operated in compliance with Technical Specifications/ODCM.

Most of the radioactive materials noted in this report are normally present in the environment, either naturally, such as potassium-40, or as a result of non-nuclear generating station activity, such as nuclear bomb testing. Measurements made in the vicinity of SGS/HCGS were compared to background or control measurements and the preoperational REMP study performed before Salem Unit 1 became operational. Samples of air particulates, air iodine, milk, surface, ground and drinking water, vegetables, game, fodder crops, fish, crabs, and sediment were collected and analyzed. External radiation dose measurements were also made in the vicinity of SGS/HCGS using thermoluminescent dosimeters.

From the results obtained, it can be concluded that the levels and fluctuations of radioactivity in environmental samples were as expected for an estuarine environment. No unusual radiological characteristics were observed in the environs of SGS/HCGS during this reporting period. Since these results were comparable to the results obtained during the preoperational phase of the program, and with historical results collected since commercial operation, we can conclude that the operation of SGS and HCGS had no significant impact on the radiological characteristics of the environs of these stations.

To demonstrate compliance with Technical Specifications/ODCM (Sections 3/4.12.1 & 6.8.4.h -1,2,3), samples were analyzed for one or more of the following: gamma emitting isotopes, tritium (H-3), iodine-131 (I-131), gross beta and gross alpha.

The results of these analyses were used to assess the environmental impact of SGS and HCGS operations, thereby demonstrating compliance with Technical Specifications/ODCM (Section 3/4.11) and applicable Federal and State regulations, and to verify the adequacy of radioactive effluent control systems.
The results provided in this report are summarized below:

- There were a total of 1206 analyses on 1119 environmental samples during 2003. Direct radiation dose measurements were made using 196 thermoluminescent dosimeters (TLDs).
- In addition to the detection of naturally-occurring isotopes (i.e. Be-7, K-40, Radium and Th-232) trace levels of Cs-137 were also detected. The concentrations of these nuclides were well below the Technical Specification reporting limit.
- Dose measurements made with quarterly TLDs at 31 offsite locations around the SGS/HCGS site, averaged 49 millirems for the year 2003. The average dose measurements at the control locations (background) was 53 millirems for the year. This was comparable to the preoperational phase of the program which had an average of 55 millirems per year for 1973 to 1976.

During the 2003 year, PSEG Nuclear continued it's investigation into the source and quantity of tritium identified in groundwater at Salem Station. This investigation has been conducted in accordance with a Remedial Investigation Work Plan that was submitted to the New Jersey Department of Environmental Protection Bureau of Nuclear Engineering (NJDEP-BNE) in June, 2003. Several meetings concerning this work have been conducted with the New Jersey Department of Environmental Protection. The results of this investigation will be found in a Remedial Investigation Report, which is anticipated to be submitted to NJDEP-BNE in the first quarter of 2004. There is no evidence that tritium contaminated water above permissible levels has migrated to the station boundary or the Delaware River.

THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Lower Alloways Creek Township, Salem County, New Jersey is the site of Salem (SGS) and Hope Creek (HCGS) Generating Stations. SGS consists of two operating pressurized water nuclear power reactors. Salem Unit One has a net rating of 1133 megawatt electric (MWe) and Salem Unit Two has a net rating of 1134 MWe. The licensed core power for both units is 3459 megawatt thermal (MWt). HCGS is a boiling water nuclear power reactor, which has a net rating of 1091 MWe (3339 MWt).

SGS/HCGS are located on a man-made peninsula on the east bank of the Delaware River. It was created by the deposition of hydraulic fill from dredging operations. The environment surrounding SGS/HCGS is characterized mainly by the Delaware River and Bay, extensive tidal marshlands, and low-lying meadowlands. These land types make up approximately 85% of the land area within five miles of the site. Most of the remaining land is used for agriculture [1,2]. More specific information on the demography, hydrology, meteorology, and land use of the area may be found in the Environmental Reports [1,2], Environmental Statements [3,4], and the Updated Final Safety Analysis Reports for SGS and HCGS [5,6].

Since 1968, a radiological environmental monitoring program (REMP) has been conducted at the SGS/HCGS Site. Starting in December, 1972, more extensive radiological monitoring programs were initiated. The operational REMP was initiated in December, 1976, when Salem Unit 1 achieved criticality. PSEG's Maplewood Testing Services (MTS) has been involved in the REMP since its inception. MTS is responsible for the collection of all radiological environmental samples and, from 1973 through June, 1983, conducted a quality assurance program in which duplicates of a portion of those samples analyzed by the primary laboratory were also analyzed by MTS.

From January, 1973, through June, 1983, Radiation Management Corporation (RMC) had primary responsibility for the analysis of all samples under the SGS/HCGS REMP and annual reporting of results. RMC reports for the preoperational and operational phase of the program are referenced in this report [7-9]. On July 1, 1983, MTS assumed primary responsibility for the analysis of all samples (except TLDs) and the reporting of results. Teledyne Brown Engineering Environmental Services (TBE), assumed responsibility for third-party QA analyses and TLDs. An additional vendor, Controls for Environmental Pollution Inc. (CEP), was retained to provide third-party QA analyses and certain non-routine analyses from May, 1988, until June 1, 1992. Currently, Framatome ANP DE&S Environmental Laboratory (Framatome) is the third party QA vendor and the laboratory which performs the TLD analyses. MTS reports for the operational phase from 1983 to 2002 are referenced in this report [10].

An overview of the 2003 Program is provided in Table 1. Radioanalytical data from samples collected under this program were compared with results from the preoperational phase. Differences between these periods were examined statistically to determine the effects of station operations. This report presents the results from January 1 through December 31, 2003, for the SGS/HCGS REMP.

OBJECTIVES

The objectives of the Operational REMP are:

- To fulfill the requirements of the Radiological Surveillance sections of the Technical Specifications/ODCM for SGS/HCGS.
- To determine whether any significant increase occurred in the concentration of radionuclides in critical pathways.
- To determine if SGS or HCGS has caused an increase in the radioactive inventory of long-lived radionuclides.
- To detect any change in ambient gamma radiation levels.
- To verify that SGS and HCGS operations have no detrimental effects on the health and safety of the public or on the environment.

This report, as required by Section 6.9.1.7 of the Salem Technical Specifications/ODCM and Section 6.9.1.6 of the Hope Creek Technical Specifications/ODCM, summarizes the findings of the 2003 REMP. Results of the four-year preoperational program have been summarized for comparison with subsequent operational reports [8].

In order to meet the objectives, an operational REMP was developed. Samples of various media were selected for monitoring due to the radiological dose impact to human and other organisms. The selection of samples was based on: (1), established critical pathways for the transfer of radionuclides through the environment to man, and, (2), experience gained during the preoperational phase. Sampling locations were determined based on site meteorology, Delaware estuarine hydrology, local demography, and land uses.

Sampling locations were divided into two classes, indicator and control. Indicator stations are those, which are expected to manifest station effects. Control samples are collected at locations which are believed to be unaffected by station operations, usually at 15 to 30 kilometers distance. Fluctuations in the levels of radionuclides and direct radiation at indicator stations are evaluated with respect to analogous fluctuations at control stations. Indicator and control station data are also evaluated relative to preoperational data. Appendix A describes and summarizes, in accordance with Section 6.9.1.7 of the Salem TS and Section 6.9.1.6 of the Hope Creek TS, the operational program as performed in 2003.

Appendix B describes the coding system which identifies sample type and location. Table B-1 lists the sampling stations and the types of samples collected at each station. These sampling stations are indicated on Maps B-1 and B-2.

DATA INTERPRETATION

Results of analyses are grouped according to sample type and presented in Appendix C. All results above the Lower Limit of Detection (LLD) are at a confidence level of 2 sigma. This represents the range of values into which 95% of repeated analyses of the same sample should fall. As defined in Regulatory Guide 4.8, LLD is the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability, with only 5% probability of falsely concluding that a blank observation represents a "real signal". LLD is normally calculated as 4.66 times the standard deviation of the background counting rate, or of the blank sample count, as appropriate, divided by counting efficiency, sample size, 2.22 (dpm per picocurie), the radiochemical yield when applicable, the radioactive decay constant and the elapsed time between sample collection and time of counting. The Minimum Detectable Concentration (MDC) is defined as the smallest concentration of radioactive material that can be detected at a given confidence level. The MDC differs from the LLD in that the MDC takes into consideration the interference caused by the presence of other nuclides while the LLD does not.

The grouped data were averaged and standard deviations calculated in accordance with Appendix B of Reference 16. Thus, the 2 sigma deviations of the averaged data represent sample and not analytical variability. For reporting and calculation of averages, any result occurring at or below the LLD is considered to be at that level. When a group of data was composed of 50% or more LLD values, averages were not calculated.

Grab sampling is a useful and acceptable procedure for taking environmental samples of a medium in which the concentration of radionuclides is expected to vary slowly with time or where intermittent sampling is deemed sufficient to establish the radiological characteristics of the medium. This method, however, is only representative of the sampled medium for that specific location and instant of time. As a result, variation in the radionuclide concentrations of the samples will normally occur. Since these variations will tend to counterbalance one another, averages based upon repetitive grab samples is considered valid.

QUALITY ASSURANCE PROGRAM

MTS has a quality assurance program designed to ensure confidence in the analytical program. Approximately 20% of the total analytical effort is spent on quality control, including process quality

control, instrument quality control, interlaboratory cross-check analyses, and data review.

The quality of the results obtained by MTS is ensured by the implementation of the Quality Assurance Program as described in the Maplewood Testing Services Quality Assurance Plan [11] and the Environmental and Chemical Division Procedures Manual. The internal quality control activity of MTS includes the quality control of instrumentation, equipment and reagents; the use of reference standards in calibration, documentation of established procedures and computer programs, and analysis of duplicate samples. The external quality control activity is implemented through participation in both the Analytics and the Environmental Resource Associates Interlaboratory Comparison Programs. The results of these Interlaboratory Comparison Programs are listed in Tables D-1 through D-4 in Appendix D.

PROGRAM CHANGES

Due to the tritium contamination of groundwater on the Salem Station site, it was decided to analyze the Delaware River water for tritium on a monthly schedule instead of quarterly as required by Salem and Hope Creek Tech Specs/ODCM.

RESULTS AND DISCUSSION

The analytical results of the 2003 REMP samples are divided into categories based on exposure pathways: atmospheric, direct, terrestrial, and aquatic. The analytical results for the 2003 REMP are summarized in Appendix A. The data for individual samples are presented in Appendix C. The data collected demonstrates that the SGS and HCGS REMP was conducted in compliance with the Technical Specifications/ODCM.

The REMP for the SGS/HCGS Site has historically included samples and analyses not specifically required by these Stations' Technical Specifications/ODCM. MTS continues to collect and analyze some of these samples in order to maintain personnel proficiency in performing these non-routine analyses. These analyses are referenced throughout the report as Management Audit samples. The summary tables in this report include these additional samples and analyses.

ATMOSPHERIC

Air particulates were collected on Schleicher-Schuell No. 25 glass fiber filters with low-volume air samplers. Iodine was collected from the air by adsorption on triethylenediamine (TEDA) impregnated charcoal cartridges connected in series after the air particulate filters. Air sample volumes were measured with calibrated dry-gas meters and were corrected to standard temperature and pressure.

Air Particulates (Tables C-1, C-2)

Air particulate samples were collected weekly, at 6 locations. Each of the 312 samples collected for the year were analyzed for gross beta. Quarterly composites of the weekly samples from each station were analyzed for specific gamma emitters. Total data recovery for the 6 sampling stations in 2003 was 99.81 percent.

- Gross beta activity was detected in all of the indicator station samples at concentrations ranging from 7.6×10^{-3} to 52×10^{-3} pCi/m^3 and in all of the control station samples from 8.9×10^{-3} to 55×10^{-3} pCi/m^3. The averages for the indicator and control station samples were 21 and 22 x 10^{-3} pCi/m^3, respectively. The maximum preoperational level detected was 920×10^{-3} pCi/m^3, with an average of 74×10^{-3} pCi/m^3. Results from 1983 to current year are plotted on Figure 1 as quarterly averages. Included along with this plot, for purposes of comparison, is an inset depicting a continuation of this plot from the current year all the way back to 1973.

- Gamma spectroscopy, performed on each of the 24 quarterly composite samples analyzed, indicated the presence of the naturally-occurring radionuclides Be-7 and K-40. All other gamma emitters searched for were below the LLD.

  - Beryllium-7, attributed to cosmic ray activity in the atmosphere, was detected in all 20 indicator station composites that were analyzed, at concentrations ranging from 44×10^{-3} to 68×10^{-3} pCi/m^3, with an average of 54×10^{-3} pCi/m^3. It was detected in the 4 control station composites ranging from 44×10^{-3} to 56×10^{-3} pCi/m^3, with an average of 52×10^{-3} pCi/m^3. The maximum preoperational level detected was 330×10^{-3} pCi/m^3, with an average of 109×10^{-3} pCi/m^3.

  - Potassium-40 activity was detected in 4 of the indicator station samples, with concentrations ranging from 8×10^{-3} to 21×10^{-3} pCi/m^3, with an average of 13×10^{-3} pCi/m^3. K-40 was also detected in 1 control station sample, at a concentration of 9×10^{-3} pCi/m^3. No preoperational data is available for comparison.

Air Iodine (Table C-3)

Iodine in filtered air samples was collected weekly, at 6 locations. Each of the 312 samples collected for the year was analyzed for I-131.

Iodine-131 was not detected in any of the weekly samples analyzed. LLD sensitivities for all the stations, both indicator and control, ranged from $<1.0 \times 10^{-3}$ to $<15 \times 10^{-3}$ pCi/m^3. The maximum preoperational level detected was 42×10^{-3} pCi/m^3.

DIRECT RADIATION

Ambient radiation levels in the environs were measured with energy-compensated $CaSO_4$ (Tl) thermoluminescent dosimeters (TLDs) supplied and read by Framatome. Packets containing TLDs for quarterly exposure were placed in the owner-controlled area and around the Site at various distances.

Direct Radiation (Table C-4)

A total of 49 locations were monitored for direct radiation during 2003, including 12 on-site locations, 31 off-site locations within the 10 mile zone, and 6 control locations beyond 10 miles. Effort was made to locate TLDs at schools and population centers in the area.

Five readings for each TLD (ie; 5 elements) at each location were taken in order to obtain a more statistically valid result. For these measurements, the rad is considered equivalent to the rem, in accordance with 10CFR20.1004.

The average dose rate for the 31 quarterly off-site indicator TLDs was 4.1 millirads per standard month, while the on-site average was 4.4 millirads per standard month. The average control rate was 4.4 millirads per standard month. The preoperational average for the quarterly TLD readings was 4.4 millirads per standard month.

In Figure 2, the quarterly average radiation levels of the off-site indicator stations versus the control stations, are plotted for the period 1983 through 2003, with an inset graph depicting the current year back to 1973.

TERRESTRIAL

Milk samples were taken semi-monthly when cows were on pasture and monthly when cows were not grazing on open pasture. Animals are considered on pasture from April to November of each year. Samples were collected in polyethylene containers and transported in ice chests with no preservatives added to the milk.

A well water sample was collected monthly. Separate raw and treated potable water samples were composited daily at the City of Salem water treatment plant. All samples were collected in new polyethylene containers.

Locally grown vegetable and fodder crops were collected at the time of harvest. Such samples were weighed and packed in plastic bags.

Game (muskrat) has been collected annually (time of year dependent on weather conditions, which affect pelt thickness) from local farms after being trapped, stripped of their pelts and gutted. The carcasses were packed in plastic bags and kept chilled in ice chests during transport.

Milk (Table C-5)

Milk samples were collected at 4 local dairy farms (2 farms in NJ and 2 in Delaware). Each sample was analyzed for I-131 and gamma emitters.

- Iodine-131 was not detected in any of the 80 samples analyzed. LLD sensitivities for both the indicator and the control station samples ranged from <0.1 to <1.0 pCi/L. The maximum preoperational level detected was 65 pCi/L which occurred following a period of atmospheric nuclear weapons tests. Results from 1983 to 2003 are plotted on Figure 3, with an inset graph depicting the current year back to 1973.
- Gamma spectroscopy performed on each of the 80 samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.
  - Potassium-40 was detected in all 80 samples. Concentrations for the 60 indicator station samples ranged from 1200 to 1520 pCi/L, with an average of 1360 pCi/L. The 20 control station sample concentrations ranged from 1210 to 1430 pCi/L, with an average of 1320 pCi/L. The maximum preoperational level detected was 2000 pCi/L, with an average of 1437 pCi/L.

Well Water (Ground Water) (Tables C-6, C-7)

Although wells in the vicinity of SGS/HCGS are not directly affected by plant operations, water samples were collected monthly from one farm's well during January through December of the year. Each sample was analyzed for gross alpha, gross beta, tritium, and gamma emitters.

- Gross alpha activity was detected in 11 of the well water samples at concentrations ranging from 0.5 to 3.7 pCi/L and an average of 2.1 pCi/L. The maximum preoperational level detected was 9.6 pCi/L. There was no preoperational average determined for this analysis.
- Gross beta activity was detected in all 12 well water samples. Concentrations for the samples ranged from 8.6 to 11 pCi/L, with an average of 10 pCi/L. The 2003 gross beta results are comparable with the preoperational results which ranged from <2.1 to 38 pCi/L, with an average value of 9 pCi/L.
- Tritium activity was not detected in any of the well water samples. The LLD sensitivities ranged from <140 to <180 pCi/L. The maximum preoperational level detected was 380 pCi/L.
- Gamma spectroscopy performed on each of the 12 well water samples indicated the presence of the naturally-occurring

radionuclides K-40 and Radium. All other gamma emitters searched for were below the LLD.

- Radium was detected in all 12 of the well water samples at concentrations ranging from 56 to 146 pCi/L with an average of 94 pCi/L. The maximum preoperational level detected was 2.0 pCi/L.

  These values are similar to those found in the past 14 years. However, as with the 1989 through 2002 results, they are higher than those found in the preoperational program. These results are due to a procedural change for sample preparation. The change results in less removal of radon (and its daughter products) from the sample. It is reasonable to conclude that values currently observed are typical for this region.

- Potassium-40 was detected in 4 of the samples at concentrations ranging from 34 to 87 pCi/L and an average of 56 pCi/L. The maximum preoperational level detected was 30 pCi/L.

Potable Water (Drinking Water) (Tables C-8, C-9)

Both raw and treated potable water samples were collected and composited by Salem water treatment plant personnel. Each sample consisted of daily aliquots composited into a monthly sample. The raw water source for this plant is Laurel Lake and adjacent wells. Each of the 24 individual samples was analyzed for gross alpha, gross beta, tritium, iodine-131 and gamma emitters.

