

John K. Wood
Vice President, Nuclear

440-280-5224
Fax: 440-280-8029

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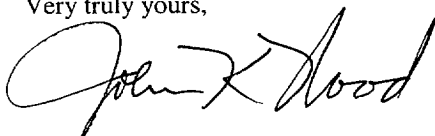
Perry Nuclear Power Plant
Docket No. 50-440
Annual Environmental and Effluent Release Report

Ladies and Gentlemen:

Enclosed is the Annual Environmental and Effluent Release Report for the Perry Nuclear Power Plant, Unit 1, for the period of January 1, 2000 through December 31, 2000. This document includes the radiological environmental operating report, radioactive effluent release report, and the non-radiological environmental operating report, which satisfies the requirements of the PNPP Technical Specifications, the Offsite Dose Calculation Manual, and the Environmental Protection Plan, Appendix B of the PNPP Operating License.

If you have any questions or require additional information, please contact Charles L. Nash at (216) 280-5875.

Very truly yours,

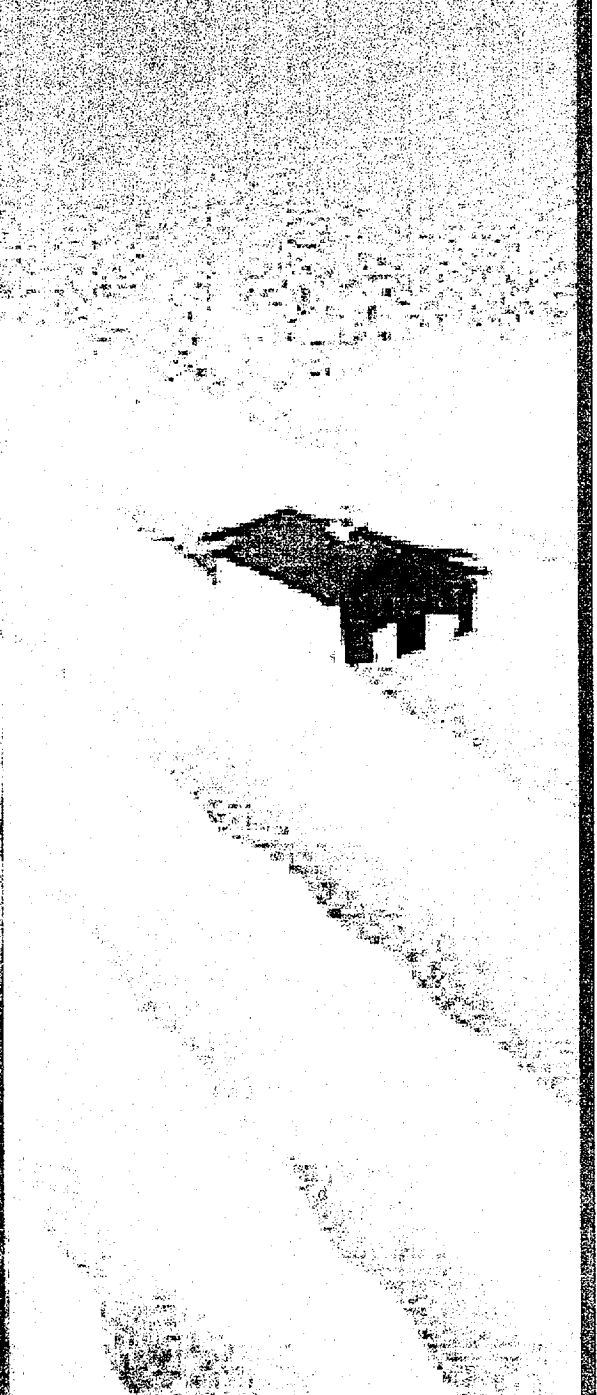


Enclosure

cc: NRC Project Manager
NRC Region III
NRC Resident Inspectors Office

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ANNUAL ENVIRONMENTAL
AND
EFFLUENT RELEASE REPORT
FOR THE
PERRY NUCLEAR POWER PLANT
2000



2000

**ANNUAL ENVIRONMENTAL
AND
EFFLUENT RELEASE
REPORT**

**for the
Perry Nuclear Power Plant**

**PREPARED BY:
RADWASTE, ENVIRONMENTAL, AND CHEMISTRY SECTION
PERRY NUCLEAR POWER PLANT
FIRSTENERGY NUCLEAR OPERATING COMPANY
PERRY, OHIO
MARCH, 2001**

ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT

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EXECUTIVE SUMMARY

The Annual Environmental and Effluent Release Report details the results of environmental and effluent monitoring programs conducted at the Perry Nuclear Power Plant (PNPP) from January 01 through December 31, 2000. This report meets all of the requirements in PNPP Technical Specifications, the Environmental Protection Plan (EPP), and Regulatory Guide 1.21. It incorporates the requirements of the Annual Radioactive Effluent Release Report (ARERR), the Annual Radiological Environmental Operating Report (AREOR) and the Annual Environmental Operating Report (AEOR). Report topics include radioactive effluent releases, radiological environmental monitoring, land use census, clam/mussel monitoring, herbicide use, and special reports. The results of the environmental and effluent programs, for 2000, indicate that the operations of the Perry Nuclear Power Plant did not result in any significant environmental impact.

RADIOACTIVE EFFLUENT RELEASES

During the normal operation of a nuclear power plant, small quantities of radioactivity may be released to the environment in liquid and gaseous effluents. Radioactive material may also be released as solid waste. PNPP maintains a comprehensive program to control and monitor the release of all radioactive materials from the site in accordance with all Nuclear Regulatory Commission (NRC) release regulations.

The radioactivity released in the plant's liquid and gaseous effluents during 2000 was well below all applicable federal regulatory limits. The calculated hypothetical maximum individual total body dose potentially received by an individual resulting from PNPP liquid effluents was 2.02E-04 mrem (0.0067 % of the applicable limit). The dose to the general public from the plant's gaseous effluents was also below the applicable regulatory limits. The calculated hypothetical maximum individual total body dose potentially received by an individual resulting from PNPP gaseous effluents was 6.33E-03 mrem (0.13% of the applicable limit). The summation of the hypothetical maximum individual dose from effluents in 2000 is equivalent to < 0.1 % of the total dose an individual living in the PNPP area receives from all sources of radiation.

Shipments of solid waste consisted of waste generated during water treatment; radioactive material generated during normal daily operations and maintenance, and irradiated components. PNPP complied with all regulations governing radioactive shipments in 2000, making shipments of solid radioactive waste to a licensed burial site.

During 2000, there were two (2) abnormal releases and one (1) ODCM Controls non-compliance:

- ◆ On June 06, 2000, the Unit 1 containment vacuum breaker was inadvertently opened, which resulted in a potential airborne radioactive effluent release to the environment. The dose contribution from this potential release showed this event had minimal consequence to any member of the general public.
- ◆ On July 07, 2000, the Emergency Service Water flow monitor, 1P45-N0271, was out of service for greater than 30 days. Erratic flow indications with a newly installed, replacement flow instrument required an engineering evaluation to determine a corrective action. The evaluation resulted in an engineering design change which resulted in monitor being out of service for 163-days. Compensatory measures, as required by ODCM Table 3.3.7.9-1, Action 113, were implemented, until the flow monitor was returned to service on December 11, 2000.
- ◆ On August 03, 2000, tritium was detected in the Turbine Building HVAC (M35) condensate drains system effluent. The most probable cause for this event was the recycling of the radioactive gaseous treatment system effluent vent discharges back into

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the M35 system as part of the air intake. There was minimal dose consequence to the any member of the general public.

RADIOLOGICAL ENVIRONMENTAL MONITORING

The Radiological Environmental Monitoring Program (REMP) was established in 1981 to monitor the radiological conditions in the environment around PNPP. The REMP is conducted in accordance with PNPP Technical Specifications and the Offsite Dose Calculation Manual (ODCM). This program includes the collection and analysis of environmental samples and evaluation of results.

The REMP was established at PNPP six (6) years before the plant became operational. This pre-operational program was designed to provide data on background radiation and radioactivity normally present in the area. PNPP has continued to monitor the environment during plant operation by collecting and analyzing samples of air, precipitation, milk, fish, produce, water and sediment, as well as by measuring radiation directly.

Of the 1375 radiological environmental samples collected in 2000, there were 3291 radioactivity analyses performed. The results of the REMP indicate the adequacy of the control of the release of radioactivity in the effluents from PNPP. These results also demonstrate that PNPP complies with all applicable federal regulations. The REMP results are divided into four sections: atmospheric monitoring, terrestrial monitoring, aquatic monitoring, and direct radiation monitoring:

- ◆ Samples of air were collected to monitor the radioactivity in the atmosphere. The 2000 results were similar to those observed for the pre-operational and operational programs from prior years. Only natural background environmental radioactivity was detected.
- ◆ Terrestrial monitoring included the analysis of milk, produce, and vegetation. The PNPP ODCM does not require vegetation or soil samples to be included in the monitoring program. The results of the sample analyses in 2000 indicated concentrations of radioactivity similar to that found in previous years. Analyses of other terrestrial samples also detected concentrations of radioactivity similar to those observed in previous years, and indicated no build-up of radioactivity attributable to the operation of PNPP.
- ◆ Aquatic monitoring included the collection and analyses of water, fish, and shoreline sediments. The 2000 analytical results for water and fish sample showed normal background radionuclide concentrations. The results of sediment sample analyses indicated that the cesium radioactivity was similar to previous years. The average concentration of cesium-137 in the sediment was 781.11 pCi/kg, which is within the maximum value of 864 pCi/kg established since 1981. In 1999, a sediment sample of the northwest drain impoundment (sampling location #64) was analyzed to contain 62 pCi/kg of cobalt-60. During 2000, eleven sampling points were identified within the impoundment to determine the boundary and to support enhanced monitoring activities. The cobalt-60 is centered within the organic material located at the top of the spillway, with little or no activity found farther upstream.
- ◆ Direct radiation measurements showed no change from previous years. The indicator locations averaged 59.59 mrem/year and control locations averaged 56.97 mrem/year. This shows that, in 2000, radiation in the area of PNPP was statistically similar to the radiation measured at locations greater than ten (10) miles away from the Plant.

Based on these results, during 2000, the operation of the PNPP resulted in no significant increase in the radionuclide concentrations observed in the environment.

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LAND USE CENSUS

In order to estimate radiation dose attributable to the operation of PNPP, the potential pathways through which public exposure can occur must be known. To identify these exposure pathways, an Annual Land Use Census is performed as part of the REMP. During the census, PNPP personnel travel every public road within a five (5) mile radius of the plant to locate key radiological exposure pathways. These key pathways include the nearest resident, garden, and milk animal in each of the sixteen meteorological sectors. The information obtained from the census is entered into a computer program, which is used to assess the hypothetical dose to members of the public.

CLAM/MUSSEL MONITORING

Clam and mussel shells can clog plant piping and components that use water from Lake Erie. For this reason, sampling for clams and mussels has been conducted in Lake Erie in the vicinity of PNPP since 1971. The monitoring is specifically for *Corbicula* (Asiatic clams), since their introduction into the Great Lakes, in 1981, and for *Dreissena* (zebra mussels), since their discovery in Lake Erie, in 1989. Since no *Corbicula* have ever been found at PNPP, routine *Corbicula* monitoring will provide early detection capability, when this pest species arrives at PNPP. The *Dreissena* program includes both monitoring and control and is directed at minimizing the mussel's impact on plant operation. As in past years, this program has successfully prevented *Dreissena* from causing any operational problems at PNPP.

HERBICIDE USE

The use of herbicides on the PNPP site is monitored to ensure compliance with Ohio Environmental Protection Agency (OEPA) requirements and to protect the site's natural areas. Based on the results of on-site herbicide applications, and weekly general site inspections, herbicide use has not had a negative impact on the environment around the plant.

SPECIAL REPORTS

Significant environmental events (for example, spills, releases), noncompliance with environmental regulations [e.g., Ohio Environmental Protection Agency (OEPA) discharge limits], and changes in plant design or operation that affect the environment are reported to regulatory agencies as they occur. These special reports are also summarized annually in this report.

One special report was submitted in 2000:

- ◆ On February 10, 2000, the OEPA was notified of the potential for approximately 2 gallons per day of chlorinated service water to bypass the permitted discharge point via a service water system standpipe located upstream of the service water dechlorination system. This flow path was by plant design to vent trapped air from the service water piping. No follow-up action was required.

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INTRODUCTION

Nuclear energy provides an alternative energy source, which is readily available and has very limited impact upon the environment. To more fully understand nuclear energy as a source of generating electricity, one must understand basic radiation concepts and its occurrence in nature.

RADIATION FUNDAMENTALS

Atoms are the basic building blocks of all matter. Simply described, atoms are made up of positively and negatively charged particles, and particles which are neutral. These particles are called protons, electrons, and neutrons, respectively. The relatively large protons and neutrons are packed together in the center of the atom called the nucleus. Orbiting around the nucleus are one or more smaller electrons. In an electrically neutral atom, the positively-charged protons in the nucleus balance the negatively charged electrons. Due to their dissimilar charges, the protons and electrons have a strong attraction for each other, which helps hold the atom together. Other attractive forces between the protons and neutrons keep the densely packed protons from repelling each other, and preventing the nucleus from breaking apart.

Atoms with the same number of protons in their nuclei make up an element. The number of neutrons in the nuclei of an element may vary. Atoms with the same number of protons but different numbers of neutrons are called isotopes. All isotopes of the same element have the same chemical properties and many are stable or non-radioactive. An unstable or radioactive isotope of an element is called a radioisotope, or radionuclide. Radionuclides contain an excess amount of energy in the nucleus, which is usually due to an excess number of neutrons.

Radioactive atoms attempt to reach a stable, non-radioactive state through a process known as radioactive decay. Radioactive decay is the release of energy from an atom's nucleus through the emission of radiation. Radionuclides vary greatly in the frequency with which their atoms release radiation. The length of time an atom remains radioactive is defined in terms of its half-life. Half-life is defined as the time required for a radioactive substance to lose half its activity through the process of radioactive decay. Half-lives vary from millionths of a second to millions of years. The typical half-life for radionuclides released from the plant is approximately five years.

RADIATION AND RADIOACTIVITY

Radioactive decay is a process in which the nucleus of an unstable atom becomes more stable by spontaneously emitting energy. Radiation refers to the energy that is released when radioactive decay occurs within the nucleus. This section includes a discussion on the three (3) primary forms of radiation produced by radioactive decay.

Alpha Particles

Alpha particles consist of two protons and two neutrons and have a positive charge. Because of their charge and large size, alpha particles do not travel very far when released (less than 4 inches, in air). They are unable to penetrate any solid material, such as paper or skin, to any significant depth. However, if alpha particles are released inside the body, they can damage the soft internal tissues because they deposit all their energy in a small area.

Beta Particles

Beta particles are essentially free electrons, which usually carry a negative electrical charge. They are much smaller than alpha particles and travel at nearly the speed of light. Thus they can travel for longer distances than alpha particles. External beta radiation primarily affects the skin. Because of their electrical charge, paper, plastic or thin metals can stop beta particles.

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Gamma Rays

Gamma rays are bundles of electromagnetic energy, called photons, which behave as though they were particles. They are similar to visible light, but of a much higher energy. Gamma rays can travel long distances in air and are often released during radioactive decay, along with alpha and beta particles. Potassium-40 is an example of a naturally occurring radionuclide found in all humans that decays by emitting a gamma ray.

Interaction with Matter

When radiation interacts with other materials, it affects the atoms of those materials principally by knocking the negatively charged electrons out of orbit. This causes an atom to lose its electrical neutrality and become positively charged. An atom that is charged, either positively or negatively, is called an ion and the radiation is called ionizing radiation.

UNITS OF MEASURE

Some of the units of measure used in this report require explanation.

Activity

Activity is the number of atoms in a material that decay per unit of time. Each time an atom decays, radiation is emitted. The curie (Ci) is the unit used to describe the activity of a material and indicates the rate at which the atoms are decaying. One curie of activity indicates the decay of 37 billion atoms per second. Smaller units of the curie are often used in this report. Two common units are the microcurie (μCi), one millionth of a curie, and the picocurie (pCi), one trillionth of a curie. The mass, or weight, of radioactive material, which would result in one (1) curie of activity, depends on the disintegration rate. For example, one gram of radium-226 is equivalent to one (1) curie of activity. It would require about 1.5 million grams of natural uranium, however, to equal one (1) curie.

Dose

Biological damage due to alpha, beta, and gamma radiation may result from the ionization caused by these types of radiation. Some types of radiation, especially alpha particles, which causes dense local ionization, can result in much more biological damage for the same energy imparted than does gamma or beta radiation. Therefore, a quality factor must be applied to account for the different ionizing capabilities of various types of ionizing radiation. When the quality factor is multiplied by the absorbed dose, the result is the dose equivalent, which is an estimate of the possible biological damage resulting from exposure to any type of ionizing radiation. The dose equivalent is measured in terms of the Roentgen Equivalent Man (rem). When discussing environmental radiation effects, the rem is a large unit. Therefore, a smaller unit, the millirem (mrem) is often used. One mrem is equivalent to 1/1000 of a rem.

LOWER LIMIT OF DETECTION

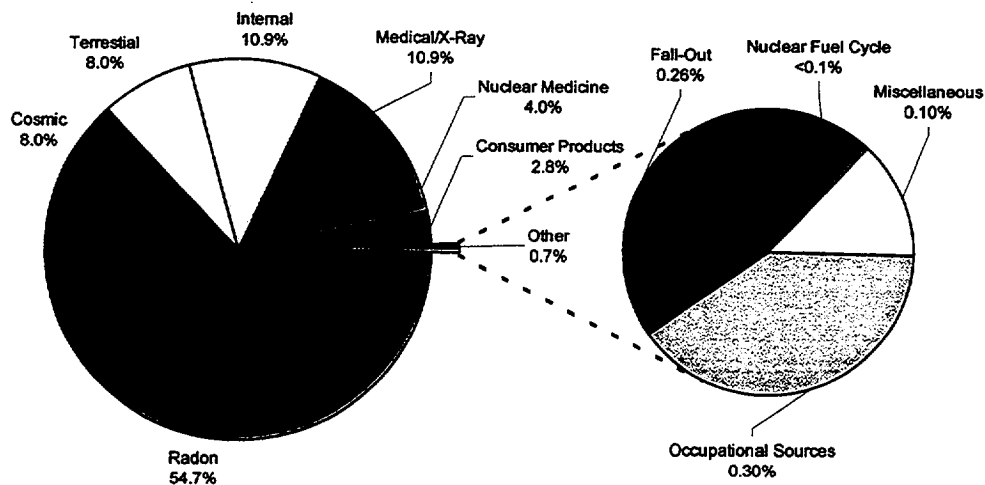
Sample results are often reported as below the Lower Limit of Detection (LLD). The LLD for an analysis is the smallest amount of radioactive material that will show a positive result for which there can be a 95% confidence that radioactivity is present. This statistical parameter is used as a measure of the sensitivity of a sample analysis. When a measurement is reported as less than the LLD (<LLD), it means that no radioactivity was detected. Had radioactivity been present at (or above) the stated LLD value, it statistically would have been detected. The NRC has established LLD values for environmental and effluent sample analyses.

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BACKGROUND RADIATION

Background radiation is a natural part of nature. Natural radioactive decay also occurs in the soil, water, air, and space. Common sources of radiation that contribute to the natural background radiation includes: the decay of radioactive elements in the earth's crust, a steady stream of high-energy particles from space (called cosmic radiation), naturally-occurring radioactive isotopes in the human body like potassium-40, the decay of radioisotopes used in medical procedures, man-made phosphate fertilizers (phosphates and uranium are often found together in nature), fallout from nuclear weapons testing, and even household items like smoke detectors. In the United States, a person's average annual exposure from background radiation is 360 mrem, and is due to the sources shown in Figure 1 [Source: National Council on Radiation Protection and measurements].

Figure 1: Sources of Background Radiation



Many radionuclides are present in the environment due to sources such as cosmic radiation and fallout from nuclear weapons testing. These radionuclides are expected to be present in many of the environmental samples collected in the vicinity of PNPP. Some of the radionuclides normally present include:

- ◆ Beryllium-7, present as a result of the interaction of cosmic radiation with the upper atmosphere,
- ◆ Potassium-40, a naturally occurring radionuclide normally found in humans and throughout the environment, and
- ◆ Radionuclides from nuclear weapons testing fallout, including tritium and cesium-137. These radionuclides may also be released in minute amounts from nuclear facilities.

Beryllium-7 and potassium-40 are especially common in REMP samples. Since they are naturally occurring and are expected to be present, positive results for these radionuclides are not discussed in the section on the 2000 Sampling Program results. These radionuclides are included, however, in Appendix C: 2000 REMP Detail Data Reports.

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RADIOACTIVE EFFLUENT RELEASES

INTRODUCTION

The source of radioactive material in a nuclear power plant is the generation of fission products (e.g., noble gas, iodine, and particulate) or neutron activation of water and corrosion products (e.g., tritium and cobalt). The majority of the fission products generated remain within the nuclear fuel pellet and fuel cladding. Fission products that escape from the fuel cladding, as well as the majority of the activated corrosion products, are removed by plant processing equipment.

During the normal operation of a nuclear power plant, small amounts of radioactive material are released in the form of solids, liquids, and gases. PNPP was designed, and is operated in such a manner as to control and monitor these effluent releases. Effluents are controlled to ensure any radioactivity released to the environment is minimal and within all regulatory limits. Effluent release programs include the operation of monitoring systems, in-plant sampling and analysis, quality assurance, and detailed procedures covering all aspects of effluent monitoring.

The main objective of controlling effluent releases is to ensure that all doses are kept As Low As Reasonably Achievable (ALARA). The ALARA principal applies to reducing radiation dose both to the individuals working at PNPP and to the general public. The term "reasonably achievable" means that exposure reduction is based upon engineering, sound operating practices and economic decisions. By practicing the ALARA concept, PNPP minimizes the health risks and possible environmental impact, which ensures that all doses are maintained well below the regulatory limits.

The liquid and gaseous radioactive waste treatment systems at PNPP are designed to collect and process these wastes in order to remove most of the radioactivity. Effluent monitoring systems are used to provide continuous indication of the radioactivity present and are sensitive enough to measure several orders of magnitude lower than the applicable release limits. This monitoring equipment is equipped with alarms and indicators in the plant control room. The alarms are set to provide warnings to alert plant operators when radioactivity levels reach a small fraction of actual limits. The waste streams are sampled and analyzed to identify and quantify the radionuclides being released to the environment.

Gaseous effluent release data is coupled with on-site meteorological data in order to calculate the dose to the general public. Devices are maintained at various locations around PNPP to constantly sample the air in the surrounding environment. Frequent samples of other environmental media are also taken to determine if any radioactive material deposition has occurred. The REMP program is described in detail in the next section.

Generation of solid waste is carefully monitored to identify opportunities for minimization. Limiting the amount of material taken into the plant, sorting material as radioactive or non-radioactive, shredding and compacting, or incinerating waste once it is identified help to lower the volume of radioactive solid waste generated. Solid waste is shipped to a licensed burial site.

REGULATORY LIMITS

The Nuclear Regulatory Commission has established limits for liquid and gaseous effluents that comply with:

Title 10 of the Code of Federal Regulations, Part 20 (Standards for Protection Against Radiation) [10CFR20], Appendix B;

Title 10 of the Code of Federal Regulations, Part 50 (Domestic Licensing of Production and Utilization Facilities) [10CFR50], Appendix I; and

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Title 40 of the Code of Federal Regulations, Part 190 (Environmental Radiation Protection Standards for Nuclear Power Plants) [40CFR190].

These limits were incorporated into the PNPP Technical Specifications, and subsequently into the PNPP Offsite Dose Calculation Manual (ODCM). The ODCM prescribe the maximum doses and dose rates due to radioactive effluents resulting from the operation of PNPP. These limits are defined in several ways to limit the over-all impact on persons living near the plant. Since there are no other nearby fuel cycle sources, the limits in 40CFR190, which are described below, were not exceeded in 2000.

Liquid Effluents

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10CFR20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases, as required by the ODCM. For dissolved or entrained noble gases, the concentration shall be limited to $2.0E-04$ $\mu\text{Ci/mL}$ of total activity. These values are the maximum effluent concentrations.

The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to the following:

- ◆ During any calendar quarter:
 - Less than or equal to 1.5 mrem to the total body, and
 - Less than or equal to 5 mrem to any organ.
- ◆ During any calendar year:
 - Less than or equal to 3 mrem to the total body, and
 - Less than or equal to 10 mrem to any organ.

Gaseous Effluents

Dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:

- ◆ Noble gases:
 - Less than or equal to 500 mrem per year to the total body, and
 - Less than or equal to 3000 mrem per year to any organ.
- ◆ Iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives greater than eight days:
 - Less than or equal to 1500 mrem per year to any organ

Air dose due to noble gases to areas at, and beyond the site boundary, shall be limited to the following:

- ◆ During any calendar quarter:
 - Less than or equal to 5 mrad for gamma radiation, and
 - Less than or equal to 10 mrad for beta radiation.
- ◆ During any calendar year:
 - Less than or equal to 10 mrad for gamma radiation, and
 - Less than or equal to 20 mrad for beta radiation.

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Dose to a member of the public from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives greater than eight days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

- ◆ Less than or equal to 7.5 mrem to any organ per any calendar quarter, and
- ◆ Less than or equal to 15 mrem to any organ per any calendar year.

The PNPP ODCM does not contain a concentration reference for gaseous effluents. For this reason, effluent concentrations are not used to calculate maximum release rates for gaseous effluents.

RELEASE SUMMARY

Effluents are sampled and analyzed to identify both the type and quantity of radionuclides present. This information is combined with effluent path flow measurements to determine the composition, concentration, and dose contribution of the radioactive effluents.

Liquid Effluents

The PNPP liquid radioactive waste system is designed to collect and treat all radioactive liquid waste produced in the plant. The treatment process used for radioactive liquid waste depends on its physical and chemical properties. It is designed to reduce the concentration of radioactive material in the liquid by filtration to remove suspended solids and demineralization to remove dissolved solids. Normally, the effluent from the liquid radioactive waste system is returned to plant systems. To reduce the volume of water stored in plant systems, however, the processed liquid effluent may be discharge from the plant via a controlled release. In this case, effluent activity and dose calculations are performed prior to, and after discharging this processed water to Lake Erie to ensure regulatory compliance and ALARA principals are maintained. This section does not include information on the abnormal tritium release related to the Turbine Building HVAC Condensate Drains (M35) System. The abnormal release is fully discussed under the "Special Reports" section.

Liquid radioactive waste system effluents may be intermittently released, which are considered to be "batch" releases. Table 1 provides information on the number and duration of these releases for 2000.

Table 1: Liquid Batch Releases

	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	TOTAL
Number of batch releases	(1)	4	5	1	10
Total time period for batch releases, min		9.01E+02	2.69E+03	2.71E+02	3.86E+03
Maximum time for a batch release, min		2.27E+02	1.64E+03	2.71E+02	1.64E+03
Average time period for a batch release, min		2.25E+02	5.37E+02	2.71E+02	3.86E+02
Minimum time for a batch release, min		2.22E+02	2.24E+02	2.71E+02	2.22E+02
Average stream flow during periods of effluent release into a flowing stream, L/min		2.40E+05	2.93E+05	2.90E+05	2.72E+05

(1) No radioactive liquid releases this reporting period.

Table 2 provides information on the nuclide composition for the liquid radioactive waste system effluent releases. If a radionuclide was not present at a level "greater than or equal to the LLD" (\geq LLD), then the value is expressed as "less than the LLD" (<LLD). In each case, LLDs were met, or were below the levels required by the ODCM.

Table 3 lists the total number of curies (Ci) of each radionuclide present in liquid effluent releases for each quarter. If a radionuclide was not present at a level "greater than or equal to the LLD" (\geq LLD), then the value is expressed as "less than the LLD" (<LLD). In each case, the LLDs were either met, or were below the levels required by the ODCM.

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Table 2: Summation of All Liquid Effluent Releases

	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST. TOTAL ERROR, %
A. Fission and Activation Products					
1. Total Released, Ci (excluding tritium, gases, alpha)	(1)	7.23E-05	7.82E-05	1.05E-04	1.00E+01
2. Average Diluted Concentration, $\mu\text{Ci/mL}$		2.27E-12	1.70E-12	3.30E-12	
3. Percent of Applicable Limit, %		N/A	N/A	N/A	
B. Tritium					
1. Total Released, Ci		2.96E+00	4.97E+00	7.99E-01	1.00E+01
2. Average Diluted Concentration, $\mu\text{Ci/mL}$		9.31E-08	1.08E-07	2.51E-08	
3. Percent of Applicable Limit, %		9.3E-03	1.1E-02	2.5E-03	
C. Dissolved and Entrained Gases					
1. Total Released, Ci		7.88E-04	7.46E-05	4.80E-05	1.00E+01
2. Average Diluted Concentration, $\mu\text{Ci/mL}$		2.92E-11	1.62E-12	1.51E-12	
3. Percent of Applicable Limit, %		1.5E-05	8.1E-07	7.6E-07	
D. Alpha Activity, Ci		<LLD	<LLD	<LLD	1.00E+01
E. Waste Volume Released, Liters (prior to dilution)		7.24E+05	2.09E+06	1.30E+05	1.00E+00
F. Dilution Water Volume Used, Liters	2.70E+10	3.18E+10	4.61E+10	3.18E+10	2.8E+01

(1) No radioactive liquid releases this reporting period.

N/A – Not Applicable, the ODCM does not have a limit for fission and activation products.

Table 3: Radioactive Liquid Effluent Nuclide Composition

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	ANNUAL TOTAL
Tritium	Ci	(1)	2.96E+00	4.97E+00	7.99E-01	8.73E+00
Chromium-51	Ci		<LLD	<LLD	<LLD	<LLD
Manganese-54	Ci		<LLD	<LLD	<LLD	<LLD
Iron-55	Ci		<LLD	<LLD	<LLD	<LLD
Cobalt-58	Ci		<LLD	<LLD	2.51E-05	2.51E-05
Iron-59	Ci		<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci		7.23E-05	7.82E-05	7.96E-05	2.30E-04
Zinc-65	Ci		<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci		<LLD	<LLD	<LLD	<LLD
Strontium-90	Ci		<LLD	<LLD	<LLD	<LLD
Strontium-92	Ci		<LLD	<LLD	<LLD	<LLD
Molybdenum-99	Ci		<LLD	<LLD	<LLD	<LLD
Technetium-99m	Ci		<LLD	<LLD	<LLD	<LLD
Iodine-131	Ci		<LLD	<LLD	<LLD	<LLD
Iodine-133	Ci		<LLD	<LLD	<LLD	<LLD
Xenon-133	Ci		7.88E-04	6.81E-05	4.80E-05	9.04E-4
Xenon-133m	Ci		<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci		<LLD	<LLD	<LLD	<LLD
Xenon-135	Ci		<LLD	6.53E-06	<LLD	6.53E-06
Cesium-137	Ci		<LLD	<LLD	<LLD	<LLD
Lanthanum-140	Ci		<LLD	<LLD	<LLD	<LLD
Cerium-141	Ci		<LLD	<LLD	<LLD	<LLD
Cerium-144	Ci		<LLD	<LLD	<LLD	<LLD
Total for Period	Ci		2.96E+00	4.97E+00	8.00E-01	8.73E+00

(1) – No radioactive liquid discharges this reporting period.

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Gaseous Effluents

Gaseous effluents are made up of fission and activation gases, iodine and particulate releases. The fission and activation gas releases are primarily a result of containment purge operations, small steam leaks, and off-gassing during plant start up and shut down operations. The iodine and particulate releases are primarily a result of small steam leaks. Gaseous effluents from PNPP exit the plant via one of four effluent vents. Each of these four effluent vents contains radiation detectors that continuously monitor the air to ensure that the levels of radioactivity released are well below regulatory limits. Samples are also collected and analyzed on a routine basis to ensure regulatory compliance ALARA principals are maintained. The majority of gaseous effluents released from PNPP are considered continuous and at ground level.

A summation of all gaseous radioactive effluent releases is given in Table 4. If a radionuclide was not present at a level "greater than or equal to the LLD" (\geq LLD), then the value is expressed as "less than the LLD" ($<$ LLD). In each case, the measured LLDs either met or were below the levels required by the PNPP ODCM.

The radionuclide composition of all gaseous radioactive effluents for a continuous-mode, ground-level release is given in Table 5. If a radionuclide was not present at a level "greater than or equal to the LLD" (\geq LLD), then the value is expressed as "less than the LLD" ($<$ LLD). In each case, LLDs were met or were below the levels required by the ODCM.

Table 4: Summation of All Gaseous Effluents

	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST. TOTAL ERROR, %
A. Fission and Activation Products					
1. Total Released, Ci	6.04E-01	4.83E+00	5.77E-01	8.88E-01	1.00E+01
2. Average Release Rate, μ Ci/sec	7.68E-02	6.15E+00	7.26E-02	1.11E-01	
3. Percent of Applicable Limit, %	N/A	N/A	N/A	N/A	
B. Iodine					
1. Total Iodine-131 Released, Ci	3.49E-04	1.92E-03	3.43E-04	3.62E-04	1.00E+01
2. Average Release Rate, μ Ci/sec	4.44E-05	2.45E-04	4.32E-05	4.55E-05	
3. Percent of Applicable Limit, %	N/A	N/A	N/A	N/A	
C. Particulates with Half-Lives > 8 days					
1. Total Released, Ci	1.27E-04	2.52E-04	4.10E-04	4.40E-04	1.00E+01
2. Average Release Rate, μ Ci/sec	1.61E-05	3.20E-05	5.16E-05	5.53E-05	
3. Percent of Applicable Limit, %	N/A	N/A	N/A	N/A	
D. Alpha Activity, Ci	<LLD	<LLD	<LLD	<LLD	
E. Tritium					
1. Total Released, Ci	<LLD	4.17E+00	2.51E+01	9.03E+00	1.00E+01
2. Average Release Rate, μ Ci/sec	<LLD	5.31E-01	3.16E+00	1.14E+00	
3. Percent of ODCM Limit, %	N/A	N/A	N/A	N/A	

<LLD - Less than the lower limit of detection

N/A - Not Applicable, the ODCM does not have a limit for fission and activation products.

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Table 5: Radioactive Gaseous Effluent Nuclide Composition

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	ANNUAL TOTAL
A. FISSION AND ACTIVATION GASES						
Tritium	Ci	<LLD	4.17E+00	2.51E+01	9.03E+00	3.83E+01
Argon-14	Ci	<LLD	5.78E-03	<LLD	<LLD	5.78E-03
Krypton-85	Ci	<LLD	1.62E+00	<LLD	<LLD	1.62E+00
Krypton-85m	Ci	6.22E-02	6.00E-01	<LLD	<LLD	6.62E-01
Krypton-87	Ci	<LLD	1.06E-01	<LLD	<LLD	1.06E-01
Krypton-88	Ci	<LLD	2.61E-01	<LLD	<LLD	2.61E-01
Xenon-131m	Ci	<LLD	1.65E-01	<LLD	<LLD	1.65E-01
Xenon-133	Ci	4.58E-01	3.26E+01	1.27E-01	1.84E-01	3.34E+01
Xenon-133m	Ci	<LLD	6.96E-01	<LLD	<LLD	6.96E-01
Xenon-135	Ci	8.05E-02	9.80E+00	4.38E-01	6.51E-01	1.10E+01
Xenon-135m	Ci	3.27E-03	2.12E+00	1.25E-02	4.52E-02	2.18E+00
Xenon-137	Ci	<LLD	1.16E-01	<LLD	<LLD	1.16E-01
Xenon-138	Ci	<LLD	2.05E-01	<LLD	<LLD	2.05E-01
Total for Period	Ci	6.04E-01	5.25E+01	2.57E+01	9.91E+00	8.87E+01
B. IODINE						
Iodine-131	Ci	3.49E-04	1.92E-03	3.43E-04	3.62E-04	2.97E-03
Iodine-132	Ci	1.08E-04	1.46E-04	<LLD	8.69E-05	3.41E-04
Iodine-133	Ci	9.00E-04	1.81E-03	5.37E-04	6.57E-04	3.90E-03
Iodine-134	Ci	1.22E-04	7.69E-05	<LLD	<LLD	8.03E-04
Iodine-135	Ci	3.22E-04	4.81E-04	<LLD	1.00E-04	9.03E-04
Total for Period	Ci	1.80E-03	4.44E-03	8.80E-04	1.21E-03	1.21E-03
B. PARTICULATE						
Manganese-56	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cobalt-56	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rubidium-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rubidium-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Strontium-89	Ci	3.36E-06	8.57E-06	8.72E-06	8.70E-06	2.94E+01
Strontium-90	Ci	6.77E-07	5.86E-07	<LLD	<LLD	<LLD
Strontium-91	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Yttrium-91m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Strontium-92	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Technetium-104	Ci	<LLD	5.16E-06	<LLD	<LLD	<LLD
Cesium-138	Ci	4.36E-05	7.27E-05	<LLD	1.43E-04	2.59E-04
Barium-139	Ci	7.94E-05	1.65E-04	4.01E-04	2.89E-04	9.43E-04
Barium-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Lanthanum-142	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	1.27E-04	2.52E-04	4.10E-04	4.40E-04	1.23E-03

<LLD - Less than the lower limit of detection

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Solid Waste

Five (5) shipments of PNPP solid radioactive waste were transported, by truck, directly to the Barnwell, South Carolina, disposal facility for burial. Solid radioactive waste from PNPP was also combined waste from several other utilities by intermediate vendors (GTS Duratek in Oak Ridge, TN; ATG in Oak Ridge TN, and Richland, WA; and Studsvik in Erwin, TN). This waste was ultimately sent to the Barnwell, South Carolina, or Clive, Utah, disposal facilities for burial. No irradiated fuel was transported from PNPP in 2000. The solid radioactive waste summary in Table 6 include all PNPP shipments.

