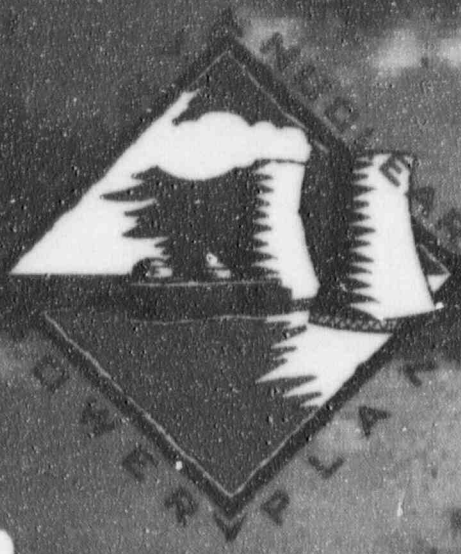
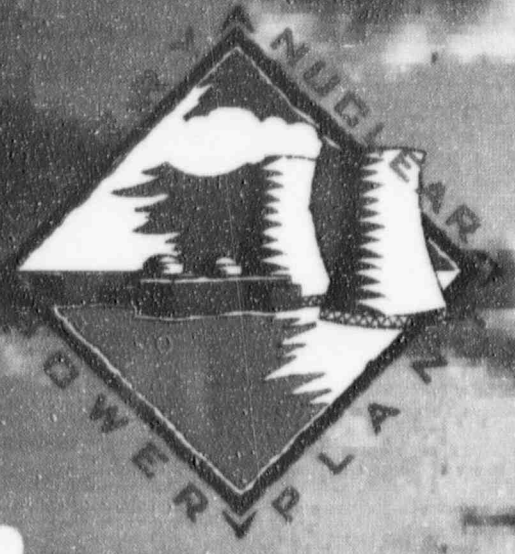
Perry Nuclear Power Plant

1996 Annual Environmental and Effluent Release Report



Perry Nuclear Power Plant

1996 Annual Environmental and Effluent Release Report



ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT FOR PERRY NUCLEAR POWER PLANT

JANUARY 1, 1996 TO DECEMBER 31, 1996

PREPARED BY:

RADWASTE, ENVIRONMENTAL, AND CHEMISTRY SECTION
PERRY NUCLEAR POWER PLANT
CLEVELAND ELECTRIC ILLUMINATING COMPANY
PERRY, OHIO

APRIL 1996

SUMMARY AND CONCLUSIONS

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 1 through December 31, 1996. This report meets all of the requirements in PNPP Technical Specifications, Appendix B of the PNPP Operating License (the Environmental Protection Plan, or EPP), and Regulatory Guide 1.21. Report topics include Annual 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 1996 indicate that the operation of the PNPP did not result in any significant environmental impact.

ANNUAL EFFLUENT RELEASES

During the normal operation of a nuclear power plant, small quantities of radioactivity are released to the environment in liquid and gaseous effluents. Radioactive materials are also released as solid waste. PNPP maintains a comprehensive program to control and monitor the release of all radioactive materials from the site. All releases are strictly regulated by the Nuclear Regulatory Commission (NRC).

The radioactivity released in the plant's liquid and gaseous effluents was well below applicable federal regulatory limits. The dose from plant effluents to the public was also below the applicable regulatory limits. The calculated hypothetical maximum individual dose potentially received by an individual resulting from PNPP liquid effluents was 0.009 mrem (0.3% of the applicable limit). The hypothetical maximum individual dose potentially received by an individual resulting from PNPP gaseous effluents was 0.004 mrad (0.04% of the applicable limit). The summation of the hypothetical maximum individual dose from effluents in 1996 is equivalent to less than one percent of the dose that an individual living in the PNPP area receives from all sources of radiation.

Shipments of solid waste consist 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 1996, making 31 shipments of solid radioactive waste to a licensed burial site.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

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 years before the plant became operational. This preoperational 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, soil, grass, water and sediment as well as by measuring radiation directly.

Over 800 radiological environmental samples were collected in 1996 and over 1300 analyses for radioactivity were performed. The results of the REMP indicate the adequacy of the control of the release of radioactivity in effluents from PNPP. These results also demonstrate that PNPP complies

with all applicable federal regulations. Results are divided into four sections: atmospheric monitoring, terrestrial monitoring, aquatic monitoring and direct radiation monitoring.