- Gross alpha activity was detected in 9 raw water samples at concentrations of 0.8 to 1.5 pCi/L and in 6 treated water samples ranging from 0.7 to 1.6 pCi/L. The averages for both raw and treated water samples was 1.1 pCi/L. The maximum preoperational level detected was 2.7 pCi/L.

- Gross beta activity was detected in all 24 samples at concentrations ranging from 2.1 to 4.1 pCi/L for both the raw and treated water. The average concentration for both raw and treated was 3.1 pCi/L. The maximum preoperational level detected was 9.0 pCi/L, with an average of 4.2 pCi/L.

- Tritium activity was not detected in any of the raw or treated water samples. LLD sensitivities ranged from <140 to <180 pCi/L. The maximum preoperational level detected was 350 pCi/L, with an average of 179 pCi/L.

- Iodine-131 measurements were performed to a sensitivity of 1.0 pCi/L even though the drinking water supplies are not affected by discharges from the Site since the receiving water body (Delaware River) is brackish and therefore the water is not used for human consumption. Iodine-131 measurements for all 24 samples were below the LLD sensitivities.

These sensitivities ranged from <0.1 to <0.4 pCi/L. There was no preoperational data available for comparison.

- Gamma spectroscopy performed on each of the 24 monthly water samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.

  - The radionuclide K-40 was detected in 7 of the raw and treated potable waters at concentrations ranging from 32 to 78 pCi/L. The combined average for both raw and treated positive results was 49 pCi/L. There was no preoperational data available for comparison.

Vegetables (Table C-10)

Although vegetables in the region are not irrigated with water into which liquid plant effluents have been discharged, a variety of food products grown in the area for human consumption were sampled at 4 indicator stations (10 samples) and 3 control stations (10 samples). The vegetables collected as management audit samples were analyzed for gamma emitters and included asparagus, cabbage, sweet corn, peppers, spinach and tomatoes.

Gamma spectroscopy performed on each of the 20 samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.

Potassium-40 was detected in all 20 samples. Concentrations for the 10 indicator station samples ranged from 1710 to 6400 pCi/kg-wet and averaged 2590 pCi/kg-wet. Concentrations for the 10 control station samples ranged from 1440 to 2910 pCi/kg-wet, and averaged 2260 pCi/kg-wet. The average concentration detected for all samples, both indicator and control, was 2420 pCi/kg-wet. The maximum preoperational level detected was 4800 pCi/kg-wet, with an average of 2140 pCi/kg-wet.

Game (Table C-11)

Although not required by the SGS or HCGS Technical Specifications/ODCM, samples of muskrats inhabiting the marshlands surrounding the Site, are collected. Local residents consume this game. The samples, when available, are collected from 2 locations once a year as management audit samples and analyzed for gamma emitters.

Gamma spectroscopy performed on the flesh indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.

Potassium-40 was detected in the indicator station sample at a concentration of 2840 pCi/kg-wet and the control station sample at 2670 pCi/kg-wet.

The average for both muskrat samples was 2755 pCi/kg-wet. The maximum preoperational level detected was 27000 pCi/kg-wet, with an average of 4400 pCi/kg-wet.

Fodder Crops (Table C-12)

Although not required by the SGS or HCGS Technical Specifications/ODCM, 6 samples of crops normally used as cattle feed (silage and soybeans) were collected from 2 indicator stations (3 samples) and 2 control station (3 samples). It was determined that these products may be a significant element in the food-chain pathway. Fodder crops are collected as management audit samples and analyzed for gamma emitters. All of the locations from which samples were collected this year are milk sampling stations.

Gamma spectroscopy performed on each of the 6 samples indicated the presence of the naturally-occurring radionuclides Be-7 and K-40. All other gamma emitters searched for were below the LLD.

Beryllium-7, attributed to cosmic ray activity in the atmosphere, was detected in both indicator silage samples at concentrations of 610 and 1030 pCi/kg-wet. It was detected in both the control station silage samples at 890 and 910 pCi/kg-wet. The average for all the silage samples was 860 pCi/kg-wet. The maximum preoperational level detected for silage was 4700 pCi/kg-wet, with an average of 2000 pCi/kg-wet. Be-7 was not detected in either of the indicator nor control station soybean samples. LLD sensitivities for the soybean samples were <27 and <60 pCi/kg-wet. The maximum preoperational level detected for soybean samples was 9300 pCi/kg-dry.

Potassium-40 was detected in all 6 samples. Concentrations for the 3 indicator station samples ranged from 4010 to 15300 pCi/kg-wet and for the 3 control station samples from 3910 and 15800 pCi/kg-wet. The average concentration detected for the silage samples (both indicator and control) was 4200 pCi/kg-wet. Preoperational results averaged 7000 pci/kg-wet.

Results for the soybean samples (both indicator and control) averaged 15600 pCi/kg-wet which is comparable to preoperational studies when the average wet/dry factor of 1.2 is used. Preoperational soybean results averaged 22000 pCi/kg-dry.

AQUATIC

Environmental Consulting Services, Inc (ECS) collected all aquatic samples (with the exception of 6S2 shoreline sediment). Surface water samples were collected in new polyethylene containers that were rinsed twice with the sample medium prior to collection.

Edible fish and crabs are taken by net and then processed. In processing, the flesh is separated from the bone and shell and

placed in sealed polyethylene containers and frozen before being transported in ice chests.

Sediment samples collected by ECS were taken with a bottom grab sampler and frozen in sealed polyethylene containers before being transported in ice chests. MTS personnel collect location 6S2 shoreline sediment on the beach behind the observation building.

Surface Water (Tables C-13, C-14, C-15)

Surface water samples were collected monthly at 4 indicator stations and one control station in the Delaware estuary.

One location is at the outfall area (which is the area where liquid radioactive effluents from the Salem Station are allowed to be discharged into the Delaware River), another is downstream from the outfall area, and another is directly west of the outfall area at the mouth of the Appoquinimink River. Two upstream locations are in the Delaware River and at the mouth of the Chesapeake and Delaware Canal, the latter being sampled when the flow is from the Canal into the river. Station 12C1, at the mouth of the Appoquinimink River, serves as the operational control. All surface water samples were analyzed monthly for gross beta, tritium and gamma emitters.

- Gross beta activity was detected in 46 of the indicator station samples ranging from 6.3 to 101 pCi/L, with an average of 38 pCi/L. Beta activity was detected in all 12 of the control station samples with concentrations ranging from 7.7 to 69 pCi/L, with an average of 30 pCi/L. The maximum preoperational level detected was 110 pCi/L, with an average of 32 pCi/L. Quarterly results for all locations are plotted on Figure 4, for the years 1983 to 2003, with an inset graph depicting the current year back to 1973.

- Tritium activity was detected in one of the control station samples at a concentration of 185 pCi/L. It was detected in 6 of the indicator station samples at concentrations ranging from 150 to 800 pCi/L with an average of 330 pCi/L. LLD sensitivities for the remaining station samples, both indicator and control, ranged from <140 to <150 pCi/L. The maximum preoperational level detected was 600 pCi/L; with an average of 210 pCi/L. Positive results from 1983 to 2003 are plotted on Figure 5, with an inset graph depicting the current year back to 1973.

- Gamma spectroscopy performed on each of the 48 indicator station and 12 control station surface water samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.

  Potassium-40 was detected in 42 samples from the indicator stations at concentrations ranging from 34 to 168 pCi/L and in 9 of the control station samples ranging from 46 to 109 pCi/L. The average for the indicator station locations was 76 pCi/L,

while the average for the control station locations was 74 pCi/L. The maximum preoperational level detected was 200 pCi/L, with an average of 48 pCi/L.

Fish (Table C-16)

Edible species of fish were collected semi-annually at 3 locations and analyzed for gamma emitters in flesh. Samples included catfish, weakfish, white perch and striped bass.

- Gamma spectroscopy performed on each of the 4 indicator station samples and 2 control station samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.
  - Potassium-40 was detected in all 4 samples from the indicator stations at concentrations ranging from 3460 to 4210 pCi/kg-wet for an average of 3750 pCi/kg-wet. K-40 was detected in both samples from the control location at 3680 and 3890 pCi/kg-wet. The average for the control samples was 3785 pCi/kg-wet. The maximum preoperational level detected was 13000 pCi/kg-wet, with an average of 2900 pCi/kg-wet.

Blue Crab (Table C-17)

Blue crab samples were collected twice during the season at 2 locations, 1 indicator and 1 control, and the edible portions were analyzed for gamma emitters.

Gamma spectroscopy performed on the flesh of the indicator station samples and the control station samples indicated the presence of the naturally-occurring radionuclide K-40. All other gamma emitters searched for were below the LLD.

Potassium-40 was detected in both indicator station samples at concentrations of 2770 and 2880 pCi/kg-wet. It was detected in the control station samples at 2290 and 2420 pCi/kg-wet. The average for both the indicator and control station samples was 2590 pCi/kg-wet. The maximum preoperational level detected was 12000 pCi/kg-wet, with an average of 2835 pCi/kg-wet.

Sediment (Table C-18)

Sediment samples were collected semi-annually from 7 locations, including 6 indicator stations and 1 control station. (Location 6S2 is the only shoreline sediment and it is directly affected by tidal fluctuations) Each of the 14 samples was analyzed for gamma emitters. Although trace levels of the man-made nuclide, Cs-137, were detected in some sediment samples, these levels were expected and well within the acceptable levels specified in section 3/4.12.1 of the Technical Specifications/ODCM.

Gamma spectroscopy was performed on each of the 12 indicator station samples and 2 control station samples. In addition to the detection of Cs-137, the naturally-occurring radionuclides Radium, K-40 and Th-232 were also detected. All other gamma emitters searched for were below the LLD.

Cesium-137 was detected in 6 indicator station samples at concentrations ranging from 28 to 100 pCi/kg-dry with an average of 49 pCi/kg-dry. It was detected in one of the control station samples at a concentration of 20 pCi/kg-dry. The maximum preoperational level detected was 400 pCi/kg-dry with an average of 150 pCi/kg-dry. Results from 1983 to 2003 are plotted on Figure 6, with an inset graph depicting the current year back to 1973.

Cobalt-60 was not detected in any of the sediment samples either indicator or control. LLD sensitivities for the 14 samples, indicator and control, ranged from <4 to <24 pCi/kg-dry. Results of all the positive values from 1983 to 2003 are plotted on Figure 6, with an inset graph depicting the current year back to 1973. There was no preoperational data available for comparison.

Potassium-40 was detected in all 12 indicator station samples at concentrations ranging from 1240 to 15400 pCi/kg-dry, with an average of 8970 pCi/kg-dry. Concentrations detected in both of the control station samples were at 14200 and 16400 pCi/kg-dry. The average for both the indicator and control station samples was 9900 pCi/kg-dry. The maximum preoperational level detected was 21000 pCi/kg-dry, with an average of 15000 pCi/kg-dry.

Radium was detected in all 12 indicator station samples at concentrations ranging from 86 to 950 pCi/kg-dry, with an average of 570 pCi/kg-dry. Concentrations detected in both of the control station samples were at 630 and 850 pCi/kg-dry, with an average of 740 pCi/kg-dry. The grand average for both the indicator and control station samples was 590 pCi/kg-dry. The maximum pre-operational level detected was 1200 pCi/kg-dry, with an average of 760 pCi/kg-dry.

Thorium-232 was detected in all 12 indicator station samples at concentrations ranging from 75 to 1230 pCi/kg-dry, with an average of 770 pCi/kg-dry. Concentrations detected in both of the control station samples were at 1040 and 1090 pCi/kg-dry, with an average of 1065 pCi/kg-dry. The grand average for both the indicator and control station samples was 810 pCi/kg-dry. The maximum pre-operational level detected was 1300 pCi/kg-dry, with an average of 840 pCi/kg-dry.

CONCLUSIONS

The Radiological Environmental Monitoring Program for Salem and Hope Creek Generating Stations was conducted during 2003 in accordance with the SGS and HCGS Technical Specifications/ODCM. The LLD values required by the Technical Specifications/ODCM were achieved for this reporting period. The objectives of the program were also met during this period. The data collected assists in demonstrating that SGS and HCGS were operated in compliance with Technical Specifications/ODCM.

From the results obtained, it can be concluded that the levels and fluctuations of radioactivity in environmental samples were as expected for an estuarine environment. No unusual radiological characteristics were observed in the environs of SGS/HCGS during this reporting period. Since these results were comparable to the results obtained during the preoperational phase of the program, which ran from 1973 to 1976, and with historical results collected since commercial operation, we can conclude that the operation of the Salem and Hope Creek Stations had no significant impact on the radiological characteristics of the environs of that area.

TABLE 1

SALEM AND HOPE CREEK GENERATING STATIONS
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
(PROGRAM OVERVIEW)

MEDIUM	STATION CODE		COLLECTION FREQUENCY	TYPE/FREQUENCY* OF ANALYSIS
	INDICATOR	CONTROL		
I. ATMOSPHERIC ENVIRONMENT				
a. Air Particulate	5S1 5D1 16E1 1F1 2F6	14G1	Weekly	Gross beta/weekly Gamma scan/quarterly
b. Air Iodine	5S1 5D1 16E1 1F1 2F6	14G1	Weekly	Iodine-131/weekly
II. DIRECT RADIATION				
a. Thermoluminescent Dosimeters	1S1 2S4 3S1 4S1 3G1 2S2 5D1 2E1 1F1 1G3 5S1 10D1 3E1 2F2 10G1 6S2 14D1 13E1 2F6 16G1 7S1 15S1 16S1 4F2 14G1 10S1 16E1 5F1 6F1 3H1 11S1 7F2 11F1 13F4 4D2 9F1 2F5 3F2 11E2 15D1 12E1 3F3 16F2 10F2 12F1 13F2 13F3 14F2 15F3		Quarterly	Gamma dose/ quarterly
III. Terrestrial Environment				
a. Milk	13E3 14F4	2G3 3G1	Monthly (when animals are not on pasture)	Iodine-131/monthly Gamma scan/monthly
			Semi-monthly (when animals are on pasture)	Iodine-131/semi-monthly Gamma scan/semi-monthly

TABLE 1 (cont'd)

SALEM AND HOPE CREEK GENERATING STATIONS
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
(PROGRAM OVERVIEW)

MEDIUM	STATION CODE INDICATOR			CONTROL		COLLECTION FREQUENCY	TYPE/FREQUENCY* OF ANALYSIS
b. Well Water	3E1					Monthly	Gross alpha/monthly Gross beta/monthly Tritium/monthly Gamma scan/monthly
c. Potable Water (Raw & Treated)	2F3					Monthly (composited daily)	Gross alpha/monthly Gross beta/monthly Tritium/monthly Gamma scan/monthly Iodine-131/monthly
d. Vegetables	2F4 6F2	2F9 14F3		1G4	2G2 3H5	Annually (at harvest)	Gamma scan/on collection
e. Game (Muskrat)	11D1	3E1				Annually	**Gamma scan/on collection
f. Fodder Crops	13E3	14F4			3G1 2G3	Annually	**Gamma scan/on collection
g. Soil	6S2 10D1 16E1	2F7 2F9 5F1	11F3 14F4		3G1	Every 3 years (2004-2007-2010)	Gamma scan/on collection

TABLE 1 (cont'd)

SALEM AND HOPE CREEK GENERATING STATIONS
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
(PROGRAM OVERVIEW)

MEDIUM	STATION CODE INDICATOR	STATION CODE CONTROL	COLLECTION FREQUENCY	TYPE/FREQUENCY* OF ANALYSIS
IV. AQUATIC ENVIRONMENT				
a. Surface Water	11A1 7E1 1F2 16F1	12C1	Monthly	Gross beta/monthly Gamma scan/monthly Tritium/monthly***
b. Edible Fish	11A1 7E1	12C1	Semi-annually	Gamma scan (flesh)/on collection
c. Blue Crabs	11A1	12C1	Semi-annually	Gamma scan (flesh)/on collection
d. Sediment	11A1 6S2 7E1 15A1 16F1 16A1	12C1	Semi-annually	Gamma scan/on collection

* Except for TLDs, the quarterly analysis is performed on a composite of individual samples collected during the quarter.

** Management audit analyses, not required by Technical Specifications or by specific commitments to local officials.

*** Tech Specs/ODCM require quarterly analysis but due to the tritium leak at Salem, it was decided to analyze surface waters on a monthly basis for tritium.