Table 6: Solid Waste Shipped Offsite for Burial or Disposal

A. Type of Solid Waste Shipped	VOLUME, m ³	ACTIVITY, Ci	EST. TOTAL ERROR, %
Spent resin, filter sludge, evaporator bottoms, etc.	15.6	181.8	+/- 25
Dry compressible waste, contaminated equipment, etc.	46.8	6.32	+/- 25
Irradiated components, control rods, etc.	0	0	+/- 25
Other (describe)	0	0	+/- 25

B. Estimate of Major ⁽¹⁾ Nuclide Composition (by type of waste)	RADIONUCLIDE	ABUNDANCE %	EST. TOTAL ERROR, %
Spent Resin, Filter Sludge, Evaporator Bottoms, etc.	Mn-54	6.0	± 25
	Fe-55	24.3	
	Co-58	3.9	
	Co-60	40.7	
	Zn-65	18.8	
	Cs-137	1.4	
	Ce-144	1.9	
Dry Compressible Waste, Contaminated Equipment, etc.	Mn-54	1.5	± 25
	Fe-55	39.0	
	Co-60	44.6	
	Ni-63	1.7	
	Zn-65	6.9	
	Ce-144	3.8	
Irradiated Components, Control Rods, etc.	None		± 25
Other (describe)	None		

C. Disposition	Number of Shipments	Mode of Transportation	Destination
Solid Waste	5 ⁽²⁾	Truck	Barnwell, SC
Irradiated Fuel Shipments	0	N/A	N/A

N/A -- Not Applicable

(1) -- "Major" is defined as any individual radionuclide identified as >1% of the waste type abundance.

(2) -- Additional shipments were combined with waste from other utilities by GTS Duratek in Oak Ridge, TN; ATG in Oak Ridge, TN and Richland, WA; and Studsvik in Erwin, TN.

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METEOROLOGICAL DATA

The Meteorological Monitoring System at PNPP consists of a 60-meter tower equipped with two independent systems for measuring wind speed, wind direction, and temperature at both 10-meter and 60-meter heights. The tower also has instrumentation to measure dew point and barometric pressure. Data is logged from the tower through separate data loggers, and transmitted to a common plant computer. This system compiles the data and calculates a variety of atmospheric parameters, communicates with the Meteorological Information Dose Assessment System (MIDAS), and sends data over communication links to the plant Control Room.

DOSE ASSESSMENT

The maximum concentration for any radioactive release is controlled by the limits set forth in Title 10 of the Code of Federal Regulations, Part 20 (10CFR20). Sampling, analyzing, processing, and monitoring the effluent stream ensures compliance with these concentration limits. Dose limit compliance is verified through periodic dose assessment calculations. Some dose calculations are conservatively performed for a hypothetical individual who is assumed to reside on the site boundary at the highest potential dose location all year. This person, called the "maximum individual", would incur the maximum potential dose from direct exposure (air plus ground plus water), inhalation, and ingestion of water, milk, vegetation, and fish. Because no one actually meets these criteria, the actual dose received by a real member of the public is significantly less than what is calculated for this hypothetical individual.

Dose calculations for this maximum individual at the site boundary are performed for two cases. First, they are performed using data for a 360° radius around the plant site (land and water based meteorological sectors), even though some of these sectors are over Lake Erie, which has no permanent residents. The second calculation is performed considering only those sectors around the plant in which people reside (land-based meteorological sectors).

The calculated hypothetical, maximum individual dose values at the site boundary are provided in Table 7. This table considers all meteorological sectors around PNPP and provides either the total body or worst-case, organ dose values. If any radionuclide was not present at a level greater than the LLD, it was not used in the dose calculations.

Table 7: Maximum Individual Site Boundary Dose, Considering All Sectors

TYPE OF DOSE	ORGAN	ESTIMATED DOSE, mrem	LIMIT	% OF LIMIT
Liquid Effluent	Total Body	2.02E-04	3.0E+00	6.7E-03
	GI-Tract	2.03E-04	1.0E+01	2.0E-03
Noble Gas - gamma air - beta air	N/A	1.42E-02	1.0E+01	1.4E-01
	N/A	2.38E-02	2.0E+01	1.2E-01
Noble Gas	Total body	6.33E-03	5.0E+00	1.3E-01
	Skin	1.73E-02	1.5E+01	1.2E-01
Particulate & Iodine	Thyroid	2.13E-01	1.5E+01	1.4E+00

N/A – Not Applicable

The calculated hypothetical, maximum population dose values at the site boundary are provided in Table 8. This table considers all meteorological sectors around PNPP and provides either the total body or worst-case, organ dose values.

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Table 8: Population Dose, Considering All Sectors

	ORGAN	ESTIMATED DOSE person-rem
Liquid Effluent	Total Body	1.5E-02
	Thyroid	1.5E-02
Gaseous Effluent	Total Body	5.7E-03
	Thyroid	3.4E-03

Table 9 provides the calculated hypothetical maximum site boundary dose values considering only the land-based sectors. If any radionuclide was not present at a level greater than the LLD, it was not used in the dose calculations.

Table 9: Maximum Individual Site Boundary Dose, Considering Sectors on Land

TYPE OF DOSE	ORGAN	ESTIMATED DOSE, mrem	LIMIT	% OF LIMIT
Liquid Effluent	Total Body	7.92E-04	3.0E+00	2.6E-02
	GI-Tract	7.93E-04	1.0E+01	7.9E-03
Noble Gas - gamma air - beta air	N/A	3.60E-03	1.0E+01	3.6E-02
	N/A	4.12E-03	2.0E+01	2.1E-02
Noble Gas	Total body	1.60E-03	5.0E+00	3.2E-02
	Skin	3.90E-03	1.5E+01	2.6E-02
Particulate & Iodine	Thyroid	1.86E-01	1.5E+01	1.2E+00

N/A – Not Applicable

Other dose calculations are performed for a hypothetical individual who is assumed to be inside the site boundary for some specified amount of time. This person would receive the maximum dose during the time spent inside site boundary. Because no one actually meets the criteria established for these conservative calculations, the actual dose received by a real member of the public is significantly less than what is calculated for this hypothetical individual. This dose is assessed relative to the offsite dose, and considers dilution, dispersion, and occupancy factors.

The highest hypothetical dose from liquid effluents to a member of the public inside the site boundary is to a person who is fishing on Lake Erie from the shore on PNPP property. The calculations assume that this person will spend 60 hours per year fishing, with a liquid dilution factor of 10. The ratio of the exposure pathway to the doses calculated for offsite locations yields the dose values shown in Table 10.

Table 10: Maximum Site Dose from Liquid Effluents

	TOTAL BODY DOSE, mrem	ORGAN DOSE, mrem
First Quarter	(1)	(1)
Second Quarter	3.1E-06	3.6E-06
Third Quarter	3.1E-06	3.3E-06
Fourth Quarter	2.9E-06	3.4E-06
Annual	8.7E-06	1.0E-05

(1) – No liquid radioactive effluent releases during this period

Although several cases were evaluated to determine the highest hypothetical dose from gaseous effluents to members of the public inside site boundary, the activity inside the site boundary with the highest dose potential is also shoreline fishing. The cases evaluated included traversing a public road within the site boundary, shoreline fishing (assuming fishing 60 hours per year), non-plant related training, car-pooling, and job interviews. The maximum on-site gaseous doses generated are shown in Table 11.

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Table 11: Maximum Site Dose from Gaseous Effluents

	TOTAL BODY DOSE, mrem	ORGAN DOSE, mrem
First Quarter	6.7E-06	3.3E-04
Second Quarter	8.2E-04	2.2E-02
Third Quarter	1.4E-03	1.8E-03
Fourth Quarter	5.6E-04	1.3E-03
Annual	2.7E-03	2.5E-02

An average total body dose to individual members of the public is then determined by combining the dose from gaseous and liquid radiological effluents. The dose from gaseous radiological effluents is based upon the population that lives within 50 miles of PNPP (2,420,000 people). The dose from liquid radiological effluents is determined for the population that receives drinking water from intakes within 50 miles of PNPP (1,820,000 people). The results of this calculation are provided in Table 12.

Table 12: Average Individual Total Body Dose

	LIQUID EFFLUENTS	GASEOUS EFFLUENTS
First Quarter	(1)	2.5E-11
Second Quarter	3.2E-11	3.0E-09
Third Quarter	4.4E-11	1.9E-10
Fourth Quarter	7.4E-12	7.6E-10
Annual	8.3E-11	3.5E-09

(1) – No liquid radioactive effluent releases during this period

ABNORMAL RELEASES

There were two abnormal radioactive release events, during 2000.

Turbine Bldg. HVAC (M35) System Condensate Drains Effluent Tritium Release

During routine monitoring of the Turbine Building HVAC (M35) system condensate drains on August 03, 2000, tritium was detected in the effluent. This system was not expected to contain radioactivity, nor was the discharge from this system a radioactive liquid effluent discharge point.

The condensate drains collected condensed moisture entrained in the intake air to the M35 system. By plant design, the condensed moisture from the outside air was discharged to the plant's storm drains as radiologically-clean effluent. The routing of the M35 system condensate drains to the plant's storm drains was implemented to remove a "radioactively clean" source of water from the radioactive liquid treatment system.

In accordance with the PNPP ODCM, this incident was considered an abnormal release. Although believed to be only a few days, the exact duration for the release could not be determined. The release was estimated to have started after June 26, 2000, which was the last time the M35 system was sampled and analyzed to have no detectable radioactivity. The immediate corrective action was to route the M35 drains to the radioactive liquid treatment system for processing.

The measured tritium activity of 1.05E-06 $\mu\text{Ci/mL}$ was 1.7E-03% of the 10CFR20, Appendix B, Table 2, Column 2 effluent concentration limit. The amount of tritium released over 37.964 days was calculated to be 2.86E-03 Ci. Since these dose values are well below any regulatory limits, this abnormal release (refer to Table 13) had minimal dose consequence to the general public.

The most probable cause for this event was the recycling of the radioactive gaseous treatment system effluent vent discharges back into the M35 system as part of the air intake. Three factors combined

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to contribute to the apparent causes associated with this event: 1) the gaseous treatment system effluent vents are considered ground-level release points, 2) a build-up of tritium in the plant, and 3) the atmospheric high humidity and very little wind. It is postulated that the low levels of tritium in the effluent vents being short-cycled back into the M35 system intakes, combined with the contributing factors, resulted in the tritium being concentrated in the M35 drains.

Table 13: Turbine Bldg. HVAC Condensate Drain System Abnormal Release

	ORGAN	ESTIMATED DOSE, mrem	ANNUAL LIMIT	% OF LIMIT
Liquid Effluent	Total body	5.90E-04	3.0E+00	2.6E-02
	GI-Tract	5.90E-04	1.0E+01	7.9E-03

The routing of the M35 drains to the storm drains system was to remove a “radioactively clean” source of water from the radioactive liquid treatment system. By reducing the input of “radioactively clean” water into the radioactive liquid treatment system, the need for discharges is significantly reduced, thus reducing the dose impact on the general public. At the time, engineering recognized the potential for radioactive material to enter the storm drains via this path. Monitoring was implemented, and corrective actions put in place should radioactivity be detected.

The most probable cause of this event was a combination of two factors: 1) the build-up of tritium in plant water systems due to boron leaking from the control rod blades and the near “zero discharge” radioactive liquid discharge policy; and 2) the meteorological conditions present in early August, 2000. The atmospheric high humidity, stability (very little wind), and PNPP’s ground-level gaseous release points combined to recycle and condense the tritium-bearing, moisture on the Turbine Bldg. HVAC intake air condensers.

Unit 1 Containment Vacuum Breaker Inadvertent Opening

On June 04, 2000, at 09:20, the Unit 1 containment vacuum breaker 1M17-F0030 was inadvertently opened, which resulted in a potential airborne radioactive effluent release to the environment. The duration of the release was approximately 20 minutes. This incident was considered an abnormal release in accordance with the PNPP ODCM. In accordance with the PNPP ODCM, a grab sample was obtained of the Unit 1 Containment Building atmosphere and analyzed for principal gamma emitters. Based on the analytical results and an estimated flow rate of 5000 cfm, compliance with the limits for Derived Air Concentration (0.0271 $\mu\text{Ci/cc}$) and 10CFR50 (5.68E-05 $\mu\text{Ci/cc}$) was verified. The dose contributions from this event (refer to Table 14) had minimal dose consequence to the general public. Refer to Appendix D: 2000 Abnormal Release Summary and Meteorological Data for compliance data, dose summaries and meteorological data.

Table 14: Vacuum Breaker Abnormal Event Dose Contribution

	ORGAN	ESTIMATED DOSE, mrem	ANNUAL LIMIT	% OF LIMIT
Noble Gas -air gamma -air beta	NA	4.29E-07	1.0E+01	4.3E-06
	NA	7.57E-07	2.0E+01	3.8E-06
Noble Gas	Total Body	2.59E-07	5.0E+00	5.2E-06
	Skin	6.97E-07	1.5E+01	4.6E-06
Particulate & Iodine	Thyroid	2.08E-04	1.5E+01	1.4E-03

The apparent cause of this event was due an inadequate pre-job brief by not ensuring the worker was aware of the surroundings. A contract electrician, who was routing a temporary power cable between the vacuum breaker test panel and a contaminated storage area, inadvertently bumped the test switch with the power cable, which resulted in the test switch shifting into the test position; thus, opening the breaker to the outside environment.

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NON-COMPLIANCES

There was one (1) non-compliance to the ODCM Controls requirements in 2000.

The Emergency Service Water flow monitor, 1P45-N0271, was out-of-service for greater than 30 days. On June 06, 2000, a new flow monitor was installed. On July 11, 2000, at 09:00, the monitor was taken out of service as a result of false flow/weir indications. As a result of an engineering evaluation, an Engineering design change was required to resolve the erratic flow indications with the newly installed replacement instrument. The design change was installed and the hardware declared operable on December 11, 2000, at 11:05, which meant the flow monitor was inoperable for 163 days. In accordance with Control 3.3.7.9, Action b, the flow monitor was declared inoperable and the compensatory requirements of Table 3.3.7.9-1, Action 113, were implemented.

Offsite Dose Calculation Manual Changes

During this reporting period, there were four (4) changes to the Offsite Dose Calculation Manual.

- ◆ The actual dose rate limits were incorporated into the Section 3.1 versus referencing 10CFR20. This change also incorporated radioactive gaseous batch releases into Section 3.0. Additionally, action statements in the Notes in Sections 2.1.1.1 and 3.1 were reworded in accordance with NRC Inspection 98-0022.
- ◆ Figure 5.1-1 was revised to remove REMP sample location #77 and to add sample location #2. Table 3.3.7.10-1, ACTION 121 and 125 was revised to read "...analyzed for principal gamma emitters as required by Table 4.11.2.1.2-1". Table 3.3.7.10-1, ACTION 122 was revised to read "...collected within 4 hours...".
- ◆ ODCM Table 3.3.7.10-1, ACTION 125 was revised to clarify that it only applied to the Containment Vessel and Drywell Purge (M14) system. Table 3.11.2.1.2-1, release path A was revised to apply to the Containment Vessel and Drywell Purge (M14) and Combustible Gas Control (M15) systems. References to calendar quarter and calendar year were removed. Removed reference to the discussion on the initial Annual Radiological Environmental Operating Report. The initial report was an administrative document and is no longer applicable.
- ◆ Table 1.1 was revised to define the refuel frequency (R) to reflect the 24-month fuel cycle.

Process Control Program Changes

During 2000, there were two (2) change to the Process Control Program during.

- ◆ Table 1.1 was revised to define the refuel frequency (R) to reflect the 24-month fuel cycle.
- ◆ The reference to Tech Specifications 6.13 was revised to reference ORM Section 7.9.

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RADIOLOGICAL ENVIRONMENTAL MONITORING

INTRODUCTION

The Radiological Environmental Monitoring Program (REMP) was established at PNPP for several reasons. First, it verifies the adequacy of plant design and operation to control radioactive materials and limit effluent releases. Second, it assesses the radiological impact, if any, that the plant has had on the surrounding environment. Third, it ensures compliance with regulatory guidelines. The REMP is conducted in accordance with the PNPP Operating License, Appendix B, Technical Specifications and the ODCM. The Nuclear Regulatory Commission (NRC) established the REMP requirements.

A wide variety of samples are collected as part of the PNPP REMP. The selection of sample types, sampling locations, and sample collection frequency are based on many things. Potential pathways for the transfer of radionuclides through the environment to humans, sample availability, local meteorology, population characteristics, land use and NRC requirements are all considered.

To ensure that the REMP data are meaningful and useful, detailed sampling methods and procedures are followed. This ensures that samples are collected in the same manner and from the same locations each time. All samples are packaged on site, then shipped to an independent vendor laboratory for analysis. The vendor laboratory analyzes the samples and reports results to the PNPP Chemistry Unit staff, the Lake County General Health District, and the State of Ohio Department of Health.

The REMP began in 1981 with 24 direct radiation monitoring locations, four sediment locations, and two fish sampling locations. In 1982, collections of air, water, milk, food products, and feed/silage were added. Vegetation, precipitation and soil were added in 1985. Although the NRC did not require these last three media, they were incorporated into the program to establish baseline data. In 1993, feed/silage sampling was dropped from the program, based on ten years worth of data. For the same reason, strontium analyses were deleted from the program in 1994, gross beta and tritium were deleted from precipitation analyses in 1995, and precipitation sampling was deleted entirely in 1996. In 1999, grass and soil sampling were dropped from the program. Although not required, the grass, soil and precipitation sampling sites remain available, if future sampling is desired.

SAMPLING LOCATIONS

REMP samples are collected at numerous locations, both on site and up to 22 miles away from the plant. Sampling locations are divided into two general categories: indicator and control. Indicator locations are those which would be most likely to display effects caused by plant operation. They are relatively close to the plant. Control locations are those which are considered to be unaffected by plant operation. Typically, they are a greater distance from the plant, in the least prevalent wind directions. Data obtained from the indicator locations are compared with data from the control locations. This comparison allows naturally occurring background radiation to be taken into account when evaluating any radiological impact PNPP may have had on the environment. Table 15, Figure 2, Figure 3 and Figure 4 identify the PNPP REMP sampling locations.

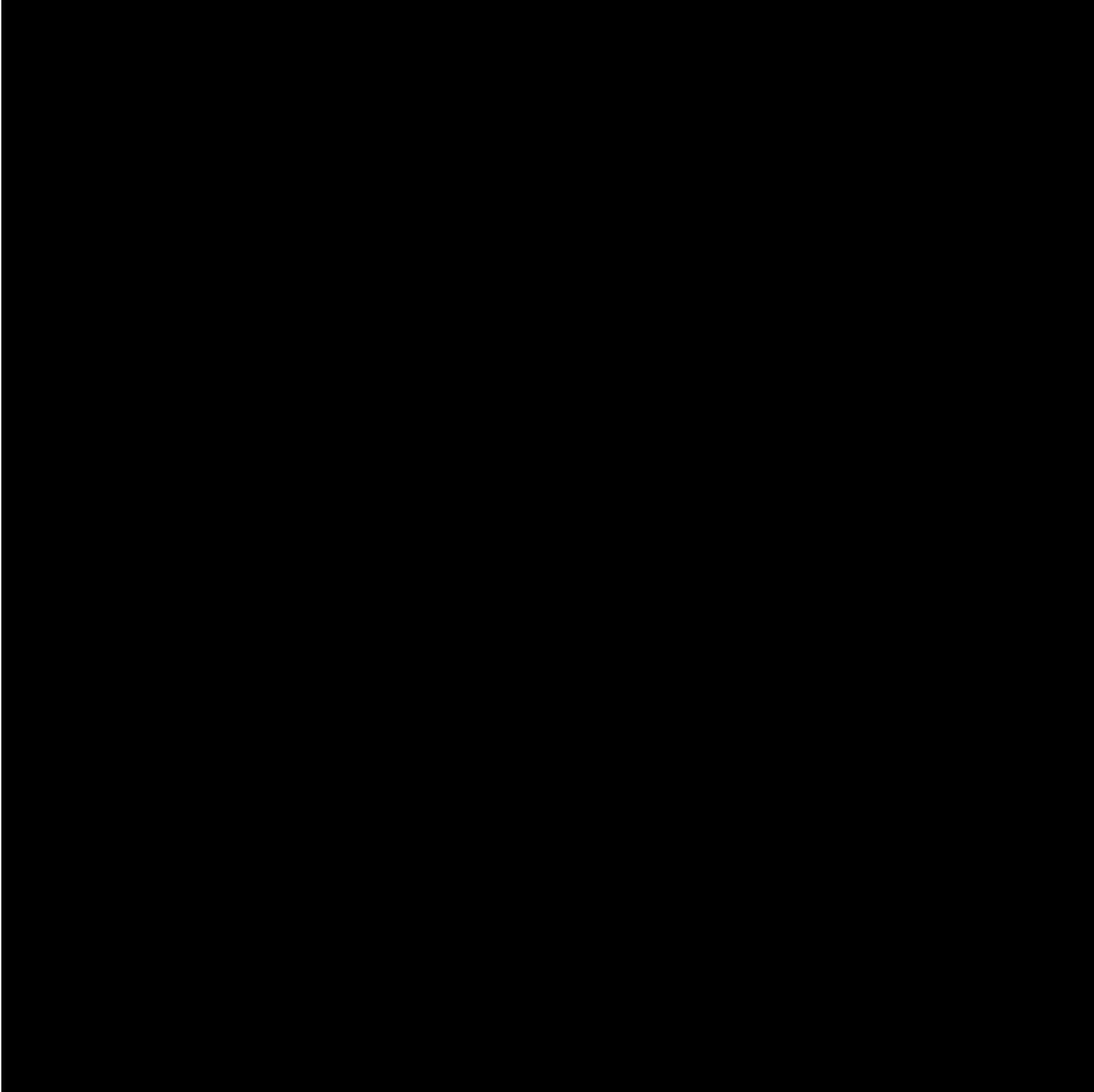
Many REMP samples are collected in addition to those required by the PNPP ODCM. The ODCM requirements for each sample type are discussed in more detail below. Sample types and locations required by the ODCM are shown in **Bold** in Table 15.

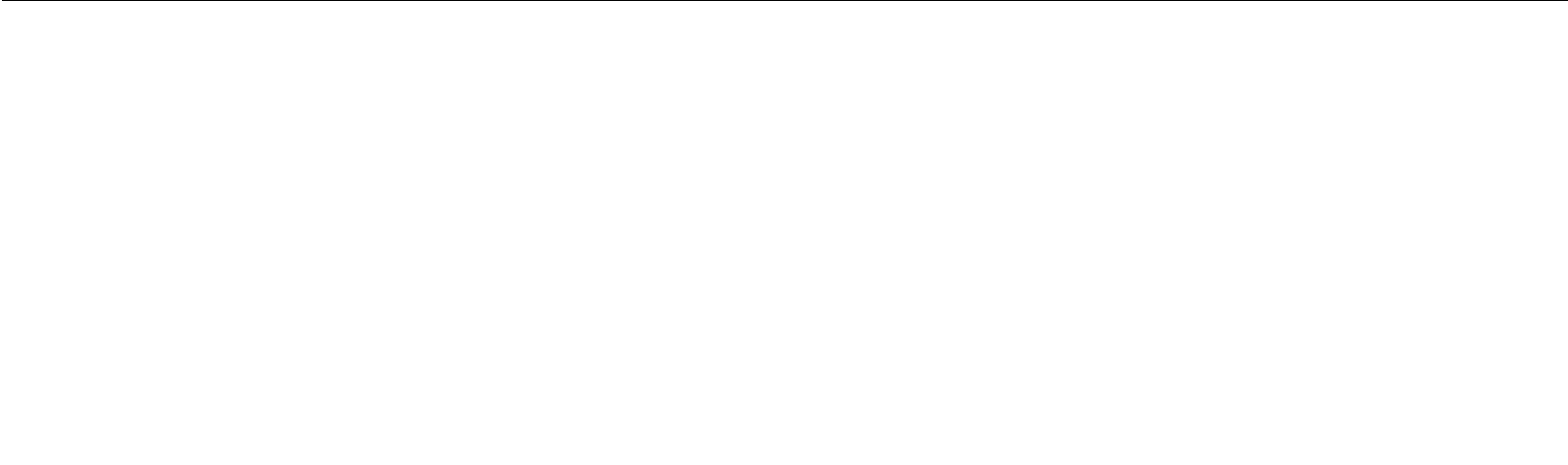
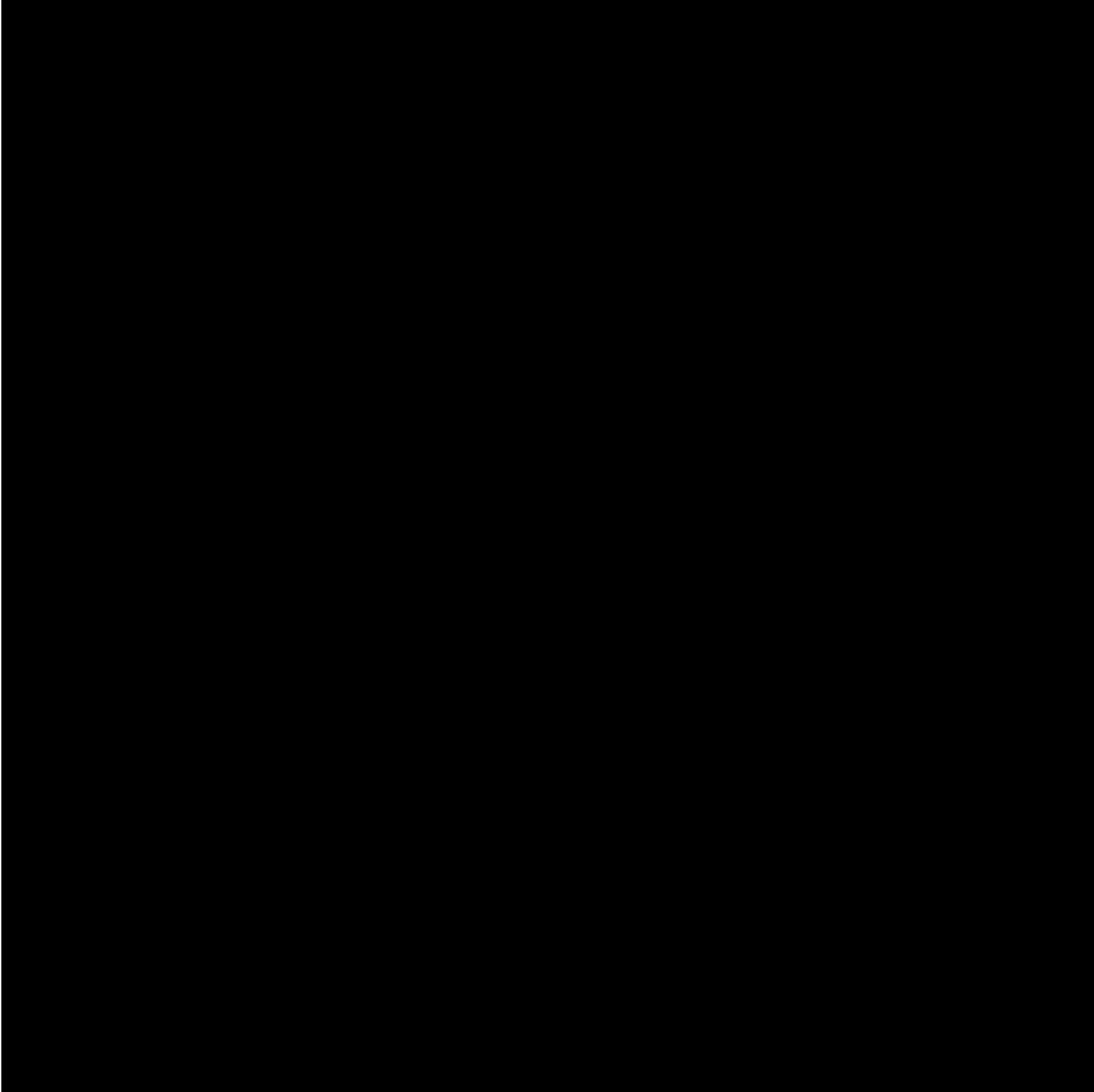
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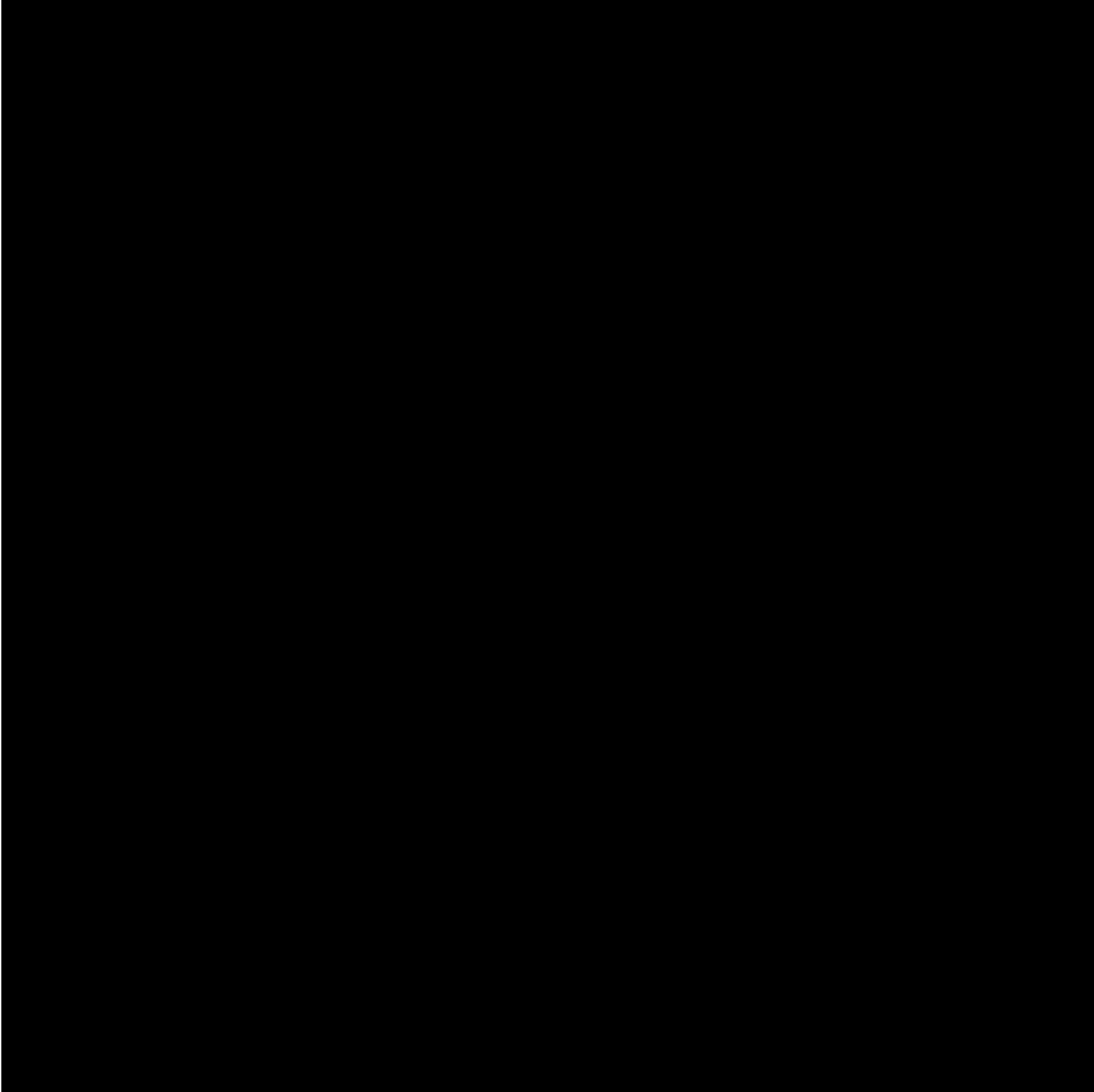
Table 15: REMP Sampling Locations

Location #	Description	Miles	Direction	Media ⁽¹⁾
1	Chapel Road	3.4	ENE	TLD, AIP
2	Kanda Garden	1.9	ENE	Food Products
3	Meteorological Tower	1.0	SE	TLD, AIP, Soil
4	Site Boundary	0.7	S	TLD, AIP, Soil
5	Quincy Substation	0.6	SW	TLD, Air
6	Concord Service Center	11.0	SSW	TLD, AIP, Soil, Veg
7	Site Boundary	0.6	NE	TLD, AIP, Soil, Veg
8	Site Boundary	0.8	E	TLD
9	Site Boundary	0.7	ESE	TLD, Soil
10	Site Boundary	0.8	SSE	TLD
11	Parmly Rd.	0.6	SSW	TLD
12	Site Boundary	0.6	WSW	TLD, Soil
13	Madison-on-the-Lake	4.7	ENE	TLD
14	Hubbard Rd.	4.9	E	TLD
15	Eagle St. Substation	5.1	ESE	TLD
16	Eubank Garden.	0.8	S	Food Products
20	Rainbow Farms	1.9	E	Food Products
21	Hardy Rd.	5.1	WSW	TLD
23	High St. Substation	7.9	WSW	TLD
24	St. Clair Ave.	15.1	SW	TLD
25	Offshore - PNPP discharge	0.6	NNW	Sediment, Fish
26	Offshore - Redbird	4.2	ENE	Sediment
27	Offshore - Fairport Harbor	7.9	WSW	Sediment
28	CEI Ashtabula Plant Intake	22.0	ENE	Water
29	River Rd.	4.3	SSE	TLD
30	Lane Rd.	4.8	SSW	TLD
31	Wood and River Rd.	4.8	SE	TLD
32	Offshore - Mentor	15.8	WSW	Sediment, Fish
33	River Rd.	4.5	S	TLD
34	PNPP Intake	0.7	NW	Water
35	Site Boundary	0.6	E	TLD, AIP, Soil, Veg
36	Lake County Water Plant	3.9	WSW	TLD, Water
37	Gerlica Farm	1.5	ENE	Food Products
42	Parmly Rd.	0.8	S	Veg
51	Rettger Milk Farm	9.6	S	Milk
53	Neff Perkins	0.5	WSW	TLD
54	Hale Rd. School	4.6	SW	TLD
55	Center Rd.	2.5	S	TLD
56	Madison High School	4.0	ESE	TLD
58	Antioch Rd.	0.8	ENE	TLD
59	Lake Shoreline at Green Rd.	4.0	ENE	Water
60	Lake Shoreline at Perry Park	1.0	WSW	Water
61	Keller Milk Farm	7.4	SE	Milk
63	Minor Stream Mouth	0.08	NNE	Sediment
64	Northwest Drain Mouth	0.09	NW	Sediment
65	Major Stream Mouth	0.18	W	Sediment
70	H&H Farm Stand	16.2	SSW	Food Products
71	Mosley Farm	7.9	SE	Milk

(1) AIP = Air, Iodine and Particulate
 Veg = Vegetation
 TLD = Thermoluminescent Dosimeter







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Sample Analysis

When environmental samples are analyzed for radioactivity, several types of measurements are performed to provide information about the types of radiation and radionuclides present. The major analyses that are performed are discussed below.

Gross beta activity measures the total amount of beta-emitting radioactivity present in a sample, and acts as a tool to identify samples that may require further analysis. Beta radiation may be released by many different radionuclides. Since beta decay results in a continuous energy spectrum rather than the discrete energy levels, or "peaks", associated with gamma radiation, identification of specific beta-emitting nuclides is much more difficult. Therefore, gross beta activity only indicates whether the sample contains normal, or abnormal amounts of beta-emitting radioactivity; it does not specifically identify the radionuclides present.

Gamma spectral analysis provides more specific information than does the analysis for gross beta activity. Gamma spectral analysis identifies each radionuclide, and the amount of radioactivity, present in the sample emitting gamma radiation. Each radionuclide has a very specific "fingerprint" that allows for accurate identification and quantification.

Iodine activity analysis measures the amount of radioactive iodine present in a sample. Some media (for example, air sample charcoal cartridges) are analyzed directly by gamma spectral analysis. With other media (for example, milk), the radioiodines are extracted by chemical separation before being analyzed by gamma spectral analysis.

Tritium activity analysis measures the amount of the radionuclide tritium (H-3) present in a sample. Tritium is an isotope of hydrogen that emits low-energy beta particles. Tritium occurs naturally and is also man-made.

Gamma doses received by Thermoluminescent Dosimeters (TLD) while in the field are determined by a special laboratory procedure. Thermoluminescence is a process by which ionizing radiation interacts with the sensitive phosphor material in the TLD. Energy is trapped in the TLD material and can be stored for months or years. This capability provides an excellent method to measure the dose received over long periods of time. The amount of energy that was stored in the TLD as a result of interaction with radiation is released by a controlled heating process and measured in a calibrated reading system. As the TLD is heated, the phosphor releases the stored energy as light. The amount of light is directly proportional to the amount of radiation to which the TLD was exposed. The reading process also zeroes the TLD and prepares it for reuse. Table 16 provides a list of the analyses performed on environmental samples collected for the PNPP REMP in 2000.