- Samples of air are collected to monitor the radioactivity in the atmosphere. The 1996 results are similar to those observed in both preoperational and operational programs from prior years. Only background environmental radioactivity was detected and only at expected levels.

- Terrestrial monitoring includes analysis of milk, produce, vegetation, and soil samples. The results of the sample analyses indicate concentrations of radioactivity similar to that found in previous years. For example, the average concentration of cesium-137 in soil was 229.14 pCi/kg in 1996, which is at the low end of the range of 208.5 to 1104.05 pCi/kg observed during the past eleven years. Analyses of other terrestrial samples also detected concentrations of radioactivity similar to those observed in previous years, and indicate no build-up of radioactivity attributable to the operation of PNPP.

- Aquatic monitoring includes the collection and analysis of water, fish, and shoreline sediments. The 1996 analyses results for water and fish sample results showed normal background concentrations of radionuclides. The results of sediment sample analyses indicated concentrations of radioactivity similar to previous years. The average concentration of cesium-137 in the sediment was 506.09 pCi/kg, which is well within the range of up to 864 pCi/kg established since 1981.

- Direct radiation measurements showed no change from previous years. Indicator locations averaged 56.62 mrem/year and control locations averaged 54.70 mrem/year. This shows that, in 1996, radiation in the area of PNPP was the same as radiation at locations greater than 10 miles away from the Plant.

Based on these results, the 1996 operation of PNPP resulted in no significant increase in the concentrations of radionuclides in the environment.

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 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, 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 1989.

Since no *Corbicula* have ever been found at PNPP, routine *Corbicula* monitoring provides data to determine when and if this pest species will arrive in the vicinity of 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 in 1996.

HERBICIDE USE

The use of herbicides on the PNPP site is monitored. This ensures compliance with Ohio Environmental Protection Agency (OEPA) requirements and protects the site's natural areas. Based on the results of surveillances of herbicide applications on site 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 (for example, 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. Two special reports were submitted in 1996.

INTRODUCTION

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: one electron for each proton in the nucleus. Due to their dissimilar charges, the protons and electrons have a strong attraction for each other, which helps hold the atom together.

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 nonradioactive. 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, nonradioactive 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 half-life. Half-life is 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 decay within the nucleus occurs. This section includes a discussion on the three main forms of radiation produced by radioactive decay: alpha particles, beta particles, and gamma rays.

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 (one to eight centimeters 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 electrons and 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. Beta particles have a similar ionizing effect as alpha particles, but since they are smaller, faster and have less charge, they cause less concentrated damage when interacting with tissue. External beta radiation affects primarily the skin. Because of their electrical charge, beta particles can be stopped by paper, plastic or thin metals.

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.

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 curie of activity depends on the disintegration rate. For example, one gram of radium-226 is one curie of activity, but it would require about 1.5 million grams of natural uranium to equal one curie since radium-226 decays more energetically than natural uranium.

Dose

Biological damage due to alpha, beta, and gamma radiation may result from the ionization caused by these radiations. Some types of radiation, especially alpha particles, which can cause dense local ionization, can result in much more biological damage for the same energy imparted as do gamma or X rays. 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 REM (Roentgen Equivalent Man). In terms of environmental radiation, the rem is a large unit. Therefore, a smaller unit, the millirem (mrem) is often used. One millirem is equal 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 is 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 less than the LLD, it means that no radioactivity was detected and that had radioactivity been present at (or above) the stated LLD value, it statistically would have been detected. The NRC has established values for the LLDs for environmental and effluent sample analyses.

BACKGROUND RADIATION

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, 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 from sources shown in the Background Radiation Chart (Table 1) [*Source: National Council on Radiation Protection and Measurements*].

Table 1: Background Radiation Chart

Natural Sources		Man Made Sources	
Radon	55%	Medical/X-rays	11%
Cosmic	8%	Nuclear Medicine	4%
Terrestrial	8%	Consumer Products	3%
Internal	11%	Other (1)	<1%

(1) - Other includes 0.3% from occupational sources, <0.3% from fall out, <0.1% from the nuclear fuel cycle, and 0.1% from miscellaneous sources.

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
- fallout radionuclides from nuclear weapons testing, 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 1996 Sampling Program results. However, the data on these radionuclides are included in Appendix B: 1996 REMP Data.