FIGURE 1
GROSS BETA ACTIVITY IN AIR PARTICULATE
1983 THROUGH 2003

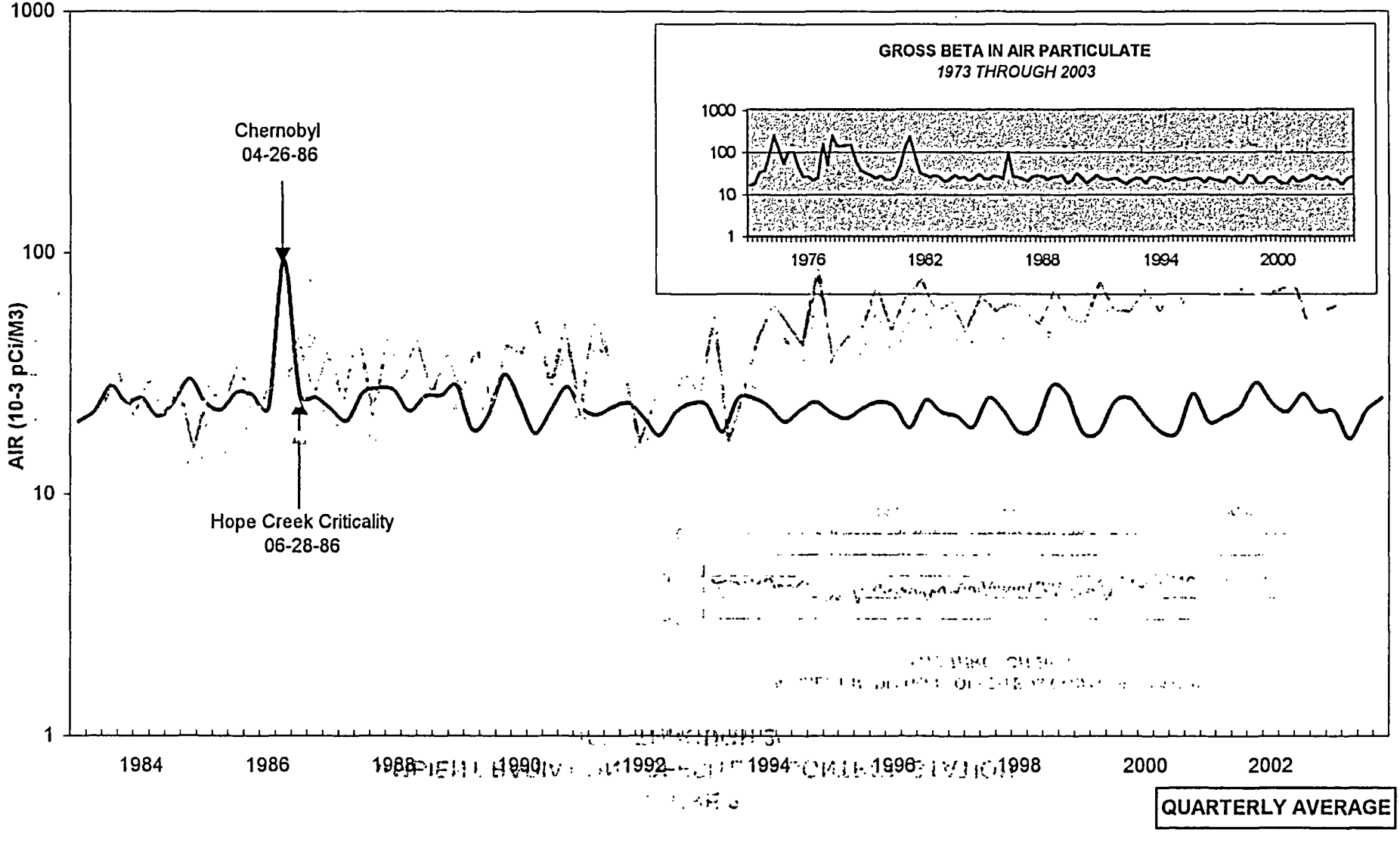
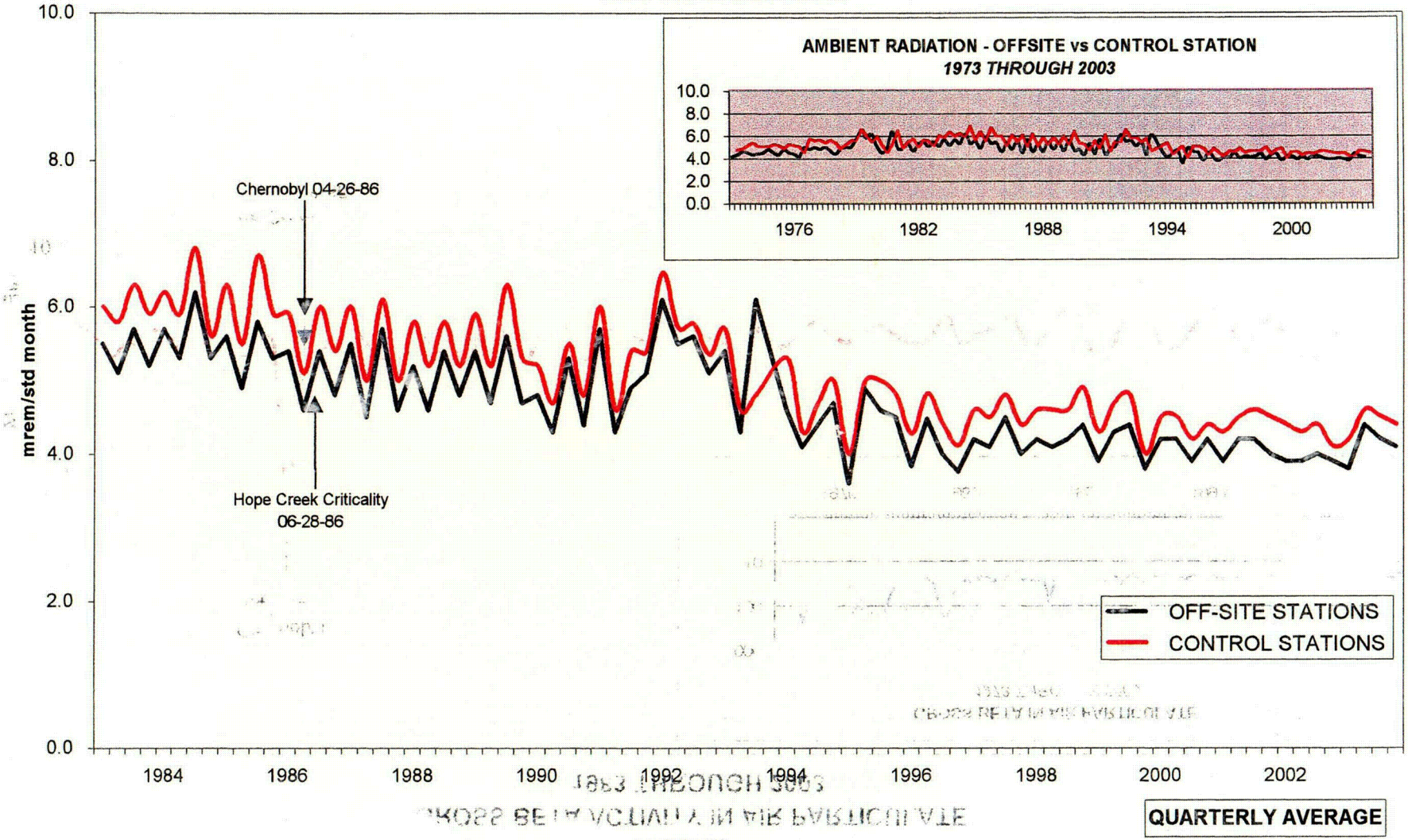
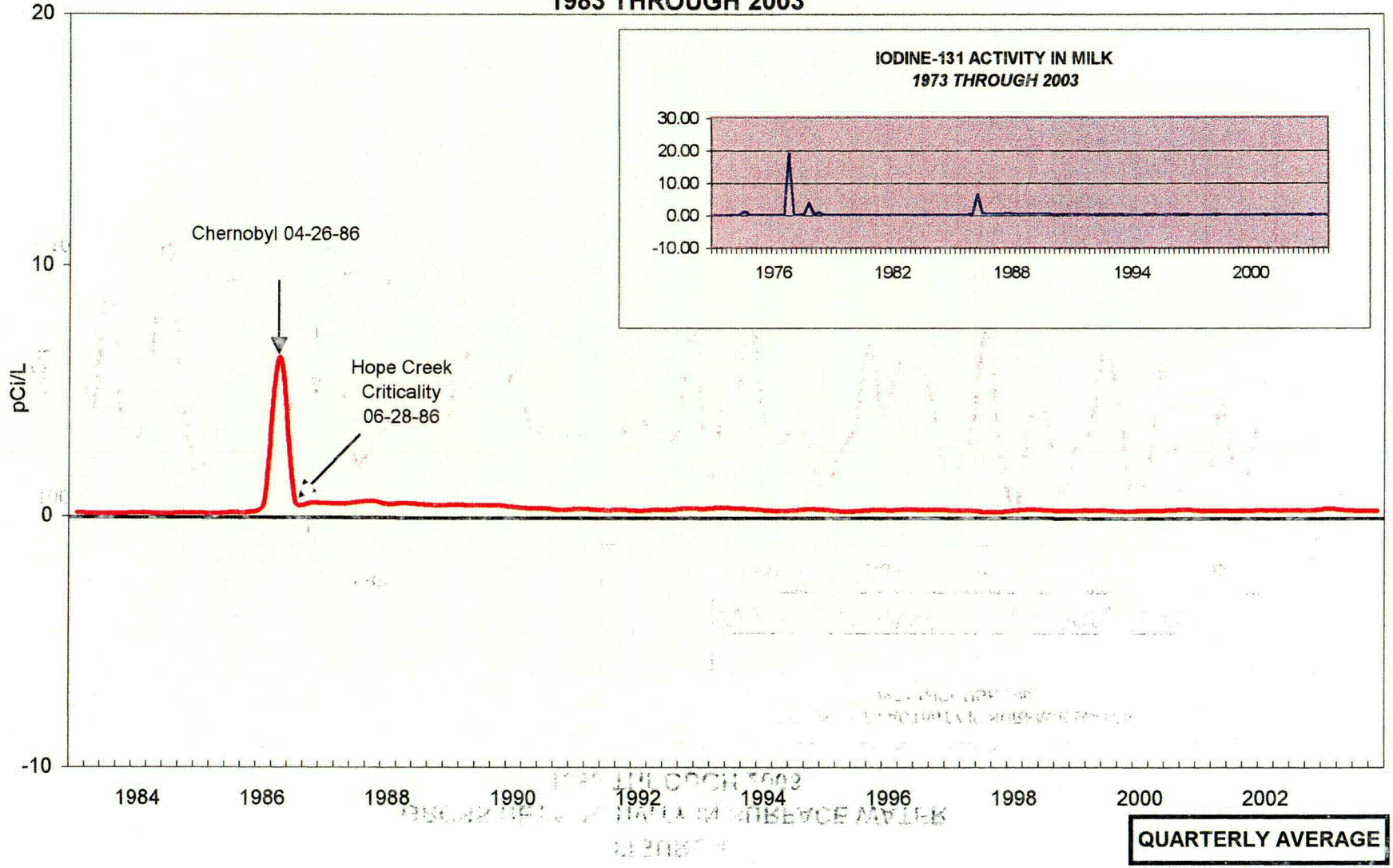


FIGURE 2
AMBIENT RADIATION - OFFSITE vs CONTROL STATION
1983 THROUGH 2003



C01

FIGURE 3
IODINE - 131 ACTIVITY IN MILK
1983 THROUGH 2003



C02

FIGURE 4
GROSS BETA ACTIVITY IN SURFACE WATER
1983 THROUGH 2003

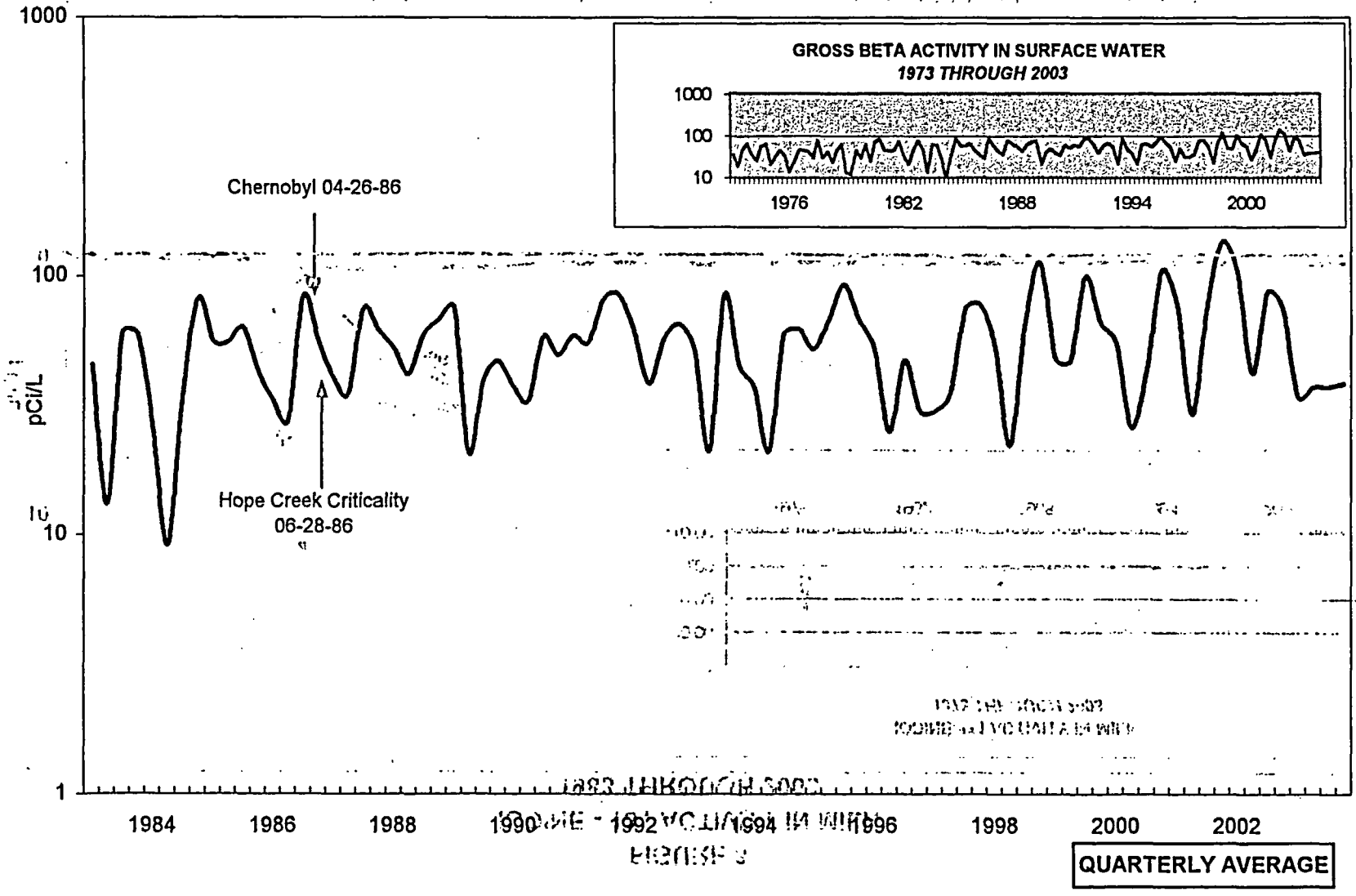


FIGURE 5
TRITIUM ACTIVITY IN SURFACE WATER
1983 THROUGH 2003

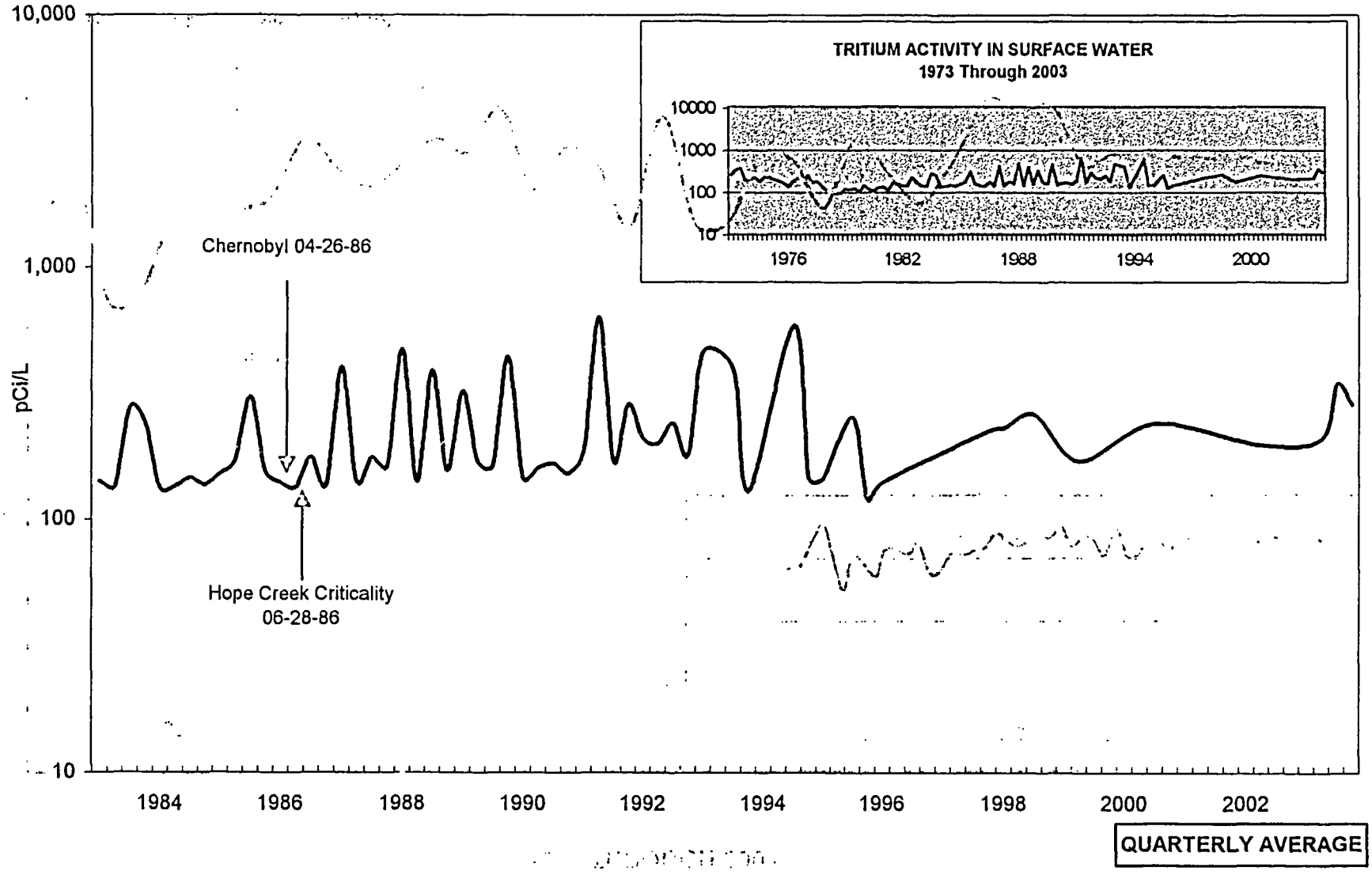
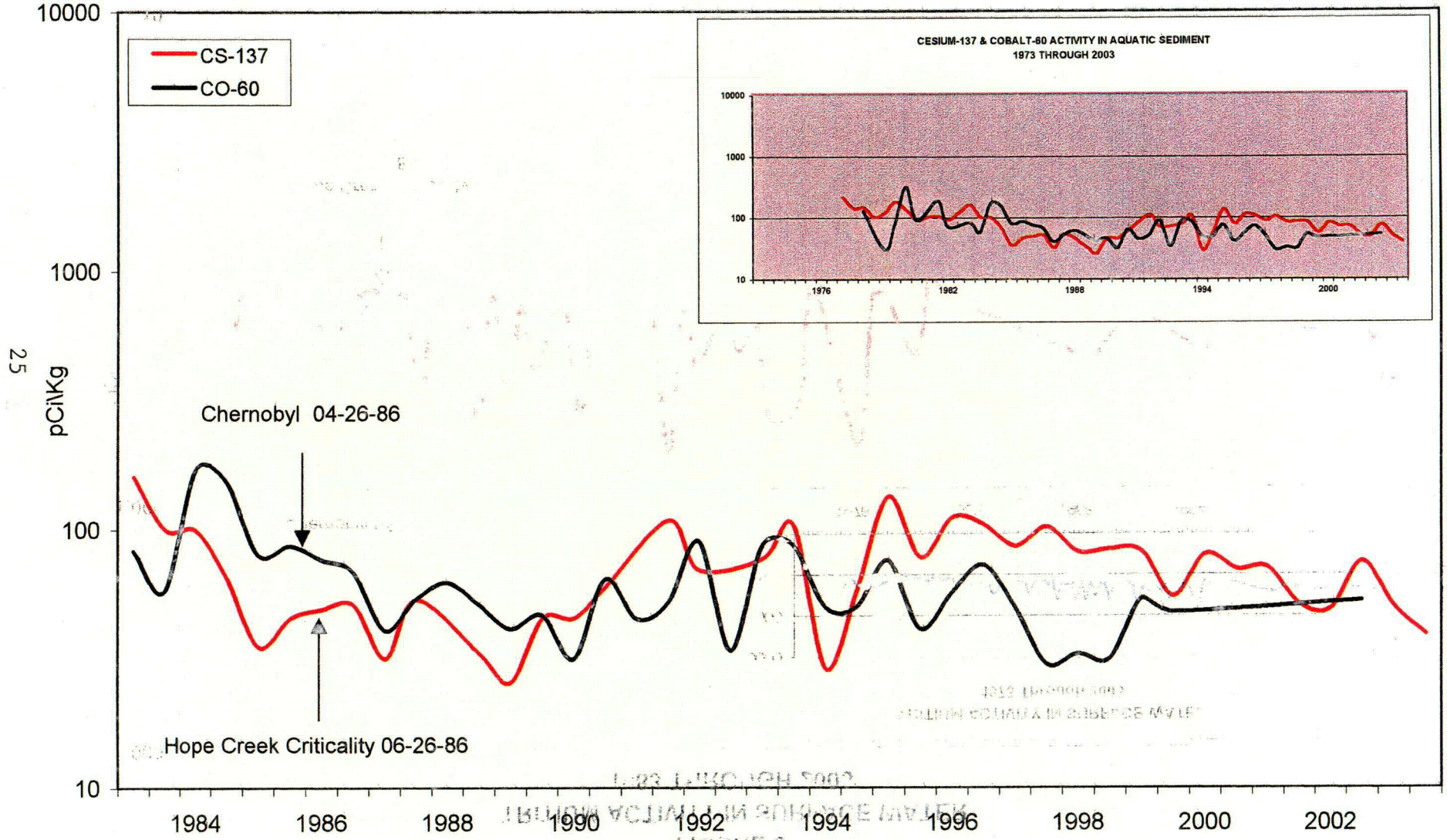


FIGURE 6
CESIUM-137 & COBALT-60 ACTIVITY IN AQUATIC SEDIMENT
1983 THROUGH 2003



SEMI-ANNUAL AVERAGE

25

C03

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[13] Public Service Enterprise Group . "Hope Creek Generating Station Technical Specifications", Appendix A to Facility Operating License No. NPF-57, 1986, Sections 6.8.4.h - 1,2,3 and 6.9.1.6.