Sample results are often reported as less than the lower limit of detection (< LLD), which is defined as the smallest amount of radioactive material that will show a positive result for which there can be confidence that radioactivity is present. This statistical parameter is used as a measure of the sensitivity of a sample analysis. When a measurement is reported as < LLD, it means that no radioactivity was detected at a value above, or equal to the appropriate ODCM table value. The NRC has established LLD values for REMP sample analyses. The vendor laboratory for REMP sample analyses was able to comply with those values in 2000.

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Table 16: REMP Sample Analyses

TYPE	SAMPLE	FREQUENCY	ANALYSIS
Atmospheric Monitoring	Airborne Particulates	Weekly Quarterly	Gross Beta Activity Gamma Spectral Analysis
	Airborne Radioiodine	Weekly	Iodine-131
Terrestrial Monitoring	Milk	Bi-Monthly	Gamma Spectral Analysis Iodine-131
	Food Products	Monthly	Gamma Spectral Analysis
	Vegetation	As Required	Gamma Spectral Analysis
	Soil	As Required	Gamma Spectral Analysis
Aquatic Monitoring	Water	Monthly	Gross Beta Activity, Gamma Spectral Analysis Tritium Activity
		Quarterly	
	Fish	Biannually	Gamma Spectral Analysis
	Sediment	Biannually	Gamma Spectral Analysis
Direct Radiation Monitoring	TLD	Quarterly	Gamma Dose
		Annually	Gamma Dose

2000 SAMPLING PROGRAM

The contribution of radionuclides to the environment resulting from PNPP operation is assessed by comparing results from the 2000 program with pre-operational data (i.e., data from before 1986), operational data from previous years, and control location data. The results for each sample type are discussed below and compared to historical data to determine if there are any observable trends. All results are expressed as concentrations. Refer to Appendix A, 2000 REMP Data Summary, and Appendix B, 2000 REMP Data, for detailed results. The NRC requires special reporting whenever sample analysis results exceed set limits. No values exceeded these reporting levels in 2000.

Program Changes

As a result of the increasing unavailability of produce in recent years, a concerted effort was made to acquire new sampling locations. In 2000, a new garden was added to the program. The PNPP ODCM requirements for a location in the eastern sector was satisfied with the addition of location #20, Rainbow Farms, which is located 1.9 miles from the site.

Missed Samples

On occasion, samples cannot be collected. This can be due to a variety of events, including equipment malfunction, animal husbandry practices, or lost shipments. Events may also occur which prevent a sample from being collected in the normal way, or prevent a complete sample from being collected. The drying period for goats is an annual occurrence, since unlike cows, goats cannot produce milk year-round. Missing TLDs may be the result of vandalism. When vandalism has been identified as a recurring problem, the TLD is relocated. If the loss of a TLD is determined to be a single or unusual event, it is not normally relocated. Table 17 provides information on samples missed during 2000.

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Table 17: Missed REMP Samples in 2000

MEDIA	LOCATION	DATE	REASON
Food Products	All	April, 2000	Vegetables not ready for harvest
Food Products	All	May, 2000	Vegetables not ready for harvest
Food Products	2	June, 2000	Vegetables not ready for harvest
Food Products	16	June, 2000	Vegetables not ready for harvest
Food Products	20	June, 2000	Vegetables not ready for harvest
Food Products	37	June, 2000	Vegetables not ready for harvest
Food Products	2	11/13/2000	No samples available
Food Products	16	11/13/2000	No samples available
Lake Water	59	02/24/2000	Sample unavailable due to frozen shoreline
Lake Water	60	02/24/2000	Sample unavailable due to frozen shoreline
Lake Water	59	12/28/2000	Sample unavailable due to frozen shoreline
Lake Water	60	12/28/2000	Sample unavailable due to frozen shoreline
Milk	61	January, February, March, April, October, November, December	Drying period for goats
Milk	61	08/24/2000	Sample lost in transit to vendor lab
Milk	71	08/24/2000	Sample lost in transit to vendor lab

Atmospheric Monitoring

Air

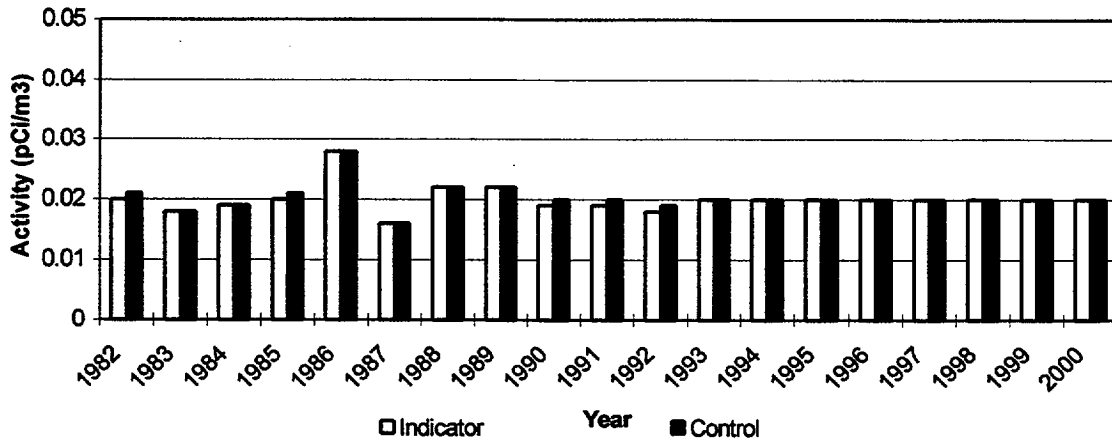
Air sampling is conducted to detect any increase in the concentration of airborne radionuclides. The PNPP ODCM requires five locations (four indicator and one control). Air sampling pumps are used to draw continuous samples at a rate of approximately two cubic foot per minute. The air is drawn through glass fiber filters (to collect particulate material) and a charcoal cartridge (to adsorb iodine). The samples are collected on a weekly basis, 52 weeks a year, from each of seven air sampling stations. Six (6) of these locations are within four miles of the plant site; the seventh is used as a control location and is eleven miles from PNPP.

Air samples are analyzed weekly for gross beta activity and radioiodine activity. The air samples are also analyzed by gamma spectral analysis quarterly. A total of 371 air samples were collected and analyzed in 2000.

Gross beta activity was detected in all air samples and ranged up to 0.06 pCi/m³. The annual average gross beta activity at both indicator and control locations was 0.02 pCi/m³. Historically, the concentration of gross beta in air has been essentially identical at indicator and control locations. Figure 5 graphs the results for all gross beta results for the year.

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Figure 5: Gross Beta Activity, in Air



Except for naturally occurring beryllium-7, no radionuclide was identified in the gamma spectral analysis above the LLD. Iodine-131 was not detected in any sample above the LLD of 0.05 pCi/m³.

Terrestrial Monitoring

Collecting and analyzing samples of milk, food products and vegetation provides data to assess the build-up of radionuclides that may be ingested by humans. The historical data from soil and vegetation samples provides information on the atmospheric radionuclide deposition. The PNPP ODCM requires neither vegetation nor soil samples.

Milk

Samples of milk are collected once each month from November through March, and twice each month from April through October. Sampling is increased during the summer because animals usually feed outside on pasture and not on stored feed. The PNPP REMP includes three (3) milk locations (two within five miles of the plant, and one control). Since the milk sampling locations did not meet the requirements of the ODCM (no milk-producing animals located within the required areas), food product sampling (discussed below) was performed. Milk was collected from the available locations, even though they did not meet the ODCM requirements. If new locations that meet the ODCM requirements are identified in the future, they will be added to the program.

Milk samples are analyzed by gamma spectral analysis for radioiodines and other radionuclides. A total of 48 milk samples were collected in 2000. Iodine was not detected above the LLD of 0.75 pCi/L in any of the samples. The concentrations of all radionuclides, except naturally occurring potassium-40, were below LLDs in all samples collected. The results for potassium-40 were similar at indicator and control locations, as expected.

Food Products

Food products can provide a direct pathway to humans by ingestion. They can absorb radionuclides from atmospheric deposition on soil or from irrigation water drawn from a lake or pond receiving airborne or liquid effluents. Also, radionuclides in the soil may be absorbed by the roots of the plants and become incorporated into the edible portions. Because there is not a sufficient number of milk sampling locations, the PNPP REMP is required to include two food product indicator locations and one control location. Food products are collected monthly during the growing season from four farms in the vicinity of PNPP. The control location for food products is 16.2 miles from PNPP.

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A total of seventy-six (76) food product samples were collected and analyzed by gamma spectral analysis in 2000. Five (5) food products were collected which included: beet greens, turnip greens, chinese cabbage, swiss chard and kale. Beryllium-7 and potassium-40, naturally-occurring radionuclides, were found in several samples, as expected. No other radionuclides were detected above the required LLDs.

Vegetation

Samples for vegetation (grass) were collected through 1999. Since the PNPP ODCM did not require these samples, vegetation sampling has been discontinued. The vegetation samples site remain available.

Soil

Samples of soil were collected through 1999. For all sample sites, the annual average concentrations were similar to those measured in previous years. Since the PNPP ODCM did not require these samples, soil sampling has been discontinued.

Aquatic Monitoring

Radionuclides may be present in Lake Erie from many sources other than the PNPP. These sources include atmospheric deposition, run-off/soil erosion, and releases of radioactivity in liquid effluents from hospitals, universities or other industrial facilities. These sources provide two forms of potential radiation exposure, external and internal. External exposure can occur from contact with water or shoreline sediments, while internal exposure can occur from either direct ingestion of radionuclides or the transfer of radionuclides through the aquatic food chain. Direct ingestion can occur from drinking the water, while the transfer via the aquatic food chain occurs from the eventual consumption of aquatic organisms, such as fish. To monitor these pathways, PNPP samples water, shoreline sediments, and fish.

Water

Water is sampled from five locations along Lake Erie in the vicinity of the PNPP as required by the PNPP ODCM. Samples from three locations are collected using composite sample pumps. The pumps are designed to collect water at regular intervals and composite it in a sample container. The containers are emptied monthly and the samples shipped to the laboratory for analysis. Samples from two locations are collected weekly and combined. Each month the combined sample is shipped for analysis.

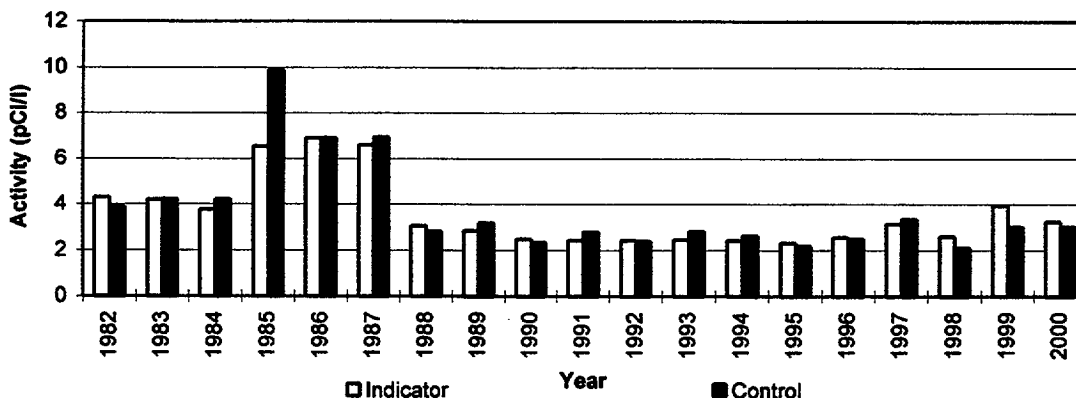
Fifty six (56) water samples were collected and analyzed for gross beta activity and gamma spectral analysis in 2000. From these monthly samples, a quarterly composite sample was obtained and analyzed for tritium activity.

Gross beta activity was detected in three (3) of the fifty-six (56) samples collected and none (0) of the twelve (12) control samples were above the ODCM LLD. The detectable (i.e., above the ODCM LLD) gross beta activity ranged from 3.09 pCi/L to 3.42 pCi/L. Referring to Figure 6, the annual average gross beta activity was 3.24 pCi/L at the indicator locations and 3.02 pCi/L at the control location, using the mean of values >LLD. The significant difference between the pre-1988 data and post-1988 data has been attributed to a change in vendor laboratories in 1987/1988. A comprehensive explanation is provided in the 1988 Annual Environmental Operating Report.

There were no radionuclides detected by gamma spectral analysis above the LLD. Tritium was not detected above the LLD value in any of the twenty (20) samples analyzed. These results are well within the range of those measured in previous years, which have ranged from below the LLD to 2,200 pCi/L.

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Figure 6: Annual Average Gross Beta Activity, in Water



Sediment

Sampling lake bottom sediments can provide an indication of the accumulation of particulate radionuclides which may lead to internal exposure to humans through the ingestion of fish, the re-suspension into drinking water, or as an external radiation source to fishermen and swimmers from shoreline exposure. Although the PNPP ODCM requires only one location, sediment is sampled twice each year from seven (7) locations. Two (2) of the sampling locations are also fish sampling locations. Sediment samples from offshore are collected using a hand dredge. Near shore samples are collected using a scoop. Fourteen (14) sediment samples were collected in 2000 and analyzed by gamma spectrometry.

The predominant radionuclide detected by gamma spectral analysis was naturally-occurring potassium-40. Potassium-40 has been detected in all samples, since the program began in 1981. Cesium-137 activity was also detected in seven (7) samples and ranged from 190.20 pCi/kg to 1460.90 pCi/kg. The annual average cesium-137 activity was 545.88 pCi/kg at the indicator locations and 1369.20 pCi/kg at the control location.

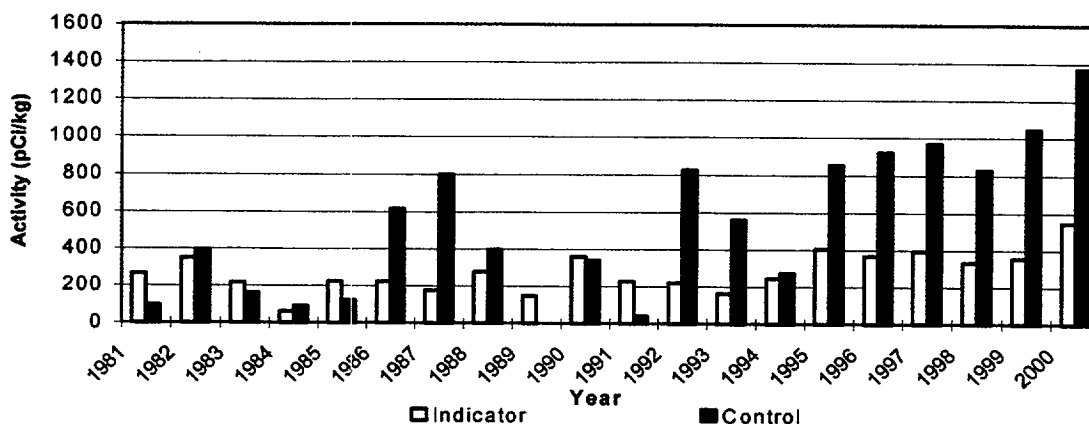
Year-to-year variations in the lake bottom sediment sample activities is expected and beyond the control of PNPP. For example, cesium-137 activity variations (refer to Figure 7) in the control locations from year-to-year may be contributed to:

1. The movement of sediment on the lake bottom due to wave action and currents, and
2. Sampling in nearly the same location approximately 4½ mile off-shore, even with GPS, is extremely difficult.

For these reasons, it is unlikely the same bed of sediment is sampled at each collection. The average Cs-137 radioactivity of 781.11 pCi/kg is within the maximum value of 864 pCi/kg established in 1981.

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Figure 7: Annual Average Cesium-137 Concentration in Sediment



In 1999, a sediment sample from sample location #64 (northwest drain impoundment) was analyzed to contain 62.00 pCi/kg of cobalt-60. This activity was just above the detection limit. In 2000, eleven (11) additional sample locations within the impoundment were established to identify the boundary of the cobalt-60 activity and to support supplemental monitoring activities. Monitoring was performed in January, May, June, October, and November, 2000. Referring to Table 18 for sampling location #64, the cobalt activity for the months of June and October, was <16.3 pCi/kg and <12.9 pCi/kg, respectively.

Table 18: Northwest Drain Impoundment Cobalt-60 Activity, pCi/kg (dry)

Location	10/25/99	12/14/99	01/12/00	05/11/00	06/27/00	10/12/00	11/28/00
64	62.0 ± 8.0				< 16.3	< 12.9	
64-1		< 16.1			< 22.1		< 10.4
64-2		< 23.6			< 23.3		35.9 ± 11.8
64-3		278.1 ± 37.1	47.6 ± 29.2		233 ± 23		60.2 ± 20.5
64-4		146.5 ± 25.1	63.8 ± 12.2		117 ± 31		152 ± 11
64-5		< 15.7			< 24.9		< 6.3
64-6			90.1 ± 30.4		74 ± 42		< 12.7
64-7			153.2 ± 39.7		117 ± 17		195 ± 20
64-8					71 ± 18		72.2 ± 39.5
64-9					129 ± 22		183 ± 43
64-10					112 ± 23		160 ± 52
64-11							

For the additional eleven (11) sampling locations, in the month of June, the cobalt-60 activity ranged from 22.1 pCi/kg to 233±23 pCi/kg, while for November, the cobalt-60 activity range from 6.3 pCi/kg to 195.00±25 pCi/kg. The cobalt-60 activity at sampling location #64 continues to be centered within the organic material at the top of the spillway, with little or no activity found farther upstream.

Fish

Fish are analyzed primarily to quantify the dietary radionuclide intake by humans, and secondarily to serve as indicators of radioactivity in the aquatic ecosystem. Fish are collected from two locations, twice each year as required by the ODCM. Important sport and commercial species are targeted, and only the fillets are sent to the laboratory for analysis. A scientific collecting permit is obtained annually from the Ohio Department of Natural Resources for fish sampling.

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Twenty-seven (27) fish samples were collected and analyzed by gamma spectral analysis in 2000. Sixteen (16) species of fish were represented, including walleye, drum, carp, quillback sucker, spotted sucker, white sucker, redhorse sucker, round goby, steelhead, catfish, yellow perch, white perch, gizzard shad, smallmouth bass, rock bass and white bass. As expected, naturally occurring potassium-40 was found in all samples. No other radionuclides were detected above the LLD.

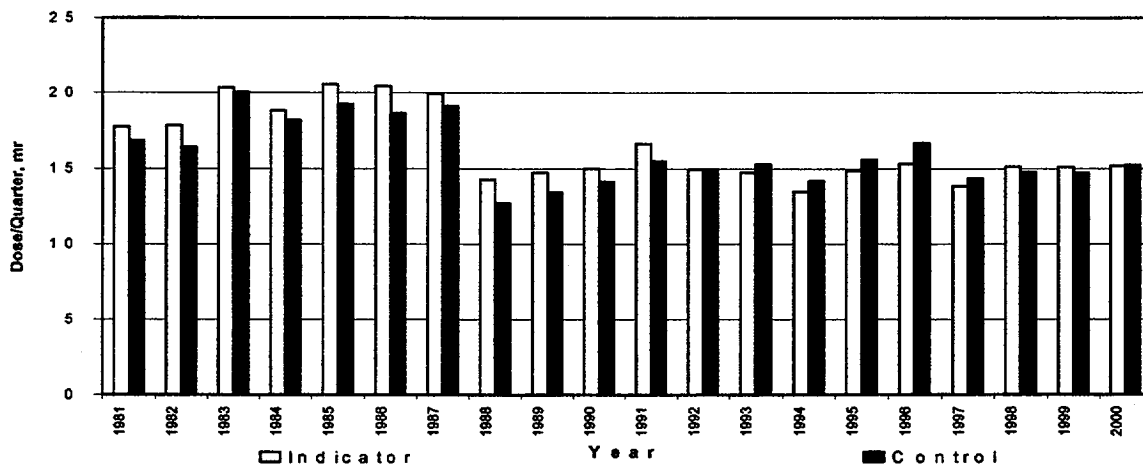
Direct Radiation Monitoring

Thermoluminescent Dosimeter (TLD)

Environmental radiation is measured directly at twenty-eight locations around the PNPP site, two of which are control locations. The locations are positioned in two rings around the plant as well as at the site boundary. The inner ring is within a one-mile radius of the plant site; the outer ring is four to five miles from the plant. The control locations are over ten miles from the plant in the two least prevalent wind directions. Each location is equipped with three TLDs, two of which are changed quarterly and one is changed annually.

A total of 252 TLDs were collected and analyzed in 2000. This included 224 collected on a quarterly basis, and twenty-eight (28) collected annually. In 2000, the annual average dose for all indicator locations was 59.59 mrem, and 56.97 mrem for all control locations. Referring to Figure 8, the average quarterly dose for all indicator locations was 15.2 mrem, and 9.1 mrem for the control locations. Prior to 1988, the TLD results were higher due to a change in vendor laboratory services. A comprehensive explanation of this difference was provided in the 1988 Annual Environmental Operating Report.

Figure 8: Average Quarterly TLD Dose



Conclusion

Sediment samples continue to confirm cobalt-60 in the northwest drain impoundment. The activity level was just above the detection limits. Samples taken upstream did not find any additional activity or the source. Additional monitoring is being performed to monitor this location. An environmental evaluation determined that there would be less impact upon the environment by leaving this material in place. Atmospheric monitoring results were consistent with past results. The prevalent radionuclide in air was beryllium-7 which is naturally occurring. Naturally occurring potassium-40 was detected in all terrestrial samples, as expected. Cesium-137 was detected in sediment samples and is the result of fallout from weapons testing. The concentrations were similar to those measured in previous years and are not related to plant operation.

Finally, direct radiation measurements are consistent with past data.

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INTER-LABORATORY CROSS-CHECK COMPARISON PROGRAM

Introduction

The purpose of the Inter-laboratory Cross-Check Comparison Program (ICCCP) is to provide an independent check on the vendor laboratory's analytical procedures. Samples with a known concentration of specific radionuclides are provided to the vendor laboratory. The vendor laboratory measures and reports the concentration of specified radionuclides. The known values are then compared to the vendor results. Results consistently outside established acceptance criteria indicate a need to check instruments or procedures. Regulatory Guide 4.15 specifically required that contractor laboratories that performed environmental measurement participate in the EPA's Environmental Radioactivity Laboratory Inter-Comparison Studies Program, or an equivalent program.

The EPA's program is not longer funded and no longer offered. The reason that the EPA program was referenced in the regulatory guide is that the EPA standards were traceable to National Bureau of Standards (now known as National Institute Standard Technology). In response to this problem, Teledyne (our vendor lab) incorporated a program offered by Environmental Resource Associates (ERA Company), which covered the same analyses in the same matrix at the same frequency as the EPA program. The ERA Company has received NIST accreditation for its program, as an equivalent program. In addition to comparison cross checks performed with the ERA Company, the vendor laboratory routinely monitors the quality of their analyses by:

- ◆ Analyzing "spiked" samples (samples with a specific quantity of radioactive material present in them),
- ◆ Participating in the Department of Energy's Mixed Analyte Performance Program (MAPEP), and
- ◆ Participating in the Environmental Measurements Laboratory Quality Assessment Program (EML).

Conclusion

Appendix A: 2000 Inter-Laboratory Cross-Check Comparison Program Results contains the results of these programs in addition to the ERA Company's cross-checks program. Three (3) water samples were determined to be outside the ERA program control limits: one sample was analyzed for radium-228, one sample was analyzed for gross alpha activity, and one sample was analyzed for strontium-90 activity. The radium-228 measurement was confirmed by reanalysis and by gamma spectral analysis. The gross alpha activity results were recalculated and determined to be within the acceptance criteria, using an americium-241 efficiency. The strontium-90 activity results were recalculated, and a reanalysis was performed. Both values were within the acceptance criteria. One (1) soil sample was determined to be outside the MAPEP program control limits on the low side. The suspected cause is incomplete dissolution of the soil. Upon reanalysis, the uranium-233/4 activity was determined to be within the control band. All other analysis results performed under these programs were within the control limits established.

LAND USE CENSUS

Introduction

Each year a land use census, which is required by Section 3/4.12.2 of the PNPP ODCM, is conducted to identify the locations of the nearest milk animal, garden (of greater than 500 square feet), and residence in each of the meteorological sectors that is over land. Information gathered during the Land Use Census is used for off-site dose assessment and to update sampling locations for the Radiological Environmental Monitoring Program. The Land Use Census is conducted by traveling

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all roads within a five-mile radius of the plant site, and recording and mapping the location of the nearest resident, milk animal, and vegetable garden in each of the meteorological sectors that is over land. The 2000 Census was conducted July 18-19. The information for the garden, residence and milk animal locations has been tabulated below and depicted on Figure 9. Note that the W, WNW, NNW, NW N, and NNE sectors extend over Lake Erie, and therefore, were not included in the survey.

Discussions and Results

In general, the predominant land use within the census area continues to be rural/agricultural. The 2000 Land Use Survey used the 1999 survey map produced by the Commercial Survey Co. of Cleveland. GPS units were used for a more accurate and detailed identification of media locations.

Table 19 has been updated to reflect corrections identified through the use of these new tools. These changes include corrections for typographical errors relating to addresses and distances.

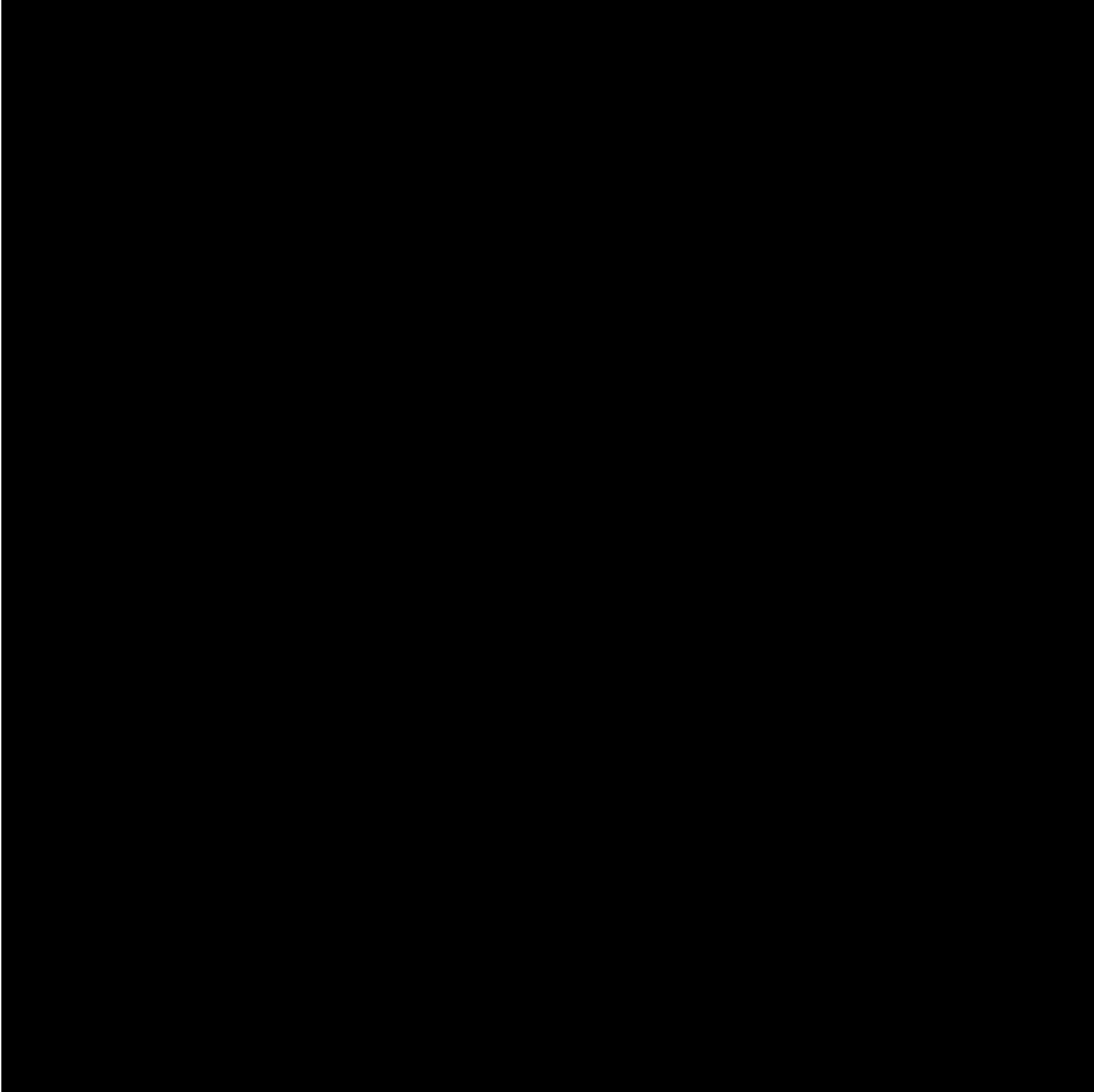
Table 19: Nearest Residence, By Sector

SECTOR	LOCATION ADDRESS	MILES FROM PNPP	X/Q VALUE, sec/m ³	MAP LOCATOR NUMBER
NE	4384 Lockwood	0.7	2.66E-06	1
ENE	4460 Lockwood	0.8	1.59E-06	2
E	2626 Antioch	1.1	6.77E-07	3
ESE	2740 Antioch	1.1	5.08E-07	4
SE	4537 North Ridge	1.3	3.44E-07	5
SSE	4243 Parmly	1.2	4.83E-06	6
S	3119 Parmly	0.9	2.25E-06	7
SSW	3121 Center	0.9	1.11E-06	8
SW	3440 Clark	1.2	4.98E-07	9
WSW	3462 Parmly	1.1	8.67E-07	10

Table 20 identifies the nearest milk animals to the PNPP and has been updated to reflect corrections identified during 2000. These changes include corrections for typographical errors relating to addresses and distances.

Table 20: Nearest Milk Animal, By Sector

SECTOR	LOCATION ADDRESS	MILES FROM PNPP	MAP LOCATOR NUMBER
S	5245 Blair Rd.	4.8	19
S	3588 River	4.8	18



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There were five (5) changes in the nearest gardens recorded during this year's census. These changes include corrections for typographical errors relating to addresses and distances. Table 21 lists the nearest gardens that occupy at least 500 square feet.

Table 21: Nearest Garden, By Sector

SECTOR	LOCATION ADDRESS	MILES FROM PNPP	D/Q VALUE, m ⁻²	MAP LOCATOR NUMBER
NE	4398 Lockwood	0.7	1.36E-08	11
ENE	4602 Lockwood	1.1	4.77E-09	12
E	2656 Antioch	0.7	1.66E-08	13
ESE	2828 Antioch	1.1	3.96E-09	20
SE	4771 North Ridge	1.5	1.97E-09	14
SSE	3323 Call	1.5	2.04E-09	15
S	3119 Parmly	0.9	1.31E-08	21
SSW	3121 Center	0.9	5.58E-09	8
SW	3440 Clark	1.2	2.24E-09	9
WSW	3422 Parmly	1.2	2.31E-09	17

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CLAM/MUSSEL MONITORING

INTRODUCTION

Sampling for benthic macro-invertebrates (clams and mussels) has been conducted in Lake Erie in the vicinity of PNPP, since 1971. The clam/mussel program currently focuses on two species: *Corbicula fluminea* (Asiatic clam) and *Dreissena polymorpha* (zebra mussel).

CORBICULA PROGRAM

Monitoring specifically for *Corbicula* was initiated in response to a NRC bulletin and concerns of the Atomic Safety and Licensing Board. The 2000 monitoring was done as part of the Environmental Protection Plan (Operating License, Appendix B). The program consists of visually inspecting the raw water systems, whenever they are opened for maintenance. The purpose of this program is to detect *Corbicula*, should it appear at PNPP.

No *Corbicula* have ever been found in any sample collected from PNPP or from Lake Erie in the vicinity of PNPP. Two *Corbicula* were found in a sample collected from the Eastlake plant in June, 1987. No *Corbicula* have been found in any other sample collected since that time. A more detailed program history can be found in the 1986 and 1987 PNPP Annual Environmental Operating Reports.

Monitoring

In 2000, samples were collected from the Service Water and Emergency Service Water systems at PNPP. All samples were collected by Ponar hand dredge, hand scoop, or scraper. They were examined for asiatic clam shells and fragments. In addition to sample collections, plant components that use raw water are inspected whenever opened for maintenance or repair. Sample collection dates are listed in Table 22.

Table 22: 2000 *Corbicula* Monitoring

DATE	SAMPLE LOCATION
01/20/00	Service Water (SW) and Emergency Service Water (ESW) Forebays
05/31/00	ESW Screen Backwash System
08/15/00	Lake Erie Intake and Discharge Cribs
08/21/00	SW Strainer Blowdown Piping

Results

As in the past, no *Corbicula* were found in any sample collected during the 2000 monitoring program.

Conclusions

The sample collected in June, 1987, was the only indication of *Corbicula* in the vicinity of PNPP. Although the presence of *Corbicula* was detected at the Eastlake Power Plant, it has not been demonstrated that their presence has created any operational problems there, or at PNPP.

DREISSENA PROGRAM

Dreissena, or Zebra mussels were first discovered at PNPP in September, 1988. The initial collection of 19 mussels was made as part of the *Corbicula* monitoring program. The *Dreissena* monitoring program began in 1989, with monitoring and testing. The current control program was designed and implemented in 1990.

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Monitoring

In addition to visually inspecting the plant's raw water systems when they are opened for maintenance or repair, monitoring methods include the use of commercial divers, side-stream monitors, and plankton nets. Commercial divers monitor mussel infestation during the inspection of forebays, basins, and the intake and discharge structures. Divers have also been used to take underwater videotapes of the water basins and intake tunnel. Sidestream monitors are flow-through containers that receive water diverted from plant systems, and are normally used in three in-plant locations during the mussel season. The sidestream monitors are fitted with slides and inspected weekly for veliger settlement. A plankton net was used on a limited basis in 2000 to help trend veligers during the spawning season.

Treatment

Chemicals used for mussel control in 2000 included chlorine and a commercial molluscicide. The chlorine is intermittently injected into the plant service water, emergency service water, and circulating water systems by metering sodium hypochlorite into each system's influent. Sodium sulfite is added at the plant discharge structure for dechlorination prior to entry into Lake Erie.

The use of a commercial molluscicide requires approval by the Ohio Environmental Protection Agency (OEPA). The chemical selected for use at the PNPP in 2000 was alkyl-dimethyl-benzyl-ammonium chloride. One treatment was applied in September, 2000. The active ingredients were detoxified by adsorption onto bentonite clay, prior to discharge into Lake Erie.

Results

The effectiveness of the intermittent chlorination treatment has been determined in several ways. First, visual inspections of raw water system components are conducted when systems are open during maintenance or repair. In addition, settlement monitors were inspected weekly for new settlement. No live settlement has been found in any plant component to date.

The effectiveness of the application of the commercial molluscicide was measured by observing mortality of mussels placed in a flow-through container placed in plant service water and subjected to the chemical treatment. The observed mortality rate in the flow-through container was 100%. To date, PNPP has had no problems related to zebra mussels.

CONCLUSIONS

Perry Nuclear Power Plant has taken the approach that the best method for avoiding problems with zebra mussels is preventive treatment of plant water systems. The current program of monitoring and chemical treatment will be continued to minimize the possibility that PNPP will experience future problems due to zebra mussels.

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HERBICIDE APPLICATIONS

Herbicides are used sparingly on the PNPP site. A request must be made to, and approved by the PNPP Chemistry Unit prior to spraying to ensure that only approved chemicals are used, and only in approved areas.

In 2000, four (4) general herbicide requests were initiated for spraying applications. Each application was in compliance with the Ohio Environmental Protection Agency's rules and regulations. There were no adverse environmental impacts observed during weekly site environmental inspections as a result of these applications. With the exception of the meteorological tower, the only herbicide approved for use in the Owner-Controlled Area was Round-Up. For the area around the meteorological tower, Accord was the herbicide used. For each application, the type of weed to be treated dictated the herbicide concentration to be used. Table 23 provides detailed documentation for each application in 2000. The volume represents the quantity of herbicide applied, after dilution.