ANNUAL EFFLUENT RELEASES

INTRODUCTION

The source of radioactive material in a nuclear power plant is fission product generation (for example, iodines, noble gases and particulates), or neutron activation of corrosion products and water (for example, cobalt and tritium, respectively). The majority of the fission products generated remain within the nuclear fuel and fuel cladding. The majority of the fission products which do escape from this 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 these radioactive materials are released as liquids, gasses and solids. PNPP was designed and is operated in a manner which controls and monitors these effluent releases. Effluents are controlled to ensure radioactivity released to the environment is minimal and does not exceed regulatory limits. Effluent 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 releases is to ensure that doses are kept As Low As Reasonably Achievable (ALARA). The ALARA principle applies to reducing radiation dose both to the individuals working at PNPP and to the general public. "Reasonably achievable" means that exposure reduction is based on sound operating practices and economic decisions. By practicing ALARA, PNPP minimizes health risks and possible environmental impact, and ensures that doses are maintained well below regulatory limits.

The liquid and gaseous radioactive waste treatment systems at PNPP are designed to collect and process the wastes in order to remove most of the radioactivity. 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 release limits. Instruments are 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. In addition, waste streams are sampled and analyzed to identify and quantify radionuclides being released. Analysis results are used with flow measurements to calculate the composition and concentrations of radionuclides in effluents.

Gaseous effluent release data is coupled with on site meteorological data in order to calculate dose to the public. In areas surrounding the plant, devices maintained for the Radiological Environmental Monitoring Program 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. This 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 nonradioactive, and shredding and compacting waste once it is identified all help to lower the volume of radioactive solid waste. Solid waste is shipped to a licensed burial site.

REGULATORY LIMITS

The Nuclear Regulatory Commission limits for liquid and gaseous effluents were incorporated into the PNPP Technical Specifications, and subsequently into (ODCM). These limits prescribe the maximum doses and dose rates due to radioactive effluents resulting from the operation of PNPP. The limits are

defined in several ways to limit the overall impact on persons living near the plant. The limits are described below. None of these limits were exceeded in 1995.

Gaseous Effluents

I. 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 for all radionuclides in particulate form with half lives greater than eight days:

Less than or equal to 1500 mrem per year to any organ.

II. 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.

III. 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, maximum permissible concentrations are not used to calculate maximum release rates for gaseous effluents.

Liquid Effluents

I. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in Title 10 of the Code of Federal Regulations (10CFR), Part 20 (Standards for Protection Against Radiation), Appendix B, Table II, 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-4 μCi/ml total activity. These values are the maximum permissible concentrations.

II. 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.

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 radioactive composition and concentration of 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 used for the liquid depends on its physical and chemical properties. It is designed to reduce the concentration of radioactive material in the liquid. Liquids are filtered to remove suspended solids, and demineralized to remove dissolved solids.

Liquid effluent releases may be required after collecting water from small leaks within the plant or to reduce the volume of stored water in plant systems. In both cases, the water is first processed through a liquid radioactive waste treatment system. Dose calculations are performed prior to discharge of this processed water to the lake to ensure regulatory compliance and that ALARA is maintained.

Error is inherent in any analytical process. Error may be due to differences in analysis results of split samples, or may be attributable to the precision limitations of instrumentation. An estimate of total error associated with different parameters is shown in Table 2.

Table 2: Error associated with liquid effluent processes

Parameter	% Error
Gamma analysis	10
Tritium analysis	8
Strontium 89/90 analysis	10
Iron-55 analysis	10
Gross alpha analysis	10
Dilution volume	31
Discharge volume	25
Liquid waste volume	1

Liquid effluents are released intermittently and are considered "batch" releases. Table 3 provides information on the number and duration of these releases for 1996.

Table 4 provides information on the nuclide composition for the liquid releases. If a radionuclide was not present at a level greater than the LLD, then the value is expressed as "less than (indicated by <), LLD". In each case, LLDs met or were below the levels required by the Technical Specifications/ODCM.