[14] Public Service Enterprise Group . "Offsite Dose Calculation Manual" - Salem Generating Station.

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[15] Public Service Enterprise Group . "Offsite Dose Calculation Manual" - Hope Creek Generating Station.

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APPENDIX A

PROGRAM SUMMARY

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

SALEM GENERATING STATION — DOCKET 50-272/-311
HOPE CREEK GENERATING STATION — DOCKET NO. 50-354

SALEM COUNTY, NEW JERSEY — JANUARY 1, 2003 to DECEMBER 31, 2003

MEDIUM OR PATHWAY SAMPLE (UNIT OF MEASUREMENT)	Analysis And Total Number of Analyses Performed		Lower Limit of Detection (LLD)*	All Indicator Locations Mean (Range) **	Location with Highest Mean Name Distance and Direction	Mean (Range)	Control Location Mean (Range)	Number of Nonroutine Reported Measurements
I. AIRBORNE								
Air Particulates (10^{-3} pCi/m^3)	Beta	312	6.0	21 (260 /260) (8-52)	14G1 11.8 mi WNW	22 (52 /52) (9-55)	22 (52 /52) (9-55)	0
					1F1 5.8 mi N	22 (52 /52) (9-52)		0
					2F6 7.3 mi NNE	22 (52 /52) (9-51)		0
	Gamma Be7	24	6.7	54 (20 /20) (44-68)	16E1 4.1 mi NNW	59 (4 /4) (52-68)	52 (4 /4) (44-56)	0
	K-40	24	11	13 (4 /20) (8-21)	16E1 4.1 mi NNW	18 (2 /4) (15-21)	9 (1 /4) (9-9)	0
Air Iodine (10^{-3} pCi/m^3)	I-131	312	15	<LLD		<LLD	<LLD	0
II DIRECT								
Direct Radiation (mrad/std. month)	Quarterly Badges	196	-	4.2 (172 /172) (2.9-7.3)	2S2 0.4 mi NNE	6.5 (4 /4) (6.2-7.3)	4.4 (24 /24) (3.4-5.6)	0
III TERRESTRIAL								
Milk (pCi/L)	I-131	80	1.0	<LLD	-	<LLD	<LLD	0
	Gamma K-40	80	50	1360 (60 /60) (1200-1520)	13E3 4.9 mi W	1400 (20 /20) (1330-1520)	1320 (20 /20) (1210-1430)	0

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

SALEM GENERATING STATION DOCKET 50-272/-311
HOPE CREEK GENERATING STATION DOCKET NO. 50-354

SALEM COUNTY, NEW JERSEY JANUARY 1, 2003 to DECEMBER 31, 2003

MEDIUM OR PATHWAY SAMPLE (UNIT OF MEASUREMENT)	Analysis And Total Number of Analyses Performed		Lower Limit of Detection (LLD)*	All Indicator Locations Mean (Range) **	Location with Highest Mean Name Distance and Direction	Mean (Range)	Control Location Mean (Range)	Number of Nonroutine Reported Measurements
III TERRESTRIAL								
Well Water (pCi/L)	Alpha	12	2.9	2.1 (11 /12) (0.5-3.7)	3E1 4.1 mi NE	2.1 (11 /12) (0.5-3.7)	No Control Location	0
	Beta	12	1.0***	10 (12 /12) (8.6-11)	3E1 4.1 mi NE	10 (12 /12) (8.6-11)	No Control Location	0
	H-3	12	180	<LLD	-	<LLD	No Control Location	0
	Gamma							
	K-40	12	58	56 (4 /12) (34-87)	3E1 4.1mi NE	56 (4 /12) (34-87)	No Control Location	0
	RA-NAT	12	6.9	94 (12 /12) (56-146)	3E1 4.1mi NE	94 (12 /12) (56-146)	No Control Location	0
Potable Water (pCi/L)	Alpha	24	1.5	1.1 (15 /24) (0.7-1.6)	2F3 8.0 mi NNE	1.1 (15 /24) (0.7-1.6)	No Control Location	0
	Beta	24	1.0***	3.1 (24 /24) (2.1-4.1)	2F3 8.0 mi NNE	3.1 (24 /24) (2.1-4.1)	No Control Location	0
	H-3	24	180	<LLD	-	<LLD	No Control Location	0
	Gamma							
	K-40	24	58	49 (7 /24) (32-78)	2F3 8.0 mi NNE	49 (7 /24) (32-78)	No Control Location	0
	I-131	24	0.4	<LLD	-	<LLD	No Control Location	0
	RA-NAT	24	6.9	<LLD	-	<LLD	No Control Location	0

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

SALEM GENERATING STATION DOCKET 50-272/-311
HOPE CREEK GENERATING STATION DOCKET NO. 50-354

SALEM COUNTY, NEW JERSEY JANUARY 1, 2003 to DECEMBER 31, 2003

MEDIUM OR PATHWAY SAMPLE (UNIT OF MEASUREMENT)	Analysis And Total Number of Analyses Performed		Lower Limit of Detection (LLD)*	All Indicator Locations Mean (Range) **	Location with Highest Mean Name Distance and Direction	Mean (Range)	Control Location Mean (Range)	Number of Nonroutine Reported Measurements
III TERRESTRIAL								
Fruit & Vegetables	Gamma K-40	20	70	2590 (10 /10) (1710-6400)	2F9 7.5 mi NNE	3170 (4 /4) (1740-6400)	2260 (10 /10) (1440-2910)	0
(pCi/Kg-wet)	RA-NAT	20	17	<LLD	-	<LLD	<LLD	0
Game	Gamma							
(pCi/Kg-wet)	K-40	2	70	2840 (1 /1) (2840)	3E1 4.1 mi. NE	2840 (1 /1) (2840)	2670 (1 /1) (2670)	0
Fodder Crops	Gamma							
(pCi/Kg-wet)	Be-7	6	60	820 (2 /3) (610-1030)	14F4 7.6 mi WNW	1030 (1 /2) (1030)	900 (2 /3) (890-910)	0
	K-40	6	70	7830 (3 /3) (4010-15300)	3G1 17 mi NE	10200 (2 /2) (4680-15800)	8130 (3 /3) (3910-15800)	0
	RA-NAT	6	23	<LLD	-	<LLD	<LLD	0
IV AQUATIC								
Surface Water (pCi/L)	Beta	60	7.0	38 (46 /48) (6.3-101)	7E1 4.5 mi SE	65 (12 /12) (35-101)	30 (12 /12) (7.7-69)	0
	H-3	60	150	330 (6 /48) (150-800)	7E1 4.5 mi SE	445 (3 /12) (210-800)	185 (1 /12) (185-185)	0
	Gamma K-40	60	58	76 (42 /48) (34-168)	7E1 4.5 mi SE	100 (12 /12) (44-168)	74 (9 /12) (46-109)	0
IV AQUATIC								
Blue Crabs (pCi/kg-wet)	Gamma K-40	4	70	2820 (2 /2) (2770-2880)	11A1 0.2 mi SW	2820 (2 /2) (2770-2880)	2360 (2 /2) (2290-2420)	0

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

SALEM GENERATING STATION DOCKET 50-272/-311
HOPE CREEK GENERATING STATION DOCKET NO. 50-354

SALEM COUNTY, NEW JERSEY JANUARY 1, 2003 to DECEMBER 31, 2003

MEDIUM OR PATHWAY SAMPLE (UNIT OF MEASUREMENT)	Analysis And Total Number of Analyses Performed		Lower Limit of Detection (LLD)*	All Indicator Locations Mean (Range) **	Location with Highest Mean Name Distance and Direction	Mean (Range)	Control Location Mean (Range)	Number of Nonroutine Reported Measurements
Edible Fish (pCi/kg-wet)	Gamma							
	K-40	6	70	3750 (4 /4) (3460-4210)	7E1 4.5 mi SE	3840 (2 /2) (3460-4210)	3780 (2 /2) (3680-3890)	0
Sediment (pCi/kg-dry)	Gamma							
	Be-7	14	238	<LLD	-		<LLD	0
	K-40	14	70	8960 (12 /12) (1240-15400)	12C1 2.5 mi WSW	15300 (2 /2) (14200-16400)	15300 (2 /2) (14200-16400)	0
	Co-60	14	24	<LLD	-		<LLD	0
	Cs-134	14	16	<LLD	-		<LLD	0
	Cs-137	14	13	49 (6 /12) (28-100)	15A1 0.3 mi NW	64 (2 /2) (28-100)	20 (1 /2) (20-20)	0
	RA-NAT	14	45	570 (12 /12) (86-895)	11A1 0.2 mi SW	870 (2 /2) (848-895)	740 (2 /2) (628-849)	0
	Th-232	14	50	770 (12 /12) (75-1230)	11A1 0.2 mi SW	1150 (2 /2) (1080-1220)	1060 (2 /2) (1040-1090)	0

* LLD listed is the lower limit of detection which we endeavored to achieve during this reporting period. In some instances nuclides were detected at concentrations above the LLD values shown.

** Mean calculated using values above LLD only. Fraction of measurements above LLD are in parentheses.

*** Typical LLD values.

APPENDIX B

SAMPLE DESIGNATION AND LOCATIONS

APPENDIX B

SAMPLE DESIGNATION

The PSEG's Maplewood Testing Services identifies samples by a three part code. The first two letters are the program identification code. Because of the proximity of the Salem and Hope Creek Stations a common environmental surveillance program is being conducted. The identification code, "SA", has been applied to Salem and Hope Creek stations. The next three letters are for the media sampled.

AIO = Air Iodine	IDM = Immersion Dose (TLD)
APT = Air Particulate	MLK = Milk
ECH = Hard Shell Blue Crab	PWR = Potable Water (Raw)
ESF = Edible Fish	PWT = Potable Water (Treated)
ESS = Sediment	SOL = Soil
FPL = Green Leafy Vegetables	SWA = Surface Water
FPV = Vegetables (Various)	VGT = Fodder Crops (Various)
GAM = Game (Muskrat)	WWA = Well Water

The last four symbols are a location code based on direction and distance from a standard reference point. Of these, the first two represent each of the sixteen angular sectors of 22.5 degrees centered about the reactor site. Sector one is divided evenly by the north axis and other sectors are numbered in a clockwise direction; e.g., 2=NNE, 3=NE, 4=ENE, etc. The next digit is a letter which represents the radial distance from the reference point:

S = On-site 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,... For example, the designation SA-WWA-3E1 would indicate a sample in the Salem and Hope Creek program (SA), consisting of well water (WWA), which had been collected in sector number 3, centered at 45° (north east) with respect to the reactor site at a radial distance of 4 to 5 miles off-site, (therefore, radial distance E). The number 1 indicates that this is sampling station #1 in that particular sector.

TABLE B-1
SAMPLING LOCATIONS

Specific information about the individual sampling locations are given in Table B-1. Maps B-1 and B-2 show the locations of sampling stations with respect to the Site. A Portable Global Positioning System (GPS) was used to provide the coordinates of sampling locations. The Datem used was WGS 84.

STATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN. SEC	LONGITUDINAL DEG. MIN. SEC	SAMPLE TYPE
1S1	0.55mi. N of vent	39 - 28 - 16	75 - 32 - 13	IDM
2S2	0.4 mi. NNE of vent; Lamp Pole 65 Near HC Switch Yard	39 - 28 - 07	75 - 32 - 00	IDM
2S4	0.59 mi. NNE of vent	39 - 28 - 16	75 - 31 - 55	IDM
3S1	0.58 mi. NE of vent	39 - 28 - 08	75 - 31 - 41	IDM
4S1	0.60 mi. ENE of vent	39 - 28 - 02	75 - 31 - 33	IDM
5S1	1.0 mi. E of vent; site access road	39 - 27 - 38	75 - 31 - 08	AIO,APT,IDM
6S2	0.2 mi. ESE of vent; observation building	39 - 27 - 43	75 - 31 - 55	IDM,SOL,ESS
7S1	0.12 mi. SE of vent; station personnel gate	39 - 27 - 44	75 - 32 - 03	IDM
10S1	0.14 mi. SSW of vent; inlet cooling water bldg.	39 - 27 - 41	75 - 32 - 10	IDM
11S1	0.09 mi. SW of vent; service water inlet bldg.	39 - 27 - 43	75 - 32 - 12	IDM
15S1	0.57 mi. NW of vent	39 - 28 - 10	75 - 32 - 32	IDM
16S1	0.54 mi. NNW of vent	39 - 28 - 13	75 - 32 - 26	IDM
11A1	0.2 mi. SW of vent; outfall area	39 - 27 - 59	75 - 32 - 25	ECH,ESF,ESS,SWA
15A1	0.3 mi. NW of vent; cooling tower blowdown discharge line outfall	39 - 27 - 67	75 - 32 - 19	ESS
16A1	0.7 mi. NNW of vent; south storm drain discharge line	39 - 28 - 24	75 - 32 - 58	ESS
12C1	2.5 mi. WSW of vent; west bank of Delaware River	39 - 27 - 22	75 - 34 - 08	ECH,ESF,ESS,SWA
4D2	3.7 mi. ENE of vent; Alloway Creek Neck Road	39 - 29 - 18	75 - 32 - 11	IDM
5D1	3.5 mi. E of vent; local farm	39 - 28 - 24	75 - 28 - 22	AIO,APT,IDM
10D1	3.9 mi. SSW of vent; Taylor's Bridge Spur	39 - 24 - 37	75 - 33 - 44	IDM,SOL
11D1	3.5 mi. SW of vent	39 - 24 - 49	75 - 34 - 26	GAM
14D1	3.4 mi. WNW of vent; Bay View, Delaware	39 - 29 - 02	75 - 35 - 31	IDM
15D1	3.8 mi. NW of vent; Rt. 9, Augustine Beach	39 - 30 - 08	75 - 35 - 02	IDM
2E1	4.4 mi. NNE of vent; local farm	39 - 31 - 23	75 - 30 - 26	IDM
3E1	4.1 mi. NE of vent; local farm	39 - 30 - 07	75 - 28 - 41	GAM,IDM,VGT,WWA,FPV

TABLE B-1 (cont'd)

STATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN. SEC	LONGITUDINAL DEG. MIN. SEC	SAMPLE TYPE
7E1	4.5 mi. SE of vent; 1 mi. W of Mad Horse Creek	39 - 25 - 08	75 - 28 - 64	ESF,ESS,SWA
11E2	5.0 mi. SW of vent; Rt. 9	39 - 24 - 20	75 - 35 - 33	IDM
12E1	4.4 mi. WSW of vent; Thomas Landing	39 - 26 - 52	75 - 36 - 59	IDM
13E1	4.2 mi. W of vent; Diehl House Lab	39 - 27 - 59	75 - 36 - 44	IDM
13E3	4.9 mi. W of vent; Joseph Vari, Odessa, DE	39 - 27 - 17	75 - 37 - 30	MLK,FPV,VGT
16E1	4.1 mi. NNW of vent; Port Penn	39 - 30 - 47	75 - 34 - 34	AIO,APT,IDM,SOL
1F1	5.8 mi. N of vent; Fort Elfsborg	39 - 32 - 45	75 - 31 - 06	AIO,APT,IDM
1F2	7.1 mi. N of vent; midpoint of Delaware River	39 - 33 - 08	75 - 32 - 54	SWA
2F2	8.7 mi. NNE of vent; Corner of 5th & Howell, Salem	39 - 34 - 38	75 - 28 - 04	IDM
2F3	8.0 mi. NNE of vent; Salem Water Company	39 - 33 - 40	75 - 27 - 18	PWR,PWT
2F4	6.3 mi. NNE of vent; local farm	39 - 33 - 21	75 - 30 - 33	FPV,FPL
2F5	7.4 mi. NNE of vent; Salem High School	39 - 33 - 27	75 - 28 - 31	IDM
2F6	7.3 mi. NNE of vent; Southern Training Center	39 - 33 - 43	75 - 28 - 48	AIO,APT,IDM
2F7	5.7 mi. NNE of vent; local farm	39 - 32 - 40	75 - 30 - 53	SOL
2F8	5.3 mi. NNE OF vent; local farm	39 - 31 - 54	75 - 29 - 18	FPV
2F9	7.5 mi. NNE of vent; Tilbury Farms, 45 S. Tilbury Rd, Salem	39 - 33 - 55	75 - 29 - 30	FPV,FPL,SOL
3F2	5.1 mi. NE of vent;Hancocks Bridge Municipal Bld	39 - 30 - 25	75 - 27 - 36	IDM
3F3	8.6 mi. NE of vent; Quinton Township School	39 - 32 - 38	75 - 24 - 45	IDM
3F6	6.5 mi. NE of vent; #324 Salem/Hancocks Bridge Road	39 - 32 - 03	75 - 28 - 00	FPV
4F2	6.0 mi. ENE of vent; Mays Lane, Harmersville	39 - 29 - 58	75 - 26 - 03	IDM
5F1	6.5 mi. E of vent; Canton	39 - 28 - 22	75 - 24 - 59	IDM,SOL
6F1	6.4 mi. ESE of vent; Stow Neck Road	39 - 26 - 24	75 - 25 - 09	IDM
6F2	8.2 mi. ESE of vent; RD#3 Box 160 Bridgeton, NJ	39 - 26 - 04	75 - 23 - 09	FPV,FPL
7F2	9.1 mi. SE of vent; Bayside, New Jersey	39 - 22 - 56	75 - 24 - 17	IDM
9F1	5.3 mi. S of vent; D.P.A.L. 48912-30217	39 - 23 - 03	75 - 32 - 32	IDM
10F2	5.8 mi. SSW of vent; Rt. 9	39 - 23 - 01	75 - 34 - 09	IDM
11F1	6.2 mi. SW of vent; Taylor's Bridge Delaware	39 - 24 - 44	75 - 37 - 37	IDM
12F1	9.4 mi. WSW of vent; Townsend Elementary School	39 - 23 - 47	75 - 41 - 18	IDM
13F2	6.5 mi. W of vent; Odessa, Delaware	39 - 27 - 18	75 - 39 - 21	IDM
13F3	9.3 mi. W of vent; Redding Middle School, Middletown, Delaware	39 - 27 - 14	75 - 42 - 32	IDM
13F4	9.8 mi. W of vent; Middletown, Delaware	39 - 26 - 51	75 - 43 - 07	IDM