Table 23: 2000 Herbicide Applications

Application Date	Location	Area sq ft	Conc. %	Volume gal
05/26/00	Gravel areas within the perimeter fence	130,000	2.9	400
08/11/00	Gravel areas within the perimeter fence	17,000	3	60
08/12/00	Gravel areas within the perimeter fence	17,000	3.3	22
08/31/00	Gravel areas within the perimeter fence	16,000	4.7	10
05/30/00	Gravel areas inside protected area	10,000	2.9	2
06/03/00	Gravel areas inside protected area	100,000	2.9	150
06/18/00	Gravel areas inside protected area	24,000	2.9	65
07/25/00	Gravel areas inside protected area	41,000	3.3	49
08/12/00	Gravel areas inside protected area	52,000	3.3	100
08/31/00	Gravel areas inside protected area	47,000	4.7	50
09/13/00	Gravel areas inside protected area	44,000	2.9	210
05/22/00	Gravel areas inside owner controlled area	800	2.9	4
06/08/00	Gravel areas inside owner controlled area	3,100	2.9	2.5
06/09/00	Gravel areas inside owner controlled area	39,200	3.8	12
06/19/00	Gravel areas inside owner controlled area	6,900	2.9	4
06/23/00	Gravel areas inside owner controlled area	26,000	3.3	12
06/27/00	Gravel areas inside owner controlled area	15,200	2.9	10
06/28/00	Gravel areas inside owner controlled area	11,240	5.7	12.5
07/06/00	Gravel areas inside owner controlled area	27,000	2.9	40
07/07/00	Gravel areas inside owner controlled area	31,000	2.9	49
07/18/00	Gravel areas inside owner controlled area	58,000	4.7	32
08/04/00	Gravel areas inside owner controlled area	22,000	2.9	6
08/23/00	Gravel areas inside owner controlled area	32,500	3.3	100
08/29/00	Gravel areas inside owner controlled area	29,000	3.3	10
09/13/00	Gravel areas inside owner controlled area	39,000	2.9	140
08/31/00	Met tower area	15,850	8	30

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SPECIAL REPORTS

NON-COMPLIANCES

NPDES Permit

The National Pollutant Discharge Elimination System (NPDES) permit is issued by the Ohio Environmental Protection Agency (OEPA). It establishes monitoring requirements and limits for discharges from the PNPP. It also specifies the locations from which the plant is allowed to discharge.

One (1) written notification was made to the OEPA on February 10, 2000. This notification was required as a result of review for possible discharge pathways onsite identified the potential for chlorinated service water to bypass the permitted discharge point. The service water system is designed to periodically purge trapped air via a standpipe. This standpipe is six (6) inches in diameter and is located upstream of the service water dechlorination system. During periods of chlorination, purging of the trapped air may carry with it service water containing up to 0.3 ppm free available chlorine. Based upon design values, approximately two (2) gallons per day may be discharge to the ground. No further action was required.

Environmental Protection Plan

The Environmental Protection Plan (EPP), which is a part of the PNPP Operating License, requires a non-radiological environmental monitoring and reporting program be established at the PNPP. There were no instances of an EPP non-compliance identified in 2000.

UNREVIEWED ENVIRONMENTAL QUESTIONS

All proposed changes to the PNPP design or operation, as well as tests or experiments, must be evaluated for potential environmental impacts in accordance with the EPP and administrative quality assurance procedures. In 2000, these reviews ensured that no changes to the facility or programs were performed, which could have resulted in an adverse environmental impact. Therefore, there were no potentially significant unreviewed environmental questions identified.

NON-ROUTINE REPORTS

There were no non-routine reports submitted in 2000.

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APPENDIX A: 2000 INTER-LABORATORY CROSS-CHECK COMPARISON PROGRAM RESULTS

Environmental, Inc., Midwest Laboratory, formerly Teledyne Brown Engineering Environmental Services, Midwest Laboratory has participated in inter-laboratory cross-check comparison programs since the formulation of its quality control program in December, 1971. These programs are operated by agencies which supply environmental type samples (e.g., milk or water) containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher, or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

The results in Table A-1 were obtained through participation in the environmental sample crosscheck program for milk, water and air filters during the past twelve months. Data for previous years is available upon request. The U.S. Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Characterization Research Division-Las Vegas, Nevada, conducted this program.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via various International Intercomparisons of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of cross-check testing with Teledyne Brown Engineering are also listed.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years is available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years is available upon request.

Table A-5 lists results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years is available upon request.

The results in Table A-6 were obtained through the participation in the Mixed Analyte Performance Evaluation Program.

The results in Table A-7 were obtained through the participation in the Environmental Measurement Laboratory Quality Assessment Program.

Attachment A lists acceptance criteria for "spiked" samples. Out-of-limit results are explained directly below the results.

Attachment B lists the data reporting conventions used.

12-31-00

ATTACHMENT A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES^a

Analysis	Level	One Standard Deviation for single determinations
Gamma Emitters	5 to 100 pCi/liter or kg >100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89 ^b	5 to 50 pCi/liter or kg >50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90 ^b	2 to 30 pCi/liter or kg >30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	>0.1 g/liter or kg	5% of known value
Gross alpha	≤20 pCi/liter >20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤100 pCi/liter >100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤4,000 pCi/liter >4,000 pCi/liter	1s = (pCi/liter) = 169.85 x (known) ^{0.0933} 10% of known value
Radium-226,-228	<0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129 ^b	≤55 pCi/liter >55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63 ^b Technetium-99 ^b	≤35 pCi/liter >35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55 ^b	50 to 100 pCi/liter >100 pCi/liter	10 pCi/liter 10% of known value
Others ^b	-	20% of known value

^a From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program, Fiscal Year, 1981-1982, EPA-600/4-81-004.

^b Laboratory limit.

Table A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^b		
				Laboratory results ±2 Sigma ^c	ERA Result ^d 1s, N=1	Control Limits
STW-863	WATER	Jan, 2000	Gr. Alpha	39.3 ± 5.2	25.4 ± 6.4	14.5 - 36.3
The analysis was repeated and recalculated with Am-241 efficiency; result of reanalysis 29.32 ± 5.79 pCi/L. Internal spike program results do not indicate a problem.						
STW-863	WATER	Jan, 2000	Gr. Beta	40.7 ± 1.2	42.1 ± 4.2	33.4 - 50.8
STW-866	WATER	Jan, 2000	Sr-89	17.1 ± 2.2	22.5 ± 5.0	13.8 - 31.2
STW-866	WATER	Jan, 2000	Sr-90	8.1 ± 0.6	9.6 ± 5.0	0.9 - 18.3
STW-868	WATER	Feb, 2000	Ra-226	7.6 ± 0.5	8.3 ± 1.2	6.1 - 10.4
STW-868	WATER	Feb, 2000	Ra-228	5.6 ± 1.0	2.3 ± 0.6	1.3 - 3.2
Result of reanalysis: 6.34 ± 0.94. Activity confirmed by gamma spectroscopy (6.00 ± 1.42 pCi/L).						
STW-868	WATER	Feb, 2000	Uranium	5.4 ± 0.2	6.1 ± 3.0	0.9 - 11.3
STW-869	WATER	Mar, 2000	H-3	23,500.0 ± 306.0	23,800.0 ± 2,380.0	19,800.0 - 27,800.0
STW-867	WATER	Mar, 2000	Gr. Alpha	83.6 ± 5.8	58.4 ± 5.8	33.3 - 83.5
Results were recalculated with Am-241 efficiency; 57.80 ± 5.73 pCi/L. Refer to STW-863.						
STW-867	WATER	Mar, 2000	Gr. Beta	15.4 ± 0.9	16.8 ± 1.7	8.1 - 25.5
STW-876	WATER	Mar, 2000	I-131	18.7 ± 0.6	19.9 ± 2.0	18.1 - 28.5
STW-877	WATER	Apr, 2000	Gr. Alpha	52.3 ± 2.3	54.0 ± 13.5	30.8 - 77.2
STW-877	WATER	Apr, 2000	Ra-226	17.5 ± 1.1	18.6 ± 2.8	13.8 - 23.4
STW-877	WATER	Apr, 2000	Ra-228	3.7 ± 0.4	3.6 ± 0.9	2.0 - 5.1
STW-878	WATER	Apr, 2000	Co-60	19.2 ± 0.6	16.9 ± 5.0	8.2 - 25.6
STW-878	WATER	Apr, 2000	Cs-134	81.0 ± 1.3	86.4 ± 5.0	77.7 - 95.1
STW-878	WATER	Apr, 2000	Cs-137	119.0 ± 2.6	123.0 ± 6.2	112.0 - 134.0
STW-878	WATER	Apr, 2000	Gr. Beta	276.0 ± 9.6	289.0 ± 43.4	214.0 - 364.0
STW-878	WATER	Apr, 2000	Sr-89	32.3 ± 3.3	50.7 ± 5.0	42.0 - 59.4
STW-878	WATER	Apr, 2000	Sr-90	11.3 ± 1.0	32.8 ± 5.0	24.1 - 41.5
An error was found in calculation. Result of recalculation: Sr-89, 55.5 ± 7.2 pCi/L / Sr-90, 30.7 ± 3.0 pCi/L. Results of reanalysis: Sr-89, 47.4 ± 14.5 pCi/L / Sr-90, 33.0 ± 1.35 pCi/L. Both results are within limits.						
STW-879	WATER	Jun, 2000	Ba-133	22.4 ± 2.1	25.5 ± 5.0	16.8 - 34.2
STW-879	WATER	Jun, 2000	Co-60	69.9 ± 3.7	65.6 ± 5.0	56.9 - 74.3
STW-879	WATER	Jun, 2000	Cs-134	13.5 ± 0.8	13.8 ± 5.0	5.1 - 22.5
STW-879	WATER	Jun, 2000	Cs-137	232.0 ± 7.8	238.0 ± 11.9	217.0 - 259.0
STW-879	WATER	Jun, 2000	Zn-65	50.9 ± 3.8	54.6 ± 5.5	45.3 - 63.9
STW-880	WATER	Jun, 2000	Ra-226	2.8 ± 0.2	3.0 ± 0.5	2.2 - 3.8
STW-880	WATER	Jun, 2000	Ra-228	10.0 ± 0.9	13.0 ± 3.3	7.4 - 18.6
STW-880	WATER	Jun, 2000	Uranium	57.0 ± 4.4	63.4 ± 6.3	52.6 - 74.2
STW-883	WATER	Jul, 2000	Gr. Alpha	6.9 ± 1.1	7.2 ± 5.0	0.0 - 15.9
STW-883	WATER	Jul, 2000	Gr. Beta	88.8 ± 9.8	87.5 ± 10.0	70.2 - 105.0
STW-884	WATER	Aug, 2000	H-3	8,740.0 ± 174.0	8,320.0 ± 832.0	6,910.0 - 9,730.0
STW-891	WATER	Sep, 2000	Ra-226	17.9 ± 1.3	18.9 ± 2.8	14.0 - 23.8
STW-891	WATER	Sep, 2000	Ra-228	5.7 ± 0.5	6.2 ± 1.6	3.5 - 8.8

Table A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^b		
				Laboratory results ±2 Sigma ^c	ERA Result ^d 1s, N=1	Control Limits
STW-891	WATER	Sep, 2000	Uranium	10.3 ± 0.1	11.9 ± 3.0	6.7 - 17.1
STW-892	WATER	Oct, 2000	I-131	16.9 ± 0.3	15.9 ± 1.6	10.7 - 21.1
STW-892	WATER	Oct, 2000	I-131(g)	17.1 ± 5.4	15.9 ± 1.6	10.7 - 21.1
STW-893	WATER	Oct, 2000	Gr. Alpha	66.3 ± 5.3	74.4 ± 18.6	42.2 - 107.0
STW-893	WATER	Oct, 2000	Ra-226	10.1 ± 1.0	10.5 ± 1.6	7.3 - 13.2
STW-893	WATER	Oct, 2000	Ra-228	21.2 ± 0.5	19.4 ± 4.9	11.0 - 27.8
STW-893	WATER	Oct, 2000	Uranium	41.4 ± 1.9	44.5 ± 4.5	36.8 - 52.2
STW-894	WATER	Oct, 2000	Co-60	93.4 ± 1.6	91.1 ± 5.0	82.4 - 99.8
STW-894	WATER	Oct, 2000	Cs-134	54.8 ± 0.3	59.8 ± 5.0	51.1 - 68.5
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Gr. Beta	209.0 ± 7.9	256.0 ± 38.4	189.0 - 323.0
STW-894	WATER	Oct, 2000	Sr-89	32.8 ± 3.0	41.3 ± 5.0	32.6 - 50.0
STW-894	WATER	Oct, 2000	Sr-90	16.0 ± 2.4	18.0 ± 5.0	9.3 - 26.7
STW-895	WATER	Nov, 2000	Gr. Alpha	50.3 ± 2.6	60.3 ± 15.1	34.4 - 86.2
STW-895	WATER	Nov, 2000	Gr. Beta	28.6 ± 1.3	25.5 ± 5.0	16.8 - 34.2
STW-896	WATER	Nov, 2000	Ba-133	78.0 ± 2.0	82.2 ± 8.2	68.0 - 96.4
STW-896	WATER	Nov, 2000	Co-60	30.8 ± 1.7	27.8 ± 5.0	19.1 - 36.5
STW-896	WATER	Nov, 2000	Cs-134	67.2 ± 3.3	76.0 ± 5.0	67.3 - 84.7
<p>The mean value for Cs-134 of all participating laboratories was 70.7 pCi/L. Other gamma emitters are within limits, the counting efficiency is not suspect. Library values were reviewed and found to be correct.</p>						
STW-896	WATER	Nov, 2000	Cs-137	109.0 ± 1.0	106.0 ± 5.3	96.8 - 115.0
STW-896	WATER	Nov, 2000	Zn-65	81.5 ± 7.4	79.0 ± 7.9	65.3 - 92.7

^a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the environmental samples crosscheck program operated by Environmental Resources Associates (ERA).

^b All results are in pCi/L, except for elemental potassium (K) data in milk, which are in mg/L; air filter samples, which are in pCi/Filter.

^c Unless otherwise indicated, the laboratory results are given as the mean ± 2 standard deviations for three determinations.

^d Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

Table A-2. Crosscheck program results; Thermoluminescent Dosimeters. (TLDs).

Lab Code	TLD Type	Date	Measurement	mR		
				Laboratory results ± 2 Sigma	Known Value	Average ± 2 Sigma (All Participants)
<u>Environmental, Inc.</u>						
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #1	14.5 ± 0.5	15.4	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #2	29.3 ± 1.0	31.8	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #3	60.0 ± 0.2	59.1	-
<u>Environmental, Inc.</u>						
1999-2	CaSO ₄ : Dy Cards	Mar, 1999	Reader 1, #1	18.3 ± 0.5	15.4	-
1999-2	CaSO ₄ : Dy Cards	Mar, 1999	Reader 1, #2	35.9 ± 1.3	31.8	-
1999-2	CaSO ₄ : Dy Cards	Mar, 1999	Reader 1, #3	66.5 ± 4.4	59.1	-
Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 1999.						
<u>Environmental, Inc.</u>						
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #1	14.4 ± 0.2	17.8	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #2	32.4 ± 0.1	35.5	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #3	61.8 ± 0.9	62.2	-
<u>Environmental, Inc.</u>						
2000-2	CaSO ₄ : Dy Cards	Mar, 2000	Reader 1, #1	21.3 ± 0.3	17.8	-
2000-2	CaSO ₄ : Dy Cards	Mar, 2000	Reader 1, #2	40.1 ± 1.9	35.5	-
2000-2	CaSO ₄ : Dy Cards	Mar, 2000	Reader 1, #3	69.9 ± 3.5	62.2	-

Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 2000.

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Laboratory results 2s, n=1 ^b	Known Activity	Control ^c Limits
SPW-271	WATER	Jan, 2000	Ra-226	14.81 ± 0.44	13.76	9.63 - 17.89
SPW-271	WATER	Jan, 2000	Ra-228	16.97 ± 2.12	14.68	10.28 - 19.08
SPW-272	WATER	Jan, 2000	Gr. Alpha	44.35 ± 1.95	41.14	20.57 - 61.71
SPW-272	WATER	Jan, 2000	Gr. Beta	31.19 ± 5.02	29.50	19.50 - 39.50
SPW-756	WATER	Jan, 2000	H-3	56339.00 ± 666.00	57667.00	46133.60 - 69200.40
SPW-480	WATER	Jan, 2000	Co-60	32.33 ± 2.87	28.36	18.36 - 38.36
SPW-480	WATER	Jan, 2000	Cs-137	35.58 ± 4.20	36.83	26.83 - 46.83
SPMI-482	MILK	Jan, 2000	Sr-90	16.93 ± 1.07	14.10	4.10 - 24.10
SPAP-484	AIR FILTER	Jan, 2000	Cs-137	1.84 ± 0.01	1.72	1.03 - 2.41
SPW-917	WATER	Feb, 2000	Gr. Alpha	16.59 ± 1.90	41.10	20.55 - 61.65
An insufficient amount of Am-241 spike was available for an accurate test.						
SPW-917	WATER	Feb, 2000	Gr. Beta	32.61 ± 2.06	29.43	19.43 - 39.43
SPW-918	WATER	Feb, 2000	Ra-226	21.15 ± 0.49	20.68	14.48 - 26.88
SPW-918	WATER	Feb, 2000	Ra-228	14.24 ± 1.64	14.51	10.16 - 18.86
SPVE-1262	VEGETATION	Mar, 2000	I-131(g)	1.17 ± 0.07	1.12	0.67 - 1.57
SPCH-1264	CHARCOAL CANISTER	Mar, 2000	I-131(g)	0.56 ± 0.02	0.53	0.32 - 0.74
SPMI-1274	MILK	Mar, 2000	I-131	47.02 ± 3.36	48.00	36.00 - 60.00
SPW-1301	WATER	Mar, 2000	I-131	66.03 ± 1.06	76.84	61.47 - 92.21
SPW-1301	WATER	Mar, 2000	I-131(g)	80.31 ± 6.28	76.84	66.84 - 86.84
SPW-1477	WATER	Mar, 2000	Gr. Alpha	32.09 ± 1.82	41.13	20.57 - 61.70
SPW-1477	WATER	Mar, 2000	Gr. Beta	29.20 ± 1.56	29.38	19.38 - 39.38
SPW-1478	WATER	Mar, 2000	Ra-226	21.78 ± 0.47	20.69	14.48 - 26.90
SPW-1478	WATER	Mar, 2000	Ra-228	14.41 ± 1.70	14.39	10.07 - 18.71
SPMI-2275	MILK	Apr, 2000	Cs-134	33.53 ± 2.82	32.12	22.12 - 42.12
SPMI-2275	MILK	Apr, 2000	Cs-137	36.38 ± 4.94	36.66	26.66 - 46.66
SPMI-2275	MILK	Apr, 2000	I-131	46.06 ± 0.82	55.50	44.40 - 66.60
SPW-2277	WATER	Apr, 2000	Ra-226	20.51 ± 0.44	20.68	14.48 - 26.88
SPW-2278	WATER	Apr, 2000	Gr. Alpha	40.22 ± 2.50	38.44	19.22 - 57.66
SPW-2278	WATER	Apr, 2000	Gr. Beta	32.63 ± 1.81	29.30	19.30 - 39.30
SPW-2278	WATER	Apr, 2000	Ra-228	14.91 ± 1.70	14.25	9.98 - 18.53
SPW-2279	WATER	Apr, 2000	Co-60	37.12 ± 3.86	34.54	24.54 - 44.54
SPW-2279	WATER	Apr, 2000	Cs-134	34.70 ± 3.32	32.12	22.12 - 42.12
SPW-2279	WATER	Apr, 2000	Cs-137	39.60 ± 5.12	36.66	26.66 - 46.66
SPW-2279	WATER	Apr, 2000	I-131	49.92 ± 0.67	55.50	44.40 - 66.60
SPW-2279	WATER	Apr, 2000	I-131(g)	60.63 ± 6.58	55.50	45.50 - 65.50
SPW-2281	WATER	Apr, 2000	H-3	58829.00 ± 682.00	56996.00	45596.80 - 68395.20
SPAP-3097	AIR FILTER	Apr, 2000	Cs-137	1.81 ± 0.02	1.71	1.03 - 2.39
SPW-3093	WATER	May, 2000	I-131	83.39 ± 1.06	85.38	68.30 - 102.46
SPW-3094	WATER	May, 2000	Ra-226	20.86 ± 0.42	20.68	14.48 - 26.88
SPW-3094	WATER	May, 2000	Ra-228	14.17 ± 1.59	14.12	9.88 - 18.36
SPW-3095	WATER	May, 2000	Gr. Alpha	38.99 ± 2.09	38.44	19.22 - 57.66

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Laboratory results 2s, n=1 ^b	Known Activity	Control ^c Limits
SPW-3095	WATER	May, 2000	Gr. Beta	30.65 ± 1.53	29.30	19.30 - 39.30
SPAP-274	AIR FILTER	May, 2000	Gr. Beta	5.08 ± 0.03	5.97	-4.03 - 15.97
SPMI-3138	MILK	May, 2000	I-131	85.08 ± 1.05	85.38	68.30 - 102.46
SPF-3180	FISH	May, 2000	Cs-134	0.52 ± 0.02	0.50	0.30 - 0.70
SPF-3180	FISH	May, 2000	Cs-137	0.65 ± 0.04	0.59	0.35 - 0.82
SPAP-3902	AIR FILTER	Jun, 2000	Gr. Beta	5.81 ± 0.03	5.35	-4.65 - 15.35
SPF-5182	FISH	Jun, 2000	Cs-134	0.60 ± 0.04	0.59	0.35 - 0.83
SPF-5182	FISH	Jun, 2000	Cs-137	0.60 ± 0.05	0.58	0.35 - 0.81
SPW-3911	WATER	Jun, 2000	Ra-226	23.73 ± 0.85	20.68	14.48 - 26.88
SPW-3911	WATER	Jun, 2000	Ra-228	20.43 ± 1.77	20.75	14.53 - 26.98
SPW-3910	WATER	Jun, 2000	Gr. Alpha	38.28 ± 2.12	38.44	19.22 - 57.66
SPW-3910	WATER	Jun, 2000	Gr. Beta	35.14 ± 1.74	29.22	19.22 - 39.22
SPW-4342	WATER	Jun, 2000	Sr-89	73.70 ± 4.77	81.00	64.80 - 97.20
SPW-4342	WATER	Jun, 2000	Sr-90	58.13 ± 2.17	55.90	44.72 - 67.08
SPW-4687	WATER	Jul, 2000	Ra-226	21.07 ± 0.56	20.68	14.48 - 26.88
SPW-4687	WATER	Jul, 2000	Ra-228	16.35 ± 1.70	20.75	14.53 - 26.98
SPW-4688	WATER	Jul, 2000	H-3	56205.00 ± 663.00	56228.00	44982.40 - 67473.60
SPAP-4807	AIR FILTER	Jul, 2000	Gr. Beta	6.07 ± 0.02	5.96	-4.04 - 15.96
SPAP-4809	AIR FILTER	Jul, 2000	Cs-137	1.82 ± 0.02	1.71	1.03 - 2.39
SPMI-4856	MILK	Jul, 2000	Cs-134	33.24 ± 3.74	29.56	19.56 - 39.56
SPMI-4856	MILK	Jul, 2000	Cs-137	39.80 ± 6.77	36.45	26.45 - 46.45
SPMI-4856	MILK	Jul, 2000	Sr-89	46.35 ± 5.10	56.34	45.07 - 67.61
SPMI-4856	MILK	Jul, 2000	Sr-90	70.47 ± 2.06	69.73	55.78 - 83.68
SPW-5372	WATER	Jul, 2000	Co-60	33.31 ± 4.61	33.24	23.24 - 43.24
SPW-5372	WATER	Jul, 2000	Cs-134	59.70 ± 4.57	58.26	48.26 - 68.26
SPW-5372	WATER	Jul, 2000	Cs-137	40.00 ± 5.58	36.42	26.42 - 46.42
SPW-4686	WATER	Aug, 2000	Gr. Alpha	34.12 ± 1.71	38.43	19.22 - 57.65
SPW-4686	WATER	Aug, 2000	Gr. Beta	35.42 ± 1.51	29.21	19.21 - 39.21
SPW-5564	WATER	Aug, 2000	Sr-89	62.97 ± 4.73	67.61	54.09 - 81.13
SPW-5564	WATER	Aug, 2000	Sr-90	65.40 ± 2.47	55.70	44.56 - 66.84
SPW-5792	WATER	Aug, 2000	Ra-226	12.82 ± 0.30	13.79	9.65 - 17.93
SPW-5792	WATER	Aug, 2000	Ra-228	15.00 ± 1.21	13.69	9.58 - 17.80
SPW-6631	WATER	Sep, 2000	Ra-228	22.20 ± 2.20	20.32	14.22 - 26.42
SPW-6632	WATER	Sep, 2000	Ra-226	13.58 ± 0.29	13.79	9.65 - 17.93
SPW-6632	WATER	Sep, 2000	Ra-228	18.84 ± 2.59	20.32	14.22 - 26.42
SPW-6633	WATER	Sep, 2000	Fe-55	1757.00 ± 674.00	1852.00	1481.60 - 2222.40
SPW-5791	WATER	Sep, 2000	Gr. Alpha	52.28 ± 9.41	69.00	34.50 - 103.50
SPW-5791	WATER	Sep, 2000	Gr. Beta	34.60 ± 4.71	29.10	19.10 - 39.10
SPW-6630	WATER	Sep, 2000	Gr. Alpha	71.54 ± 7.15	69.14	34.57 - 103.71
SPW-6630	WATER	Sep, 2000	Gr. Beta	37.78 ± 1.62	29.04	19.04 - 39.04
SPW-7744	WATER	Oct, 2000	Ra-226	12.36 ± 0.25	13.79	9.65 - 17.93

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Laboratory results 2s, n=1 ^b	Known Activity	Control ^c Limits
SPW-7744	WATER	Oct, 2000	Ra-228	10.37 ± 1.15	13.40	9.38 - 17.42
SPW-7745	WATER	Oct, 2000	H-3	54650.00 ± 643.00	55391.00	44312.80 - 66469.20
SPAP-7764	AIR FILTER	Oct, 2000	Gr. Beta	6.14 ± 0.03	5.91	-4.09 - 15.91
SPAP-7766	AIR FILTER	Oct, 2000	Cs-137	1.84 ± 0.01	1.69	1.01 - 2.37
SPMI-8347	MILK	Oct, 2000	Cs-134	29.18 ± 6.51	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-134	29.37 ± 3.63	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-137	39.04 ± 8.76	36.20	26.20 - 46.20
SPMI-8347	MILK	Oct, 2000	Cs-137	34.89 ± 5.71	36.20	26.20 - 46.20
SPF-8349	FISH	Oct, 2000	Cs-134	0.56 ± 0.02	0.54	0.32 - 0.75
SPF-8349	FISH	Oct, 2000	Cs-137	0.92 ± 0.04	0.87	0.52 - 1.22
SPW-8369	WATER	Oct, 2000	Co-60	32.49 ± 1.86	32.19	22.19 - 42.19
SPW-8369	WATER	Oct, 2000	Cs-134	55.87 ± 1.71	53.66	43.66 - 63.66
SPW-8369	WATER	Oct, 2000	Cs-137	36.46 ± 2.73	36.21	26.21 - 46.21
SPW-7743	WATER	Oct, 2000	Gr. Alpha	51.28 ± 2.28	69.10	34.55 - 103.65
SPW-7743	WATER	Oct, 2000	Gr. Beta	36.86 ± 1.66	29.00	19.00 - 39.00
SPW-9101	WATER	Nov, 2000	Ra-226	14.35 ± 0.24	13.79	9.65 - 17.93
SPW-9101	WATER	Nov, 2000	Ra-228	22.14 ± 1.56	20.09	14.06 - 26.12
SPW-9102	WATER	Dec, 2000	Gr. Alpha	77.76 ± 3.02	69.14	34.57 - 103.71
SPW-9102	WATER	Dec, 2000	Gr. Beta	36.71 ± 1.65	28.99	18.99 - 38.99
SPW-9726	WATER	Dec, 2000	Gr. Alpha	43.03 ± 2.18	69.14	34.57 - 103.71
SPW-9726	WATER	Dec, 2000	Gr. Beta	32.17 ± 1.55	28.89	18.89 - 38.89
SPW-9727	WATER	Dec, 2000	Ra-226	13.35 ± 0.29	13.79	9.65 - 17.93
SPW-9727	WATER	Dec, 2000	Ra-228	15.44 ± 1.23	19.75	13.83 - 25.68
SPCH-10228	CHARCOAL CANISTER	Dec, 2000	Ba-133	1.80 ± 0.05	2.11	1.26 - 2.95

^a All results are in pCi/L, except for elemental potassium (K) in milk, which are in mg/L.; air filter samples, which are in pCi/Filter; and food products, which are in mg/kg.

^b All samples are the results of single determinations.

^c Control limits are based on Attachment A, page A2 of this report.

NOTE: For fish, Jello is used for the spike matrix. For vegetation, Sawdust is used for the spike matrix.

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a .		
				Laboratory results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPW-270	WATER	Jan 2000	Gr. Alpha	< 0.50	0.52 ± 0.41	< 1.0
SPW-270	WATER	Jan 2000	Gr. Beta	< 1.50	-0.34 ± 1.11	< 3.2
SPW-270	WATER	Jan 2000	Ra-226		0.06 ± 0.01	< 1.0
SPW-270	WATER	Jan 2000	Ra-228	< 0.94	0.14 ± 0.45	< 2.0
SPW-447	WATER	Jan 2000	H-3	< 184.00	-54.70 ± 88.60	< 200.0
SPW-481	WATER	Jan 2000	Co-60	< 2.42		< 10.0
SPW-481	WATER	Jan 2000	Cs-134	< 3.99		< 10.0
SPW-481	WATER	Jan 2000	Cs-137	< 2.90		< 10.0
SPMI-483	MILK	Jan 2000	Cs-137	< 2.73		< 10.0
SPMI-483	MILK	Jan 2000	Sr-90		1.03 ± 0.40	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPAP-485	AIR FILTER	Jan 2000	Cs-137	< 1.64		< 100.0
SPW-919	WATER	Feb 2000	Gr. Alpha	< 0.80	0.56 ± 0.61	< 1.0
SPW-919	WATER	Feb 2000	Gr. Beta	< 1.65	0.11 ± 1.16	< 3.2
SPW-919	WATER	Feb 2000	Ra-226	< 0.02	0.02 ± 0.01	< 1.0
SPW-919	WATER	Feb 2000	Ra-228	< 0.60	0.02 ± 0.01	< 2.0
SPVE-1263	VEGETATION	Mar 2000	Cs-134	< 11.48		< 100.0
SPVE-1263	VEGETATION	Mar 2000	Cs-137	< 24.82		< 100.0
SPCH-1265	CHARCOAL CANISTER	Mar 2000	I-131(g)	< 7.00		< 9.6
SPMI-1292	MILK	Mar 2000	I-131	< 0.32	0.05 ± 0.18	< 0.5
SPMI-1292	MILK	Mar 2000	I-131(g)	< 4.60		< 20.0
SPW-1302	WATER	Mar 2000	I-131	< 0.30	0.01 ± 0.14	< 0.5
SPW-1479	WATER	Mar 2000	Gr. Alpha	< 0.84	-0.32 ± 0.53	< 1.0
SPW-1479	WATER	Mar 2000	Gr. Beta	< 1.86	-1.39 ± 1.19	< 3.2
SPW-1479	WATER	Mar 2000	Ra-226	< 0.01	0.06 ± 0.01	< 1.0
SPW-1479	WATER	Mar 2000	Ra-228	< 1.00	1.17 ± 0.60	< 2.0
SPMI-2276	MILK	Apr 2000	Cs-134	< 4.20		< 10.0
SPMI-2276	MILK	Apr 2000	Cs-137	< 3.33		< 10.0
SPMI-2276	MILK	Apr 2000	I-131	< 0.50	0.32 ± 0.30	< 0.5
SPW-2280	WATER	Apr 2000	Co-60	< 2.78		< 10.0
SPW-2280	WATER	Apr 2000	Cs-134	< 3.56		< 10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a		
				Laboratory results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPW-2280	WATER	Apr 2000	Cs-137	< 2.81		<10.0
SPW-2280	WATER	Apr 2000	Gr. Alpha	< 0.60	0.55 ± 0.45	<1.0
SPW-2280	WATER	Apr 2000	Gr. Beta	< 1.66	0.62 ± 1.11	<3.2
SPW-2280	WATER	Apr 2000	I-131	< 0.29	-0.16 ± 0.19	<0.5
SPW-2280	WATER	Apr 2000	I-131(g)	< 3.42		<20.0
SPW-2280	WATER	Apr 2000	Ra-226		0.03 ± 0.01	<1.0
SPW-2280	WATER	Apr 2000	Ra-228	< 0.87	0.65 ± 0.47	<2.0
SPW-2282	WATER	Apr 2000	H-3	< 151.60	-5.40 ± 74.90	<200.0
SPAP-3098	AIR FILTER	Apr 2000	Cs-137	< 1.37		<100.0
SPW-3096	WATER	May 2000	Gr. Alpha	< 0.68		<1.0
SPW-3096	WATER	May 2000	Gr. Beta	< 1.62		<3.2
SPW-3096	WATER	May 2000	Ra-226		0.05 ± 0.01	<1.0
SPW-3096	WATER	May 2000	Ra-228	< 0.90	0.05 ± 0.01	<2.0
SPAP-273	AIR FILTER	May 2000	Gr. Beta	< 0.54	0.90 ± 0.32	<3.2
SPMI-3139	MILK	May 2000	I-131	< 0.33		<0.5
SPF-3181	FISH	May 2000	Cs-134	< 3.02		<100.0
SPF-3181	FISH	May 2000	Cs-137	< 4.99		<100.0
SPAP-3903	AIR FILTER	Jun 2000	Gr. Beta	< 0.48		<3.2
SPW-3912	WATER	Jun 2000	Gr. Alpha	< 0.35	0.28 ± 0.28	<1.0
SPW-3912	WATER	Jun 2000	Gr. Beta	< 1.22	0.54 ± 0.86	<3.2
SPW-3912	WATER	Jun 2000	Ra-226		0.04 ± 0.02	<1.0
SPW-3912	WATER	Jun 2000	Ra-228	< 0.65		<2.0
SPMI-4343	MILK	Jun 2000	Sr-89	< 0.73		<5.0
SPMI-4343	MILK	Jun 2000	Sr-90	< 0.56		<1.0
SPW-4689	WATER	Jul 2000	Ra-226		0.03 ± 0.01	<1.0
SPW-4689	WATER	Jul 2000	Ra-228	< 0.93	1.11 ± 0.55	<2.0
SPW-4690	WATER	Jul 2000	H-3	< 178.00	18.57 ± 89.13	<200.0
SPW-4808	WATER	Jul 2000	Gr. Alpha	< 0.45		<1.0
SPAP-4810	AIR FILTER	Jul 2000	Cs-137	< 2.18		<100.0
SPMI-4857	MILK	Jul 2000	Cs-137	< 6.13		<10.0
SPMI-4857	MILK	Jul 2000	I-131(g)	< 7.19		<20.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a .		
				Laboratory results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPMI-4857	MILK	Jul 2000	Sr-89	< 0.66		< 5.0
SPMI-4857	MILK	Jul 2000	Sr-90		1.15 ± 0.32	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPF-5183	FISH	Jul 2000	Cs-134	< 17.71		< 100.0
SPF-5183	FISH	Jul 2000	Cs-137	< 12.81		< 100.0
SPW-4689	WATER	Jul 2000	Gr. Alpha	< 0.50		< 1.0
SPW-4689	WATER	Jul 2000	Gr. Beta	< 1.20		< 3.2
SPW-5373	WATER	Jul 2000	Co-60	< 5.20		< 10.0
SPW-5373	WATER	Jul 2000	Cs-134	< 4.80		< 10.0
SPW-5373	WATER	Jul 2000	Cs-137	< 4.00		< 10.0
SPW-5565	WATER	Aug 2000	Sr-89	< 1.56	-0.64 ± 1.11	< 5.0
SPW-5565	WATER	Aug 2000	Sr-90	< 0.59	0.17 ± 0.30	< 1.0
SPW-5793	WATER	Aug 2000	Gr. Alpha	< 0.51	0.02 ± 0.36	< 1.0
SPW-5793	WATER	Aug 2000	Ra-226		0.05 ± 0.02	< 1.0
SPW-5793	WATER	Aug 2000	Ra-228	< 0.95	0.26 ± 0.47	< 2.0
SPW-5793	WATER	Aug 2000	Gr. Beta	< 1.40	-0.13 ± 1.01	< 3.2
SPW-6634	WATER	Sep 2000	Fe-55	< 617.00	-105.90 ± 453.40	< 1000.0
SPW-6634	WATER	Sep 2000	Ra-226	< 0.01	0.03 ± 0.01	< 1.0
SPW-6634	WATER	Sep 2000	Ra-228	< 0.99	0.36 ± 0.51	< 2.0
SPW-6634	WATER	Sep 2000	Gr. Alpha	< 0.67	-0.22 ± 0.45	< 1.0
SPW-6634	WATER	Sep 2000	Gr. Beta	< 1.60	-0.20 ± 1.12	< 3.2
SPSO-10595	SOIL	Oct 2000	Cs-134	< 16.87		< 100.0
SPSO-10595	SOIL	Oct 2000	Cs-137	< 9.40		< 100.0
SPW-7746	WATER	Oct 2000	Ra-226	< 0.03	0.04 ± 0.02	< 1.0
SPW-7746	WATER	Oct 2000	Ra-228	< 1.08	0.00 ± 0.87	< 2.0
SPW-7747	WATER	Oct 2000	H-3	< 158.00	-38.00 ± 77.00	< 200.0
SPAP-7765	AIR FILTER	Oct 2000	Gr. Beta	< 0.64	0.00 ± 0.00	< 3.2
SPAP-7767	AIR FILTER	Oct 2000	Co-60	< 0.19		< 100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-134	< 0.32		< 100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-137	< 2.32		< 100.0
SPMI-8348	MILK	Oct 2000	Cs-134	< 3.35		< 10.0
SPMI-8348	MILK	Oct 2000	Cs-137	< 3.07		< 10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a .		
				Laboratory results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPF-8350	FISH	Oct 2000	Cs-134	< 10.26		<100.0
SPF-8350	FISH	Oct 2000	Cs-137	< 10.51		<100.0
SPW-8370	WATER	Oct 2000	Co-60	< 4.67		<10.0
SPW-8370	WATER	Oct 2000	Cs-134	< 5.28		<10.0
SPW-8370	WATER	Oct 2000	Cs-137	< 4.93		<10.0
SPW-7746	WATER	Oct 2000	Gr. Alpha	< 0.46	0.06 ± 0.33	<1.0
SPW-7746	WATER	Oct 2000	Gr. Beta	< 1.24	0.00 ± 0.87	<3.2
SPW-9103	WATER	Nov 2000	Ra-226	< 0.01	0.02 ± 0.01	<1.0
SPW-9103	WATER	Nov 2000	Ra-228	< 1.00	0.14 ± 0.48	<2.0
SPW-9729	WATER	Dec 2000	Gr. Alpha	< 0.46	0.23 ± 0.36	<1.0
SPW-9729	WATER	Dec 2000	Gr. Beta	< 1.33	-0.46 ± 0.98	<3.2
SPW-9729	WATER	Dec 2000	Ra-226	< 0.02	0.05 ± 0.01	<1.0
SPW-9729	WATER	Dec 2000	Ra-228	< 0.70	0.22 ± 0.35	<2.0
SPW-9103	WATER	Dec 2000	Gr. Alpha	< 0.51	-0.11 ± 0.37	<1.0
SPW-9103	WATER	Dec 2000	Gr. Beta	< 1.21	0.55 ± 0.91	<3.2
SPCH-10583	CHARCOAL CANISTER	Dec 2000	I-131(g)	< 1.49		<9.6

^a Liquid sample results are reported in pCi/Liter, air filter sample results are in pCi/filter, charcoal sample results are in pCi/charcoal, and solid sample results are in pCi/kilogram.