Table 3: Liquid batch releases

Item	Value
Number of batch releases	85
Total time period for batch releases (minutes)	17560
Maximum time for a batch release (minutes)	246
Average time period for a batch release (minutes)	207
Minimum time for a batch release (minutes)	1
Average stream flow during periods of release of effluent into a flowing stream (liters/minute)	1.78E+05

Table 4: Summation of all liquid effluent releases

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and activation products						
1. Total releases (not including tritium, gases, alpha)	Ci	2.42E-02	8.52E-03	1.97E-03	<LLD	1.00E+1
2. Average diluted concentration during period	µCi/ml	1.87E-08	9.22E-09	2.71E-09	<LLD	
3. Percent of applicable limit	%	<<1%	<<1%	<<1%	NA	
"NA" - This item is Not Applicable. The Technical Specifications/ODCM do not have a limit for fission and activation products.						
B. Tritium						
1. Total release	Ci	4.77E+0	2.02E+0	1.29E+0	<LLD	1.00+E1
2. Average diluted concentration during period	µCi/ml	3.69E-06	2.19E-06	1.77E-6	<LLD	
3. Percent of applicable limit	%	1.23E-1	7.29E-2	5.91E-2	NA	
C. Dissolved and entrained gases						
1. Total release	Ci	4.46E-3	7.30E-5	2.75E-05	<LLD	1.00E+1
2. Average diluted concentration during period	µCi/ml	3.45E-9	7.89E-11	3.78E-11	<LLD	
3. Percent of applicable limit	%	1.72E-3	3.95E-5	1.89E-5	NA	
D. Gross alpha radioactivity						
1. Total release	Ci	7.03E-05	2.10E-04	<LLD	<LLD	1.00E+1
E. Volume of waste released (prior to dilution)	liters	5.40+06	2.70E+6	2.21E+6	0.00E00	1.00E+0
F. Volume of dilution water used during period	liters	1.29E+9	9.25E+8	7.28E+8	NA	2.80E+1

The total number of curies of each nuclide present in liquid effluent releases for each quarter are shown in Table 5.

Table 5: Nuclide composition of liquid effluents

Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
tritium	Ci	4.77E+00	2.02E+00	1.29E+00	<LLD
chromium-51	Ci	3.30E-03	1.06E-03	<LLD	<LLD
manganese-54	Ci	6.00E-04	1.19E-04	1.76E-05	<LLD
iron-55	Ci	<LLD	5.30E-04	2.19E-04	<LLD
cobalt-58	Ci	7.22E-04	4.37E-05	<LLD	<LLD
cobalt-60	Ci	3.93E-03	1.29E-03	3.26E-04	<LLD
zinc-65	Ci	1.30E-02	4.60E-03	1.33E-03	<LLD
strontium-89	Ci	4.31E-05	2.87E-05	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
strontium-92	Ci	<LLD	3.89E-05	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	3.30E-05	<LLD	<LLD	<LLD
iodine-131	Ci	9.03E-05	<LLD	<LLD	<LLD
iodine-133	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	3.57E-03	7.30E-05	<LLD	<LLD
xenon-133m	Ci	1.16E-04	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	7.30E-06	<LLD	<LLD
xenon-135	Ci	7.68E-04	<LLD	<LLD	<LLD
cesium-137	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	2.29E-03	6.53E-04	7.96E-05	<LLD
cerium-141	Ci	1.26E-04	1.83E-05	5.79E-06	<LLD
Total for period	Ci	4.79E+00	2.03E+00	1.29E+00	<LLD

Gaseous Effluents

Gaseous effluents are made up of noble gases, iodines and particulates. The noble 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 from one of four effluent vents. Each of the four effluent vents contains radiation detectors that continuously monitor the air to ensure that radioactivity release levels are well below regulatory limits. Samples are also collected and analyzed on a routine basis to ensure regulatory compliance and that ALARA is maintained. All gaseous effluent released from PNPP are considered continuous and at ground level.

A small amount of error is inherent in any analytical process. Error may be due to differences in analysis results of split samples, or may be attributable to the precision limitations of instrumentation. An estimate of total error associated with different parameters is shown in Table 6.

Table 6: Error associated with gaseous effluent processes

Parameter	% Error
Noble gas analysis	11
Partic[illegible]te analysis	9
Iodine analysis	12
Tritium analysis	8
Strontium-89/90 analysis	10
Gross alpha analysis	10
Sample flow rate	4
Effluent flow rate	4

If a radionuclide was not present at a level greater than the LLD, then the value is expressed as "less than (indicated by <), LLD". In all cases, the LLDs met or were below the levels required by the Technical Specifications/ODCM. A summation of all gaseous releases is given in Table 7. The nuclide composition of gaseous effluents is given in Table 8.