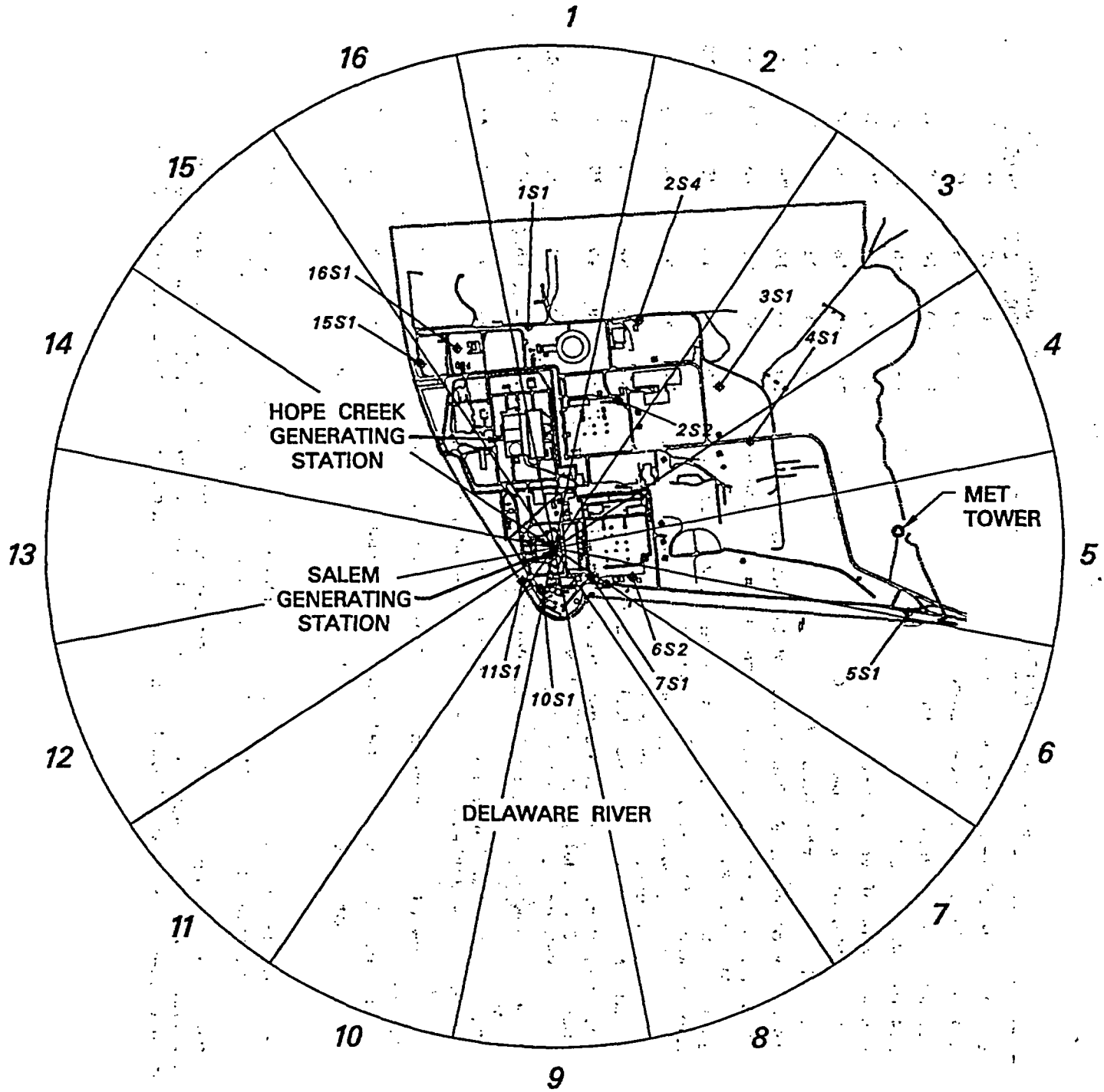
TABLE B-1 (cont'd)

STATION CODE	STATION LOCATION	LATITUDINAL DEG. MIN. SEC	LONGITUDINAL DEG. MIN. SEC	SAMPLE TYPE
14F2	6.6 mi. WNW of vent; Boyds Corner	39 - 30 - 00	75 - 38 - 59	IDM
14F3	5.4 mi. WNW of vent; local farm	39 - 29 - 33	75 - 37 - 55	FPV,FPL
14F4	7.6 mi. WNW of vent; local farm	39 - 30 - 44	75 - 40 - 52	MLK,VGT,SOL
15F3	5.4 mi. NW of vent	39 - 30 - 58	75 - 36 - 36	IDM
16F1	6.9 mi. NNW of vent; C&D Canal	39 - 33 - 55	75 - 34 - 25	ESS,SWA
16F2	8.1 mi. NNW of vent; Delaware City Public School	39 - 34 - 18	75 - 35 - 25	IDM
1G1	10.3 mi. N of vent; local farm	39 - 36 - 31	75 - 29 - 59	FPV,FPL
1G3	19 mi. N of vent; N. Church St. Wilmington, Del	39 - 44 - 16	75 - 32 - 31	IDM
1G4	10.8 mi. N of vent; (Dads Produce) Rte. 49, South Broadway, Pennsville	39 - 37 - 55	75 - 30 - 44	FPV
2G2	13.5 mi. NNE of vent; Moore's Market; 324 Pointers Auburn Road (Rt. 540), Salem, NJ 08079	39 - 38 - 19	75 - 26 - 10	FPV
2G3	12 mi. NNE of vent; Asa Caldwallader, Waldac Farms, Corner of Routes 540 & 45, Mannington, NJ	39 - 36 - 21	75 - 24 - 53	MLK,FPV,VGT
3G1	17 mi. NE of vent; Mr. Lee Williams Farm	39 - 35 - 56	75 - 16 - 47	IDM,MLK,VGT,SOL
9G1	10.3 mi. S of Vent; Mr. Goldsburrough, 1784 Woodland Beach Rd., Smyrna, Delaware	39 - 18 - 47	75 - 33 - 50	FPV
10G1	12 mi. SSW of vent; Smyrna, Delaware	39 - 18 - 13	75 - 36 - 05	IDM
14G1	11.8 mi. WNW of vent; Rte. 286; Bethel Church Road; Delaware	39 - 31 - 18	75 - 46 - 30	AIO,APT,IDM
14G2	12.1 mi. WNW of vent; Locust Grove Farm & Garden Center; 1084 Bethel Church Road; Middletown, DE 19709	39 - 31 - 21	75 - 44 - 57	FPV
16G1	15 mi. NNW of vent; Across from Greater Wilmington Airport	39 - 40 - 38	75 - 35 - 35	IDM
3H1	32 mi. NE of vent; National Park, New Jersey	39 - 51 - 36	75 - 11 - 06	IDM
3H5	25 mi. NE of vent; Sorbello Girl's Market	39 - 41 - 02	75 - 12 - 23	FPL,FPV

NOTE: All station locations are referenced to the midpoint of the two Salem Units' Vents. The coordinates of this location are: Latitude N 39° - 27' - 45.3" and Longitude W 75° - 32' - 09.7".

All Game (GAM), Vegetables(FPV & FPL) and Vegetation (VGT), are management audit samples. They are not required by the Salem & Hope Creek Stations' Tech Specs nor listed in the Station's ODCM. Vegetable samples are not always collected in consecutive years from the same farmer since they rotate the type of crop they grow.

MAP B-1
ON-SITE SAMPLING LOCATIONS



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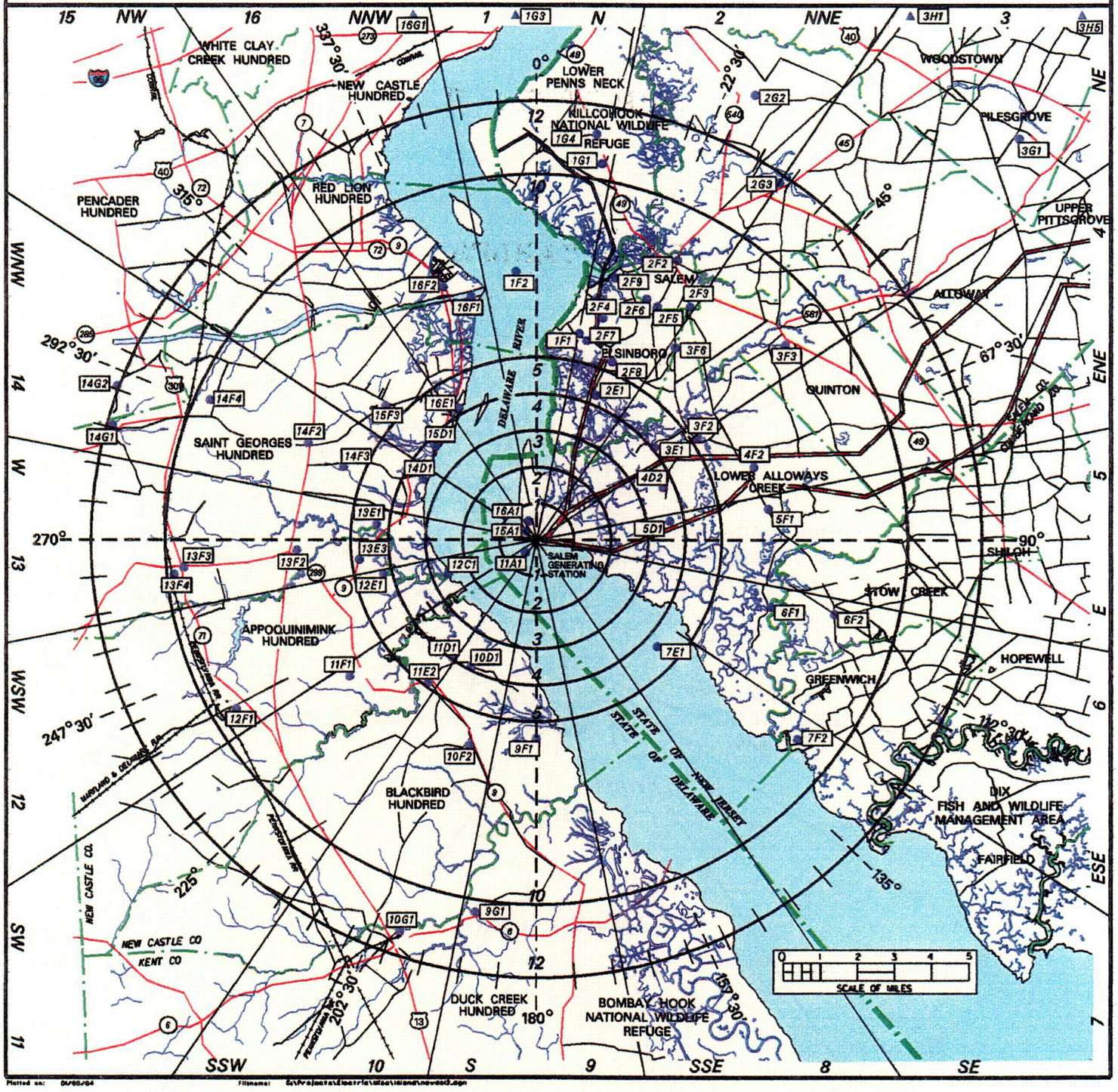
MAP B-2

SALEM AND HOPE CREEK GENERATING STATIONS
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
OFF-SITE SAMPLING LOCATION



C04

APPENDIX C

DATA TABLES

APPENDIX C

DATA TABLES

Appendix C presents the analytical results of the 2003 Radiological Environmental Monitoring Program for the period of January 1 to December 31, 2003.

TABLE OF CONTENTS

DATA TABLES (cont'd.)

DATA TABLES (cont'd.)

Table C-1

2003 CONCENTRATIONS OF GAMMA EMITTERS*
IN QUARTERLY COMPOSITES OF AIR PARTICULATES

Results in Units of 10^{-3} pCi/m^3 +/- 2 sigma

STATION ID	Sampling Period Start		Stop	<--- Gamma Emitters ---> Be-7	K-40
SA-APT-5S1	12/30/2002	to	03/31/2003	55±4	<3
SA-APT-1F1	12/30/2002	to	03/31/2003	51±4	<5
SA-APT-2F6	12/30/2002	to	03/31/2003	54±4	<5
SA-APT-5D1	12/30/2002	to	03/31/2003	46±3	<3
SA-APT-16E1	12/30/2002	to	03/31/2003	60±6	21±4
SA-APT-14G1(C)	12/30/2002	to	03/31/2003	44±4	9±2
SA-APT-5S1	03/31/2003	to	06/30/2003	53±4	<3
SA-APT-1F1	03/31/2003	to	06/30/2003	54±4	<3
SA-APT-2F6	03/31/2003	to	06/30/2003	54±4	<4
SA-APT-5D1	03/31/2003	to	06/30/2003	51±4	<3
SA-APT-16E1	03/31/2003	to	06/30/2003	55±4	<3
SA-APT-14G1(C)	03/31/2003	to	06/30/2003	51±4	<4
SA-APT-5S1	06/30/2003	to	09/29/2003	65±4	8±2
SA-APT-1F1	06/30/2003	to	09/29/2003	58±4	<3
SA-APT-2F6	06/30/2003	to	09/29/2003	53±4	<9
SA-APT-5D1	06/30/2003	to	09/29/2003	57±4	9±2
SA-APT-16E1	06/30/2003	to	09/30/2003	68±4	15±3
SA-APT-14G1(C)	06/30/2003	to	09/30/2003	56±4	<3
SA-APT-5S1	09/29/2003	to	12/29/2003	44±3	<3
SA-APT-1F1	09/29/2003	to	12/29/2003	45±4	<3
SA-APT-2F6	09/29/2003	to	12/29/2003	49±3	<3
SA-APT-5D1	09/29/2003	to	12/29/2003	52±3	<3
SA-APT-16E1	09/30/2003	to	12/30/2003	52±4	<6
SA-APT-14G1(C)	09/30/2003	to	12/30/2003	55±4	<4
AVERAGE				53±11	-

* All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.
(C) Control Station

TABLE C-2

2003 CONCENTRATIONS OF GROSS BETA EMITTERS IN AIR PARTICULATES

Results in Units of 10^{-3} pCi/m^3 +/- 2 sigma

MONTH	Control SA-APT-14G1	SA-APT-16E1	SA-APT-1F1	SA-APT-2F6	SA-APT-5D1	SA-APT-5S1	AVERAGE
	<---------- STATION ID ---------->						
January	22±2	19±2	16±2	19±2	19±2	20±2	19±3
	16±2	20±2	22±2	22±2	24±2	19±2	20±6
	29±2	28±2	28±2	31±2	26±2	34±3	29±5
	26±2	25±2	23±2	27±2	23±2	23±2	25±3
	18±2	27±2	24±2	28±2	19±2	21±2	23±8
February	27±2	25±2	26±3	28±3	25±2	25±2	26±2
	19±1	19±2	18±2	16±2	14±2	16±2	17±4
	16±2	17±2	17±2	16±2	13±2	16±2	16±3
	22±2	30±2	27±3	26±3	23±2	28±2	26±6
March	27±3	29±3	26±2	25±2	27±3	28±3	27±3
	26±3	25±2	22±2	30±2	17±2	24±2	24±9
	16±2	14±2	18±2	15±2	15±2	14±2	15±3
	17±2	15±2	16±2	17±2	12±2	14±2	15±4
April	19±2	19±2	18±2	17±2	15±2	17±2	18±3
	19±2	18±2	17±2	18±2	14±2	20±2	18±4
	33±3	27±2	27±2	29±2	20±2	25±2	27±8
	17±2	17±2	14±2	17±2	15±2	20±2	17±4
	24±3	22±2	27±3	24±2	22±2	21±2	23±5
May	18±2	14±2	15±2	15±2	13±2	15±2	15±3
	9±2	10±2	10±2	9±2	13±2	12±2	11±3
	10±2	11±2	10±2	11±2	8±2	10±2	10±2
	13±2	12±2	15±2	12±2	13±2	14±2	13±2
June	9±2	10±2	9±2	10±2	10±2	11±2	10±2
	21±2	19±2	16±2	18±2	17±2	15±2	18±4
	12±2	12±2	14±2	11±2	12±2	11±2	12±2
	39±3	36±3	35±3	35±3	33±3	32±3	35±5