^b The activity reported is the net activity result.

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
CF-23, 24	Jan, 2000	Gr. Beta	13.05 ± 0.39	12.46 ± 0.36	12.75 ± 0.26
CF-23, 24	Jan, 2000	K-40	13.00 ± 0.90	11.73 ± 0.79	12.36 ± 0.60
CF-23, 24	Jan, 2000	Sr-90	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
WW-65, 66	Jan, 2000	Co-60	-0.53 ± 1.62	0.44 ± 2.11	-0.04 ± 1.33
WW-65, 66	Jan, 2000	Cs-137	-2.13 ± 1.70	0.41 ± 2.35	-0.86 ± 1.45
WW-65, 66	Jan, 2000	H-3	131.62 ± 84.13	182.81 ± 86.33	157.22 ± 60.27
WW-686, 687	Jan, 2000	Gr. Beta	4.76 ± 1.22	4.59 ± 1.27	4.67 ± 0.88
AP-1204, 1205	Jan, 2000	Be-7	0.19 ± 0.09	0.10 ± 0.07	0.14 ± 0.06
SW-68, 69	Jan, 2000	K-40 (FP)	1.30 ± 0.13	1.30 ± 0.13	1.30 ± 0.09
MI-277, 278	Jan, 2000	I-131	-0.08 ± 0.27	-0.00 ± 0.26	-0.04 ± 0.19
MI-277, 278	Jan, 2000	K-40	1,664.70 ± 113.20	1,431.30 ± 90.30	1,548.00 ± 72.40
MI-277, 278	Jan, 2000	Sr-90	0.63 ± 0.42	0.51 ± 0.40	0.57 ± 0.29
SW-728, 729	Jan, 2000	Co-60	0.39 ± 1.79	1.04 ± 1.53	0.72 ± 1.18
SW-728, 729	Jan, 2000	Cs-137	-0.67 ± 1.86	1.22 ± 1.38	0.27 ± 1.16
SW-403, 404	Jan, 2000	H-3	795.21 ± 109.04	857.22 ± 111.09	826.22 ± 77.83
SWT-437, 438	Jan, 2000	Gr. Beta	1.73 ± 0.57	2.60 ± 0.58	2.16 ± 0.41
PW-637, 638	Jan, 2000	Co-60	4.90 ± 2.92	-2.56 ± 2.80	1.17 ± 2.02
PW-637, 638	Jan, 2000	Cs-137	2.73 ± 2.51	-1.68 ± 2.71	0.53 ± 1.85
PW-637, 638	Jan, 2000	Gr. Beta	1.67 ± 1.31	4.00 ± 1.59	2.83 ± 1.03
SW-587, 588	Jan, 2000	Co-60	-1.24 ± 1.86	-0.27 ± 1.79	-0.76 ± 1.29
SW-587, 588	Jan, 2000	Cs-137	1.35 ± 1.94	0.23 ± 1.80	0.79 ± 1.32
SW-587, 588	Jan, 2000	Gr. Beta	3.80 ± 1.56	6.76 ± 1.75	5.28 ± 1.17
SW-611, 612	Jan, 2000	H-3	2,229.26 ± 158.61	2,115.19 ± 155.80	2,172.23 ± 111.16
SW-459, 460	Feb, 2000	Gr. Beta	2.15 ± 0.94	2.79 ± 0.94	2.47 ± 0.66
WW-774, 775	Feb, 2000	Co-60	4.26 ± 3.48	1.61 ± 4.46	2.93 ± 2.83
WW-774, 775	Feb, 2000	Cs-137	-1.19 ± 3.78	2.37 ± 4.65	0.59 ± 2.99
WW-774, 775	Feb, 2000	H-3	2,841.35 ± 174.48	2,566.76 ± 168.19	2,704.05 ± 121.17
SW-707, 708	Feb, 2000	Gr. Alpha	2.20 ± 1.73	0.16 ± 1.29	1.18 ± 1.08
SW-707, 708	Feb, 2000	Gr. Beta	7.90 ± 1.70	7.70 ± 1.70	7.80 ± 1.20
SW-707, 708	Feb, 2000	H-3	117.00 ± 92.00	69.00 ± 90.00	93.00 ± 64.35
CW-854, 855	Feb, 2000	Gr. Beta	2.13 ± 1.36	1.34 ± 1.25	1.74 ± 0.93
SW-881, 882	Feb, 2000	H-3	1,794.91 ± 145.81	1,762.31 ± 144.95	1,778.61 ± 102.80
SW-959, 960	Feb, 2000	Gr. Alpha	1.04 ± 1.00	0.92 ± 0.67	0.98 ± 0.60
SW-959, 960	Feb, 2000	Gr. Beta	1.24 ± 0.89	1.79 ± 0.90	1.51 ± 0.63
PW-1055, 1056	Feb, 2000	Co-60	-0.72 ± 3.18	1.73 ± 1.89	0.51 ± 1.85
PW-1055, 1056	Feb, 2000	Cs-137	0.55 ± 2.81	0.90 ± 1.86	0.72 ± 1.69
PW-1055, 1056	Feb, 2000	Gr. Beta	2.40 ± 1.52	2.20 ± 1.50	2.30 ± 1.07

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI-1079, 1080	Mar, 2000	Calcium	0.79 ± 0.08	0.78 ± 0.08	0.79 ± 0.06
MI-1079, 1080	Mar, 2000	K-40	1,229.00 ± 138.00	1,387.00 ± 162.00	1,308.00 ± 106.40
MI-1079, 1080	Mar, 2000	Sr-90	0.90 ± 0.40	1.70 ± 0.50	1.30 ± 0.32
CW-1156, 1157	Mar, 2000	H-3	1,994.51 ± 143.09	2,012.54 ± 143.55	2,003.53 ± 101.34
SW-1967, 1968	Mar, 2000	Gr. Beta	11.96 ± 1.31	12.57 ± 1.31	12.27 ± 0.93
SW-2468, 2469	Mar, 2000	Sr-90	0.93 ± 0.45	0.50 ± 0.29	0.72 ± 0.27
WW-1402, 1403	Mar, 2000	H-3	93.34 ± 97.05	60.63 ± 95.75	76.98 ± 68.17
LW-1269, 1270	Mar, 2000	Gr. Beta	1.97 ± 0.57	3.22 ± 0.69	2.60 ± 0.45
AP-,	Mar, 2000	Be-7	0.06 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
MI-1541, 1542	Mar, 2000	K-40	1,380.00 ± 122.00	1,476.00 ± 158.00	1,428.00 ± 99.81
CW-1571, 1572	Mar, 2000	Gr. Beta	2.29 ± 1.48	1.35 ± 1.27	1.82 ± 0.98
CW-1693, 1694	Mar, 2000	Gr. Beta	0.56 ± 1.18	1.91 ± 1.49	1.24 ± 0.95
SWT-,	Mar, 2000	Gr. Beta	2.36 ± 0.65	2.01 ± 0.57	2.19 ± 0.43
WW-1916, 1917	Mar, 2000	H-3	25.37 ± 90.21	3.90 ± 89.27	14.63 ± 63.46
AP-2155, 2156	Mar, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
SWU-2547, 2548	Mar, 2000	Sr-90	0.57 ± 0.24	0.55 ± 0.24	0.56 ± 0.17
CW-1798, 1799	Mar, 2000	Gr. Beta	2.73 ± 1.85	0.76 ± 1.71	1.75 ± 1.26
AP-2176, 2177	Mar, 2000	Be-7	0.06 ± 0.01	0.08 ± 0.02	0.07 ± 0.01
WW-2046, 2047	Mar, 2000	H-3	221.85 ± 101.64	185.19 ± 100.24	203.52 ± 71.38
SW-1967, 1968	Apr, 2000	K-40	9.20 ± 0.90	9.10 ± 0.90	9.15 ± 0.64
SW-2241, 2242	Apr, 2000	Gr. Alpha	2.49 ± 1.44	3.15 ± 1.53	2.82 ± 1.05
SW-2241, 2242	Apr, 2000	Gr. Beta	8.37 ± 1.36	7.20 ± 1.29	7.79 ± 0.94
WW-,	Apr, 2000	Gr. Beta	4.20 ± 0.64	4.68 ± 0.73	4.44 ± 0.49
WW-2711, 2712	Apr, 2000	Cs-137	-0.76 ± 2.19	1.43 ± 3.63	0.34 ± 2.12
WW-2711, 2712	Apr, 2000	H-3	3,877.05 ± 192.54	3,951.88 ± 193.99	3,914.46 ± 136.66
WW-2511, 2512	Apr, 2000	H-3	108.10 ± 79.80	127.80 ± 80.70	117.95 ± 56.75
SO-2435, 2436	Apr, 2000	K-40	4.73 ± 0.38	4.83 ± 0.53	4.78 ± 0.33
SS-2669, 2670	Apr, 2000	K-40	8.60 ± 0.55	9.18 ± 0.45	8.89 ± 0.36
SWU-2732, 2733	Apr, 2000	Gr. Beta	3.33 ± 0.68	3.19 ± 0.69	3.26 ± 0.48
PW-2605, 2606	Apr, 2000	Co-60	0.36 ± 1.10	1.05 ± 2.03	0.71 ± 1.16
PW-2605, 2606	Apr, 2000	Cs-137	-0.07 ± 0.93	-0.98 ± 2.37	-0.53 ± 1.27
PW-2605, 2606	Apr, 2000	Gr. Beta	1.51 ± 1.31	2.91 ± 1.39	2.21 ± 0.96
WW-2711, 2712	Apr, 2000	H-3	3,877.00 ± 192.50	3,951.90 ± 194.00	3,914.45 ± 136.65
WW-2711, 2712	Apr, 2000	Co-60	0.97 ± 1.93	0.82 ± 3.64	0.90 ± 2.06
BS-3212, 3213	Apr, 2000	Gr. Beta	7.90 ± 1.97	7.57 ± 1.88	7.74 ± 1.36
SW-,	May, 2000	K-40	1.30 ± 0.13	1.20 ± 0.12	1.25 ± 0.09
MI-2810, 2811	May, 2000	K-40	1,285.00 ± 111.00	1,338.00 ± 127.00	1,311.50 ± 84.34

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
SW-3003, 3004	May, 2000	Gr. Beta	5.06 ± 0.73	5.27 ± 0.73	5.17 ± 0.52
F-2831, 2832	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.01
F-2831, 2832	May, 2000	Cs-137	-0.00 ± 0.01	0.00 ± 0.01	0.00 ± 0.01
WW-3128, 3129	May, 2000	Gr. Beta	5.41 ± 1.35	4.43 ± 1.22	4.92 ± 0.91
BS-3411, 3412	May, 2000	Co-60	-0.00 ± 0.01	0.01 ± 0.01	0.00 ± 0.01
BS-3411, 3412	May, 2000	Cs-137	0.01 ± 0.01	0.00 ± 0.01	0.00 ± 0.00
F-3436, 3437	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.00
F-3436, 3437	May, 2000	Cs-137	0.00 ± 0.01	-0.00 ± 0.00	-0.00 ± 0.00
F-2978, 2979	May, 2000	K-40	2.72 ± 0.26	2.14 ± 0.30	2.43 ± 0.20
SS-3482, 3483	May, 2000	Cs-137	0.11 ± 0.03	0.12 ± 0.03	0.12 ± 0.02
SS-3482, 3483	May, 2000	K-40	11.26 ± 0.57	11.37 ± 0.54	11.32 ± 0.39
BS-3458, 3459	May, 2000	Co-60	0.01 ± 0.01	0.02 ± 0.01	0.01 ± 0.01
BS-3458, 3459	May, 2000	Cs-137	0.04 ± 0.01	0.03 ± 0.02	0.03 ± 0.01
MI-3510, 3511	May, 2000	Co-60	0.48 ± 3.05	-0.80 ± 2.74	-0.16 ± 2.05
MI-3510, 3511	May, 2000	Cs-137	1.17 ± 2.96	0.38 ± 2.60	0.77 ± 1.97
MI-3510, 3511	May, 2000	I-131	-0.06 ± 0.25	-0.04 ± 0.24	-0.05 ± 0.17
SO-3629, 3630	May, 2000	Cs-137	0.23 ± 0.03	0.20 ± 0.03	0.22 ± 0.02
SO-3629, 3630	May, 2000	Gr. Beta	20.49 ± 2.82	19.14 ± 2.73	19.82 ± 1.96
SO-3629, 3630	May, 2000	K-40	13.03 ± 0.61	12.25 ± 0.57	12.64 ± 0.42
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.65 ± 1.32
SW-3904, 3905	May, 2000	Co-60	-0.65 ± 1.54	1.32 ± 1.77	0.33 ± 1.17
SW-3904, 3905	May, 2000	Cs-137	0.19 ± 1.22	-0.16 ± 1.15	0.01 ± 0.84
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.64 ± 1.32
SP-3833, 3834	May, 2000	Gr. Alpha	4.19 ± 1.34	3.22 ± 1.20	3.71 ± 0.90
MI-3105, 3106	May, 2000	K-40	1,460.00 ± 173.00	1,452.00 ± 110.00	1,456.00 ± 102.50
VE-3191, 3192	May, 2000	Be-7	0.42 ± 0.23	0.39 ± 0.16	0.40 ± 0.14
VE-3191, 3192	May, 2000	Gr. Alpha	0.15 ± 0.06	0.28 ± 0.07	0.22 ± 0.05
VE-3191, 3192	May, 2000	Gr. Beta	3.76 ± 0.13	3.88 ± 0.14	3.82 ± 0.10
VE-3191, 3192	May, 2000	K-40	3.58 ± 0.43	3.47 ± 0.72	3.53 ± 0.42
MI-3718, 3719	May, 2000	K-40	1,447.00 ± 165.00	1,444.00 ± 177.00	1,445.50 ± 120.99
DW-3770, 3771	May, 2000	Gr. Beta	5.92 ± 1.32	4.54 ± 1.10	5.23 ± 0.86
MI-3653, 3654	Jun, 2000	K-40	1,407.00 ± 170.00	1,388.00 ± 102.00	1,397.50 ± 99.13
SW-4614, 4615	Jun, 2000	Sr-90	0.50 ± 0.27	0.55 ± 0.27	0.53 ± 0.19
WW-3883, 3884	Jun, 2000	H-3	4,401.80 ± 204.60	4,298.00 ± 202.70	4,349.90 ± 144.00
WW-3883, 3884	Jun, 2000	Co-60	0.91 ± 3.01	-0.28 ± 1.52	0.32 ± 1.69
WW-3883, 3884	Jun, 2000	Cs-137	0.49 ± 2.16	0.66 ± 1.82	0.57 ± 1.41
WW-3883, 3884	Jun, 2000	H-3	4,401.78 ± 204.63	4,297.96 ± 202.67	4,349.87 ± 144.00

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
BS-3980, 3981	Jun, 2000	Cs-137	0.07 ± 0.02	0.08 ± 0.02	0.08 ± 0.01
BS-3980, 3981	Jun, 2000	Cs-137	0.06 ± 0.02	0.07 ± 0.02	0.07 ± 0.01
BS-3980, 3981	Jun, 2000	K-40	1,458.60 ± 69.40	1,421.90 ± 52.20	1,440.25 ± 43.42
VE-4065, 4066	Jun, 2000	K-40	6.37 ± 0.54	6.34 ± 0.51	6.36 ± 0.37
WW-4252, 4253	Jun, 2000	H-3	705.40 ± 114.10	718.90 ± 114.60	712.15 ± 80.86
TSWU-4283, 4284	Jun, 2000	Gr. Beta	3.24 ± 0.63	3.11 ± 0.62	3.18 ± 0.44
F-4438, 4439	Jun, 2000	Gr. Beta	2.25 ± 0.06	2.13 ± 0.06	2.19 ± 0.04
SW-4459, 4460	Jun, 2000	H-3	532.20 ± 108.10	670.50 ± 112.90	601.35 ± 78.15
WW-4480, 4481	Jun, 2000	H-3	601.50 ± 99.50	573.10 ± 108.50	587.30 ± 73.61
SW-4375, 4376	Jun, 2000	Gr. Beta	4.53 ± 1.59	4.43 ± 1.54	4.48 ± 1.11
SW-4375, 4376	Jun, 2000	Cs-137	-0.09 ± 1.61	-0.43 ± 1.39	-0.26 ± 1.06
AP-,	Jun, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.07 ± 0.01
AP-4712, 4713	Jun, 2000	Be-7	0.07 ± 0.02	0.09 ± 0.02	0.08 ± 0.01
SW-4537, 4538	Jun, 2000	H-3	584.10 ± 108.80	599.20 ± 109.30	591.65 ± 77.11
SL-4636, 4637	Jul, 2000	Be-7	0.93 ± 0.18	0.56 ± 0.12	0.75 ± 0.11
SL-4636, 4637	Jul, 2000	Gr. Beta	2.41 ± 0.32	2.69 ± 0.32	2.55 ± 0.23
SL-4636, 4637	Jul, 2000	K-40	1.25 ± 0.24	1.13 ± 0.30	1.19 ± 0.19
SL-4636, 4637	Jul, 2000	Sr-90	0.04 ± 0.02	0.05 ± 0.03	0.05 ± 0.02
G-4667, 4668	Jul, 2000	Be-7	0.93 ± 0.20	0.98 ± 0.31	0.96 ± 0.18
G-4667, 4668	Jul, 2000	Gr. Beta	6.16 ± 0.13	6.68 ± 0.14	6.42 ± 0.10
G-4667, 4668	Jul, 2000	K-40	7.72 ± 0.51	8.43 ± 0.83	8.08 ± 0.49
WW-4818, 4819	Jul, 2000	H-3	13.30 ± 77.10	29.70 ± 77.90	21.50 ± 54.80
MI-4839, 4840	Jul, 2000	K-40	1,313.00 ± 173.00	1,398.00 ± 161.00	1,355.50 ± 118.16
MI-4949, 4950	Jul, 2000	K-40	1,307.00 ± 56.00	1,346.00 ± 58.00	1,326.50 ± 40.31
LW-4991, 4992	Jul, 2000	Gr. Beta	2.78 ± 0.66	2.22 ± 0.55	2.50 ± 0.43
MI-4903, 4904	Jul, 2000	K-40	1,383.10 ± 193.20	1,328.00 ± 153.10	1,355.55 ± 123.25
MI-4881, 4882	Jul, 2000	K-40	1,538.40 ± 103.00	1,438.00 ± 125.30	1,488.20 ± 81.10
MI-4881, 4882	Jul, 2000	Sr-90	1.01 ± 0.37	1.38 ± 0.42	1.19 ± 0.28
G-5388, 5389	Jul, 2000	Be-7	1.64 ± 0.16	1.52 ± 0.21	1.58 ± 0.13
G-5388, 5389	Jul, 2000	K-40	5.51 ± 0.33	5.86 ± 0.49	5.69 ± 0.30
G-5388, 5389	Jul, 2000	Gr. Beta	5.64 ± 0.15	5.81 ± 0.15	5.73 ± 0.11
SWU-5473, 5474	Jul, 2000	Gr. Beta	3.50 ± 0.67	3.17 ± 0.61	3.34 ± 0.45
SW-5410, 5411	Jul, 2000	Gr. Beta	1.95 ± 0.81	1.89 ± 1.04	1.92 ± 0.66
PW-5550, 5551	Jul, 2000	Gr. Beta	0.71 ± 1.15	2.50 ± 1.49	1.61 ± 0.94
WW-5623, 5624	Jul, 2000	H-3	22,713.90 ± 429.00	22,265.50 ± 424.90	22,489.70 ± 301.90
MI-5529, 5530	Aug, 2000	K-40	1,396.80 ± 103.80	1,278.20 ± 117.50	1,337.50 ± 78.39
VE-,	Aug, 2000	K-40	1.66 ± 0.32	1.93 ± 0.33	1.80 ± 0.23

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI-5808, 5809	Aug, 2000	K-40	1,261.90 ± 124.40	1,234.40 ± 152.80	1,248.15 ± 98.52
CW-6514, 6515	Aug, 2000	Gr. Beta	1.42 ± 0.37	1.44 ± 0.41	1.43 ± 0.28
MI-5933, 5934	Aug, 2000	Calcium	0.88 ± 0.09	0.89 ± 0.09	0.89 ± 0.06
MI-5933, 5934	Aug, 2000	Sr-90	3.29 ± 0.51	1.72 ± 0.47	2.51 ± 0.35
VE-6002, 6003	Aug, 2000	Sr-90	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
VE-6002, 6003	Aug, 2000	K-40	1.44 ± 0.23	1.78 ± 0.18	1.61 ± 0.14
PW-6209, 6210	Aug, 2000	H-3	528.20 ± 112.70	578.50 ± 114.50	553.35 ± 80.33
SW-6291, 6292	Aug, 2000	Gr. Beta	4.14 ± 1.58	1.95 ± 1.32	3.05 ± 1.03
WW-6312, 6313	Aug, 2000	H-3	7,804.20 ± 262.70	7,221.70 ± 253.80	7,512.95 ± 182.64
WW-5981, 5982	Aug, 2000	Gr. Beta	4.85 ± 0.78	5.87 ± 0.79	5.36 ± 0.56
PW-6341, 6342	Aug, 2000	Gr. Beta	2.45 ± 1.42	2.63 ± 1.37	2.54 ± 0.99
CW-6514, 6515	Aug, 2000	H-3	5,600.10 ± 226.80	5,434.30 ± 223.90	5,517.20 ± 159.35
MI-6409, 6410	Sep, 2000	I-131	-0.04 ± 0.23	0.19 ± 0.24	0.08 ± 0.17
MI-6409, 6410	Sep, 2000	K-40	1,367.80 ± 111.40	1,368.60 ± 107.50	1,368.20 ± 77.41
MI-6409, 6410	Sep, 2000	Sr-90	1.19 ± 0.35	0.80 ± 0.30	1.00 ± 0.23
MI-6542, 6543	Sep, 2000	K-40	1,298.00 ± 140.10	1,470.60 ± 139.70	1,384.30 ± 98.92
MI-6450, 6451	Sep, 2000	K-40	1,237.20 ± 102.10	1,328.10 ± 108.30	1,282.65 ± 74.42
MI-7102, 7103	Sep, 2000	I-131	-0.11 ± 0.23	-0.02 ± 0.25	-0.07 ± 0.17
MI-7102, 7103	Sep, 2000	K-40	1,473.10 ± 101.40	1,400.70 ± 168.60	1,436.90 ± 98.37
SWT-7262, 7263	Sep, 2000	Gr. Beta	3.45 ± 0.66	2.32 ± 0.57	2.89 ± 0.44
SWU-7283, 7284	Sep, 2000	Gr. Beta	2.75 ± 0.55	2.87 ± 0.56	2.81 ± 0.39
SWU-7283, 7284	Sep, 2000	H-3	197.76 ± 94.07	172.31 ± 93.00	185.04 ± 66.14
SW-7081, 7082	Sep, 2000	H-3	89.32 ± 92.99	42.38 ± 90.37	65.85 ± 64.83
AP-7685, 7686	Sep, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-7706, 7707	Sep, 2000	Be-7	0.06 ± 0.01	0.05 ± 0.01	0.05 ± 0.01
SW-7482, 7483	Sep, 2000	Gr. Beta	5.31 ± 1.75	6.70 ± 1.85	6.01 ± 1.27
SP-7347, 7348	Sep, 2000	Gr. Alpha	6.12 ± 1.54	5.68 ± 1.49	5.90 ± 1.07
SW-7436, 7437	Sep, 2000	H-3	40.60 ± 79.90	72.00 ± 81.40	56.30 ± 57.03
CW-7748, 7749	Sep, 2000	Gr. Alpha	0.47 ± 0.28	0.65 ± 0.36	0.56 ± 0.23
CW-7748, 7749	Sep, 2000	Gr. Beta	2.35 ± 0.39	2.02 ± 0.38	2.19 ± 0.27
SL-7304, 7305	Oct, 2000	Gr. Beta	2.94 ± 0.23	2.90 ± 0.23	2.92 ± 0.17
SL-7304, 7305	Oct, 2000	K-40	1.14 ± 0.36	1.73 ± 0.58	1.44 ± 0.34
BS-7369, 7370	Oct, 2000	Cs-137	10.79 ± 4.96	20.04 ± 9.40	15.41 ± 5.31
SO-7950, 7951	Oct, 2000	Ac-228	0.66 ± 0.10	0.77 ± 0.10	0.72 ± 0.07
SO-7950, 7951	Oct, 2000	Bi-214	0.42 ± 0.06	0.57 ± 0.07	0.49 ± 0.05
SO-7950, 7951	Oct, 2000	Cs-137	0.20 ± 0.31	0.21 ± 0.04	0.20 ± 0.16
SO-7950, 7951	Oct, 2000	Gr. Beta	29.22 ± 1.98	28.02 ± 1.98	28.62 ± 1.40

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
SO-7950, 7951	Oct, 2000	K-40	21.36 ± 0.93	21.77 ± 0.89	21.56 ± 0.64
SO-7950, 7951	Oct, 2000	Pb-212	0.72 ± 0.12	0.92 ± 0.12	0.82 ± 0.09
SO-7950, 7951	Oct, 2000	Ra-226	1.21 ± 0.33	1.30 ± 0.31	1.26 ± 0.22
SO-7950, 7951	Oct, 2000	Tl-208	0.21 ± 0.04	0.25 ± 0.03	0.23 ± 0.02
VE-7554, 7555	Oct, 2000	Gr. Beta	0.73 ± 0.02	0.74 ± 0.02	0.74 ± 0.01
MI-7622, 7623	Oct, 2000	K-40	1,505.90 ± 142.70	1,453.60 ± 172.00	1,479.75 ± 111.74
F-8219, 8220	Oct, 2000	K-40	2.94 ± 0.22	3.39 ± 0.38	3.16 ± 0.22
WW-7844, 7845	Oct, 2000	H-3	-68.13 ± 74.09	84.23 ± 81.38	8.05 ± 55.03
WW-8240, 8241	Oct, 2000	Gr. Beta	0.35 ± 1.89	1.61 ± 2.28	0.98 ± 1.48
WW-8240, 8241	Oct, 2000	H-3	72.46 ± 92.95	38.87 ± 91.51	55.66 ± 65.22
BS-8170, 8171	Oct, 2000	Gr. Beta	11.96 ± 2.55	11.30 ± 2.39	11.63 ± 1.75
BS-8170, 8171	Oct, 2000	K-40	8.36 ± 0.46	8.76 ± 0.47	8.56 ± 0.33
MI-8085, 8086	Oct, 2000	Calcium	0.94	0.94	0.94
MI-8085, 8086	Oct, 2000	Sr-90	1.04 ± 0.35	0.75 ± 0.31	0.90 ± 0.24
MI-8149, 8150	Oct, 2000	K-40	1,358.10 ± 95.81	1,341.80 ± 178.00	1,349.95 ± 101.07
SO-8967, 8968	Oct, 2000	Be-7	1.25 ± 0.37	1.27 ± 0.35	1.26 ± 0.26
SO-8967, 8968	Oct, 2000	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.02
SO-8967, 8968	Oct, 2000	K-40	4.53 ± 0.66	4.46 ± 0.58	4.50 ± 0.44
MI-8522, 8523	Oct, 2000	I-131	-0.05 ± 0.23	0.18 ± 0.25	0.07 ± 0.17
SWU-8894, 8895	Oct, 2000	Gr. Beta	3.63 ± 0.62	2.45 ± 0.61	3.04 ± 0.43
MI-8802, 8803	Nov, 2000	I-131	-0.22 ± 0.24	-0.25 ± 0.26	-0.24 ± 0.18
MI-8802, 8803	Nov, 2000	K-40	1,340.50 ± 113.80	1,453.50 ± 100.50	1,397.00 ± 75.91
MI-8802, 8803	Nov, 2000	Sr-89	0.19 ± 1.31	0.61 ± 1.34	0.40 ± 0.94
MI-8802, 8803	Nov, 2000	Sr-90	1.10 ± 0.39	0.90 ± 0.38	1.00 ± 0.27
LW-8823, 8824	Nov, 2000	Gr. Beta	2.13 ± 0.55	1.59 ± 0.52	1.86 ± 0.38
VE-9014, 9015	Nov, 2000	Gr. Alpha	0.10 ± 0.06	0.15 ± 0.07	0.12 ± 0.05
VE-9014, 9015	Nov, 2000	Gr. Beta	5.59 ± 0.17	5.90 ± 0.19	5.74 ± 0.13
PW-9991, 9992	Nov, 2000	Gr. Beta	2.50 ± 0.01	3.49 ± 1.18	3.00 ± 0.59
SW-9991, 9992	Nov, 2000	Co-60	1.16 ± 1.70	-2.94 ± 3.39	-0.89 ± 1.89
SW-9991, 9992	Nov, 2000	Cs-134	-0.07 ± 1.85	2.27 ± 3.73	1.10 ± 2.08
SW-9991, 9992	Nov, 2000	Cs-137	-0.88 ± 1.67	3.84 ± 3.45	1.48 ± 1.92
DW-9682, 9683	Dec, 2000	Gr. Beta	1.61 ± 1.02	2.10 ± 0.94	1.86 ± 0.69
MI-9749, 9750	Dec, 2000	K-40	1,562.40 ± 118.70	1,495.90 ± 168.30	1,529.15 ± 102.97
AP-10782, 10783	Dec, 2000	Be-7	0.21 ± 0.10	0.31 ± 0.14	0.26 ± 0.09
AP-10824, 10825	Dec, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.06 ± 0.01
WW-10424, 10425	Dec, 2000	H-3	1,690.87 ± 137.81	1,551.48 ± 1,339.42	1,621.18 ± 673.25

Table A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration ^b		
				Laboratory result ^c	MAPEP Result ^d 1s, N=1	Control Limits
STSO-882	SOIL	Jan, 2000	Am-241	64.90 ± 6.49	61.10	42.77 - 79.43
STSO-882	SOIL	Jan, 2000	Co-57	721.10 ± 83.80	949.00	664.30 - 1,233.70
The MAPEP soil sample (STSO-882), as received, did not closely match a standard gamma geometry. The results for gamma-emitting isotopes are reanalyses, with a reduced sample size.						
STSO-882	SOIL	Jan, 2000	Co-60	1,264.40 ± 78.60	1,180.00	826.00 - 1,534.00
STSO-882	SOIL	Jan, 2000	Cs-134	969.30 ± 76.90	1,047.00	732.90 - 1,361.10
STSO-882	SOIL	Jan, 2000	Cs-137	944.00 ± 92.00	930.00	651.00 - 1,209.00
STSO-882	SOIL	Jan, 2000	K-40	811.70 ± 79.90	652.00	456.40 - 847.60
STSO-882	SOIL	Jan, 2000	Mn-54	1,103.30 ± 64.20	1,023.00	716.10 - 1,329.90
STSO-882	SOIL	Jan, 2000	Ni-63	711.00 ± 71.10	960.00	672.00 - 1,248.00
STSO-882	SOIL	Jan, 2000	Pu-239/40	67.90 ± 6.79	74.40	52.08 - 96.72
STSO-882	SOIL	Jan, 2000	Sr-90	345.00 ± 34.50	304.00	212.80 - 395.20
STSO-882	SOIL	Jan, 2000	U-233/4	62.90 ± 6.29	90.00	63.00 - 117.00
Incomplete dissolution of the sample is suspected. Results of reanalysis: U-233/234 67.3 ± 3.3 pCi/g, U-238 68.1 ± 8.9 pCi/g.						
STSO-882	SOIL	Jan, 2000	U-238	63.20 ± 6.32	93.00	65.10 - 120.90
STSO-882	SOIL	Jan, 2000	Zn-65	1,544.30 ± 61.50	1,540.00	1,078.00 - 2,002.00

^a Results obtained by Environmental Inc., Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho.

^b All results are in Bq/kg or Bq/L as requested by the Department of Energy.

^c Unless otherwise indicated, laboratory results are given as the mean ± 1 standard deviations for three determinations.

^d Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination), and control limits as defined by the MAPEP.