Table 7: Summation of all gaseous effluent releases

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and activation gases						
1. Total release	Ci	6.20E+1	3.13E+1	9.33E+0	9.46E+0	1.00E+1
2. Average release rate for period	µCi/sec	7.89E+0	3.89E+0	1.17E+0	1.19E+0	
3. Percent of Technical Specification limit	%	NA	NA	NA	NA	

"NA" - This item is Not Applicable. The Technical Specifications/ODCM do not have a limit for fission and activation products.

B. Iodines						
1. Total Iodine-131	Ci	3.14E-03	1.70E-03	1.76E-03	1.58E-03	1.00E+1
2. Average release rate for period	µCi/sec	4.00E-04	2.16E-04	2.22E-04	1.98E-04	
3. Percent of Technical Specification limit	%	NA	NA	NA	NA	

"NA" - This item is Not Applicable. The Technical Specifications/ODCM do not have a limit for fission and activation products.

C. Particulates						
1. Particulates with half-lives >8 days	Ci	2.42E-03	6.41E-03	5.64E-03	5.80E-03	1.00E+1
2. Average release rate for period	µCi/sec	3.08E-04	8.15E-04	7.09E-04	7.30E-04	
3. Percent of Technical Specification limit	%	NA	NA	NA	NA	
4. Gross alpha radioactivity	Ci	<LLD	<LLD	<LLD	<LLD	

"NA" - This item is Not Applicable. The Technical Specifications/ODCM do not have a limit for fission and activation products.

D. Tritium						
1. Total release	Ci	<LLD	<LLD	<LLD	<LLD	1.00E+1
2. Average release rate for period	µCi/sec	NA	NA	NA	NA	
3. Percent of Technical Specification limit	%	NA	NA	NA	NA	

"NA" - This item is Not Applicable. The Technical Specifications/ODCM do not have a limit for fission and activation products.

Table 8: Nuclide composition of gaseous effluents - ground level release, continuous mode

Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1. Fission gases					
tritium	Ci	<LLD	<LLD	<LLD	<LLD
argon-41	Ci	<LLD	2.66E-03	<LLD	<LLD
krypton-85	Ci	4.89E-01	<LLD	<LLD	<LLD
krypton-85m	Ci	1.29E-01	1.31E-01	1.49E-01	2.68E-02
krypton-87	Ci	5.54E-03	2.72E-01	<LLD	<LLD
krypton-88	Ci	6.65E-02	2.47E-01	<LLD	<LLD
xenon-131m	Ci	<LLD	<LLD	3.04E-01	<LLD
xenon-133	Ci	3.46E+01	1.53E+01	3.60E+00	1.91E+00
xenon-133m	Ci	7.63E-01	1.51E-01	1.34E-01	5.45E-02
xenon-135	Ci	1.87E+01	4.32E+00	2.80E+00	2.19E+00
xenon-135m	Ci	7.03E+00	8.56E+00	2.33E+00	5.22E+00
xenon-137	Ci	<LLD	9.75E-01	<LLD	<LLD
xenon-138	Ci	2.31E-01	1.33E+00	1.99E-02	6.08E-02
Total for period	Ci	6.20E+01	3.13E+01	9.33E+00	9.46E+00
2. Iodines					
iodine-131	Ci	3.14E-03	1.70E-03	1.76E-03	1.58E-03
iodine-132	Ci	2.86E-05	4.90E-04	6.04E-04	4.69E-04
iodine-133	Ci	1.32E-03	3.41E-03	4.35E-03	3.92E-03
iodine-134	Ci	1.57E-05	4.97E-04	5.31E-04	4.13E-04
iodine-135	Ci	3.04E-04	2.59E-03	3.26E-03	3.10E-03
Total for period	Ci	4.81E-03	8.68E-03	1.05E-02	9.48E-03
3. Particulates					
manganese-56	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-56	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	3.97E-06	6.52E-06	<LLD	<LLD
rubidium-88	Ci	<LLD	8.86E-06	<LLD	<LLD
rubidium-89	Ci	<LLD	1.83E-04	<LLD	<LLD
strontium-89	Ci	5.84E-05	5.79E-05	5.33E-05	9.37E-05
strontium-90	Ci	5.00E-07	<LLD	<LLD	6.84E-08
strontium-91	Ci	8.64E-05	3.75E-04	2.73E-04	1.83E-04
yttrium-91m	Ci	<LLD	<LLD	2.82E-05	<LLD
strontium-92	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	1.49E-05	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
technetium-104	Ci	<LLD	<LLD	<LLD	<LLD
cesium-138	Ci	8.28E-04	1.34E-03	2.32E-03	2.54E-03
barium-139	Ci	1.26E-03	3.46E-03	2.94E-03	2.97E-03
barium-140	Ci	7.02E-05	8.37E-04	<LLD	<LLD
lanthanum-140	Ci	1.00E-04	1.43E-04	1.71E-05	1.49E-05
Total for period	Ci	2.42E-03	6.41E-03	5.64E-03	5.80E-03