TABLE C-2

2003 CONCENTRATIONS OF GROSS BETA EMITTERS IN AIR PARTICULATES

Results in Units of 10^{-3} pCi/m^3 +/- 2 sigma

MONTH	Control SA-APT-14G1	SA-APT-16E1	SA-APT-1F1	SA-APT-2F6	SA-APT-5D1	SA-APT-5S1	AVERAGE
	<---------- STATION ID ----------						>
July	23±2	20±2	25±3	24±2	24±2	25±2	23±3
	19±2	21±2	21±2	17±2	13±2	20±2	19±6
	24±2	23±2	21±2	24±2	21±2	21±2	22±3
	29±2	20±2	27±3	25±2	30±3	29±3	26±7
	19±2	16±2	17±2	16±2	15±2	18±2	17±3
August	16±2	13±2	12±2	12±2	16±2	15±2	14±4
	26±3	24±3	30±3	28±3	22±3	26±3	26±5
	26±2	28±3	29±3	27±3	28±3	27±3	27±2
	29±2	25±2	30±2	28±2	27±2	28±2	28±4
September	16±2	12±2	15±2	15±2	15±2	15±2	15±3
	14±2	18±2	16±2	17±2	16±2	17±2	16±3
	28±2	23±2	25±2	26±2	21±2	19±2	24±7
	25±2	27±2	30±3	32±3	32±3	33±3	30±6
October	20±2	18±2	18±2	19±2	17±2	19±2	19±2
	55±3	47±3	52±3	51±3	47±3	43±3	49±8
	19±2	23±3	23±2	24±2	26±2	27±2	23±5
	26±2	25±2	22±3	22±2	22±2	21±2	23±4
	33±3	23±2	28±3	25±2	28±2	23±2	27±8
November	23±2	23±2	23±2	24±2	21±2	23±2	23±2
	25±2	25±3	24±2	25±2	22±2	24±2	24±2
	34±3	33±3	31±3	32±3	29±3	29±3	31±4
	27±2	25±2	25±2	26±2	23±2	23±2	25±3
December	19±2	17±2	18±2	18±2	18±2	18±2	18±1
	18±2	22±2	22±2	18±2	17±2	18±2	19±4
	26±2	25±2	26±2	23±2	20±2	25±2	24±5
	28±2	24±2	24±2	24±2	23±2	24±2	25±4
AVERAGE	22±16	21±14	22±15	22±15	20±14	21±13	
					GRAND AVERAGE		22±14

TABLE C-3

2003 CONCENTRATIONS OF IODINE-131* IN FILTERED AIR

Results in Units of 10^{-3} pCi/m^3

	<---------- STATION ID ---------->					
MONTH	Control SA-AIO-14G1	SA-AIO-16E1	SA-AIO-1F1	SA-AIO-2F6	SA-AIO-5D1	SA-AIO-5S1
January	<1.7	<2.1	<3.2	<1.2	<3.4	<3.3
	<8.4	<1.9	<2.3	<1.8	<3	<3.7
	<2.4	<2	<1.1	<1.8	<2.5	<3
	<2.9	<2.5	<3.3	<2.5	<3.2	<2
	<2.9	<4.6	<1.8	<5	<2.4	<1
February	<2.5	<2.5	<3.1	<2.3	<4.1	<2.1
	<1.9	<1.3	<2.7	<2.2	<2.3	<2
	<2.5	<1.8	<1.9	<2.9	<2.6	<3.3
	<6.3	<2.7	<5	<3	<2.5	<1.3
March	<4.4	<2.4	<2.7	<3.8	<1.6	<2
	<1.5	<5.9	<3.3	<3.1	<2.8	<3.8
	<5.5	<3.8	<5.1	<3.1	<2.1	<3.8
	<1.5	<2.1	<5.9	<2.3	<7.5	<3.5
April	<3.8		<2.3	<1.6	<3.2	<2.4
	<2.2	<5	<2	<5.5	<3.4	<2.9
	<2	<3.2	<2.1	<2	<1.8	<2.1
	<1.7	<4.1	<3.7	<3.8	<2.2	<6.8
May	<4.7	<2.1	<2.2	<2.7	<3.3	<1.3
	<5.5	<4.3	<1.8	<3.4	<3.9	<5.6
	<4.6	<3.2	<3.3	<2.1	<2	<2.3
	<3	<3.7	<3.1	<2.6	<3.3	<2.6
	<3.5	<2.7	<2.5	<5.4	<1.4	<1.9
June	<3.8	<3.6	<3.4	<4.6	<2.3	<3.9
	<2	<2.2	<4.7	<3.5	<1.2	<1.9
	<2.3	<2.8	<2.6	<2.3	<1.4	<3.9
	<4.2	<7.7	<3	<5.5	<7.4	<4.4

TABLE C-3

2003 CONCENTRATIONS OF IODINE-131* IN FILTERED AIR

Results in Units of 10^{-3} pCi/m^3

MONTH	Control SA-AIO-14G1	SA-AIO-16E1	SA-AIO-1F1	SA-AIO-2F6	SA-AIO-5D1	SA-AIO-5S1
	<---------- STATION ID ---------->					
July	<1.8	<2.4	<6.2	<2.7	<3.7	<3.6
	<1.7	<2.1	<15	<1.9	<3.6	<2.3
	<5.7	<3	<5.5	<2.9	<1.8	<3
	<3.4	<2.1	<1.7	<2.7	<7.4	<2.2
	<3.5	<5.2	<1.8	<2.5	<2.6	<3.2
August	<1.9	<4.6	<2.1	<1.8	<6.3	<1.9
	<4.9	<4.7	<1.8	<1.4	<2.4	<2.6
	<2	<2.8	<3.2	<4.5	<3.4	<2.8
	<2.3	<6.8	<1.9	<3.4	<3	<1
September	<2.2	<3.4	<4.5	<1.5	<1.6	<4.1
	<2.7	<2.3	<1.9	<1.2	<2.2	<1.4
	<2.9	<2.2	<6.1	<1.7	<1.7	<1.4
	<5.7	<3	<2.9	<2.5	<4.5	<3.6
October	<2.3	<1.8	<2.7	<1.7	<2.9	<2.4
	<3.6	<3	<2.6	<2.5	<2.2	<2.9
	<7.4	<3.3	<1.8	<3.8	<3.7	<1.6
	<2.9	<1.4	<7.1	<3.5	<4.3	<4
	<2.2	<3.2	<3.4	<4.2	<2.8	<2.5
November	<4.4	<4.7	<2.2	<2.3	<2.3	<4.3
	<3.4	<4.1	<1.4	<3.6	<3.7	<3.8
	<1.3	<6.6	<4.5	<2	<2.9	<3.8
	<7.9	<4.6	<1.4	<3.4	<2.8	<3.8
December	<3.5	<5.2	<5.9	<2.7	<3.6	<3.3
	<1.6	<7.1	<2	<6.7	<2.1	<2.2
	<3.2	<3.4	<2.9	<2.8	<3.6	<2.4
	<2.8	<3.5	<3.9	<2.6	<4.1	<2.8

* I-131 results are corrected for decay to sample stop date.

TABLE C-4

2003 DIRECT RADIATION MEASUREMENTS - QUARTERLY TLD RESULTS

Results in mrad/standard month* +/- 2 sigma

STATION ID	JAN to MAR	APR to JUN	JUL to SEP	OCT to DEC	QTR ELEMENTS** AVG
SA-IDM-2S2	6.2±0.8	6.2±0.5	7.3±0.7	6.4±0.8	6.5±1.1
SA-IDM-5S1	3.3±0.5	4.0±0.3	3.9±0.3	3.6±0.5	3.7±0.6
SA-IDM-6S2	4.7±0.6	5.3±0.5	5.2±0.4	4.9±0.8	5.1±0.5
SA-IDM-7S1	5.2±0.6	6.1±0.4	6.1±0.5	5.7±0.7	5.8±0.9
SA-IDM-10S1	4.0±0.6	4.7±0.5	4.5±0.4	4.1±0.7	4.3±0.6
SA-IDM-11S1	3.6±0.4	3.9±0.3	3.9±0.4	3.4±0.6	3.7±0.5
SA-IDM-4D2	3.9±0.4	4.7±0.4	4.5±0.5	4.3±0.7	4.3±0.7
SA-IDM-5D1	3.6±0.4	4.1±0.4	4.2±0.4	3.8±0.9	3.9±0.6
SA-IDM-10D1	4.0±0.5	5.0±0.6	4.7±0.5	4.5±0.5	4.5±0.8
SA-IDM-14D1	3.6±0.5	4.3±0.5	4.1±0.3	3.9±0.9	4.0±0.6
SA-IDM-15D1	4.3±0.5	4.8±0.5	4.7±0.3	4.7±0.7	4.6±0.4
SA-IDM-2E1	3.7±0.5	4.7±0.6	4.3±0.4	4.2±0.6	4.2±0.8
SA-IDM-3E1	3.3±0.4	3.8±0.4	3.2±0.3	3.4±0.5	3.5±0.5
SA-IDM-9F1	4.1±0.5	4.9±0.6	4.8±0.6	4.6±0.5	4.6±0.7
SA-IDM-11E2	4.2±0.6	4.7±0.4	4.7±0.5	4.6±0.6	4.6±0.5
SA-IDM-12E1	4.2±0.6	5.0±0.4	4.9±0.4	4.6±0.6	4.7±0.7
SA-IDM-13E1	3.3±0.4	3.9±0.3	3.7±0.3	3.7±0.5	3.6±0.5
SA-IDM-16E1	3.8±0.7	4.5±0.5	4.4±0.4	4.5±0.6	4.3±0.6
SA-IDM-1F1	3.8±0.7	4.5±0.5	4.9±1.1	4.1±0.6	4.3±0.9
SA-IDM-2F2	3.3±0.4	3.8±0.6	3.7±0.4	3.5±0.6	3.6±0.5
SA-IDM-2F5	3.9±0.6	4.6±0.4	4.4±0.3	4.4±0.6	4.3±0.6
SA-IDM-2F6	3.7±0.5	4.2±0.5	4.0±0.3	4.0±0.5	4.0±0.4
SA-IDM-3F2	3.5±1.2	4.0±0.4	3.8±0.4	3.8±0.5	3.8±0.3
SA-IDM-3F3	3.4±0.5	4.0±0.6	3.8±0.3	3.6±0.5	3.7±0.5
SA-IDM-4F2	3.4±0.4	3.7±0.4	3.7±0.5	3.5±0.5	3.6±0.3
SA-IDM-5F1	3.6±0.5	4.1±0.4	3.9±0.3	3.7±0.5	3.8±0.4
SA-IDM-6F1	3.2±0.4	3.4±0.4	3.3±0.3	3.1±0.5	3.3±0.2
SA-IDM-7F2	2.9±0.5	3.2±0.5	2.9±0.4	2.9±0.5	3.0±0.3
SA-IDM-10F2	4.2±0.4	4.8±0.4	4.7±0.5	4.4±0.7	4.5±0.5
SA-IDM-11F1	4.3±0.6	4.9±0.5	4.8±0.5	4.6±0.7	4.6±0.5
SA-IDM-12F1	4.0±0.5	4.6±0.4	4.4±0.4	4.3±0.6	4.3±0.5
SA-IDM-13F2	4.0±0.4	4.5±0.8	4.3±0.4	4.2±0.5	4.2±0.4
SA-IDM-13F3	3.9±0.4	4.4±0.4	4.2±0.3	4.2±0.6	4.2±0.5
SA-IDM-13F4	4.0±0.5	4.3±0.4	4.2±0.3	4.2±0.6	4.2±0.3
SA-IDM-14F2	4.3±0.5	4.9±0.6	4.6±0.4	4.6±0.6	4.6±0.5
SA-IDM-15F3	4.5±0.5	5.1±0.7	4.9±0.4	4.7±0.7	4.8±0.5
SA-IDM-16F2	3.6±0.5	4.1±0.6	4.0±0.3	3.8±0.5	3.9±0.4
SA-IDM-1G3 (C)	5.0±0.5	5.6±0.6	5.3±0.4	5.2±0.6	5.3±0.5
SA-IDM-3G1 (C)	4.1±0.4	4.7±0.4	4.6±0.5	4.5±0.6	4.5±0.5
SA-IDM-10G1(C)	4.3±0.8	4.6±0.6	4.5±0.4	4.5±0.7	4.5±0.3
SA-IDM-16G1(C)	4.0±0.4	4.4±0.6	4.2±0.5	4.2±0.7	4.2±0.3
SA-IDM-3H1 (C)	3.4±0.4	3.8±0.4	3.6±0.4	3.6±0.5	3.6±0.3
SA-IDM-1S1	4.2±0.5	4.7±0.4	5.0±0.7	4.5±0.6	4.6±0.6
SA-IDM-3S1	3.2±0.4	3.6±0.5	3.4±0.3	3.3±0.5	3.4±0.3
SA-IDM-2S4	3.4±0.5	4.0±0.5	3.7±0.4	3.6±0.5	3.7±0.5
SA-IDM-4S1	3.7±0.5	4.3±0.3	4.2±0.6	4.1±0.5	4.1±0.5
SA-IDM-15S1	3.5±0.5	3.9±0.4	3.7±0.3	3.6±0.5	3.7±0.4
SA-IDM-16S1	4.1±0.6	4.6±0.4	4.6±0.6	4.3±0.6	4.4±0.5
SA-IDM-14G1(C)	4.1±0.6	4.7±0.5	4.7±0.3	4.4±0.7	4.5±0.5
AVERAGE	3.9±1.1	4.5±1.2	4.3±1.5	4.2±1.3	
			GRAND AVG		4.2±1.3

* The standard month = 30.4 days.
** Quarterly Element TLD results by Framatome ANP.
(C) Control Station

TABLE C-5

2003 CONCENTRATIONS OF IODINE-131* AND GAMMA EMITTERS** IN MILK

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING PERIOD *** START	STOP	GAMMA EMITTERS I-131	K-40
SA-MLK-2G3	01/05/2003	01/06/2003	<1	1410 ±70
SA-MLK-13E3	01/05/2003	01/06/2003	<0.2	1340 ±80
SA-MLK-14F4	01/06/2003	01/07/2003	<0.2	1480 ±90
SA-MLK-3G1 (C)	01/05/2003	01/06/2003	<0.2	1290 ±70
SA-MLK-2G3	02/02/2003	02/03/2003	<0.2	1370 ±70
SA-MLK-13E3	02/02/2003	02/03/2003	<0.1	1510 ±90
SA-MLK-14F4	02/03/2003	02/04/2003	<0.2	1400 ±80
SA-MLK-3G1 (C)	02/02/2003	02/03/2003	<0.2	1300 ±80
SA-MLK-2G3	03/02/2003	03/03/2003	<0.3	1290 ±80
SA-MLK-13E3	03/02/2003	03/03/2003	<0.2	1410 ±70
SA-MLK-14F4	03/03/2003	03/04/2003	<0.2	1380 ±70
SA-MLK-3G1 (C)	03/02/2003	03/03/2003	<0.3	1300 ±90
SA-MLK-2G3	04/07/2003	04/08/2003	<0.2	1400 ±80
SA-MLK-13E3	04/06/2003	04/07/2003	<0.2	1370 ±70
SA-MLK-14F4	04/06/2003	04/07/2003	<0.2	1400 ±70
SA-MLK-3G1 (C)	04/06/2003	04/07/2003	<0.3	1340 ±70
SA-MLK-2G3	04/21/2003	04/22/2003	<0.2	1380 ±80
SA-MLK-13E3	04/20/2003	04/21/2003	<0.2	1370 ±70
SA-MLK-14F4	04/20/2003	04/21/2003	<0.3	1310 ±70
SA-MLK-3G1 (C)	04/20/2003	04/21/2003	<0.2	1310 ±70
SA-MLK-2G3	05/04/2003	05/05/2003	<0.2	1350 ±80
SA-MLK-13E3	05/04/2003	05/05/2003	<0.3	1340 ±70
SA-MLK-14F4	05/04/2003	05/05/2003	<0.2	1200 ±70
SA-MLK-3G1 (C)	05/04/2003	05/05/2003	<0.2	1310 ±80
SA-MLK-2G3	05/19/2003	05/20/2003	<0.2	1350 ±80
SA-MLK-13E3	05/19/2003	05/20/2003	<0.2	1380 ±70
SA-MLK-14F4	05/18/2003	05/19/2003	<0.2	1260 ±70
SA-MLK-3G1 (C)	05/18/2003	05/19/2003	<0.3	1310 ±70
SA-MLK-2G3	06/02/2003	06/03/2003	<0.2	1320 ±70
SA-MLK-13E3	06/01/2003	06/02/2003	<0.2	1330 ±70
SA-MLK-14F4	06/01/2003	06/02/2003	<0.2	1280 ±80
SA-MLK-3G1 (C)	06/01/2003	06/02/2003	<0.2	1290 ±80
SA-MLK-2G3	06/16/2003	06/17/2003	<0.3	1310 ±80
SA-MLK-13E3	06/15/2003	06/16/2003	<0.2	1400 ±70
SA-MLK-14F4	06/15/2003	06/16/2003	<0.2	1270 ±70
SA-MLK-3G1 (C)	06/15/2003	06/16/2003	<0.1	1210 ±80
SA-MLK-2G3	07/06/2003	07/07/2003	<0.1	1310 ±90
SA-MLK-13E3	07/07/2003	07/08/2003	<0.2	1460 ±70
SA-MLK-14F4	07/07/2003	07/08/2003	<0.2	1310 ±70
SA-MLK-3G1 (C)	07/06/2003	07/07/2003	<0.3	1320 ±70
SA-MLK-2G3	07/20/2003	07/21/2003	<0.2	1320 ±80
SA-MLK-13E3	07/20/2003	07/21/2003	<0.2	1420 ±90
SA-MLK-14F4	07/20/2003	07/21/2003	<0.3	1320 ±70
SA-MLK-3G1 (C)	07/20/2003	07/21/2003	<0.2	1290 ±70

TABLE C-5

2003 CONCENTRATIONS OF IODINE-131* AND GAMMA EMITTERS** IN MILK

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING PERIOD *** START	STOP	I-131	GAMMA EMITTERS K-40
SA-MLK-2G3	08/03/2003	08/04/2003	<0.2	1340 ±70
SA-MLK-13E3	08/04/2003	08/05/2003	<0.3	1370 ±70
SA-MLK-14F4	08/03/2003	08/04/2003	<0.2	1260 ±80
SA-MLK-3G1 (C)	08/03/2003	08/04/2003	<0.2	1430 ±70
SA-MLK-2G3	08/17/2003	08/18/2003	<0.1	1420 ±60
SA-MLK-13E3	08/18/2003	08/19/2003	<0.1	1380 ±80
SA-MLK-14F4	08/17/2003	08/18/2003	<0.2	1310 ±70
SA-MLK-3G1 (C)	08/17/2003	08/18/2003	<0.3	1350 ±70
SA-MLK-2G3	09/02/2003	09/03/2003	<0.2	1350 ±70
SA-MLK-13E3	09/02/2003	09/03/2003	<0.1	1380 ±80
SA-MLK-14F4	09/01/2003	09/02/2003	<0.2	1300 ±70
SA-MLK-3G1 (C)	09/01/2003	09/02/2003	<0.2	1390 ±80
SA-MLK-2G3	09/14/2003	09/15/2003	<0.2	1270 ±80
SA-MLK-13E3	09/15/2003	09/16/2003	<0.2	1520 ±80
SA-MLK-14F4	09/15/2003	09/16/2003	<0.2	1260 ±70
SA-MLK-3G1 (C)	09/14/2003	09/15/2003	<0.1	1350 ±80
SA-MLK-2G3	10/06/2003	10/07/2003	<0.1	1260 ±80
SA-MLK-13E3	10/07/2003	10/08/2003	<0.2	1400 ±80
SA-MLK-14F4	10/07/2003	10/08/2003	<0.3	1360 ±80
SA-MLK-3G1 (C)	10/06/2003	10/07/2003	<0.2	1390 ±70
SA-MLK-2G3	10/20/2003	10/21/2003	<0.2	1370 ±80
SA-MLK-13E3	10/19/2003	10/20/2003	<0.3	1380 ±70
SA-MLK-14F4	10/19/2003	10/20/2003	<0.2	1240 ±80
SA-MLK-3G1 (C)	10/19/2003	10/20/2003	<0.2	1310 ±70
SA-MLK-2G3	11/03/2003	11/04/2003	<0.2	1330 ±80
SA-MLK-13E3	11/03/2003	11/04/2003	<0.1	1420 ±70
SA-MLK-14F4	11/02/2003	11/03/2003	<0.3	1330 ±90
SA-MLK-3G1 (C)	11/02/2003	11/03/2003	<0.2	1340 ±70
SA-MLK-2G3	11/17/2003	11/18/2003	<0.1	1410 ±90
SA-MLK-13E3	11/16/2003	11/17/2003	<0.2	1440 ±80
SA-MLK-14F4	11/16/2003	11/17/2003	<0.1	1310 ±70
SA-MLK-3G1 (C)	11/17/2003	11/18/2003	<0.2	1370 ±70
SA-MLK-2G3	12/01/2003	12/02/2003	<0.2	1410 ±80
SA-MLK-13E3	11/30/2003	12/01/2003	<0.3	1390 ±80
SA-MLK-14F4	11/30/2003	12/01/2003	<0.2	1340 ±80
SA-MLK-3G1 (C)	11/30/2003	12/01/2003	<0.2	1220 ±80
AVERAGE			-	1350 ±130

* Iodine-131 results are corrected for decay to midpoint of collection period & analyzed to a sensitivity of 1.0 pCi/L.