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration ^b		Control Limits ^c
				Laboratory result ^c	EML Result ^d	
STSO-870	SOIL	Mar, 2000	Ac-228	98.300 ± 7.100	97.600	0.79 - 1.75
STSO-870	SOIL	Mar, 2000	Bi-212	98.500 ± 15.100	106.000	0.42 - 1.22
STSO-870	SOIL	Mar, 2000	Bi-214	88.000 ± 3.800	86.700	0.75 - 1.42
STSO-870	SOIL	Mar, 2000	Cs-137	324.000 ± 5.000	339.000	0.83 - 1.32
STSO-870	SOIL	Mar, 2000	K-40	872.000 ± 34.000	811.000	0.78 - 1.53
STSO-870	SOIL	Mar, 2000	Pb-212	93.700 ± 2.700	97.300	0.74 - 1.33
STSO-870	SOIL	Mar, 2000	Pb-214	100.100 ± 3.700	86.500	0.65 - 1.45
STSO-870	SOIL	Mar, 2000	Pu-238	19.800 ± 3.000	18.600	0.52 - 2.84
STSO-870	SOIL	Mar, 2000	Pu-239/40	8.100 ± 1.700	7.000	0.69 - 1.74
STSO-870	SOIL	Mar, 2000	Sr-90	13.600 ± 3.100	20.200	0.60 - 3.66
STVE-871	VEGETATION	Mar, 2000	Am-241	9.800 ± 0.900	10.400	0.68 - 2.70
STVE-871	VEGETATION	Mar, 2000	Co-60	46.500 ± 2.100	52.800	0.69 - 1.46
STVE-871	VEGETATION	Mar, 2000	Cs-137	1,872.000 ± 46.000	1,380.000	0.80 - 1.40
STVE-871	VEGETATION	Mar, 2000	K-40	506.400 ± 28.000	521.000	0.79 - 1.42
STVE-871	VEGETATION	Mar, 2000	Pu-239/40	14.300 ± 1.500	15.500	0.68 - 1.59
STVE-871	VEGETATION	Mar, 2000	Sr-90	1,198.000 ± 85.000	1,780.000	0.50 - 1.33
STAP-872	AIR FILTER	Mar, 2000	Co-57	5.900 ± 0.100	5.310	0.65 - 1.39
STAP-872	AIR FILTER	Mar, 2000	Co-60	5.900 ± 0.100	5.320	0.75 - 1.32
STAP-872	AIR FILTER	Mar, 2000	Cs-137	7.500 ± 0.100	6.100	0.73 - 1.37
STAP-872	AIR FILTER	Mar, 2000	Gr. Alpha	3.300 ± 0.100	3.020	0.50 - 1.55
STAP-872	AIR FILTER	Mar, 2000	Gr. Beta	2.700 ± 0.100	2.420	0.72 - 1.67
STAP-872	AIR FILTER	Mar, 2000	Mn-54	31.800 ± 0.300	27.200	0.76 - 1.33
STAP-872	AIR FILTER	Mar, 2000	Pu-238	0.060 ± 0.030	0.080	0.74 - 1.40
STAP-872	AIR FILTER	Mar, 2000	Pu-239/40	0.090 ± 0.010	0.089	0.76 - 1.44
STAP-872	AIR FILTER	Mar, 2000	Ru-106	3.500 ± 1.000	2.010	0.59 - 1.30
Result within activity ± error margin.						
STAP-872	AIR FILTER	Mar, 2000	Sr-90	0.310 ± 0.160	0.242	0.61 - 1.93
STAP-872	AIR FILTER	Mar, 2000	Uranium	0.120 ± 0.010	0.126	0.80 - 3.35
STW-874	WATER	Mar, 2000	Am-241	1.700 ± 0.220	1.950	0.75 - 1.49
STW-874	WATER	Mar, 2000	Co-60	51.000 ± 1.200	48.900	0.80 - 1.20

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration ^b		Control Limits ^e
				Laboratory result ^c	EML Result ^d	
STW-874	WATER	Mar, 2000	Cs-137	108.600 ± 1.800	103.000	0.80 - 1.26
STW-874	WATER	Mar, 2000	Fe-55	33.000 ± 1.200	33.100	0.44 - 1.53
STW-874	WATER	Mar, 2000	Gr. Alpha	1,217.000 ± 35.000	1,700.000	0.61 - 1.32
STW-874	WATER	Mar, 2000	Gr. Beta	792.000 ± 25.000	690.000	0.55 - 1.54
STW-874	WATER	Mar, 2000	H-3	147.000 ± 26.000	79.400	0.71 - 1.79
Analysis was repeated; result of reanalysis; 97.5 ± 11.6 Bq/L.						
STW-874	WATER	Mar, 2000	Ni-63	101.000 ± 6.000	112.000	0.25 - 1.75
STW-874	WATER	Mar, 2000	Pu-238	0.750 ± 0.170	0.944	0.78 - 1.25
STW-874	WATER	Mar, 2000	Pu-239/40	0.990 ± 0.090	0.918	0.80 - 1.39
STW-874	WATER	Mar, 2000	Sr-90	4.460 ± 0.990	3.390	0.75 - 1.50
STW-874	WATER	Mar, 2000	Uranium	0.270 ± 0.020	0.995	0.67 - 1.42
Result reported was for U-234. Result for U (total); 0.58 ± 0.02 pCi/L.						
STSO-885	SOIL	Sep, 2000	Ac-228	78.000 ± 1.500	80.200	0.80 - 1.50
STSO-885	SOIL	Sep, 2000	Bi-212	73.000 ± 3.300	80.500	0.45 - 1.23
STSO-885	SOIL	Sep, 2000	Bi-214	91.000 ± 4.000	83.300	0.78 - 1.50
STSO-885	SOIL	Sep, 2000	Cs-137	925.700 ± 14.200	1,020.000	0.80 - 1.29
STSO-885	SOIL	Sep, 2000	K-40	713.600 ± 7.100	713.000	0.80 - 1.37
STSO-885	SOIL	Sep, 2000	Pb-212	66.100 ± 4.300	79.300	0.74 - 1.36
STSO-885	SOIL	Sep, 2000	Pb-214	100.100 ± 3.700	86.300	0.76 - 1.53
STSO-885	SOIL	Sep, 2000	Pu-239/40	18.400 ± 0.400	16.800	0.71 - 1.33
STSO-885	SOIL	Sep, 2000	Sr-90	39.900 ± 5.300	50.400	0.61 - 3.91
STSO-885	SOIL	Sep, 2000	Th-234	154.700 ± 9.300	148.000	0.68 - 2.36
STSO-885	SOIL	Sep, 2000	Uranium	254.300 ± 13.000	327.000	0.62 - 1.35
STW-886	WATER	Sep, 2000	Am-241	1.300 ± 0.200	1.190	0.76 - 1.48
STW-886	WATER	Sep, 2000	Co-60	71.900 ± 7.200	73.700	0.80 - 1.20
STW-886	WATER	Sep, 2000	Cs-137	62.700 ± 6.300	67.000	0.80 - 1.24
STW-886	WATER	Sep, 2000	H-3	92.300 ± 8.900	91.300	0.74 - 2.29
STW-886	WATER	Sep, 2000	Pu-238	0.700 ± 0.100	0.786	0.74 - 1.22
STW-886	WATER	Sep, 2000	Pu-239/40	0.600 ± 0.100	0.591	0.75 - 1.26
STW-886	WATER	Sep, 2000	Sr-90	4.600 ± 0.400	4.530	0.64 - 1.50

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration ^b		Control Limits ^e
				Laboratory result ^c	EML Result ^d	
STW-886	WATER	Sep, 2000	Uranium	0.800 ± 0.100	0.916	0.73 - 1.37
STW-887	WATER	Sep, 2000	Gr. Alpha	1,113.700 ± 17.900	1,070.000	0.58 - 1.26
STW-887	WATER	Sep, 2000	Gr. Beta	1,129.400 ± 16.700	950.000	0.56 - 1.50
STAP-888	AIR FILTER	Sep, 2000	Am-241	0.060 ± 0.010	0.032	0.69 - 2.40
STAP-888	AIR FILTER	Sep, 2000	Co-57	16.500 ± 0.600	14.500	0.69 - 1.37
STAP-888	AIR FILTER	Sep, 2000	Co-60	9.200 ± 0.400	8.430	0.79 - 1.30
STAP-888	AIR FILTER	Sep, 2000	Cs-137	8.800 ± 0.500	7.410	0.78 - 1.35
STAP-888	AIR FILTER	Sep, 2000	Mn-54	50.200 ± 2.300	43.200	0.80 - 1.36
STAP-888	AIR FILTER	Sep, 2000	Pu-238	0.033 ± 0.010	0.045	0.66 - 1.35
STAP-888	AIR FILTER	Sep, 2000	Pu-239/40	0.080 ± 0.010	0.074	0.69 - 1.29
STAP-888	AIR FILTER	Sep, 2000	Sr-90	3.300 ± 0.100	1.640	0.55 - 2.05
STAP-888	AIR FILTER	Sep, 2000	U-233/4	0.034 ± 0.001	0.040	0.80 - 1.92
STAP-888	AIR FILTER	Sep, 2000	U-238	0.032 ± 0.010	0.041	0.80 - 1.59
Result within activity ± error margin.						
STAP-888	AIR FILTER	Sep, 2000	Uranium	0.070 ± 0.010	0.083	0.80 - 2.54
STAP-889	AIR FILTER	Sep, 2000	Gr. Alpha	2.840 ± 0.010	2.350	0.57 - 1.47
STAP-889	AIR FILTER	Sep, 2000	Gr. Beta	2.080 ± 0.020	1.520	0.76 - 1.52
STVE-890	VEGETATION	Sep, 2000	Am-241	5.900 ± 1.200	5.600	0.72 - 2.34
STVE-890	VEGETATION	Sep, 2000	Cm-244	3.200 ± 0.100	3.600	0.61 - 1.61
STVE-890	VEGETATION	Sep, 2000	Co-60	29.400 ± 0.400	32.800	0.75 - 1.51
STVE-890	VEGETATION	Sep, 2000	Cs-137	739.300 ± 23.000	867.000	0.80 - 1.37
STVE-890	VEGETATION	Sep, 2000	K-40	597.500 ± 49.300	639.000	0.78 - 1.43
STVE-890	VEGETATION	Sep, 2000	Pu-239/40	4.500 ± 0.200	9.600	0.67 - 1.49
No reason for deviation was found with original result. The result of reanalysis; 12.1 ± 1.1 Bq/kg.						
STVE-890	VEGETATION	Sep, 2000	Sr-90	1,201.500 ± 117.300	1,150.000	0.52 - 1.23

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration ^b		Control Limits ^e
				Laboratory result ^c	EML Result ^d	

^a The Environmental Measurements Laboratory provides the following nuclear species : Air Filters, Soil, Vegetation and Water.

^b Results are reported in Bq/L with the following exceptions: Air Filter results are reported in Bq/Filter, Soil results are reported in Bq/Kg, Vegetation results are reported in Bq/Kg.

^c Laboratory results are reported as the mean of three determinations \pm standard deviation.

^d The EML result listed is the mean of replicate determinations for each nuclide \pm the standard error of the mean.

^e The control limits are reported by EML as the ratio of Reported Value / EML value.

ATTACHMENT B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$

where: x = value of the measurement;

$s = 2s$ counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L , it is reported as: $<L$, where L = the lower limit of detection based on $4.66s$ uncertainty for a background sample.

3.0. Duplicate analyses

3.1 Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$

Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$

3.2. Individual results: $<L_1, <L_2$ Reported result: $<L$, where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s, <L$ Reported result: $x \pm s$ if $x \geq L$; $<L$ otherwise.

4.0. Computation of Averages and Standard Deviations

4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average \bar{x} and standard deviation s of a set of n numbers $x_1, x_2 \dots x_n$ are defined as follows:

$$\bar{x} = \frac{1}{n} \sum x \qquad s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

4.2 Values below the highest lower limit of detection are not included in the average.

4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.

4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.

4.5 In rounding off, the following rules are followed:

4.5.1. If the figure following those to be retained is less than 5, the figure is dropped, and the retained figures are kept unchanged. As an example, 11.443 is rounded off to 11.44.

4.5.2. If the figure following those to be retained is equal to or greater than 5, the figure is dropped and the last retained figure is raised by 1. As an example, 11.445 is rounded off to 11.45.

ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT

APPENDIX B: 2000 REMP DATA SUMMARY REPORTS

Air Gross Beta Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Air pCi/m3	Gross Beta 371	0.01	0.02 370 / 371 0.01 - 0.06	0.02 317 / 318 0.01 - 0.06	1 3.40 ENE	0.02 53 / 53 0.01 - 0.05

Air Gamma Spectral Summary Report 2000
Radiological Environmental Monitoring Program Data Summary
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Air pCi/m3	Be-7 28	N/A	0.06 28 / 28 0.04 - 0.09	0.06 24 / 24 0.04 - 0.09	1 3.40 ENE	0.05 4 / 4 0.04 - 0.06
Air pCi/m3	Co-58 28	N/A	LLD	-	-	-
Air pCi/m3	Co-60 28	N/A	LLD	-	-	-
Air pCi/m3	Cs-134 28	0.04	LLD	-	-	-
Air pCi/m3	Cs-137 28	0.05	LLD	-	-	-

Air Iodine Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Air pCi/m3	I-131 371	0.05	LLD	-	-	-

Milk Gamma Spectral Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Milk pCi/L	Ba-140 47	45.00	LLD	-	-	-
Milk pCi/L	Cs-134 47	11.00	LLD	-	-	-
Milk pCi/L	Cs-137 47	13.00	LLD	-	-	-
Milk pCi/L	K-40 47	N/A	1,433.49 47 / 47 1,069.90 - 1,994.00	1,464.26 28 / 28 1,069.90 - 1,994.00	61 7.40 SE	1,833.72 10 / 50 1,696.60 - 1,994.00
Milk pCi/L	La-140 47	11.00	LLD	-	-	-
						1,388.16 19 / 19 1,137.40 - 1,528.00

Milk Iodine Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Milk pCi/L	I-131 47	0.75	LLD	-	-	-

Food Products Gamma Spectral Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Food Products pCi/kg wet	Be-7 76	N/A	316.36 41 / 76 93.98 - 704.71	308.27 34 / 58 93.98 - 704.71	2 190 ENE	355.63 7 / 18 155.04 - 652.03
Food Products pCi/kg wet	Co-58 76	N/A	LLD	-	-	-
Food Products pCi/kg wet	Co-60 76	N/A	LLD	-	-	-
Food Products pCi/kg wet	Cs-134 76	45.00	LLD	-	-	-
Food Products pCi/kg wet	Cs-137 76	60.00	LLD	-	-	-
Food Products pCi/kg wet	I-131 76	45.00	LLD	-	-	-
Food Products pCi/kg wet	K-40 76	N/A	4,307.93 76 / 76 2,010.90 - 7,501.50	4,349.87 58 / 58 2,139.20 - 6,838.95	16 0.80 S	4,172.79 18 / 18 2,010.90 - 7,501.50

Fish Gamma Spectral Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location # and Distance and Direction	Location with Highest Annual Mean and Number Detected/Number Collected and Range	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Fish pCi/kg wet	Co-58 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Co-60 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Cs-134 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Cs-137 27	112.00	LLD	-	-	-	-
Fish pCi/kg wet	Fe-59 27	195.00	LLD	-	-	-	-
Fish pCi/kg wet	K-40 27	N/A	2,550.04 27 / 27 1,641.60 - 3,198.40	2,512.22 12 / 12 1,641.60 - 2,905.20	32 15.80 WSW	2,580.29 15 / 120 1,886.80 - 3,198.40	2,580.29 15 / 15 1,886.80 - 3,198.40
Fish pCi/kg wet	Mn-54 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Zn-65 27	195.00	LLD	-	-	-	-

Water Gamma Spectral Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location with Highest Annual Mean: Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Water pCi/L	Ba-140 56	45.00	LLD	-	-	-
Water pCi/L	Co-58 56	11.00	LLD	-	-	-
Water pCi/L	Co-60 56	11.00	LLD	-	-	-
Water pCi/L	Cs-134 56	11.00	LLD	-	-	-
Water pCi/L	Cs-137 56	13.00	LLD	-	-	-
Water pCi/L	Fe-59 56	22.00	LLD	-	-	-
Water pCi/L	La-140 56	11.00	LLD	-	-	-
Water pCi/L	Mn-54 56	11.00	LLD	-	-	-
Water pCi/L	Nb-95 56	11.00	LLD	-	-	-
Water pCi/L	Zn-65 56	22.00	LLD	-	-	-
Water pCi/L	Zr-95 56	22.00	LLD	-	-	-

Water Tritium Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location # and Distance and Direction	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Water pCi/L	H-3 20	1,500.00	LLD	-	-	-

Sediment Gamma Spectral Summary Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location # and Distance and Direction	Location with Highest Annual Mean: Mean and Number Detected/Number Collected and Range	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
Sediment pCi/kg dry	Cs-134 14	112.00	LLD	-	-	-	-
Sediment pCi/kg dry	Cs-137 14	135.00	781.11 7 / 14 190.20 - 1,460.90	545.88 5 / 12 190.20 - 993.90	32 15.80 WSW	1,369.20 2 / 10 1,277.50 - 1,460.90	1,369.20 2 / 2 1,277.50 - 1,460.90
Sediment pCi/kg dry	K-40 14	N/A	15,874.21 14 / 14 4,358.30 - 29,145.00	13,789.42 12 / 12 4,358.30 - 24,103.00	32 15.80 WSW	28,383.00 2 / 10 27,621.00 - 29,145.00	28,383.00 2 / 2 27,621.00 - 29,145.00
Sediment pCi/kg dry	Co-58 14	50.00	LLD	-	-	-	-
Sediment pCi/kg dry	Co-60 14	40.00	LLD	-	-	-	-

TLD Gamma Dose Summary Report 3000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Type and Units	Type and Number of Analyses Performed	Lower Limit (LLD)	Mean of Results from All Locations and Number Detected/Number Collected and Range	Mean of Results from All Indicator Locations and Number Detected/Number Collected and Range	Location # and Distance and Direction	Location with Highest Annual Mean: Mean and Number Detected/Number Collected and Range	Mean of Results from All Control Locations and Number Detected/Number Collected and Range
TLD	Direct 112	1.00	15.28 112 / 112 10.79 - 20.42	15.25 104 / 104 10.79 - 20.42	29 4.30 SSE	18.93 4 / 4 18.23 - 20.42	15.69 8 / 8 13.81 - 17.54
TLD	Direct 112	1.00	15.11 112 / 112 11.52 - 21.20	15.13 104 / 104 11.52 - 21.20	33 4.50 S	19.78 4 / 4 18.78 - 21.20	14.75 8 / 8 13.16 - 17.11
TLD	Direct 28	1.00	59.41 28 / 28 51.87 - 73.51	59.59 26 / 26 51.87 - 73.51	10 0.80 SSE	73.51 1 / 1 73.51 - 73.51	56.97 2 / 2 54.00 - 59.94

ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT

APPENDIX C: 2000 REMP DETAIL DATA REPORTS

Air Gross Beta Detail Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

Collection Date	Sample Type	Location					
		1	3	4	5	6	
1/5/00	Air	0.028 +/- 0.003 0.026 +/- 0.003	0.029 +/- 0.003 0.027 +/- 0.003	0.024 +/- 0.003	0.027 +/- 0.003	0.030 +/- 0.003	
1/12/00	Air	0.030 +/- 0.003 0.032 +/- 0.003	0.033 +/- 0.003 0.031 +/- 0.003	0.033 +/- 0.003	0.033 +/- 0.003	0.031 +/- 0.003	
1/19/00	Air	0.021 +/- 0.003 0.020 +/- 0.003	0.023 +/- 0.003 0.023 +/- 0.003	0.023 +/- 0.003	0.024 +/- 0.003	0.020 +/- 0.003	
1/26/00	Air	0.045 +/- 0.003 0.055 +/- 0.004	0.047 +/- 0.004 0.046 +/- 0.003	0.050 +/- 0.004	0.048 +/- 0.004	0.053 +/- 0.004	
2/2/00	Air	0.034 +/- 0.002 0.036 +/- 0.003	0.039 +/- 0.003 0.036 +/- 0.003	0.040 +/- 0.003	0.034 +/- 0.003	0.036 +/- 0.003	
2/9/00	Air	0.032 +/- 0.003 0.033 +/- 0.003	0.035 +/- 0.003 0.035 +/- 0.003	0.031 +/- 0.003	0.033 +/- 0.003	0.032 +/- 0.003	
2/16/00	Air	0.036 +/- 0.003 0.038 +/- 0.003	0.038 +/- 0.003 0.037 +/- 0.003	0.038 +/- 0.003	0.039 +/- 0.003	0.038 +/- 0.003	
2/23/00	Air	0.032 +/- 0.003 0.033 +/- 0.003	0.038 +/- 0.003 0.033 +/- 0.003	0.036 +/- 0.003	0.036 +/- 0.003	0.032 +/- 0.003	
3/1/00	Air	0.026 +/- 0.003 0.025 +/- 0.003	0.028 +/- 0.003 0.025 +/- 0.003	0.027 +/- 0.003	0.027 +/- 0.003	0.025 +/- 0.003	
3/8/00	Air	0.026 +/- 0.003 0.027 +/- 0.003	0.028 +/- 0.003 0.026 +/- 0.003	0.027 +/- 0.003	0.026 +/- 0.003	0.024 +/- 0.003	
3/15/00	Air	0.023 +/- 0.003 0.025 +/- 0.003	0.027 +/- 0.003 0.025 +/- 0.003	0.023 +/- 0.003	0.023 +/- 0.003	0.019 +/- 0.003	
3/22/00	Air	0.030 +/- 0.002 0.028 +/- 0.002	0.029 +/- 0.002 0.028 +/- 0.002	0.026 +/- 0.002	0.026 +/- 0.002	0.027 +/- 0.002	
3/30/00	Air	0.018 +/- 0.002 0.021 +/- 0.002	0.019 +/- 0.002 0.020 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.002	
4/5/00	Air	0.030 +/- 0.003 0.028 +/- 0.003	0.029 +/- 0.003 0.030 +/- 0.003	0.031 +/- 0.003	0.027 +/- 0.002	0.028 +/- 0.003	
4/12/00	Air	0.017 +/- 0.003 0.017 +/- 0.003	0.020 +/- 0.003 0.018 +/- 0.003	0.020 +/- 0.003	0.017 +/- 0.003	0.016 +/- 0.003	

Air Gross Beta Detail Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

		Location					
Collection Date	Sample Type	1	3	4	5	6	
		7	35				
4/19/00	Air	0.021 +/- 0.003 0.021 +/- 0.003	0.023 +/- 0.003 0.021 +/- 0.003	0.020 +/- 0.003	0.018 +/- 0.002	0.020 +/- 0.003	
4/25/00	Air	0.016 +/- 0.003 0.015 +/- 0.003	0.014 +/- 0.003 0.016 +/- 0.003	0.016 +/- 0.003	0.014 +/- 0.003	0.014 +/- 0.003	
5/2/00	Air	0.025 +/- 0.003 0.023 +/- 0.003	0.023 +/- 0.003 0.023 +/- 0.003	0.025 +/- 0.003	0.022 +/- 0.003	0.023 +/- 0.003	
5/9/00	Air	0.026 +/- 0.003 0.027 +/- 0.003	0.025 +/- 0.003 0.022 +/- 0.003	0.025 +/- 0.003	0.027 +/- 0.003	0.023 +/- 0.003	
5/17/00	Air	0.017 +/- 0.002 0.018 +/- 0.002	0.015 +/- 0.002 0.018 +/- 0.002	0.015 +/- 0.002	0.016 +/- 0.002	0.018 +/- 0.002	
5/24/00	Air	0.017 +/- 0.002 0.016 +/- 0.002	0.017 +/- 0.002 0.016 +/- 0.002	0.019 +/- 0.003	0.019 +/- 0.002	0.016 +/- 0.002	
5/31/00	Air	0.013 +/- 0.002 0.011 +/- 0.002	0.011 +/- 0.002 0.011 +/- 0.002	0.013 +/- 0.002	0.012 +/- 0.002	0.011 +/- 0.002	
6/7/00	Air	0.019 +/- 0.002 0.019 +/- 0.002	0.018 +/- 0.002 0.016 +/- 0.002	0.014 +/- 0.002	0.019 +/- 0.002	0.015 +/- 0.002	
6/14/00	Air	0.027 +/- 0.003 0.026 +/- 0.003	0.026 +/- 0.003 0.027 +/- 0.003	0.024 +/- 0.003	0.027 +/- 0.003	0.027 +/- 0.003	
6/21/00	Air	0.016 +/- 0.003 0.014 +/- 0.002	0.016 +/- 0.002 0.014 +/- 0.002	0.015 +/- 0.002	0.015 +/- 0.002	0.016 +/- 0.003	
6/28/00	Air	0.020 +/- 0.003 0.016 +/- 0.002	0.017 +/- 0.002 0.019 +/- 0.003	0.019 +/- 0.002	0.016 +/- 0.002	0.017 +/- 0.002	
7/5/00	Air	0.017 +/- 0.003 0.018 +/- 0.003	0.017 +/- 0.003 0.015 +/- 0.003	0.017 +/- 0.003	0.015 +/- 0.002	0.019 +/- 0.003	
7/12/00	Air	0.014 +/- 0.003 0.013 +/- 0.002	0.014 +/- 0.002 0.016 +/- 0.003	0.014 +/- 0.003	0.014 +/- 0.002	0.017 +/- 0.003	
7/19/00	Air	0.013 +/- 0.002 0.012 +/- 0.002	0.016 +/- 0.002 0.016 +/- 0.002	0.014 +/- 0.002	0.015 +/- 0.002	0.017 +/- 0.002	
7/26/00	Air	0.016 +/- 0.002 0.015 +/- 0.002	0.012 +/- 0.002 0.014 +/- 0.002	0.012 +/- 0.002	0.014 +/- 0.002	0.012 +/- 0.002	

Air Gross Beta Detail Report 2000

Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

Location

Collection Date	Sample Type	1	3	4	5	6
		7	35			
8/2/00	Air	0.028 +/- 0.003 0.025 +/- 0.003	0.025 +/- 0.003 0.031 +/- 0.003	0.027 +/- 0.003	0.027 +/- 0.003	0.028 +/- 0.003
8/9/00	Air	0.021 +/- 0.003 0.020 +/- 0.003	0.021 +/- 0.003 0.020 +/- 0.003	0.021 +/- 0.003	0.021 +/- 0.003	0.021 +/- 0.003
8/16/00	Air	0.022 +/- 0.003 0.018 +/- 0.003	0.019 +/- 0.003 0.020 +/- 0.003	0.017 +/- 0.003	0.019 +/- 0.003	0.021 +/- 0.003
8/23/00	Air	0.012 +/- 0.002 0.012 +/- 0.002	0.013 +/- 0.002 0.013 +/- 0.002	0.014 +/- 0.002	0.013 +/- 0.002	0.014 +/- 0.003
8/28/00	Air	LLD 0.020 +/- 0.003	0.018 +/- 0.003 0.021 +/- 0.003	0.021 +/- 0.003	0.021 +/- 0.003	0.022 +/- 0.003
9/5/00	Air	0.019 +/- 0.002 0.020 +/- 0.002	0.019 +/- 0.002 0.020 +/- 0.003	0.019 +/- 0.002	0.019 +/- 0.002	0.018 +/- 0.002
9/13/00	Air	0.022 +/- 0.002 0.019 +/- 0.002	0.020 +/- 0.002 0.021 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.002
9/20/00	Air	0.022 +/- 0.003 0.022 +/- 0.003	0.021 +/- 0.003 0.023 +/- 0.003	0.025 +/- 0.003	0.022 +/- 0.002	0.020 +/- 0.003
9/27/00	Air	0.017 +/- 0.002 0.014 +/- 0.002	0.015 +/- 0.002 0.016 +/- 0.002	0.014 +/- 0.002	0.016 +/- 0.002	0.015 +/- 0.002
10/4/00	Air	0.027 +/- 0.003 0.026 +/- 0.003	0.028 +/- 0.003 0.030 +/- 0.003	0.029 +/- 0.003	0.029 +/- 0.003	0.028 +/- 0.003
10/11/00	Air	0.017 +/- 0.003 0.014 +/- 0.002	0.017 +/- 0.003 0.016 +/- 0.003	0.018 +/- 0.003	0.016 +/- 0.003	0.016 +/- 0.003
10/18/00	Air	0.038 +/- 0.003 0.041 +/- 0.003	0.036 +/- 0.003 0.036 +/- 0.003	0.036 +/- 0.003	0.036 +/- 0.003	0.040 +/- 0.003
10/25/00	Air	0.049 +/- 0.003 0.045 +/- 0.003	0.046 +/- 0.003 0.044 +/- 0.003	0.047 +/- 0.003	0.044 +/- 0.003	0.046 +/- 0.003
11/1/00	Air	0.027 +/- 0.003 0.029 +/- 0.003	0.027 +/- 0.003 0.030 +/- 0.003	0.030 +/- 0.003	0.029 +/- 0.003	0.028 +/- 0.003
11/8/00	Air	0.023 +/- 0.003 0.023 +/- 0.003	0.024 +/- 0.003 0.024 +/- 0.003	0.023 +/- 0.003	0.025 +/- 0.003	0.024 +/- 0.003

Air Gross Beta Detail Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

Collection Date	Sample Type	Location					
		1	3	4	5	6	
11/15/00	Air	0.021 +/- 0.003 0.023 +/- 0.003	0.024 +/- 0.003 0.021 +/- 0.003	0.023 +/- 0.003	0.024 +/- 0.003	0.019 +/- 0.003	
11/22/00	Air	0.027 +/- 0.003 0.027 +/- 0.003	0.026 +/- 0.003 0.025 +/- 0.003	0.024 +/- 0.003	0.033 +/- 0.003	0.028 +/- 0.003	
11/29/00	Air	0.026 +/- 0.003 0.027 +/- 0.003	0.027 +/- 0.003 0.024 +/- 0.003	0.024 +/- 0.002	0.026 +/- 0.003	0.025 +/- 0.003	
12/6/00	Air	0.016 +/- 0.002 0.017 +/- 0.002	0.017 +/- 0.002 0.017 +/- 0.002	0.019 +/- 0.002	0.018 +/- 0.002	0.014 +/- 0.002	
12/13/00	Air	0.035 +/- 0.003 0.031 +/- 0.003	0.029 +/- 0.003 0.030 +/- 0.003	0.031 +/- 0.003	0.032 +/- 0.003	0.027 +/- 0.003	
12/20/00	Air	0.040 +/- 0.003 0.035 +/- 0.003	0.041 +/- 0.003 0.036 +/- 0.003	0.034 +/- 0.003	0.037 +/- 0.003	0.030 +/- 0.003	
12/27/00	Air	0.026 +/- 0.003 0.026 +/- 0.003	0.021 +/- 0.003 0.026 +/- 0.003	0.025 +/- 0.003	0.026 +/- 0.003	0.021 +/- 0.003	
1/3/01	Air	0.023 +/- 0.003 0.020 +/- 0.003	0.023 +/- 0.003 0.022 +/- 0.003	0.021 +/- 0.003	0.022 +/- 0.003	0.018 +/- 0.003	

Air Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly Results in pCi/m3 +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
1	Air	3/30/00	0.073 +/- 0.008	< 0.000	< 0.000	< 0.000	< 0.000
1	Air	6/28/00	0.062 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
1	Air	9/27/00	0.089 +/- 0.013	< 0.000	< 0.001	< 0.000	< 0.000
1	Air	1/3/01	0.046 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
3	Air	3/30/00	0.074 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
3	Air	6/28/00	0.055 +/- 0.009	< 0.001	< 0.000	< 0.000	< 0.000
3	Air	9/27/00	0.051 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
3	Air	1/3/01	0.046 +/- 0.008	< 0.000	< 0.000	< 0.000	< 0.000
4	Air	3/30/00	0.063 +/- 0.008	< 0.000	< 0.000	< 0.000	< 0.000
4	Air	6/28/00	0.062 +/- 0.010	< 0.001	< 0.000	< 0.001	< 0.001
4	Air	9/27/00	0.044 +/- 0.008	< 0.000	< 0.001	< 0.000	< 0.000

Air Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly Results in pCi/m3 +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
4	Air	1/3/01	0.038 +/- 0.008	< 0.000	< 0.000	< 0.000	< 0.000
5	Air	3/30/00	0.069 +/- 0.009	< 0.001	< 0.000	< 0.000	< 0.000
5	Air	6/28/00	0.062 +/- 0.011	< 0.000	< 0.000	< 0.000	< 0.000
5	Air	9/27/00	0.051 +/- 0.006	< 0.000	< 0.000	< 0.000	< 0.000
5	Air	1/3/01	0.051 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
6	Air	3/30/00	0.060 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
6	Air	6/28/00	0.057 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
6	Air	9/27/00	0.048 +/- 0.008	< 0.000	< 0.001	< 0.001	< 0.000
6	Air	1/3/01	0.040 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
7	Air	3/30/00	0.069 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
7	Air	6/28/00	0.062 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000

Air Gamma Spectral Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Quarterly Results in pCi/m3 +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
7	Air	9/27/00	0.041 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
7	Air	1/3/01	0.046 +/- 0.001	< 0.000	< 0.000	< 0.001	< 0.000
35	Air	3/30/00	0.061 +/- 0.006	< 0.000	< 0.000	< 0.000	< 0.000
35	Air	6/28/00	0.059 +/- 0.007	< 0.000	< 0.000	< 0.000	< 0.000
35	Air	9/27/00	0.049 +/- 0.009	< 0.000	< 0.000	< 0.000	< 0.000
35	Air	1/3/01	0.041 +/- 0.010	< 0.000	< 0.000	< 0.000	< 0.000

Air Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

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Location Sample Type Collection Dat

I	Air	1/5/00	< 0.003
I	Air	1/12/00	< 0.008
I	Air	1/19/00	< 0.009
I	Air	1/26/00	< 0.005
I	Air	2/2/00	< 0.008
I	Air	2/9/00	< 0.004
I	Air	2/16/00	< 0.008
I	Air	2/23/00	< 0.008
I	Air	3/1/00	< 0.008
I	Air	3/8/00	< 0.009
I	Air	3/15/00	< 0.010
I	Air	3/22/00	< 0.007
I	Air	3/30/00	< 0.006
I	Air	4/5/00	< 0.004
I	Air	4/12/00	< 0.004
I	Air	4/19/00	< 0.004
I	Air	4/25/00	< 0.010
I	Air	5/2/00	< 0.010
I	Air	5/9/00	< 0.007
I	Air	5/17/00	< 0.006
I	Air	5/24/00	< 0.003
I	Air	5/31/00	< 0.006
I	Air	6/7/00	< 0.004
I	Air	6/14/00	< 0.003
I	Air	6/21/00	< 0.006
I	Air	6/28/00	< 0.007
I	Air	7/5/00	< 0.008
I	Air	7/12/00	< 0.004
I	Air	7/19/00	< 0.005
I	Air	7/26/00	< 0.001
I	Air	8/2/00	< 0.007
I	Air	8/9/00	< 0.003
I	Air	8/16/00	< 0.003
I	Air	8/23/00	< 0.007
I	Air	8/28/00	< 0.009
I	Air	9/5/00	< 0.007
I	Air	9/13/00	< 0.004
I	Air	9/20/00	< 0.005
I	Air	9/27/00	< 0.007
I	Air	10/4/00	< 0.004
I	Air	10/11/00	< 0.004
I	Air	10/18/00	< 0.005

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Location	Sample Type	Collection Dat	Results
1	Air	10/25/00	< 0.006
1	Air	11/1/00	< 0.007
1	Air	11/8/00	< 0.004
1	Air	11/15/00	< 0.005
1	Air	11/22/00	< 0.005
1	Air	11/29/00	< 0.004
1	Air	12/6/00	< 0.002
1	Air	12/13/00	< 0.004
1	Air	12/20/00	< 0.005
1	Air	12/27/00	< 0.004
1	Air	1/3/01	< 0.007
3	Air	1/5/00	< 0.003
3	Air	1/12/00	< 0.009
3	Air	1/19/00	< 0.010
3	Air	1/26/00	< 0.005
3	Air	2/2/00	< 0.009
3	Air	2/9/00	< 0.005
3	Air	2/16/00	< 0.008
3	Air	2/23/00	< 0.008
3	Air	3/1/00	< 0.008
3	Air	3/8/00	< 0.009
3	Air	3/15/00	< 0.011
3	Air	3/22/00	< 0.007
3	Air	3/30/00	< 0.006
3	Air	4/5/00	< 0.004
3	Air	4/12/00	< 0.005
3	Air	4/19/00	< 0.004
3	Air	4/25/00	< 0.011
3	Air	5/2/00	< 0.010
3	Air	5/9/00	< 0.007
3	Air	5/17/00	< 0.005
3	Air	5/24/00	< 0.003
3	Air	5/31/00	< 0.005
3	Air	6/7/00	< 0.004
3	Air	6/14/00	< 0.003
3	Air	6/21/00	< 0.005
3	Air	6/28/00	< 0.007
3	Air	7/5/00	< 0.008
3	Air	7/12/00	< 0.004
3	Air	7/19/00	< 0.005
3	Air	7/26/00	< 0.001
3	Air	8/2/00	< 0.007

Air Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

Location	Sample Type	Collection Dat	I-131
3	Air	8/9/00	< 0.003
3	Air	8/16/00	< 0.002
3	Air	8/23/00	< 0.007
3	Air	8/28/00	< 0.009
3	Air	9/5/00	< 0.007
3	Air	9/13/00	< 0.004
3	Air	9/20/00	< 0.005
3	Air	9/27/00	< 0.007
3	Air	10/4/00	< 0.004
3	Air	10/11/00	< 0.004
3	Air	10/18/00	< 0.005
3	Air	10/25/00	< 0.006
3	Air	11/1/00	< 0.007
3	Air	11/8/00	< 0.004
3	Air	11/15/00	< 0.005
3	Air	11/22/00	< 0.005
3	Air	11/29/00	< 0.004
3	Air	12/6/00	< 0.002
3	Air	12/13/00	< 0.004
3	Air	12/20/00	< 0.005
3	Air	12/27/00	< 0.003
3	Air	1/3/01	< 0.006
4	Air	1/5/00	< 0.003
4	Air	1/12/00	< 0.009
4	Air	1/19/00	< 0.009
4	Air	1/26/00	< 0.005
4	Air	2/2/00	< 0.008
4	Air	2/9/00	< 0.004
4	Air	2/16/00	< 0.008
4	Air	2/23/00	< 0.008
4	Air	3/1/00	< 0.008
4	Air	3/8/00	< 0.009
4	Air	3/15/00	< 0.011
4	Air	3/22/00	< 0.007
4	Air	3/30/00	< 0.006
4	Air	4/5/00	< 0.004
4	Air	4/12/00	< 0.004
4	Air	4/19/00	< 0.004
4	Air	4/25/00	< 0.011
4	Air	5/2/00	< 0.011
4	Air	5/9/00	< 0.007
4	Air	5/17/00	< 0.006

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Location	Sample Type	Collection Dat	
4	Air	5/24/00	< 0.003
4	Air	5/31/00	< 0.006
4	Air	6/7/00	< 0.004
4	Air	6/14/00	< 0.003
4	Air	6/21/00	< 0.005
4	Air	6/28/00	< 0.007
4	Air	7/5/00	< 0.008
4	Air	7/12/00	< 0.004
4	Air	7/19/00	< 0.005
4	Air	7/26/00	< 0.001
4	Air	8/2/00	< 0.007
4	Air	8/9/00	< 0.003
4	Air	8/16/00	< 0.003
4	Air	8/23/00	< 0.007
4	Air	8/28/00	< 0.009
4	Air	9/5/00	< 0.007
4	Air	9/13/00	< 0.004
4	Air	9/20/00	< 0.005
4	Air	9/27/00	< 0.007
4	Air	10/4/00	< 0.004
4	Air	10/11/00	< 0.004
4	Air	10/18/00	< 0.005
4	Air	10/25/00	< 0.006
4	Air	11/1/00	< 0.008
4	Air	11/8/00	< 0.005
4	Air	11/15/00	< 0.005
4	Air	11/22/00	< 0.005
4	Air	11/29/00	< 0.004
4	Air	12/6/00	< 0.002
4	Air	12/13/00	< 0.004
4	Air	12/20/00	< 0.005
4	Air	12/27/00	< 0.004
4	Air	1/3/01	< 0.006
5	Air	1/5/00	< 0.003
5	Air	1/12/00	< 0.008
5	Air	1/19/00	< 0.009
5	Air	1/26/00	< 0.005
5	Air	2/2/00	< 0.009
5	Air	2/9/00	< 0.005
5	Air	2/16/00	< 0.008
5	Air	2/23/00	< 0.008
5	Air	3/1/00	< 0.008