** All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.

*** Monthly sample collected during Jan., Feb., March and Dec., when animals are not on pasture

(C) Control Station

TABLE C-6

2003 CONCENTRATIONS OF GROSS ALPHA AND GROSS BETA EMITTERS, AND TRITIUM IN WELL WATER

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING DATE	GROSS ALPHA	GROSS BETA	TRITIUM
SA-WWA-3E1	02/04/2003	1.7±1.3	11±0.8	<180
SA-WWA-3E1	02/25/2003	3±1.2	10±0.8	<140
SA-WWA-3E1	03/31/2003	2.7±1.3	10±0.8	<140
SA-WWA-3E1	04/28/2003	3.7±1.3	10±0.8	<140
SA-WWA-3E1	05/27/2003	1.9±1.2	11±0.8	<150
SA-WWA-3E1	06/30/2003	2±1.3	11±0.8	<140
SA-WWA-3E1	07/28/2003	1.7±1.1	11±0.8	<140
SA-WWA-3E1	08/25/2003	1.8±1.2	11±0.8	<140
SA-WWA-3E1	09/29/2003	0.7±0.4	8.6±0.7	<140
SA-WWA-3E1	10/27/2003	0.5±0.3	9.3±0.8	<150
SA-WWA-3E1	11/24/2003	3.7±1.3	10±0.8	<150
SA-WWA-3E1	12/29/2003	<2.9	10±1.2	<150
AVERAGE		2.2±2.1	10±1	

TABLE C-7

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN WELL WATER

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING DATE	<-----GAMMA EMITTERS -----> K-40	RA-NAT
SA-WWA-3E1	02/04/2003	<25	146±5
SA-WWA-3E1	02/25/2003	<58	123±4
SA-WWA-3E1	03/31/2003	87±22	73±4
SA-WWA-3E1	04/28/2003	41±12	80±4
SA-WWA-3E1	05/27/2003	<36	128±4
SA-WWA-3E1	06/30/2003	<17	66±4
SA-WWA-3E1	07/28/2003	60±23	139±6
SA-WWA-3E1	08/25/2003	34±13	72±4
SA-WWA-3E1	09/29/2003	<18	65±3
SA-WWA-3E1	10/27/2003	<53	121±4
SA-WWA-3E1	11/24/2003	<52	56±3
SA-WWA-3E1	12/29/2003	<30	64±4
AVERAGE		-	94±68

* All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.

TABLE C-8

2003 CONCENTRATIONS OF GROSS ALPHA AND GROSS BETA EMITTERS AND TRITIUM IN RAW AND TREATED POTABLE WATER

Results in Units of pCi/L +/- 2 sigma

TYPE	SAMPLING PERIOD	GROSS ALPHA	GROSS BETA	TRITIUM
RAW	1/1-31/2003	<0.9	3.1±0.5	<180
TREATED	1/1-31/2003	<1.1	3.3±0.5	<180
RAW	2/1-28/2003	1.2±0.6	3.5±0.5	<140
TREATED	2/1-28/2003	1.6±0.7	3.3±0.5	<140
RAW	3/1-31/2003	0.8±0.6	3±0.5	<140
TREATED	3/1-31/2003	0.9±0.7	2.7±0.5	<140
RAW	4/1-30/2003	1.2±0.5	2.8±0.5	<140
TREATED	4/1-30/2003	0.7±0.5	2.1±0.4	<140
RAW	5/1-31/2003	1±0.6	3±0.5	<150
TREATED	5/1-31/2003	<0.8	2.8±0.5	<140
RAW	6/1-30/2003	1.3±0.8	3.5±0.5	<150
TREATED	6/1-30/2003	<0.9	2.5±0.5	<140
RAW	7/1-31/2003	1.5±0.7	3.3±0.5	<140
TREATED	7/1-31/2003	1.1±0.8	2.7±0.5	<140
RAW	8/1-31/2003	0.9±0.6	3.5±0.5	<140
TREATED	8/1-31/2003	<1.1	3.4±0.5	<140
RAW	9/1-30/2003	<0.8	3±0.5	<140
TREATED	9/1-30/2003	<1.3	2.7±0.5	<140
RAW	10/1-31/2003	1±0.6	3.3±0.5	<140
TREATED	10/1-31/2003	1±0.7	3.4±0.5	<140
RAW	11/1-30/2003	1.2±0.6	4.1±0.6	<150
TREATED	11/1-30/2003	0.9±0.5	4±0.6	<150
RAW	12/1-31/2003	<1.3	3.2±0.8	<150
TREATED	12/1-31/2003	<1.5	3.1±0.8	<140
AVERAGE				
RAW		1.1±0.4	3.3±0.7	-
TREATED		1.1±0.6	3±1	-
GRAND AVERAGE		1.1±0.5	3.1±0.9	-

TABLE C-9

2003 CONCENTRATIONS OF IODINE-131* AND GAMMA EMITTERS**
IN RAW AND TREATED POTABLE WATER

Results in Units of pCi/L +/- 2 sigma

TYPE	SAMPLING PERIOD	I-131	GAMMA EMITTERS K-40
RAW	1/1-31/2003	<0.4	<43
TREATED	1/1-31/2003	<0.3	40 ± 14
RAW	2/1-28/2003	<0.3	<20
TREATED	2/1-28/2003	<0.3	41 ± 13
RAW	3/1-31/2003	<0.2	<21
TREATED	3/1-31/2003	<0.1	<16
RAW	4/1-30/2003	<0.4	<46
TREATED	4/1-30/2003	<0.2	<16
RAW	5/1-31/2003	<0.3	<20
TREATED	5/1-31/2003	<0.3	<15
RAW	6/1-30/2003	<0.2	<16
TREATED	6/1-30/2003	<0.2	78 ± 19
RAW	7/1-31/2003	<0.2	<15
TREATED	7/1-31/2003	<0.3	<38
RAW	8/1-31/2003	<0.3	<24
TREATED	8/1-31/2003	<0.3	52 ± 10
RAW	9/1-30/2003	<0.2	<15
TREATED	9/1-30/2003	<0.2	<44
RAW	10/1-31/2003	<0.3	<29
TREATED	10/1-31/2003	<0.3	53 ± 14
RAW	11/1-30/2003	<0.2	48 ± 13
TREATED	11/1-30/2003	<0.3	32 ± 11
RAW	12/1-31/2003	<0.2	<18
TREATED	12/1-31/2003	<0.1	<20
AVERAGES			
RAW		-	-
TREATED		-	-
GRAND AVERAGE		-	-

* Iodine-131 analyzed to a sensitivity of 1.0 pCi/L.

** All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.

TABLE C-10

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN VEGETABLES
Results in Units of pCi/kg (Wet) +/- 2 sigma

STATION ID	SAMPLING DATE	SAMPLE TYPE	GAMMA EMITTERS K-40
SA-FPV-2G2 (C)	05/06/2003	Asparagus	2910±110
SA-FPV-2F9	05/12/2003	Asparagus	2730±220
AVERAGE			2820±250
SA-FPL-2F9	05/12/2003	Spinach	6400±290
SA-FPL-3H5 (C)	07/21/2003	Cabbage	2860±150
SA-FPL-6F2	07/22/2003	Cabbage	2450±130
SA-FPL-14F3	08/12/2003	Cabbage	1960±160
AVERAGE			3420±4040
SA-FPV-2G2 (C)	07/21/2003	Corn	2500±100
SA-FPV-3H5 (C)	07/21/2003	Corn	2600±210
SA-FPV-2F4	07/28/2003	Corn	2710±230
SA-FPV-2F9	08/12/2003	Corn	1740±160
SA-FPV-14F3	08/12/2003	Corn	2350±160
SA-FPV-1G4 (C)	08/19/2003	Corn	2220±180
AVERAGE			2350±690
SA-FPV-6F2	07/22/2003	Peppers	1710±170
SA-FPV-2G2 (C)	07/23/2003	Peppers	1440±160
SA-FPV-1G4 (C)	08/19/2003	Peppers	1720±150
AVERAGE			1620±320
SA-FPV-3H5 (C)	07/21/2003	Tomatoes	2540±150
SA-FPV-2G2 (C)	07/21/2003	Tomatoes	1960±140
SA-FPV-14F3	08/12/2003	Tomatoes	2030±150
SA-FPV-1G4 (C)	08/19/2003	Tomatoes	1820±130
SA-FPV-2F9	08/12/2003	Tomatoes	1820±70
AVERAGE			2030±590
GRAND AVERAGE			2420±2070

* All other gamma emitters searched for were ≤LLD; typical LLDs are given in Table C-19
(C) Control Station

TABLE C-11

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN GAME

Results in Units of pCi/kg (wet) +/- 2 sigma

STATION ID	SAMPLING DATE	SAMPLE TYPE	GAMMA EMITTERS K-40
SA-GAM-3E1	02/24/2003	Muskrat	2840 ± 170
SA-GAM-11D1 (C)	03/16/2003	Muskrat	2670 ± 190
AVERAGE		Muskrat	2755 ± 240

*All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19

TABLE C-12

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN FODDER CROPS

Results in Units of pCi/kg (wet) +/- 2 sigma

STATION ID	SAMPLING DATE	SAMPLE TYPE	<--GAMMA EMITTERS--> Be-7	K-40
SA-VGT-2G3 (C)	10/04/2003	Silage	910±80	3910±200
SA-VGT-3G1 (C)	10/03/2003	Silage	890±100	4680±260
SA-VGT-13E3	10/03/2003	Silage	610±70	4180±220
SA-VGT-14F4	10/04/2003	Silage	1030±130	4010±240
AVERAGE			860±360	4200±680
SA-VGT-3G1 (C)	11/18/2003	Soybeans	<60	15800±300
SA-VGT-14F4	11/13/2003	Soybeans	<27	15300±270
AVERAGE			-	15600±700

* All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.

TABLE C-13

2003 CONCENTRATIONS OF GROSS BETA EMITTERS IN SURFACE WATER

Results in Units of pCi/L +/- 2 sigma

SAMPLING DATE	STATION ID SA-SWA-11A1	SA-SWA-12C1 (Control)	SA-SWA-16F1	SA-SWA-1F2	SA-SWA-7E1	AVERAGE
January	36±6	18±5	10±5	11±5	54±7	26±38
February	52±7	46±7	36±6	29±6	82±8	49±41
March	45±7	16±5	16±5	10±5	59±7	29±43
April	71±8	40±6	33±6	19±5	82±8	49±54
May	50±7	30±6	26±5	17±5	74±8	39±46
June	23±6	12±5	<7	7±5	40±7	20±29
July	35±6	21±5	17±5	7±4	59±7	28±40
August	33±6	27±6	11±5	19±5	58±7	30±36
September	64±8	53±7	44±7	27±6	79±8	54±39
October	42±6	25±5	16±5	11±4	59±7	30±40
November	13±3	8±3	6±2	<3	35±4	15±26
December	89±6	69±5	46±4	21±3	101±7	65±65
AVERAGE	46±42	30±36	22±28	15±16	65±38	
				GRAND AVERAGE		36±49

TABLE C-14

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN SURFACE WATER

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING DATE	GAMMA EMITTERS K-40
SA-SWA-1F2	01/10/2003	69±20
SA-SWA-7E1	01/10/2003	104±20
SA-SWA-11A1	01/10/2003	83±22
SA-SWA-12C1(C)	01/10/2003	54±15
SA-SWA-16F1	01/10/2003	48±16
SA-SWA-1F2	02/24/2003	56±14
SA-SWA-7E1	02/24/2003	128±27
SA-SWA-11A1	02/24/2003	48±16
SA-SWA-12C1(C)	02/24/2003	46±20
SA-SWA-16F1	02/24/2003	52±22
SA-SWA-1F2	03/04/2003	64±11
SA-SWA-7E1	03/04/2003	101±16
SA-SWA-11A1	03/04/2003	77±21
SA-SWA-12C1(C)	03/04/2003	65±23
SA-SWA-16F1	03/04/2003	34±18
SA-SWA-1F2	04/13/2003	<16
SA-SWA-7E1	04/13/2003	168±41
SA-SWA-11A1	04/13/2003	101±19
SA-SWA-12C1(C)	04/13/2003	<43
SA-SWA-16F1	04/13/2003	63±14
SA-SWA-1F2	05/06/2003	93±23
SA-SWA-7E1	05/06/2003	121±22
SA-SWA-11A1	05/06/2003	49±18
SA-SWA-12C1(C)	05/06/2003	<21
SA-SWA-16F1	05/06/2003	61±17
SA-SWA-1F2	06/06/2003	39±17
SA-SWA-7E1	06/06/2003	44±17
SA-SWA-11A1	06/06/2003	39±12
SA-SWA-12C1(C)	06/06/2003	52±12
SA-SWA-16F1	06/06/2003	<15
SA-SWA-1F2	07/08/2003	<16
SA-SWA-7E1	07/08/2003	88±15
SA-SWA-11A1	07/08/2003	84±17
SA-SWA-12C1(C)	07/08/2003	105±23
SA-SWA-16F1	07/08/2003	75±20

TABLE C-14

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN SURFACE WATER

Results in Units of pCi/L +/- 2 sigma

STATION ID	SAMPLING DATE	GAMMA EMITTERS K-40
SA-SWA-1F2	08/04/2003	59 ± 17
SA-SWA-7E1	08/04/2003	128 ± 22
SA-SWA-11A1	08/04/2003	75 ± 22
SA-SWA-12C1(C)	08/04/2003	69 ± 17
SA-SWA-16F1	08/04/2003	<42
SA-SWA-1F2	09/05/2003	91 ± 27
SA-SWA-7E1	09/05/2003	116 ± 20
SA-SWA-11A1	09/05/2003	102 ± 21
SA-SWA-12C1(C)	09/05/2003	106 ± 14
SA-SWA-16F1	09/05/2003	70 ± 16
SA-SWA-1F2	10/07/2003	67 ± 22
SA-SWA-7E1	10/07/2003	59 ± 14
SA-SWA-11A1	10/07/2003	58 ± 18
SA-SWA-12C1(C)	10/07/2003	57 ± 13
SA-SWA-16F1	10/07/2003	50 ± 18
SA-SWA-1F2	11/06/2003	<18
SA-SWA-7E1	11/06/2003	63 ± 15
SA-SWA-11A1	11/06/2003	41 ± 17
SA-SWA-12C1(C)	11/06/2003	<12
SA-SWA-16F1	11/06/2003	<21
SA-SWA-1F2	12/09/2003	58 ± 23
SA-SWA-7E1	12/09/2003	81 ± 24
SA-SWA-11A1	12/09/2003	121 ± 19
SA-SWA-12C1(C)	12/09/2003	109 ± 22
SA-SWA-16F1	12/09/2003	76 ± 20
AVERAGE		68 ± 66

* All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19.
C) Control Station

TABLE C-15

2003 CONCENTRATIONS OF TRITIUM IN SURFACE WATER

Results in Units of pCi/L +/- 2 sigma

SAMPLING PERIOD	STATION ID					
	SA-SWA-11A1	SA-SWA-12C1 (Control)	SA-SWA-16F1	SA-SWA-1F2	SA-SWA-7E1	AVERAGE
January	<150	<140	<150	<150	<150	-
February	<140	<140	<150	<150	<150	-
March	<140	<140	<140	<140	<140	-
April	<140	<140	<140	<140	<140	-
May	<140	<140	<140	<140	210±90	-
June	<140	<140	<140	<140	<140	-
July	<150	<150	<150	<150	800±100	-
August	<140	<140	150±90	<140	<140	-
September	230±85	180±90	<140	<140	<140	-
October	240±90	<150	<150	<150	320±90	-
November	<140	<140	<140	<140	<140	-
December	<150	<140	<140	<150	<150	-

TABLE C-16

2003 CONCENTRATIONS OF GAMMA EMITTERS** IN EDIBLE FISH

Results in Units of pCi/kg (wet) +/- 2 sigma

STATION ID	SAMPLING PERIOD	GAMMA EMITTERS (FLESH) K-40
SA-ESF-7E1	5/3-6/2003	3460±210
SA-ESF-11A1	5/3-6/2003	3740±210
SA-ESF-12C1 (C)	5/3-6/2003	3680±110
AVERAGE		3630±290
SA-ESF-7E1	9/22-10/31/2003	4210±210
SA-ESF-11A1	9/22-10/31/2003	3600±210
SA-ESF-12C1 (C)	9/22-10/31/2003	3890±210
AVERAGE		3900±610
GRAND AVERAGE		3760±520

** All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19
(C) Control Station

TABLE C-17

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN CRABS

Results in Units of pCi/kg (wet) +/- 2 sigma

STATION ID.	SAMPLING PERIOD	GAMMA EMITTER (FLESH) K-40
SA-ECH-11A1	08/05/2003	2770 ± 180
SA-ECH-12C1 (C)	08/07/2003	2290 ± 180
AVERAGE		2530 ± 680
SA-ECH-11A1	09/25/2003	2880 ± 210
SA-ECH-12C1 (C)	10/01/2003	2420 ± 160
AVERAGE		2650 ± 650
GRAND AVERAGE		2590 ± 560

* All other gamma emitters searched for were <LLD; Typical LLDs are given in Table C-19.