Air Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

I-131

Location	Sample Type	Collection Dat	
5	Air	3/8/00	< 0.009
5	Air	3/15/00	< 0.010
5	Air	3/22/00	< 0.007
5	Air	3/30/00	< 0.006
5	Air	4/5/00	< 0.004
5	Air	4/12/00	< 0.004
5	Air	4/19/00	< 0.004
5	Air	4/25/00	< 0.010
5	Air	5/2/00	< 0.010
5	Air	5/9/00	< 0.007
5	Air	5/17/00	< 0.005
5	Air	5/24/00	< 0.003
5	Air	5/31/00	< 0.005
5	Air	6/7/00	< 0.004
5	Air	6/14/00	< 0.003
5	Air	6/21/00	< 0.005
5	Air	6/28/00	< 0.007
5	Air	7/5/00	< 0.008
5	Air	7/12/00	< 0.004
5	Air	7/19/00	< 0.005
5	Air	7/26/00	< 0.001
5	Air	8/2/00	< 0.007
5	Air	8/9/00	< 0.003
5	Air	8/16/00	< 0.002
5	Air	8/23/00	< 0.007
5	Air	8/28/00	< 0.009
5	Air	9/5/00	< 0.006
5	Air	9/13/00	< 0.004
5	Air	9/20/00	< 0.005
5	Air	9/27/00	< 0.007
5	Air	10/4/00	< 0.004
5	Air	10/11/00	< 0.004
5	Air	10/18/00	< 0.005
5	Air	10/25/00	< 0.006
5	Air	11/1/00	< 0.008
5	Air	11/8/00	< 0.005
5	Air	11/15/00	< 0.005
5	Air	11/22/00	< 0.005
5	Air	11/29/00	< 0.004
5	Air	12/6/00	< 0.002
5	Air	12/13/00	< 0.004
5	Air	12/20/00	< 0.005
5	Air	12/27/00	< 0.004

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Location Sample Type Collection Date

5	Air	1/3/01	< 0.007
6	Air	1/5/00	< 0.003
6	Air	1/12/00	< 0.009
6	Air	1/19/00	< 0.009
6	Air	1/26/00	< 0.005
6	Air	2/2/00	< 0.009
6	Air	2/9/00	< 0.005
6	Air	2/16/00	< 0.009
6	Air	2/23/00	< 0.008
6	Air	3/1/00	< 0.008
6	Air	3/8/00	< 0.009
6	Air	3/15/00	< 0.011
6	Air	3/22/00	< 0.007
6	Air	3/30/00	< 0.006
6	Air	4/5/00	< 0.004
6	Air	4/12/00	< 0.005
6	Air	4/19/00	< 0.004
6	Air	4/25/00	< 0.011
6	Air	5/2/00	< 0.010
6	Air	5/9/00	< 0.007
6	Air	5/17/00	< 0.006
6	Air	5/24/00	< 0.003
6	Air	5/31/00	< 0.006
6	Air	6/7/00	< 0.004
6	Air	6/14/00	< 0.003
6	Air	6/21/00	< 0.006
6	Air	6/28/00	< 0.007
6	Air	7/5/00	< 0.008
6	Air	7/12/00	< 0.005
6	Air	7/19/00	< 0.005
6	Air	7/26/00	< 0.001
6	Air	8/2/00	< 0.007
6	Air	8/9/00	< 0.003
6	Air	8/16/00	< 0.003
6	Air	8/23/00	< 0.007
6	Air	8/28/00	< 0.009
6	Air	9/5/00	< 0.007
6	Air	9/13/00	< 0.004
6	Air	9/20/00	< 0.005
6	Air	9/27/00	< 0.007
6	Air	10/4/00	< 0.004
6	Air	10/11/00	< 0.004

Air Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m³ +/- 2 Sigma

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Location	Sample Type	Collection Dat	
6	Air	10/18/00	< 0.005
6	Air	10/25/00	< 0.006
6	Air	11/1/00	< 0.008
6	Air	11/8/00	< 0.005
6	Air	11/15/00	< 0.005
6	Air	11/22/00	< 0.005
6	Air	11/29/00	< 0.004
6	Air	12/6/00	< 0.002
6	Air	12/13/00	< 0.004
6	Air	12/20/00	< 0.005
6	Air	12/27/00	< 0.004
6	Air	1/3/01	< 0.007
7	Air	1/5/00	< 0.003
7	Air	1/12/00	< 0.009
7	Air	1/19/00	< 0.009
7	Air	1/26/00	< 0.005
7	Air	2/2/00	< 0.008
7	Air	2/9/00	< 0.004
7	Air	2/16/00	< 0.008
7	Air	2/23/00	< 0.008
7	Air	3/1/00	< 0.008
7	Air	3/8/00	< 0.009
7	Air	3/15/00	< 0.011
7	Air	3/22/00	< 0.007
7	Air	3/30/00	< 0.006
7	Air	4/5/00	< 0.004
7	Air	4/12/00	< 0.004
7	Air	4/19/00	< 0.004
7	Air	4/25/00	< 0.010
7	Air	5/2/00	< 0.011
7	Air	5/9/00	< 0.007
7	Air	5/17/00	< 0.006
7	Air	5/24/00	< 0.003
7	Air	5/31/00	< 0.006
7	Air	6/7/00	< 0.004
7	Air	6/14/00	< 0.003
7	Air	6/21/00	< 0.006
7	Air	6/28/00	< 0.007
7	Air	7/5/00	< 0.008
7	Air	7/12/00	< 0.004
7	Air	7/19/00	< 0.005
7	Air	7/26/00	< 0.001

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Location Sample Type Collection Dat

7	Air	8/2/00	< 0.007
7	Air	8/9/00	< 0.003
7	Air	8/16/00	< 0.003
7	Air	8/23/00	< 0.007
7	Air	8/28/00	< 0.009
7	Air	9/5/00	< 0.007
7	Air	9/13/00	< 0.004
7	Air	9/20/00	< 0.005
7	Air	9/27/00	< 0.007
7	Air	10/4/00	< 0.004
7	Air	10/11/00	< 0.004
7	Air	10/18/00	< 0.005
7	Air	10/25/00	< 0.006
7	Air	11/1/00	< 0.008
7	Air	11/8/00	< 0.005
7	Air	11/15/00	< 0.005
7	Air	11/22/00	< 0.005
7	Air	11/29/00	< 0.004
7	Air	12/6/00	< 0.002
7	Air	12/13/00	< 0.004
7	Air	12/20/00	< 0.005
7	Air	12/27/00	< 0.004
7	Air	1/3/01	< 0.007
35	Air	1/5/00	< 0.003
35	Air	1/12/00	< 0.003
35	Air	1/19/00	< 0.008
35	Air	1/26/00	< 0.006
35	Air	2/2/00	< 0.002
35	Air	2/9/00	< 0.003
35	Air	2/16/00	< 0.008
35	Air	2/23/00	< 0.002
35	Air	3/1/00	< 0.005
35	Air	3/8/00	< 0.002
35	Air	3/15/00	< 0.003
35	Air	3/22/00	< 0.004
35	Air	3/30/00	< 0.003
35	Air	4/5/00	< 0.003
35	Air	4/12/00	< 0.003
35	Air	4/19/00	< 0.003
35	Air	4/25/00	< 0.003
35	Air	5/2/00	< 0.006
35	Air	5/9/00	< 0.003

Air Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Weekly Results in pCi/m3 +/- 2 Sigma

Location	Sample Type	Collection Dat	I-131
35	Air	5/17/00	< 0.007
35	Air	5/24/00	< 0.003
35	Air	5/31/00	< 0.008
35	Air	6/7/00	< 0.016
35	Air	6/14/00	< 0.006
35	Air	6/21/00	< 0.007
35	Air	6/28/00	< 0.005
35	Air	7/5/00	< 0.006
35	Air	7/12/00	< 0.006
35	Air	7/19/00	< 0.033
35	Air	7/26/00	< 0.003
35	Air	8/2/00	< 0.009
35	Air	8/9/00	< 0.006
35	Air	8/16/00	< 0.004
35	Air	8/23/00	< 0.004
35	Air	8/28/00	< 0.009
35	Air	9/5/00	< 0.003
35	Air	9/13/00	< 0.002
35	Air	9/20/00	< 0.006
35	Air	9/27/00	< 0.006
35	Air	10/4/00	< 0.008
35	Air	10/11/00	< 0.003
35	Air	10/18/00	< 0.007
35	Air	10/25/00	< 0.006
35	Air	11/1/00	< 0.005
35	Air	11/8/00	< 0.004
35	Air	11/15/00	< 0.003
35	Air	11/22/00	< 0.003
35	Air	11/29/00	< 0.004
35	Air	12/6/00	< 0.002
35	Air	12/13/00	< 0.002
35	Air	12/20/00	< 0.004
35	Air	12/27/00	< 0.013
35	Air	1/3/01	< 0.003

Milk Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	1/11/00	< 24	< 4	< 6	1,486 +/- 200	< 8
51	Milk	2/7/00	< 15	< 3	< 3	1,368 +/- 88	< 1
51	Milk	3/6/00	< 20	< 6	< 7	1,479 +/- 188	< 3
51	Milk	4/3/00	< 15	< 3	< 5	1,137 +/- 139	< 3
51	Milk	4/18/00	< 10	< 6	< 4	1,437 +/- 172	< 3
51	Milk	5/8/00	< 22	< 2	< 4	1,528 +/- 140	< 3
51	Milk	5/22/00	< 39	< 3	< 5	1,352 +/- 178	< 6
51	Milk	6/5/00	< 20	< 6	< 4	1,201 +/- 150	< 4
51	Milk	6/19/00	< 26	< 3	< 3	1,285 +/- 111	< 3
51	Milk	7/10/00	< 19	< 2	< 4	1,266 +/- 124	< 5
51	Milk	7/24/00	< 23	< 4	< 4	1,173 +/- 128	< 6
51	Milk	8/8/00	< 23	< 3	< 4	1,404 +/- 124	< 3

Milk Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	8/22/00	< 31	< 5	< 7	1,452 +/- 202	< 4
51	Milk	9/5/00	< 10	< 2	< 2	1,272 +/- 92	< 1
51	Milk	9/19/00	< 25	< 10	< 4	1,479 +/- 210	< 5
51	Milk	10/3/00	< 15	< 4	< 3	1,378 +/- 103	< 3
51	Milk	10/16/00	< 8	< 3	< 2	1,457 +/- 89	< 2
51	Milk	11/6/00	< 25	< 5	< 5	1,432 +/- 170	< 5
51	Milk	12/5/00	< 11	< 4	< 3	1,490 +/- 114	< 3
61	Milk	5/8/00	< 27	< 3	< 6	1,994 +/- 166	< 6
61	Milk	5/22/00	< 33	< 5	< 5	1,697 +/- 185	< 4
61	Milk	6/5/00	< 15	< 3	< 3	1,775 +/- 117	< 3
61	Milk	6/19/00	< 42	< 5	< 5	1,750 +/- 143	< 10
61	Milk	7/10/00	< 19	< 4	< 4	1,821 +/- 114	< 3

Milk Gamma Spectral Detail Report 2000

Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no.: 50-440/50-441
 Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
61	Milk	7/24/00	< 17	< 3	< 4	1,861 +/- 123	< 3
61	Milk	8/7/00	< 24	< 5	< 4	1,933 +/- 175	< 5
61	Milk	8/22/00	< 22	< 6	< 4	1,945 +/- 214	< 5
61	Milk	9/5/00	< 20	< 7	< 3	1,850 +/- 187	< 3
61	Milk	9/18/00	< 12	< 5	< 5	1,713 +/- 164	< 3
71	Milk	1/10/00	< 21	< 6	< 4	1,291 +/- 139	< 3
71	Milk	2/7/00	< 13	< 4	< 6	1,269 +/- 145	< 3
71	Milk	3/6/00	< 20	< 5	< 4	1,234 +/- 147	< 4
71	Milk	4/3/00	< 17	< 6	< 7	1,446 +/- 177	< 3
71	Milk	4/17/00	< 22	< 5	< 5	1,332 +/- 181	< 3
71	Milk	5/8/00	< 23	< 2	< 2	1,305 +/- 68	< 3
71	Milk	5/22/00	< 21	< 6	< 6	1,254 +/- 160	< 6

Milk Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
71	Milk	6/5/00	< 16	< 2	< 2	1,324 +/- 102	< 2
71	Milk	6/19/00	< 45	< 4	< 3	1,286 +/- 99	< 5
71	Milk	7/10/00	< 12	< 5	< 4	1,218 +/- 104	< 5
71	Milk	7/24/00	< 22	< 5	< 3	1,475 +/- 210	< 6
71	Milk	8/7/00	< 26	< 6	< 4	1,070 +/- 130	< 4
71	Milk	9/5/00	< 15	< 5	< 3	1,194 +/- 173	< 5
71	Milk	9/18/00	< 22	< 4	< 4	1,096 +/- 151	< 4
71	Milk	10/3/00	< 8	< 2	< 3	1,180 +/- 103	< 1
71	Milk	10/16/00	< 15	< 3	< 3	1,171 +/- 101	< 3
71	Milk	11/6/00	< 16	< 6	< 5	1,260 +/- 127	< 2
71	Milk	12/4/00	< 8	< 3	< 2	1,259 +/- 75	< 2

Milk Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-4 #1
 Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

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Location	Sample Type	Collection Dat	
51	Milk	1/11/00	< 0.39
51	Milk	2/7/00	< 0.30
51	Milk	3/6/00	< 0.35
51	Milk	4/3/00	< 0.40
51	Milk	4/18/00	< 0.35
51	Milk	5/8/00	< 0.39
51	Milk	5/22/00	< 0.40
51	Milk	6/5/00	< 0.32
51	Milk	6/19/00	< 0.40
51	Milk	7/10/00	< 0.29
51	Milk	7/24/00	< 0.21
51	Milk	8/8/00	< 0.28
51	Milk	8/22/00	< 0.33
51	Milk	9/5/00	< 0.26
51	Milk	9/19/00	< 0.33
51	Milk	10/3/00	< 0.16
51	Milk	10/16/00	< 0.30
51	Milk	11/6/00	< 0.27
51	Milk	12/5/00	< 0.27
61	Milk	5/8/00	< 0.34
61	Milk	5/22/00	< 0.42
61	Milk	6/5/00	< 0.41
61	Milk	6/19/00	< 0.37
61	Milk	7/10/00	< 0.29
61	Milk	7/24/00	< 0.22
61	Milk	8/7/00	< 0.30
61	Milk	8/22/00	< 0.34
61	Milk	9/5/00	< 0.25
61	Milk	9/18/00	< 0.33
71	Milk	1/10/00	< 0.36
71	Milk	2/7/00	< 0.43
71	Milk	3/6/00	< 0.35
71	Milk	4/3/00	< 0.39
71	Milk	4/17/00	< 0.37
71	Milk	5/8/00	< 0.32
71	Milk	5/22/00	< 0.46
71	Milk	6/5/00	< 0.41
71	Milk	6/19/00	< 0.40
71	Milk	7/10/00	< 0.28
71	Milk	7/24/00	< 0.38

Milk Iodine Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Bi-Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Dat	I-131
71	Milk	8/7/00	< 0.26
71	Milk	9/5/00	< 0.24
71	Milk	9/18/00	< 0.36
71	Milk	10/3/00	< 0.25
71	Milk	10/16/00	< 0.30
71	Milk	11/6/00	< 0.30
71	Milk	12/4/00	< 0.36

Food Products Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
2	beet greens	7/24/00	< 113.36 < 10.59	< 5.60 5,684.50 +/- 314.90	< 8.08	< 10.56	< 9.25
2	chinese cabbage	7/24/00	< 154.62 < 10.83	< 8.59 3,154.90 +/- 416.70	< 13.23	< 14.39	< 15.64
2	turnip greens	7/24/00	232.65 +/- 120.90 < 16.92	< 15.88 4,890.20 +/- 441.00	< 9.95	< 13.33	< 12.37
2	beet greens	8/7/00	< 163.21 < 19.19	< 15.21 5,220.40 +/- 473.90	< 13.38	< 18.10	< 14.82
2	chinese cabbage	8/7/00	334.71 +/- 128.00 < 15.36	< 9.62 3,289.20 +/- 350.10	< 5.99	< 7.31	LLD
2	kale	8/7/00	< 142.28 < 9.63	< 8.82 3,559.80 +/- 385.40	< 6.51	< 10.83	< 11.77
2	beet greens	9/11/00	< 106.50 < 9.80	< 6.87 3,495.80 +/- 371.40	< 6.25	< 7.64	< 9.12
2	kale	9/11/00	< 155.28 < 15.92	< 7.42 4,019.80 +/- 430.30	< 11.12	< 19.18	< 9.07
2	beet greens	10/9/00	515.04 +/- 122.20 < 17.28	< 11.86 5,682.70 +/- 409.00	< 10.71	< 11.30	< 12.67
2	kale	10/9/00	< 143.18 < 13.43	< 14.37 4,997.90 +/- 423.40	< 14.56	< 8.66	< 16.02
16	beet greens	7/10/00	< 105.92 < 15.75	< 11.06 6,838.95 +/- 380.34	< 9.21	< 10.29	< 11.98
16	chinese cabbage	7/10/00	182.76 +/- 96.89 < 13.88	< 12.28 4,059.10 +/- 364.40	< 10.79	< 13.71	< 11.02

Food Products Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
16	turnip greens	7/10/00	213.11 +/- 74.28 < 9.21	< 7.14 5,145.70 +/- 254.40	< 7.66	< 8.27	< 5.30
16	beet greens	7/24/00	< 123.01 < 15.86	< 8.18 6,652.10 +/- 521.40	< 7.82	< 8.30	< 12.55
16	chinese cabbage	7/24/00	< 81.64 < 10.62	< 6.75 3,891.00 +/- 260.70	< 6.11	< 8.72	< 8.42
16	turnip greens	7/24/00	< 141.29 < 9.86	< 15.96 5,221.70 +/- 490.10	< 4.86	< 13.64	< 14.41
16	beet greens	8/7/00	< 98.99 < 10.35	< 5.14 4,625.60 +/- 300.50	< 7.01	< 6.19	< 9.52
16	chinese cabbage	8/7/00	< 99.67 < 18.22	< 12.11 2,956.80 +/- 304.40	< 12.29	< 11.82	< 12.18
16	turnip greens	8/7/00	223.96 +/- 127.30 < 20.98	< 11.60 3,311.90 +/- 358.00	< 10.35	< 15.57	< 10.43
16	beet greens	9/11/00	157.90 +/- 79.40 < 9.02	< 7.65 5,150.70 +/- 305.40	< 8.40	< 8.27	< 9.09
16	chinese cabbage	9/11/00	< 104.27 < 9.57	< 7.33 4,015.00 +/- 387.60	< 7.76	< 8.47	< 11.48
16	turnip greens	9/11/00	131.19 +/- 69.21 < 10.39	< 10.29 4,770.50 +/- 463.80	< 13.44	< 10.17	< 8.11
16	chinese cabbage	10/9/00	639.11 +/- 151.40 < 14.76	< 5.68 5,238.60 +/- 388.00	< 13.72	< 9.81	< 12.55
16	turnip greens	10/9/00	704.71 +/- 159.50 < 18.95	< 15.54 5,687.40 +/- 489.00	< 11.11	< 21.41	< 13.20

Food Products Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
20	turnip greens	7/10/00	298.43 +/- 85.96 < 8.03	< 7.35 3,803.00 +/- 229.20	< 4.40	< 9.77	< 6.76
20	chinese cabbage	7/24/00	192.90 +/- 112.40 < 14.55	< 4.31 3,722.10 +/- 314.50	< 6.05	< 11.13	< 8.07
20	turnip greens	7/24/00	< 188.57 < 13.67	< 9.49 4,346.60 +/- 357.00	< 11.36	< 6.10	< 13.36
20	beet greens	8/7/00	241.40 +/- 101.30 < 14.88	< 10.26 3,478.50 +/- 426.30	< 7.78	< 11.59	< 12.34
20	chinese cabbage	8/7/00	193.07 +/- 112.30 < 8.99	< 9.52 2,968.80 +/- 341.70	< 7.96	< 10.56	< 8.98
20	turnip greens	8/7/00	252.04 +/- 90.56 < 13.81	< 7.81 3,858.40 +/- 263.06	< 7.91	< 9.83	< 12.28
20	beet greens	9/11/00	< 123.36 < 10.59	< 8.66 5,962.30 +/- 321.20	< 6.09	< 12.39	< 7.77
20	chinese cabbage	9/11/00	< 67.06 < 5.64	< 5.03 2,756.30 +/- 221.20	< 5.10	< 9.70	< 5.99
20	turnip greens	9/11/00	385.06 +/- 128.10 < 8.96	< 7.38 5,395.70 +/- 396.10	< 8.21	< 7.37	< 10.12
20	beet greens	10/9/00	266.11 +/- 94.07 < 7.68	< 7.81 4,945.30 +/- 351.50	< 8.89	< 9.16	< 7.31
20	chinese cabbage	10/9/00	306.28 +/- 135.90 < 10.70	< 8.53 3,656.60 +/- 338.40	< 10.47	< 10.05	< 9.25
20	turnip greens	10/9/00	432.84 +/- 224.20 < 22.22	< 11.31 4,109.90 +/- 465.40	< 11.75	< 14.54	< 12.68

Food Products Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
20	beet greens	11/13/00	505.21 +/- 116.70 < 10.83	< 11.30 5,157.50 +/- 354.20	< 12.26	< 12.75	< 10.05
20	chinese cabbage	11/13/00	157.56 +/- 77.91 < 8.97	< 7.46 3,436.00 +/- 243.50	< 5.83	< 4.09	< 8.46
20	turnip greens	11/13/00	343.42 +/- 136.00 < 15.91	< 9.23 4,215.60 +/- 327.90	< 6.58	< 9.85	< 8.33
37	chinese cabbage	6/20/00	138.00 +/- 58.88 < 6.85	< 4.84 3,468.50 +/- 205.10	< 6.87	< 5.88	< 6.50
37	turnip greens	6/20/00	185.99 +/- 90.61 < 10.68	< 11.51 4,353.40 +/- 474.30	< 5.27	< 11.21	< 15.89
37	beet greens	7/10/00	< 110.77 < 8.27	< 8.52 6,600.90 +/- 315.60	< 8.01	< 9.15	< 7.60
37	turnip greens	7/10/00	324.29 +/- 130.60 < 9.95	< 10.39 4,236.40 +/- 400.30	< 9.95	< 12.83	< 10.24
37	beet greens	7/24/00	< 191.75 < 31.89	< 21.50 6,714.00 +/- 784.90	< 24.75	< 18.55	< 26.08
37	turnip greens	7/24/00	93.98 +/- 53.35 < 11.72	< 7.16 4,237.10 +/- 246.90	< 6.45	< 7.93	< 7.06
37	beet greens	8/7/00	217.68 +/- 108.50 < 16.71	< 11.37 4,484.90 +/- 468.50	< 8.13	< 17.14	< 10.59
37	chinese cabbage	8/7/00	< 75.31 < 10.59	< 9.46 2,139.20 +/- 264.50	< 8.89	< 5.05	< 6.57
37	turnip greens	8/7/00	241.46 +/- 94.69 < 12.70	< 9.70 4,561.20 +/- 356.70	< 10.66	< 10.93	< 10.63

Food Products Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
37	beet greens	9/11/00	218.98 +/- 125.70 < 14.08	< 10.82 4,008.20 +/- 363.40	< 10.59	< 11.08	< 14.56
37	chinese cabbage	9/11/00	< 149.08 < 12.06	< 10.51 2,765.60 +/- 413.40	< 20.40	< 20.13	< 14.97
37	kale	9/11/00	< 133.66 < 18.87	< 14.69 3,277.40 +/- 431.00	< 9.62	< 12.44	< 5.71
37	turnip greens	9/11/00	168.44 +/- 100.60 < 7.43	< 10.75 3,315.80 +/- 332.00	< 12.12	< 12.52	< 7.93
37	beet greens	10/9/00	417.05 +/- 123.00 < 12.70	< 4.37 4,404.20 +/- 334.20	< 7.37	< 7.91	< 10.53
37	chinese cabbage	10/9/00	< 137.67 < 18.43	< 8.64 2,903.70 +/- 450.70	< 15.72	< 13.58	< 9.81
37	turnip greens	10/9/00	462.63 +/- 92.09 < 9.54	< 5.50 3,343.80 +/- 265.10	< 7.39	< 5.35	< 3.39
37	beet greens	11/13/00	401.41 +/- 114.30 < 10.81	< 8.93 4,721.90 +/- 285.90	< 8.82	< 6.82	< 7.73
37	chinese cabbage	11/13/00	< 161.75 < 10.11	< 13.59 3,840.00 +/- 453.70	< 10.20	< 8.50	< 9.07
37	turnip greens	11/13/00	701.95 +/- 168.80 < 18.48	< 7.19 5,543.30 +/- 396.40	< 6.79	< 18.83	< 17.09
70	beet greens	7/10/00	155.04 +/- 86.59 < 10.68	< 10.50 6,154.30 +/- 375.80	< 9.44	< 12.11	< 12.61
70	broccoli	7/10/00	< 92.18 < 13.03	< 9.53 3,521.60 +/- 355.70	< 8.60	< 12.36	< 10.88

Food Products Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
70	chinese cabbage	7/10/00	< 89.63 < 7.86	< 6.67 3,155.00 +/- 268.70	< 8.76	< 6.01	< 8.09
70	broccoli	7/24/00	< 198.09 < 35.41	< 11.58 3,738.80 +/- 499.80	< 19.02	< 16.10	< 16.52
70	cabbage	7/24/00	< 98.46 < 27.99	< 15.47 2,505.40 +/- 413.40	< 5.60	< 17.75	< 7.71
70	turnip greens	7/24/00	191.08 +/- 72.98 < 8.97	< 7.52 7,501.50 +/- 389.80	< 10.63	< 5.54	< 6.52
70	beet greens	8/7/00	< 142.35 < 10.05	< 12.85 6,197.90 +/- 488.20	< 11.98	< 15.14	< 17.11
70	chinese cabbage	8/7/00	< 80.32 < 11.74	< 5.96 2,586.30 +/- 288.10	< 6.83	< 10.98	< 9.20
70	turnip greens	8/7/00	324.61 +/- 171.00 < 17.39	< 14.83 4,285.50 +/- 449.30	< 9.57	< 12.34	< 14.58
70	beet greens	9/11/00	< 143.69 < 21.05	< 13.87 5,831.90 +/- 582.40	< 6.05	< 14.60	< 11.54
70	chinese cabbage	9/11/00	< 80.21 < 13.13	< 7.47 2,233.20 +/- 211.27	< 5.49	< 5.78	< 9.80
70	swiss chard	9/11/00	< 90.86 < 13.46	< 5.07 5,239.00 +/- 357.90	< 7.45	< 7.20	< 8.94
70	beet greens	10/9/00	320.15 +/- 81.28 < 10.86	< 7.24 4,271.80 +/- 313.80	< 6.28	< 7.26	< 10.20
70	chinese cabbage	10/9/00	< 72.19 < 15.38	< 6.83 2,010.90 +/- 247.20	< 6.34	< 13.72	< 11.08

Food Products Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Bc-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
70	turnip greens	10/9/00	558.27 +/- 131.60 < 11.07	< 7.71 3,794.30 +/- 395.90	< 9.25	< 7.81	< 11.15
70	chinese cabbage	11/13/00	< 74.58 < 14.74	< 5.81 2,034.70 +/- 288.50	< 5.42	< 5.02	< 8.12
70	swiss chard	11/13/00	288.23 +/- 159.80 < 18.17	< 18.41 4,981.10 +/- 501.30	< 6.21	< 18.73	< 10.57
70	turnip greens	11/13/00	652.03 +/- 108.60 < 7.76	< 6.53 5,067.00 +/- 330.00	< 7.83	< 9.36	< 8.37

Fish Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Bi-Annually Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
25	carp	5/12/00	< 15.83 1,641.60 +/- 371.70	< 6.88 < 10.67	< 18.84 < 25.52	< 16.19	< 20.06
25	freshwater drum	5/12/00	< 22.79 1,942.90 +/- 380.50	< 14.60 < 10.94	< 18.20 < 36.89	< 11.22	< 53.94
25	smallmouth bass	5/12/00	< 18.72 2,286.80 +/- 377.80	< 15.08 < 7.73	< 11.58 < 11.61	< 13.78	< 64.41
25	walleye	5/12/00	< 6.88 2,905.20 +/- 290.30	< 11.27 < 8.19	< 7.87 < 8.62	< 8.47	< 38.68
25	white perch	5/12/00	< 6.69 2,262.90 +/- 440.30	< 24.15 < 15.83	< 13.26 < 33.17	< 19.76	< 31.63
25	carp	10/13/00	< 15.59 2,854.10 +/- 389.80	< 7.84 < 9.19	< 13.58 < 25.18	< 11.88	< 30.98
25	channel catfish	10/13/00	< 28.22 2,833.70 +/- 453.80	< 18.83 < 22.07	< 21.38 < 38.78	< 17.80	< 37.93
25	gizzard shad	10/13/00	< 9.82 2,247.60 +/- 265.10	< 8.05 < 7.33	< 11.13 < 13.70	< 12.58	< 30.18
25	steelhead	10/13/00	< 12.38 2,681.50 +/- 338.40	< 9.52 < 15.48	< 7.85 < 15.59	< 11.24	< 29.55
25	walleye	10/13/00	< 16.46 2,828.30 +/- 377.40	< 8.72 < 14.68	< 7.38 < 32.75	< 18.20	< 27.73
25	white bass	10/13/00	< 24.59 2,792.20 +/- 327.89	< 14.09 < 17.87	< 18.46 < 31.95	< 19.69	< 47.32
25	white sucker	10/13/00	< 23.95 2,869.80 +/- 576.20	< 13.04 < 11.81	< 16.96 < 25.65	< 15.48	< 43.42

Fish Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Bi-Annually Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	freshwater drum	5/12/00	< 8.35 2,538.30 +/- 363.30	< 7.14 < 10.51	< 10.46 < 35.07	< 11.92	< 70.56
32	redhorse sucker	5/12/00	< 7.58 2,660.10 +/- 263.30	< 9.56 < 7.70	< 6.98 < 12.91	< 3.01	< 35.95
32	walleye	5/12/00	< 8.79 2,676.60 +/- 265.30	< 11.68 < 4.93	< 7.37 < 7.82	< 9.58	< 35.01
32	white perch	5/12/00	< 7.30 2,498.20 +/- 285.90	< 13.55 < 8.56	< 11.96 < 19.39	< 7.93	< 27.86
32	white sucker	5/12/00	< 12.12 1,886.80 +/- 248.80	< 11.21 < 9.94	< 3.49 < 14.09	< 7.94	< 33.39
32	yellow perch	5/12/00	< 26.50 2,568.00 +/- 440.50	< 19.97 < 9.98	< 18.71 < 20.17	< 17.52	< 43.38
32	carp	10/13/00	< 12.30 2,282.30 +/- 297.30	< 7.60 < 5.94	< 8.26 < 14.74	< 10.41	< 24.76
32	channel catfish	10/13/00	< 17.24 2,266.30 +/- 439.60	< 19.22 < 18.43	< 25.56 < 54.47	< 15.36	< 52.54
32	gizzard shad	10/13/00	< 16.72 3,198.40 +/- 387.50	< 4.75 < 10.49	< 16.02 < 33.01	< 13.49	< 30.26
32	quillback sucker	10/13/00	< 32.56 2,498.90 +/- 524.90	< 14.48 < 11.94	< 28.33 < 53.66	< 16.29	< 65.41
32	redhorse sucker	10/13/00	< 11.17 2,643.10 +/- 326.90	< 8.27 < 10.98	< 10.75 < 19.54	< 10.73	< 28.95
32	steelhead	10/13/00	< 14.20 3,193.20 +/- 351.20	< 7.26 < 7.88	< 10.97 < 20.34	< 12.79	< 31.54

Fish Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Bi-Annually Results in pCi/kg wet +/- 2 Sigma

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	walleye	10/13/00	< 7.37 2,822.50 +/- 291.10	< 7.22 < 9.47	< 5.89 < 14.68	LLD	< 16.29
32	white bass	10/13/00	< 13.68 2,723.90 +/- 439.20	< 9.75 < 17.95	< 8.32 < 17.04	< 14.83	< 30.74
32	white sucker	10/13/00	< 17.10 2,247.80 +/- 309.80	< 8.77 < 10.47	< 15.37 < 11.49	< 9.65	< 41.05

Water Gross Beta Detail Report 2000
 Radiological Environmental Monitoring Program Data Summary
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

		Location					
Collection Period	Sample Type	28	34	36	59	60	
12/28/99 to 1/27/00	Water	LLD	LLD	LLD			
1/5/00 to 1/27/00	Water				3.09 +/- 0.66	3.42 +/- 0.69	
1/27/00 to 2/24/00	Water	LLD	LLD	LLD			
2/24/00 to 3/29/00	Water	LLD	LLD	LLD			
3/2/00 to 3/29/00	Water						LLD
3/9/00 to 3/29/00	Water				LLD		
3/29/00 to 4/27/00	Water	LLD	LLD	LLD	LLD	LLD	
4/27/00 to 5/25/00	Water	LLD	LLD	LLD	3.20 +/- 0.67	LLD	
5/25/00 to 6/29/00	Water	LLD	LLD	LLD	LLD	LLD	
6/29/00 to 7/27/00	Water	LLD	LLD	LLD	LLD	LLD	
7/27/00 to 8/31/00	Water	LLD	LLD	LLD	LLD	LLD	
8/31/00 to 9/28/00	Water	LLD	LLD	LLD	LLD	LLD	

Water Gross Beta Detail Report 2000
Radiological Environmental Monitoring Program Data Summary
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

		Location					
Collection Period	Sample Type	28	34	36	59	60	
9/28/00 to 10/26/00	Water	LLD	LLD	LLD	LLD	LLD	
10/26/00 to 11/30/00	Water	LLD	LLD	LLD	LLD	LLD	
11/30/00 to 12/28/00	Water	LLD	LLD	LLD	LLD	LLD	

Water Gamma Spectral Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
28	Water	12/28/99 to 1/27/00	< 26.46 < 4.93 < 7.64	< 4.58 < 3.62	< 1.50 < 4.52	< 3.65 < 3.57	< 5.37 < 6.78
28	Water	1/27/00 to 2/24/00	< 24.73 < 6.92 < 15.30	< 5.65 < 2.82	< 4.90 < 4.51	< 4.77 < 6.19	< 4.27 < 5.48
28	Water	2/24/00 to 3/29/00	< 21.42 < 8.58 < 12.59	< 3.13 < 3.32	< 2.22 < 3.58	< 6.21 < 5.30	< 6.53 < 11.30
28	Water	3/29/00 to 4/27/00	< 7.65 < 4.30 < 2.43	< 1.10 < 1.52	< 1.62 < 1.61	< 2.11 < 1.38	< 3.05 < 2.13
28	Water	4/27/00 to 5/25/00	< 34.72 < 5.26 < 7.06	< 2.66 < 5.98	< 2.72 < 2.89	< 5.28 < 3.64	< 3.61 < 7.47
28	Water	5/25/00 to 6/29/00	< 23.26 < 8.90 < 8.45	< 2.83 < 3.36	< 2.75 < 3.50	< 2.27 < 5.02	< 4.22 < 6.48
28	Water	6/29/00 to 7/27/00	< 17.92 < 6.89 < 7.56	< 2.65 < 3.09	< 2.52 < 2.86	< 3.30 < 2.53	< 2.29 < 5.16
28	Water	7/27/00 to 8/31/00	< 11.22 < 1.46 < 7.24	< 1.38 < 2.96	< 1.71 < 2.07	< 2.22 < 1.60	< 3.32 < 2.28
28	Water	8/31/00 to 9/28/00	< 13.67 < 6.78 < 9.88	< 2.27 < 4.47	< 2.00 < 3.42	< 4.14 < 2.80	< 5.50 < 5.96
28	Water	9/28/00 to 10/26/00	< 29.53 < 11.75 < 6.82	< 3.42 < 8.25	< 5.50 < 4.48	< 5.05 < 4.75	< 5.51 < 3.65
28	Water	10/26/00 to 11/30/00	< 21.48 < 11.14 < 4.03	< 2.78 < 7.00	< 3.96 < 4.09	< 3.33 < 2.66	< 2.95 < 3.61
28	Water	11/30/00 to 12/28/00	< 16.57 < 4.87 < 11.97	< 4.94 < 6.81	< 3.85 < 5.20	< 6.56 < 4.05	< 5.97 < 6.54