(C) Control Station

TABLE C-18

2003 CONCENTRATIONS OF GAMMA EMITTERS* IN SEDIMENT

Results in Units of pCi/kg (dry) +/- 2 sigma

STATION ID	SAMPLING DATE	K-40	Co-60	Cs-137	RA NAT	Th-232
SA-ESS-6S2	05/20/2003	1240±50	<4	<3	86±4	75±8
SA-ESS-11A1	05/15/2003	4750±280	<8	<9	895±30	1220±60
SA-ESS-15A1	05/15/2003	13100±430	<10	100±20	498±30	814±80
SA-ESS-16A1	05/15/2003	13200±400	<24	35±10	510±20	763±65
SA-ESS-12C1(C)	05/15/2003	14200±400	<16	20±8	849±35	1090±60
SA-ESS-7E1	05/15/2003	13400±360	<9	<11	838±20	1030±60
SA-ESS-16F1	05/15/2003	14100±420	<20	43±9	569±20	828±60
AVERAGE		10600±10600	-	32±67	610±570	830±750
SA-ESS-6S2	11/10/2003	1980±140	<4	<5	117±10	88±30
SA-ESS-11A1	11/21/2003	4460±240	<8	<8	848±20	1080±50
SA-ESS-15A1	11/21/2003	6650±260	<6	28±11	601±30	787±50
SA-ESS-16A1	11/21/2003	6600±230	<11	<7	523±15	562±50
SA-ESS-12C1(C)	11/21/2003	16400±530	<16	<13	628±40	1040±80
SA-ESS-7E1	11/21/2003	15400±430	<10	43±9	712±30	1140±110
SA-ESS-16F1	11/21/2003	12700±400	<10	45±12	583±30	877±70
AVERAGE		9200±11300	-	-	570±450	800±740
GRAND AVERAGE		9900±10600	-	-	590±500	810±710

* All other gamma emitters searched for were <LLD; typical LLDs are given in Table C-19
(C) Control Station

TABLE C-19

2003 MAPLEWOOD TESTING SERVICES

LLDs FOR GAMMA SPECTROSCOPY

SAMPLE TYPE:	<----------AIR---------->		<---------WATER---------->		<----------MILK---------->	
	IODINE	PARTICULATES	GAMMA SCAN	IODINE	GAMMA SCAN	IODINE
ACTIVITY:	10^{-3} pCi/m^3	10^{-3} pCi/m^3	pCi/L	pCi/L	pCi/L	pCi/L
GEOMETRY:	47 ML	13 FILTERS	3.5 LITER	100 ML	3.5 LITER	100 ML
COUNT TIME:	120 MINS	500 MINS	1000 MIN	1000 MINS	500 MINS	1000 MINS
DELAY TO COUNT:	2 DAYS	5 DAYS	7 DAYS	3 DAYS	2 DAYS	2 DAYS
NUCLIDES						
BE-7	-	6.7	18	-	18	-
NA-22	-	0.5	4.9	-	6.7	-
K-40	-	11	58	-	50	-
CR-51	-	2.5	20.4	-	17	-
MN-54	-	0.72	1.3	-	2.7	-
CO-58	-	0.23	3.4	-	2.0	-
FE-59	-	0.64	5.8		7.9	-
CO-60	-	0.40	2.9	-	4.3	-
ZN-65	-	0.60	3.8		9.5	-
ZRNB-95	-	0.46	3.0	-	8.1	-
MO-99	-	17	118	-	47	-
RU-103	-	0.24	2.6	-	1.8	-
RU-106	-	2.5	28	-	30	-
AG-110M	-	0.41	3.0	-	5.7	-
SB-125	-	0.52	3.3	-	5.0	-
TE-129M	-	8.5	81	-	89	-
I-131	15	0.40	3.0	0.4	3.4	1.0
TE-132	-	0.98	13.6	-	3.0	-
BA-133	-	0.46	3.0	-	2.8	-
CS-134	-	0.34	1.7	-	1.9	-
CS-136	-	0.51	4.2	-	6.0	-
CS-137	-	0.39	3.0	-	5.5	-
BALA-140	-	1.2	9.8	-	12.0	-
CE-141	-	0.30	4.0	-	2.9	-
CE-144	-	0.73	14	-	12	-
RA-NAT	-	0.58	6.9	-	11.0	-
TH-232	-	2.4	16.7	-	22	-

TABLE C-19 (Cont'd)

2003 MAPLEWOOD TESTING SERVICES

LLDs FOR GAMMA SPECTROSCOPY

SAMPLE TYPE:	FOOD PRODUCTS	VEGETATION	GAME	FISH & SHELLFISH	SEDIMENT & SOIL
ACTIVITY:	pCi/kg WET	pCi/kg WET	pCi/kg WET	pCi/kg WET	pCi/kg DRY
GEOMETRY:	500 ml	3.5 LITER	500 ml	500 ml	500 ml
COUNT TIME:	500 MINS	500 MINS	500 MINS	500 MINS	500 MINS
DELAY TO COUNT:	3 DAYS	7 DAYS	5 DAYS	5 DAYS	30 DAYS
NUCLIDES					
BE-7	175	60	30	36	238
NA-22	13	32	10	9.8	12
K-40	70	70	70	70	70
CR-51	45	36	28	37	186
MN-54	8.9	6.0	7.0	14	34
CO-58	6.7	5.5	4.0	6.3	26
FE-59	21	21	11	20	73
CO-60	9.5	12	7.5	7.9	24
ZN-65	17	14	9.4	19	24
ZRNB-95	15	17	12	9.4	35
MO-99	80	50	174	1280	51500
RU-103	11	5.6	3.7	5.4	14
RU-106	62	46	36	93	95
AG-110M	15	22	4.3	9.6	25
SB-125	32	14	9.8	14	24
TE-129M	192	195	93	280	450
I-131	6.2	7.0	4.0	10	125
TE-132	11	15	15	15	7200
BA-133	6.1	5.0	3.9	4.3	11
CS-134	5.9	5.2	2.8	6.5	16
CS-136	14	8.0	5.3	10	50
CS-137	12	8.8	6.5	10	13
BALA-140	35	29	22	22	160
CE-141	10	6.4	4.3	6.0	21
CE-144	43	25	18	20	45
RA-NAT	17	23	8.0	23	45
TH-232	40	68	19	30	50

APPENDIX D

SUMMARY OF RESULTS FROM ANALYTICS AND ENVIRONMENTAL RESOURCE ASSOCIATES INTERLABORATORY COMPARISON PROGRAMS

APPENDIX D

SUMMARY OF RESULTS FOR ANALYTICS AND ENVIRONMENTAL RESOURCE ASSOCIATES INTERLABORATORY COMPARISON PROGRAM

Appendix D presents a summary of the analytical results for the 2003 Analytics and Environmental Resource Associates (ERA) Interlaboratory Comparison Program.

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TABLE D-1

RESULTS FOR ANALYTICS AND ERA INTERLABORATORY COMPARISON PROGRAM

Gross Alpha and Gross Beta Emitters In Water (pCi/L)

DATE MM-YY	PSEG SAMPLE CODE	MEDIUM	ANALYSIS	* PSEG Mean ± s.d.	ANALYTICS ERA Known	ANALYTICS/ERA Acceptance Criteria Lower Limit	& Upper Limit
06-2003	ANL-WAT-AB570	Water	Alpha	41±0	49	39	59
			Beta	280±6	268	214	322
08-2003	ERA-WAT-AB574	Water	Alpha	70±3	65	37	93
			Beta	35±2	32	23	40
09-2003	ANL-WAT-AB580	Water	Alpha	33±0	36	30	42
			Beta	278±8	246	198	294
12-2003	ANL-WAT-AB585	Water	Alpha	37±3	51	39	63
			Beta	164±2	141	117	165

* s.d. - one standard deviation of three individual analytical results

TABLE D-2

RESULTS FOR ANALYTICS AND ERA INTERLABORATORY COMPARISON PROGRAM

Gamma Emitters In Water and Milk (pCi/L)

DATE MM-YY	PSEG SAMPLE CODE	MEDIUM	ANALYSIS	* PSEG Mean ± s.d.	ANALYTICS ERA Known	ANALYTICS/ERA Acceptance Criteria Lower Limit	& Upper Limit
03-2003	ANL-WAT-G565	Water	Cr-51	261±14	238	190	286
			Mn-54	71±6	63	51	75
			Fe-59	59±4	46	34	58
			Co-60	159±5	157	127	187
			Zn-65	113±4	90	72	108
			I-131	76±4	70	58	82
			Cs-134	82±2	88	70	106
			Cs-137	203±6	195	153	237
			Ce-141	179±1	168	132	204
03-2003	ANL-MLK-G567	Milk	Cr-51	282±9	246	198	294
			Mn-54	78±1	64	52	76
			Fe-59	68±3	47	35	59
			Co-60	176±5	162	132	192
			Zn-65	117±5	93	75	111
			I-131	82±4	74	62	86
			Cs-134	87±3	90	72	108
			Cs-137	212±3	200	158	242
			Ce-141	188±1	173	137	209
02-2003	ERA-WAT-G569	Water	Ba-133	18±0.4	20	11	28
			Co-60	39±0.9	37	29	46
			Cs-134	18±0.7	18	9	26
			Cs-137	47±0.4	44	36	53
			Zn-65	65±0.9	60	50	71
12-2003	ANL-WAT-G582	Water	Cr-51	245±13	262	208	316
			Mn-54	171±3	162	132	192
			Fe-59	117±5	96	78	114
			Co-60	146±4	145	115	175
			Zn-65	190±10	184	148	220
			I-131	71±8	61	49	73
			Cs-134	119±4	127	103	151
			Cs-137	125±3	121	97	145
			Ce-141	188±6	189	153	225
			Co-58	106±3	104	86	122

* s.d. - one standard deviation of three individual analytical results

TABLE D-3

RESULTS OF ANALYTICS AND ERA INTERLABORATORY COMPARISON PROGRAM

Gamma Emitters In Soil (pCi/Kg-dry)
and Air Particulate Samples (pCi/m^3)

DATE MM-YY	PSEG SAMPLE CODE	MEDIUM	ANALYSIS	* PSEG Mean ± s.d.	ANALYTICS ERA Known	ANALYTICS/ERA Acceptance Criteria Lower Limit	Upper Limit
03-2003	ANL-SOL-G566	Soil	Cr-51	538±27	508	406	610
			Mn-54	143±5	133	109	157
			Fe-59	116±1	98	80	116
			Co-60	336±11	335	269	401
			Zn-65	193±4	192	156	228
			Cs-137	533±9	497	395	599
			Ce-141	354±9	358	286	430
06-2003	ANL-APT-G572	APT	Cr-51	176±10	175	139	211
			Mn-54	145±3	136	106	166
			Co-60	96±2	97	79	115
			Fe-59	79±3	73	61	85
			Zn-65	147±3	133	109	157
			Cs-134	62±1	76	58	94
			Cs-137	177±4	169	133	205
			Co-58	68±1	68	56	80
			Ce-141	213±6	208	166	250
09-2003	ANL-SOL-G577	Soil	Cr-51	559±18	525	417	633
			Mn-54	228±7	209	167	251
			Fe-59	200±12	178	142	214
			Co-58	221±7	222	180	264
			Co-60	296±4	278	224	332
			Zn-65	408±4	395	317	473
			Cs-137	333±2	305	245	365
			Ce-141	195±10	193	157	229
			Cs-134	257±7	269	215	323

* s.d. - one standard deviation of three individual analytical results

TABLE D-4

RESULTS OF ANALYTICS AND ERA INTERLABORATORY COMPARISON PROGRAM

Tritium Analysis In Water (pCi/L)
Iodine-131 Analysis In Water (pCi/L)
And Iodine In Air Samples (pCi/m^3)

DATE MM-YY	PSEG SAMPLE CODE	MEDIUM	ANALYSIS	* PSEG Mean ± s.d.	ANALYTICS ERA Known	ANALYTICS/ERA Acceptance Criteria Lower Limit	& Upper Limit
03-2003	ANL-WAT-H564	Water	H-3	4634±107	4463	3569	5357
03-2003	ANL-AIO-I568	AIO	I-131	77±4	74	62	86
05-2003	ERA-WAT-H575	Water	H-3	1239±33	1250	677	1823
05-2003	ERA-WAT-I579	Water	I-131	20±0.6	21	16	26
06-2003	ANL-AIO-I571	AIO	I-131	67±2	62	50	74
06-2003	ANL-WAT-H573	Water	H-3	11653±30	11953	9565	14341
09-2003	ANL-AIO-I576	AIO	I-131	86±1	86	68	104
09-2003	ANL-WAT-H578	Water	H-3	8062±109	8000	6200	9800
11-2003	ERA-WAT-I584	Water	I-131	27±3	28	23	33
12-2003	ANL-WAT-I581	AIO	I-131	84±1	78	60	96
12-2003	ANL-WAT-H583	Water	H-3	2238±40	2290	490	4090

* s.d. - one standard deviation of three individual analytical results

APPENDIX E

SYNOPSIS OF LAND USE CENSUS

APPENDIX E

SYNOPSIS OF 2003 LAND USE CENSUS

A land use census was conducted to identify, within a distance of 8 km (5 miles), the location of the nearest milk animal, the nearest residence, and the nearest garden of greater than 50m^2 (500ft^2) producing broad leaf vegetation, in each of the 16 meteorological sectors.

Tabulated below are the results of these surveys:

Meteorological Sector	Milk Animal July, 2003 km (miles)	Nearest Residence July, 2003 km (miles)	Vegetable Garden July, 2003 km (miles)
N	None	None	None
NNE	None	None	None
NE	None	6.4 (4.0)	None
ENE	None	5.8 (3.6)	None
E	None	8.7 (5.4)	None
ESE	None	None	None
SE	None	None	None
SSE	None	None	None
S	None	None	None
SSW	None	5.5 (3.4)	None
SW	None	6.9 (4.3)	7.7 (4.8)
WSW	None	7.1 (4.4)	None
W	7.8 (4.9)	6.5 (4.0)	None
WNW	None	5.5 (3.4)	None
NW	None	5.9 (3.7)	None
NNW	None	6.8 (4.2)	None

APPENDIX F

RADIOLOGICAL IMPACT ON MAN

APPENDIX F

RADIOLOGICAL IMPACT ON MAN

The calculated individual doses in this section are based on the controlling dose pathways and age groups as described below. The estimated dose represents the maximum radiation dose that could be received by a member of the general public. The population dose impact is based on the evaluation year site-specific data (i.e., food production, milk production, feed for milk animals and seafood production).

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the 12-month reporting interval. Individual doses from batch and continuous releases were calculated using the annual average historic meteorological dispersion factors as described in the respective Offsite Dose Calculation Manual. Population doses were calculated using the meteorological dispersion coefficients for the twelve month reporting interval.

Liquid Pathways

Type	Age Group	Location	Pathway
Total Body	Adult	Site Boundary	Seafood Ingestion
Organ	Adult	Site Boundary	Seafood Ingestion

Salem Unit 1

Type	Dose	Limit
Total Body	7.17E-3 mrem	3 mrem
Organ Dose (GI-LI)	1.62E-2 mrem	10 mrem

Salem Unit 2

Type	Dose	Limit
Total Body	5.73E-3 mrem	3 mrem
Organ Dose (GI-LI)	1.29E-2 mrem	10 mrem

Hope Creek

Type	Dose	Limit
Total Body	6.76E-5 mrem	3 mrem
Organ Dose (GI-LLI)	5.29E-4 mrem	10 mrem

Site	Dose	Limit
Population (Total)	4.59E-03 person-rem	N/A
Population (Average)	1.19E-06 mrem	N/A

Air Pathways

Type	Age Group	Location	Pathway
Total Body	All	Site Boundary	Direct Exposure
Skin	All	Site Boundary	Direct Exposure
Organ	Infant	4.9 mi. W.	Milk, Ground Plane, Inhalation

Salem Units 1&2

Type	Dose		Limit
Total Body	1.72E-02	mrem	500 mrem
Skin	4.92E-02	mrem	3000 mrem
Organ Dose (Thyroid)	1.18E-01	mrem	15 mrem

Hope Creek

Type	Dose		Limit
Total Body	3.29E-04	mrem	500 mrem
Skin	6.43E-04	mrem	3000 mrem
Organ Dose (Thyroid)	3.97E-02	mrem	15 mrem

Site	Dose		Limit
Population(Total)	4.33E-01	person-rem	N/A
Population (Average)	8.66E-05	mrem	N/A

Direct Radiation

Direct radiation may be estimated by thermoluminescent dosimetric (TLD) measurements. One method for comparing TLD measurements is by comparison with pre-operational data. It should be noted that the TLDs measure direct radiation from both the Salem and Hope Creek Generating Stations at Artificial Island, and natural background radiation.

TLD data for the twelve-month reporting period is given below:

TLD	Location	Measurement
1S-1	0.4 mile NNE	4.63 mrad/std. month
5S-1	1.0 mile E	3.81 mrad/std. month

These values are interpreted to represent natural background, since the values are within the statistical variation associated with the pre-operational program results which are 3.7 mrad/standard month for TLD 1S-1 and 4.2 mrad/standard month for TLD 5S-1.

Total Dose

40CFR190 limits the total dose to members of the public due to radioactivity and radiation from uranium fuel cycle sources to:

<25 mrem total body or any organ and;

<75 mrem thyroid for a calendar year.

For Artificial Island, the major sources of dose are from liquid and gaseous effluents from the Hope Creek and Salem plants.

The following doses to a "hypothetical maximum exposed individual" have been calculated for the twelve-month reporting period. They are the sum of gaseous and liquid pathway doses for the Salem 1 and 2 and Hope Creek plants:

1.66E-02	mrem	Total Body
3.79E-02	mrem	Organ (GI-LLI)
1.49E-01	mrem	Thyroid

Dose to members of the public due to activities inside the site Boundary

Dose to members of the public is limited to 100 mrem total effective dose equivalent (TEDE) in a year in accordance with 10CFR20.1301. The definition of members of the public changed on September 11, 2001. The various food vendors that have previously comprised the maximally exposed group are no longer allowed on site. For this reporting period, the definition of the members of the public are the members of the New Jersey National Guard to augment the security force at the site. Their typical patrol spans the site, and the following locations 16S1; CA8 and CA15 (Hope Creek Barge Slip, Dredge Spoils and Baseball Field) are averaged to estimate their dose. In accordance with the requirements of ODCM 6.9.1.8 (SGS) and 6.9.1.7 (HCGS), the dose to members of the public inside the site boundary has been calculated based on the following assumptions:

a. The National Guard works a 40 hour week, therefore all doses are multiplied by 0.25 to assess their dose.

   For the 12-month reporting period, January 1, 2003 to December 31, 2003 the calculated doses are:

2.13E-01	mrem	TEDE	Total Body
1.97E-02	mrem	TEDE	Organ (Lung)
3.12E-02	mrem	TEDE	Thyroid