Water Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
34	Water	12/28/99 to 1/27/00	< 32.83 < 8.51 < 12.02	< 4.99 < 4.65	< 2.66 < 2.41	< 4.79 < 4.92	< 3.75 < 10.39
34	Water	1/27/00 to 2/24/00	< 19.11 < 10.39 < 8.09	< 4.76 < 4.14	< 3.40 < 3.35	< 3.34 < 6.57	< 3.89 < 4.90
34	Water	2/24/00 to 3/29/00	< 12.33 < 3.95 < 3.77	< 2.23 < 1.69	< 1.23 < 2.17	< 2.05 < 2.84	< 2.13 < 4.10
34	Water	3/29/00 to 4/27/00	< 17.89 < 4.91 < 7.23	< 1.72 < 3.61	< 4.68 < 3.56	< 2.89 < 3.61	< 4.19 < 6.07
34	Water	4/27/00 to 5/25/00	< 19.48 < 7.64 < 6.21	< 5.65 < 3.82	< 3.73 < 3.41	< 4.40 < 4.48	< 4.80 < 8.63
34	Water	5/25/00 to 6/29/00	< 18.60 < 6.63 < 10.13	< 2.97 < 2.50	< 2.07 < 1.24	< 1.79 < 1.63	< 2.39 < 3.55
34	Water	6/29/00 to 7/27/00	< 20.00 < 5.60 < 4.53	< 3.50 < 4.99	< 4.03 < 2.18	< 2.94 < 3.56	< 3.27 < 4.96
34	Water	7/27/00 to 8/31/00	< 20.18 < 6.61 < 11.14	< 3.02 < 2.85	< 3.69 < 3.84	< 3.40 < 3.95	< 3.85 < 4.35
34	Water	8/31/00 to 9/28/00	< 20.17 < 5.04 < 6.23	< 5.29 < 4.37	< 5.21 < 3.93	< 5.97 < 2.23	< 4.80 < 7.37
34	Water	9/28/00 to 10/26/00	< 23.06 < 4.26 < 5.22	< 1.64 < 3.49	< 2.03 < 2.47	< 3.75 < 3.29	< 3.50 < 4.66
34	Water	10/26/00 to 11/30/00	< 15.44 < 4.83 < 5.57	< 2.22 < 3.55	< 1.72 < 3.47	< 3.02 < 3.97	< 3.58 < 5.24
34	Water	11/30/00 to 12/28/00	< 13.44 < 6.22 < 4.92	< 1.45 < 3.48	< 2.05 < 4.65	< 6.32 < 3.71	< 5.42 < 7.24

Water Gamma Spectral Detail Report 2000
Radiological Environmental Monitoring Program Detail Data
Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
36	Water	12/28/99 to 1/27/00	< 23.84 < 9.92 < 9.32	< 4.15 < 8.51	< 3.92 < 3.94	< 4.70 < 5.32	< 5.36 < 6.36
36	Water	1/27/00 to 2/24/00	< 22.08 < 7.81 < 6.14	< 3.74 < 1.50	< 2.22 < 1.69	< 3.48 < 4.13	< 3.86 < 5.04
36	Water	2/24/00 to 3/29/00	< 8.85 < 3.93 < 3.43	< 1.65 < 4.13	< 2.40 < 1.61	< 1.79 < 1.66	< 2.89 < 4.09
36	Water	3/29/00 to 4/27/00	< 11.31 < 4.11 < 4.86	< 1.78 < 1.06	< 1.81 < 1.61	< 1.36 < 1.57	< 2.64 < 3.71
36	Water	4/27/00 to 5/25/00	< 15.49 < 4.36 < 3.44	< 2.03 < 1.97	< 0.81 < 1.96	< 2.01 < 1.80	< 2.09 < 3.69
36	Water	5/25/00 to 6/29/00	< 13.76 < 4.37 < 4.32	< 1.43 < 2.84	< 1.93 < 1.87	< 1.95 < 1.17	< 2.53 < 1.89
36	Water	6/29/00 to 7/27/00	< 22.64 < 2.46 < 6.21	< 4.23 < 3.25	< 1.32 < 3.13	< 1.05 < 1.58	< 2.35 < 5.65
36	Water	7/27/00 to 8/31/00	< 13.47 < 3.44 < 5.22	< 3.22 < 3.44	< 2.62 < 3.64	< 1.59 < 4.09	< 3.72 < 3.63
36	Water	8/31/00 to 9/28/00	< 24.59 < 7.23 < 11.48	< 4.81 < 6.99	< 5.44 < 3.03	< 4.70 < 2.78	< 5.92 < 5.85
36	Water	9/28/00 to 10/26/00	< 14.14 < 6.93 < 3.37	< 2.40 < 1.92	< 2.72 < 2.84	< 2.03 < 2.84	< 2.82 < 4.86
36	Water	10/26/00 to 11/30/00	< 26.83 < 5.25 < 11.84	< 1.92 < 4.97	< 2.08 < 5.98	< 4.14 < 8.45	< 3.58 < 6.54
36	Water	11/30/00 to 12/28/00	< 16.60 < 7.81 < 7.88	< 3.08 < 4.37	< 3.50 < 4.54	< 2.90 < 2.54	< 2.46 < 3.80

Water Gamma Spectral Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
59	Water	1/5/00 to 1/27/00	< 16.83 < 8.88 < 12.14	< 4.30 < 6.69	< 5.24 < 4.45	< 4.83 < 2.69	< 5.07 < 4.51
59	Water	3/9/00 to 3/29/00	< 21.20 < 5.88 < 8.26	< 2.27 < 5.23	< 1.89 < 2.74	< 5.05 < 2.88	< 4.08 < 5.90
59	Water	3/29/00 to 4/27/00	< 16.40 < 3.33 < 5.46	< 2.18 < 2.67	< 3.02 < 3.35	< 2.99 < 2.69	< 2.39 < 5.47
59	Water	4/27/00 to 5/25/00	< 28.51 < 7.34 < 6.71	< 4.21 < 5.22	< 4.38 < 3.93	< 3.31 < 3.30	< 8.04 < 6.42
59	Water	5/25/00 to 6/29/00	< 14.53 < 10.84 < 6.51	< 3.50 < 6.38	< 1.56 < 2.70	< 3.13 < 2.45	< 3.52 < 3.81
59	Water	6/29/00 to 7/27/00	< 28.00 < 11.95 < 8.47	< 1.42 < 7.39	< 1.95 < 2.30	< 2.67 < 4.91	< 3.27 < 8.22
59	Water	7/27/00 to 8/31/00	< 25.94 < 7.70 < 7.56	< 5.56 < 5.99	< 5.83 < 3.71	< 4.52 < 2.67	< 5.78 < 4.46
59	Water	8/31/00 to 9/28/00	< 22.48 < 4.16 < 11.05	< 4.01 < 4.72	< 5.57 < 3.98	< 5.56 < 5.13	< 4.72 < 4.75
59	Water	9/28/00 to 10/26/00	< 28.43 < 10.19 < 7.52	< 2.93 < 5.10	< 4.80 < 4.24	< 4.74 < 5.91	< 5.78 < 9.77
59	Water	10/26/00 to 11/30/00	< 13.35 < 2.50 < 5.27	< 2.24 < 2.27	< 1.05 < 1.53	< 1.48 < 1.97	< 1.94 < 1.70
60	Water	1/5/00 to 1/27/00	< 31.88 < 9.14 < 8.58	< 3.80 < 4.59	< 2.50 < 2.40	< 4.75 < 5.94	< 4.29 < 6.80
60	Water	3/2/00 to 3/29/00	< 18.18 < 2.81 < 8.00	< 3.55 < 2.98	< 1.67 < 2.56	< 2.21 < 3.91	< 2.92 < 6.12

Water Gamma Spectral Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Monthly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
60	Water	3/29/00 to 4/27/00	< 26.63 < 6.27 < 7.18	< 2.90 < 3.44	< 3.08 < 4.38	< 3.37 < 2.11	< 3.16 < 7.87
60	Water	4/27/00 to 5/25/00	< 11.40 < 4.46 < 5.32	< 4.55 < 6.63	< 2.45 < 2.71	< 5.18 < 2.75	< 1.80 < 4.25
60	Water	5/25/00 to 6/29/00	< 17.52 < 6.73 < 8.69	< 3.95 < 3.89	< 3.07 < 2.83	< 3.64 < 2.65	< 2.27 < 3.55
60	Water	6/29/00 to 7/27/00	< 11.07 < 3.74 < 10.67	< 5.03 < 2.29	< 5.08 < 3.22	< 3.35 < 2.84	< 3.36 < 6.36
60	Water	7/27/00 to 8/31/00	< 24.66 < 4.84 < 4.94	< 2.38 < 5.60	< 1.99 < 3.40	< 3.53 < 2.09	< 2.20 < 7.89
60	Water	8/31/00 to 9/28/00	< 26.97 < 5.70 < 10.81	< 1.82 < 5.84	< 5.20 < 4.26	< 7.82 < 3.69	< 3.98 < 6.95
60	Water	9/28/00 to 10/26/00	< 28.48 < 10.08 < 7.91	< 4.26 < 7.91	< 4.71 < 3.49	< 7.33 < 4.88	< 3.77 < 6.08
60	Water	10/26/00 to 11/30/00	< 14.48 < 2.28 < 5.50	< 3.00 < 2.67	< 1.99 < 1.71	< 2.29 < 2.42	< 2.16 < 2.03

Water Tritium Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Quarterly Results in pCi/L +/- 2 Sigma

Location	Sample Type	Collection Date	H-3
28	Water	3/29/00	< 183.93
28	Water	6/29/00	< 178.56
28	Water	9/28/00	LLD
28	Water	12/28/00	LLD
34	Water	3/29/00	< 183.93
34	Water	6/29/00	LLD
34	Water	9/28/00	< 172.35
34	Water	12/28/00	< 163.77
36	Water	3/29/00	< 183.93
36	Water	6/29/00	< 178.56
36	Water	9/28/00	< 172.35
36	Water	12/28/00	< 163.77
59	Water	3/29/00	< 183.93
59	Water	6/29/00	< 178.56
59	Water	9/28/00	< 172.35
59	Water	11/30/00	< 163.77
60	Water	3/29/00	< 183.93
60	Water	6/29/00	LLD
60	Water	9/28/00	< 172.35
60	Water	11/30/00	< 163.77

Sediment Gamma Spectra: Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no.: 50-440/50-441
 Sample Frequency is: Bi-Annually Results in pCi/kg dry +/- 2 Sigma

Location	Sample Type	Collection Date	Co-58	Co-60	Cs-134	Cs-137	K-40
25	Sediment	5/11/00	< 29.35	< 20.43	< 18.49	589.84 +/- 48.54	18,597.00 +/- 808.10
25	Sediment	10/12/00	< 21.58	< 19.27	< 25.50	190.20 +/- 16.93	13,801.00 +/- 534.40
26	Sediment	5/11/00	< 27.03	< 23.26	< 20.01	993.90 +/- 47.54	18,823.50 +/- 750.10
26	Sediment	10/12/00	< 17.57	< 14.22	< 25.87	LLD	13,626.00 +/- 545.60
27	Sediment	5/11/00	< 36.63	< 19.45	< 29.25	620.24 +/- 62.79	24,103.00 +/- 1,194.00
27	Sediment	10/12/00	< 25.34	< 27.54	< 29.24	335.21 +/- 35.71	20,426.00 +/- 746.80
32	Sediment	5/11/00	< 49.32	< 37.82	< 48.60	1,460.90 +/- 96.48	29,145.00 +/- 1,548.00
32	Sediment	10/12/00	< 27.71	< 24.35	< 34.90	1,277.50 +/- 41.97	27,621.00 +/- 722.90
63	Sediment	5/11/00	< 23.67	< 16.13	< 15.03	< 14.66	7,961.30 +/- 612.40
63	Sediment	10/12/00	< 14.44	< 15.90	< 18.19	< 13.81	9,485.90 +/- 499.10

Sediment Gamma Spectral Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Bi-Annually Results in pCi/kg dry +/- 2 Sigma

Location	Sample Type	Collection Date	Co-58	Co-60	Cs-134	Cs-137	K-40
64	Sediment	5/11/00	< 13.48	< 16.35	< 12.14	< 13.02	4,358.30 +/- 500.70
64	Sediment	10/12/00	< 10.57	< 12.85	< 15.04	< 10.76	9,801.50 +/- 370.80
65	Sediment	5/11/00	< 14.46	< 15.78	< 21.77	< 14.42	12,711.00 +/- 513.20
65	Sediment	10/12/00	< 8.01	< 9.79	< 12.03	LLD	11,778.50 +/- 435.18

7-17-00 11:00 AM

Location	Sample Type	Collection Period	Exposure
1	TLA	1/4/00 to 1/4/01	58.07 +/- 0.58
3	TLA	1/4/00 to 1/4/01	56.84 +/- 0.57
4	TLA	1/4/00 to 1/4/01	60.95 +/- 0.57
5	TLA	1/4/00 to 1/4/01	51.87 +/- 0.65
6	TLA	1/4/00 to 1/4/01	59.94 +/- 0.64
7	TLA	1/4/00 to 1/4/01	58.07 +/- 0.57
8	TLA	1/4/00 to 1/4/01	51.93 +/- 0.67
9	TLA	1/4/00 to 1/4/01	51.96 +/- 0.74
10	TLA	1/4/00 to 1/4/01	73.51 +/- 0.58
11	TLA	1/4/00 to 1/4/01	54.87 +/- 0.57
12	TLA	1/4/00 to 1/4/01	61.04 +/- 0.58
13	TLA	1/4/00 to 1/4/01	58.50 +/- 0.58
14	TLA	1/4/00 to 1/4/01	52.77 +/- 0.58
15	TLA	1/4/00 to 1/4/01	53.06 +/- 0.58
21	TLA	1/4/00 to 1/4/01	61.26 +/- 0.58
23	TLA	1/4/00 to 1/4/01	61.29 +/- 0.61
24	TLA	1/4/00 to 1/4/01	54.00 +/- 0.58
29	TLA	1/4/00 to 1/4/01	72.31 +/- 0.69
30	TLA	1/4/00 to 1/4/01	56.64 +/- 0.72
31	TLA	1/4/00 to 1/4/01	68.14 +/- 1.14
33	TLA	1/4/00 to 1/4/01	71.18 +/- 0.60
35	TLA	1/4/00 to 1/4/01	53.18 +/- 0.59

TLD Gamma Dose Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Annual

Location	Sample Type	Collection Period	Exposure
36	TLA	1/4/00 to 1/4/01	72.46 +/- 0.69
53	TLA	1/4/00 to 1/4/01	57.67 +/- 0.58
54	TLA	1/4/00 to 1/4/01	56.08 +/- 0.73
55	TLA	1/4/00 to 1/4/01	66.20 +/- 0.60
56	TLA	1/4/00 to 1/4/01	55.24 +/- 0.58
58	TLA	1/4/00 to 1/4/01	54.37 +/- 0.57

Perry Nuclear Power Plant, Lake County Ohio

Location	Sample Type	Collection Period	Exposure
1	TLB	1/4/00 to 4/4/00	11.53 +/- 0.25
1	TLB	4/4/00 to 7/11/00	13.33 +/- 0.20
1	TLB	7/11/00 to 10/4/00	12.24 +/- 0.24
1	TLB	10/4/00 to 1/4/01	13.98 +/- 0.29
3	TLB	1/4/00 to 4/4/00	13.98 +/- 0.44
3	TLB	4/4/00 to 7/11/00	13.76 +/- 0.21
3	TLB	7/11/00 to 10/4/00	15.38 +/- 0.21
3	TLB	10/4/00 to 1/4/01	14.30 +/- 0.32
4	TLB	1/4/00 to 4/4/00	14.87 +/- 0.23
4	TLB	4/4/00 to 7/11/00	13.89 +/- 0.24
4	TLB	7/11/00 to 10/4/00	15.29 +/- 0.40
4	TLB	10/4/00 to 1/4/01	14.81 +/- 0.23
5	TLB	1/4/00 to 4/4/00	15.25 +/- 0.23
5	TLB	4/4/00 to 7/11/00	13.09 +/- 0.20
5	TLB	7/11/00 to 10/4/00	15.56 +/- 0.35
5	TLB	10/4/00 to 1/4/01	13.94 +/- 0.43
6	TLB	1/4/00 to 4/4/00	16.05 +/- 0.22
6	TLB	4/4/00 to 7/11/00	15.13 +/- 0.33
6	TLB	7/11/00 to 10/4/00	17.11 +/- 0.22
6	TLB	10/4/00 to 1/4/01	16.06 +/- 0.25
7	TLB	1/4/00 to 4/4/00	14.85 +/- 0.23
7	TLB	4/4/00 to 7/11/00	14.11 +/- 0.20
7	TLB	7/11/00 to 10/4/00	15.48 +/- 0.34
7	TLB	10/4/00 to 1/4/01	13.82 +/- 0.40
8	TLB	1/4/00 to 4/4/00	13.90 +/- 0.39
8	TLB	4/4/00 to 7/11/00	11.80 +/- 0.33
8	TLB	7/11/00 to 10/4/00	15.01 +/- 0.23
8	TLB	10/4/00 to 1/4/01	12.36 +/- 0.24
9	TLB	1/4/00 to 4/4/00	13.61 +/- 0.40
9	TLB	4/4/00 to 7/11/00	12.58 +/- 0.20
9	TLB	7/11/00 to 10/4/00	14.59 +/- 0.28
9	TLB	10/4/00 to 1/4/01	13.17 +/- 0.26
10	TLB	1/4/00 to 4/4/00	16.22 +/- 0.25
10	TLB	4/4/00 to 7/11/00	16.49 +/- 0.22
10	TLB	7/11/00 to 10/4/00	17.57 +/- 0.22
10	TLB	10/4/00 to 1/4/01	16.84 +/- 0.25

TLD Gamma Dose Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
11	TLB	1/4/00 to 4/4/00	14.00 +/- 0.28
11	TLB	4/4/00 to 7/11/00	12.95 +/- 0.22
11	TLB	7/11/00 to 10/4/00	16.71 +/- 0.18
11	TLB	10/4/00 to 1/4/01	15.16 +/- 0.26
12	TLB	1/4/00 to 4/4/00	14.37 +/- 0.34
12	TLB	4/4/00 to 7/11/00	14.57 +/- 0.22
12	TLB	7/11/00 to 10/4/00	15.51 +/- 0.35
12	TLB	10/4/00 to 1/4/01	14.19 +/- 0.42
13	TLB	1/4/00 to 4/4/00	13.20 +/- 0.23
13	TLB	4/4/00 to 7/11/00	13.41 +/- 0.20
13	TLB	7/11/00 to 10/4/00	14.11 +/- 0.26
13	TLB	10/4/00 to 1/4/01	13.81 +/- 0.33
14	TLB	1/4/00 to 4/4/00	12.01 +/- 0.20
14	TLB	4/4/00 to 7/11/00	13.73 +/- 0.21
14	TLB	7/11/00 to 10/4/00	12.78 +/- 0.21
14	TLB	10/4/00 to 1/4/01	13.91 +/- 0.34
15	TLB	1/4/00 to 4/4/00	11.52 +/- 0.24
15	TLB	4/4/00 to 7/11/00	13.00 +/- 0.19
15	TLB	7/11/00 to 10/4/00	12.05 +/- 0.18
15	TLB	10/4/00 to 1/4/01	13.92 +/- 0.43
21	TLB	1/4/00 to 4/4/00	16.50 +/- 0.22
21	TLB	4/4/00 to 7/11/00	16.45 +/- 0.20
21	TLB	7/11/00 to 10/4/00	18.11 +/- 0.20
21	TLB	10/4/00 to 1/4/01	15.99 +/- 0.23
23	TLB	1/4/00 to 4/4/00	13.64 +/- 0.24
23	TLB	4/4/00 to 7/11/00	16.03 +/- 0.20
23	TLB	7/11/00 to 10/4/00	15.10 +/- 0.40
23	TLB	10/4/00 to 1/4/01	15.24 +/- 0.26
24	TLB	1/4/00 to 4/4/00	13.16 +/- 0.22
24	TLB	4/4/00 to 7/11/00	13.31 +/- 0.19
24	TLB	7/11/00 to 10/4/00	13.21 +/- 0.26
24	TLB	10/4/00 to 1/4/01	13.97 +/- 0.28
29	TLB	1/4/00 to 4/4/00	18.16 +/- 0.30
29	TLB	4/4/00 to 7/11/00	17.97 +/- 0.20
29	TLB	7/11/00 to 10/4/00	19.38 +/- 0.21

Location	Sample Type	Collection Period	Exposure
29	TLB	10/4/00 to 1/4/01	18.73 +/- 0.24
30	TLB	1/4/00 to 4/4/00	15.26 +/- 0.23
30	TLB	4/4/00 to 7/11/00	14.49 +/- 0.20
30	TLB	7/11/00 to 10/4/00	15.50 +/- 0.30
30	TLB	10/4/00 to 1/4/01	14.90 +/- 0.23
31	TLB	1/4/00 to 4/4/00	19.34 +/- 0.24
31	TLB	4/4/00 to 7/11/00	16.48 +/- 0.21
31	TLB	7/11/00 to 10/4/00	19.85 +/- 0.31
31	TLB	10/4/00 to 1/4/01	17.95 +/- 0.39
33	TLB	1/4/00 to 4/4/00	19.39 +/- 0.21
33	TLB	4/4/00 to 7/11/00	18.78 +/- 0.21
33	TLB	7/11/00 to 10/4/00	21.20 +/- 0.19
33	TLB	10/4/00 to 1/4/01	19.74 +/- 0.24
35	TLB	1/4/00 to 4/4/00	14.37 +/- 0.35
35	TLB	4/4/00 to 7/11/00	13.86 +/- 0.22
35	TLB	7/11/00 to 10/4/00	15.49 +/- 0.29
35	TLB	10/4/00 to 1/4/01	15.26 +/- 0.26
36	TLB	1/4/00 to 4/4/00	18.26 +/- 0.39
36	TLB	4/4/00 to 7/11/00	17.29 +/- 0.21
36	TLB	7/11/00 to 10/4/00	19.85 +/- 0.50
36	TLB	10/4/00 to 1/4/01	19.93 +/- 0.23
53	TLB	1/4/00 to 4/4/00	15.21 +/- 0.23
53	TLB	4/4/00 to 7/11/00	14.40 +/- 0.22
53	TLB	7/11/00 to 10/4/00	17.18 +/- 0.22
53	TLB	10/4/00 to 1/4/01	15.73 +/- 0.24
54	TLB	1/4/00 to 4/4/00	14.35 +/- 0.40
54	TLB	4/4/00 to 7/11/00	14.40 +/- 0.21
54	TLB	7/11/00 to 10/4/00	15.16 +/- 0.32
54	TLB	10/4/00 to 1/4/01	15.20 +/- 0.25
55	TLB	1/4/00 to 4/4/00	14.91 +/- 0.22
55	TLB	4/4/00 to 7/11/00	15.33 +/- 0.25
55	TLB	7/11/00 to 10/4/00	15.56 +/- 0.24
55	TLB	10/4/00 to 1/4/01	15.74 +/- 0.26
56	TLB	1/4/00 to 4/4/00	13.62 +/- 0.24
56	TLB	4/4/00 to 7/11/00	12.64 +/- 0.20

TLD Gamma Dose Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
56	TLB	7/11/00 to 10/4/00	14.53 +/- 0.21
56	TLB	10/4/00 to 1/4/01	12.76 +/- 0.26
58	TLB	1/4/00 to 4/4/00	13.68 +/- 0.23
58	TLB	4/4/00 to 7/11/00	13.76 +/- 0.22
58	TLB	7/11/00 to 10/4/00	14.88 +/- 0.26
58	TLB	10/4/00 to 1/4/01	13.86 +/- 0.37

TLD Gamma Dose Detail Report 2000

Radiological Environmental Monitoring Program Detail Data

Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
1	TLD	1/4/00 to 4/4/00	15.00 +/- 0.19
1	TLD	4/4/00 to 7/11/00	13.85 +/- 0.19
1	TLD	7/11/00 to 10/4/00	15.42 +/- 0.49
1	TLD	10/4/00 to 1/4/01	14.30 +/- 0.28
3	TLD	1/4/00 to 4/4/00	15.39 +/- 0.21
3	TLD	4/4/00 to 7/11/00	14.14 +/- 0.18
3	TLD	7/11/00 to 10/4/00	15.59 +/- 0.43
3	TLD	10/4/00 to 1/4/01	15.04 +/- 0.25
4	TLD	1/4/00 to 4/4/00	14.69 +/- 0.19
4	TLD	4/4/00 to 7/11/00	14.23 +/- 0.19
4	TLD	7/11/00 to 10/4/00	15.50 +/- 0.51
4	TLD	10/4/00 to 1/4/01	14.76 +/- 0.42
5	TLD	1/4/00 to 4/4/00	14.00 +/- 0.30
5	TLD	4/4/00 to 7/11/00	13.06 +/- 0.20
5	TLD	7/11/00 to 10/4/00	14.99 +/- 0.35
5	TLD	10/4/00 to 1/4/01	14.04 +/- 0.36
6	TLD	1/4/00 to 4/4/00	17.22 +/- 0.24
6	TLD	4/4/00 to 7/11/00	15.62 +/- 0.39
6	TLD	7/11/00 to 10/4/00	17.54 +/- 0.34
6	TLD	10/4/00 to 1/4/01	15.48 +/- 0.25
7	TLD	1/4/00 to 4/4/00	13.85 +/- 0.36
7	TLD	4/4/00 to 7/11/00	14.18 +/- 0.19
7	TLD	7/11/00 to 10/4/00	15.36 +/- 0.58
7	TLD	10/4/00 to 1/4/01	14.17 +/- 0.39
8	TLD	1/4/00 to 4/4/00	12.17 +/- 0.22
8	TLD	4/4/00 to 7/11/00	11.69 +/- 0.25
8	TLD	7/11/00 to 10/4/00	12.53 +/- 0.37
8	TLD	10/4/00 to 1/4/01	13.39 +/- 0.28
9	TLD	1/4/00 to 4/4/00	10.79 +/- 0.21
9	TLD	4/4/00 to 7/11/00	13.22 +/- 0.21
9	TLD	7/11/00 to 10/4/00	11.12 +/- 0.50
9	TLD	10/4/00 to 1/4/01	13.05 +/- 0.28
10	TLD	1/4/00 to 4/4/00	16.45 +/- 0.26
10	TLD	4/4/00 to 7/11/00	16.83 +/- 0.19
10	TLD	7/11/00 to 10/4/00	17.38 +/- 0.35

TLD Gamma Dose Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
10	TLD	10/4/00 to 1/4/01	17.15 +/- 0.29
11	TLD	1/4/00 to 4/4/00	14.10 +/- 0.37
11	TLD	4/4/00 to 7/11/00	14.72 +/- 0.19
11	TLD	7/11/00 to 10/4/00	15.93 +/- 0.45
11	TLD	10/4/00 to 1/4/01	14.11 +/- 0.39
12	TLD	1/4/00 to 4/4/00	14.39 +/- 0.39
12	TLD	4/4/00 to 7/11/00	15.61 +/- 0.26
12	TLD	7/11/00 to 10/4/00	15.40 +/- 0.47
12	TLD	10/4/00 to 1/4/01	14.30 +/- 0.28
13	TLD	1/4/00 to 4/4/00	15.78 +/- 0.22
13	TLD	4/4/00 to 7/11/00	13.80 +/- 0.21
13	TLD	7/11/00 to 10/4/00	16.31 +/- 0.34
13	TLD	10/4/00 to 1/4/01	14.14 +/- 0.41
14	TLD	1/4/00 to 4/4/00	12.57 +/- 0.22
14	TLD	4/4/00 to 7/11/00	13.80 +/- 0.23
14	TLD	7/11/00 to 10/4/00	13.04 +/- 0.35
14	TLD	10/4/00 to 1/4/01	14.11 +/- 0.35
15	TLD	1/4/00 to 4/4/00	14.39 +/- 0.36
15	TLD	4/4/00 to 7/11/00	13.60 +/- 0.21
15	TLD	7/11/00 to 10/4/00	15.50 +/- 0.51
15	TLD	10/4/00 to 1/4/01	14.03 +/- 0.44
21	TLD	1/4/00 to 4/4/00	18.04 +/- 0.21
21	TLD	4/4/00 to 7/11/00	17.37 +/- 0.22
21	TLD	7/11/00 to 10/4/00	19.55 +/- 0.35
21	TLD	10/4/00 to 1/4/01	17.55 +/- 0.28
23	TLD	1/4/00 to 4/4/00	16.89 +/- 0.21
23	TLD	4/4/00 to 7/11/00	16.60 +/- 0.19
23	TLD	7/11/00 to 10/4/00	19.47 +/- 0.36
23	TLD	10/4/00 to 1/4/01	17.18 +/- 0.28
24	TLD	1/4/00 to 4/4/00	14.92 +/- 0.22
24	TLD	4/4/00 to 7/11/00	13.81 +/- 0.20
24	TLD	7/11/00 to 10/4/00	15.53 +/- 0.38
24	TLD	10/4/00 to 1/4/01	15.37 +/- 0.26
29	TLD	1/4/00 to 4/4/00	18.70 +/- 0.38
29	TLD	4/4/00 to 7/11/00	18.23 +/- 0.23

Location	Sample Type	Collection Period	Exposure
29	TLD	7/11/00 to 10/4/00	20.42 +/- 0.45
29	TLD	10/4/00 to 1/4/01	18.37 +/- 0.42
30	TLD	1/4/00 to 4/4/00	13.89 +/- 0.41
30	TLD	4/4/00 to 7/11/00	15.32 +/- 0.20
30	TLD	7/11/00 to 10/4/00	15.46 +/- 0.53
30	TLD	10/4/00 to 1/4/01	15.49 +/- 0.26
31	TLD	1/4/00 to 4/4/00	16.23 +/- 0.22
31	TLD	4/4/00 to 7/11/00	17.80 +/- 0.18
31	TLD	7/11/00 to 10/4/00	18.97 +/- 0.35
31	TLD	10/4/00 to 1/4/01	18.34 +/- 0.39
33	TLD	1/4/00 to 4/4/00	16.74 +/- 0.19
33	TLD	4/4/00 to 7/11/00	19.43 +/- 0.27
33	TLD	7/11/00 to 10/4/00	18.02 +/- 0.33
33	TLD	10/4/00 to 1/4/01	20.05 +/- 0.28
35	TLD	1/4/00 to 4/4/00	12.63 +/- 0.24
35	TLD	4/4/00 to 7/11/00	14.17 +/- 0.20
35	TLD	7/11/00 to 10/4/00	13.17 +/- 0.39
35	TLD	10/4/00 to 1/4/01	14.11 +/- 0.43
36	TLD	1/4/00 to 4/4/00	17.08 +/- 0.23
36	TLD	4/4/00 to 7/11/00	17.69 +/- 0.21
36	TLD	7/11/00 to 10/4/00	18.36 +/- 0.36
36	TLD	10/4/00 to 1/4/01	18.43 +/- 0.28
53	TLD	1/4/00 to 4/4/00	13.75 +/- 0.34
53	TLD	4/4/00 to 7/11/00	15.78 +/- 0.32
53	TLD	7/11/00 to 10/4/00	15.40 +/- 0.48
53	TLD	10/4/00 to 1/4/01	15.96 +/- 0.29
54	TLD	1/4/00 to 4/4/00	12.10 +/- 0.22
54	TLD	4/4/00 to 7/11/00	14.98 +/- 0.22
54	TLD	7/11/00 to 10/4/00	13.52 +/- 0.36
54	TLD	10/4/00 to 1/4/01	15.13 +/- 0.26
55	TLD	1/4/00 to 4/4/00	13.83 +/- 0.40
55	TLD	4/4/00 to 7/11/00	15.62 +/- 0.26
55	TLD	7/11/00 to 10/4/00	15.48 +/- 0.53
55	TLD	10/4/00 to 1/4/01	15.90 +/- 0.27
56	TLD	1/4/00 to 4/4/00	13.86 +/- 0.39

TLD Gamma Dose Detail Report 2000
 Radiological Environmental Monitoring Program Detail Data
 Perry Nuclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
 Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
56	TLD	4/4/00 to 7/11/00	13.12 +/- 0.22
56	TLD	7/11/00 to 10/4/00	14.12 +/- 0.39
56	TLD	10/4/00 to 1/4/01	13.35 +/- 0.28
58	TLD	1/4/00 to 4/4/00	13.79 +/- 0.38
58	TLD	4/4/00 to 7/11/00	14.20 +/- 0.21
58	TLD	7/11/00 to 10/4/00	15.41 +/- 0.43
58	TLD	10/4/00 to 1/4/01	14.05 +/- 0.46

ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT

**APPENDIX D: 2000 ABNORMAL RELEASE SUMMARY AND
METEOROLOGICAL DATA**

SITE: PERRY

UNIT: UNIT 1

0006071036

USER: CLN

SUMMARY OF MAXIMUM INDIVIDUAL DOSES

LAST ACCUMULATIONS FOR PERIODS:

LIQUID 00060409-00060410

GASEOUS 00060409-00060410

AIR 00060409-00060410

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (MREM)	AGE GROUP	LOCATION DIST DIR (M) (TOWARD)	% OF APPLICABLE LIMIT	LIMIT (MREM)
LIQUID	TOTAL BODY	0.00E+00	CHILD	RECEPTOR 1	0.0E+00	3.0E+00
LIQUID	BONE	0.00E+00	CHILD	RECEPTOR 1	0.0E+00	1.0E+01
NOBLE GAS	AIR DOSE (GAMMA-MRAD)	4.29E-07		900. WSW	4.3E-06	1.0E+01
NOBLE GAS	AIR DOSE (BETA-MRAD)	7.57E-07		900. WSW	3.8E-06	2.0E+01
NOBLE GAS	T.BODY	2.59E-07	ALL	900. WSW	5.2E-06	5.0E+00
NOBLE GAS	SKIN	6.97E-07	ALL	900. WSW	4.6E-06	1.5E+01
IODINE& PARTICULATES	THYROID	2.08E-04	CHILD	900. WSW	1.4E-03	1.5E+01

END OF REPORT

SITE: PERRY

UNIT: UNIT 1

0006121214

USER: CLN

SUMMARY OF MAXIMUM INDIVIDUAL DOSES

LAST ACCUMULATIONS FOR PERIODS:

LIQUID 00032701-00060410

GASEOUS 00032701-00060410

AIR 00032701-00060410

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (MREM)	AGE GROUP	LOCATION (M) (TOWARD)	% OF APPLICABLE LIMIT	LIMIT (MREM)
LIQUID	TOTAL BODY	0.00E+00	CHILD	RECEPTOR 1	0.0E+00	3.0E+00
LIQUID	BONE	0.00E+00	CHILD	RECEPTOR 1	0.0E+00	1.0E+01
NOBLE GAS	AIR DOSE (GAMMA-MRAD)	3.30E-04		294. N	3.3E-03	1.0E+01
NOBLE GAS	AIR DOSE (BETA-MRAD)	4.78E-04		294. N	2.4E-03	2.0E+01
NOBLE GAS	T.BODY	2.10E-04	ALL	294. N	4.2E-03	5.0E+00
NOBLE GAS	SKIN	5.57E-04	ALL	294. N	3.7E-03	1.5E+01
IODINE& PARTICULATES	THYROID	8.42E-03	CHILD	294. N	5.6E-02	1.5E+01

END OF REPORT

SITE: PERRY

UNIT: UNIT 1

0006121218

USER: CLN

SUMMARY OF MAXIMUM INDIVIDUAL DOSES

LAST ACCUMULATIONS FOR PERIODS:

LIQUID 00010101-00060410

GASEOUS 00010101-00060410

AIR 00010101-00060410

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (MREM)	AGE GROUP	LOCATION DIST (M)	DIR (TOWARD)	% OF APPLICABLE LIMIT	LIMIT (MREM)
LIQUID	TOTAL BODY	0.00E+00	CHILD	RECEPTOR 1		0.0E+00	3.0E+00
LIQUID	BONE	0.00E+00	CHILD	RECEPTOR 1		0.0E+00	1.0E+01
NOBLE GAS	AIR DOSE (GAMMA-MRAD)	3.84E-04		294.	N	3.8E-03	1.0E+01
NOBLE GAS	AIR DOSE (BETA-MRAD)	6.08E-04		294.	N	3.0E-03	2.0E+01
NOBLE GAS	T-BODY	2.42E-04	ALL	294.	N	4.8E-03	5.0E+00
NOBLE GAS	SKIN	6.46E-04	ALL	294.	N	4.3E-03	1.5E+01
IODINE& PARTICULATES	THYROID	1.13E-02	CHILD	294.	N	7.5E-02	1.5E+01

END OF REPORT

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: A DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: B DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: C DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: D DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	0	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
<hr/>							
TOTAL	1	1	0	0	0	0	2

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 0
HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: E DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: F DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: G DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

SITE: PERRY

UNIT: UNIT 1

06/07/01 10:12

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 000600409-00060410

STABILITY CLASS: ALL DT/DZ

ELEVATION: SPEED:SPD10P DIRECTION:DIR10P LAPSE:DT50M

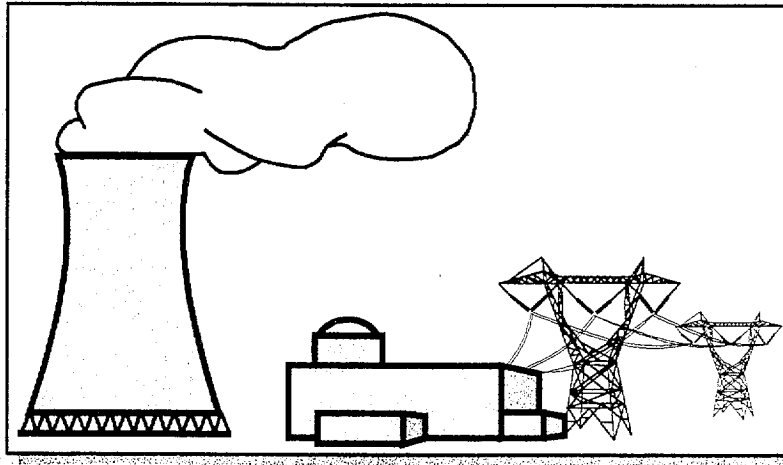
WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	0	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	1	1	0	0	0	0	2

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 0

HOURS OF MISSING DATA: 0

PNPPD



Generating Success!

For more information, write or call:

**Perry Nuclear Power Plant
Radwaste, Environmental and Chemistry Section
10 Center Road P.O. Box 97
Perry OH 44081-0097
(440) 280-5599**