Solid Waste

Thirty one shipments of radioactive waste were transported from PNPP for disposal in 1996. Shipments were delivered to the Barnwell, South Carolina and to Clive, Utah facilities. In addition, PNPP waste was sent to the Barnwell disposal facility from Scientific Ecology Group in Oak Ridge, Tennessee, and from Alaron in Wampum, Pennsylvania as partial shipments in conjunction with other utilities. The waste total in Table 9 below includes these shipments from Scientific Ecology Group and Alaron. No irradiated fuel was transported from PNPP in 1996.

Table 9: Solid waste and irradiated fuel shipments

1. Solid waste shipped off site for burial or disposal

Type of Waste	Unit	Annual Value	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	87.4	± 25
	Ci	795.0	
b. Dry compressible waste, contaminated equipment, etc.	m^3	59.9	± 25
	Ci	2.9	
c. Irradiated components, control rods, etc.	m^3	0	± 25
	Ci	0	
d. Other (describe) Emergency Service Water Sediment	m^3	78.1	± 25
	Ci	7.0 E-5	

2. Estimate of major nuclide composition (by type of waste)

Type of Waste	Radionuclide	%	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	Fe-55	12.4	
	Co-60	26.3	
	Zn-65	51.1	± 25
	Cs-137	2.7	
	Mn-54	3.2	
	Cs-134	2.5	
b. Dry compressible waste, contaminated equipment, etc.	Co-60	32.2	
	Fe-55	58.2	
	Zn-65	6.7	± 25
	Mn-54	1.5	
	Cs-137	1.0	
	Ni-63	1.0	
c. Irradiated components, control rods, etc.	None		
d. Other (describe) Emergency Service Water Sediment	Co-60	58.0	
	Zn-65	18.2	± 25
	Cs-137	23.8	

3. Solid waste disposition

Number of Shipments (1)	Mode of Transportation	Destination
26	Truck	Barnwell, South Carolina
5	Truck	Clive, Utah

(1) Additional shipments were made combined with waste from other utilities from Scientific Ecology Group in Oak Ridge, Tennessee and Alaron in Wampum, Pennsylvania.

4. Irradiated fuel shipments (Disposition)

Number of Shipments	Mode of Transportation	Destination
0	N/A	N/A

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 instrumentation into the Meteorological Data Processing System. This system compiles the data and calculates a variety of atmospheric parameters, communicates with the Meteorological Information Dose Assessment System, and sends data over communication links to the plant control room.

All meteorological data is maintained at PNPP and is available upon request.

DOSE ASSESSMENT

The maximum concentration for any radioactive release is controlled by the limits set forth in the Code of Federal Regulations, Title 10 Part 20 (10CFR20). Compliance with these concentration limits is ensured by sampling, analyzing, processing, and monitoring the effluent stream. 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 this area is over Lake Erie, which has no permanent residents. The second calculation is performed considering only the areas around the plant that are not over Lake Erie (land based meteorological sectors), in which people reside. Tables 10 and 11 provide the calculated hypothetical maximum site boundary dose values to either the total body or worst case organ considering all meteorological sectors. Table 12 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 dose calculations.

Table 10: 1996 Site boundary dose to maximum individual considering all sectors

Effluent	Organ	Estimated dose (mrem)	Limit	% of limit
Liquid	Total body	9.07E-03	3.0E+0	3.00E-01
Liquid	Liver	1.77E-02	1.0E+1	1.77E-01
Noble gas - gamma	NA	4.29E-03	1.0E+1	4.29E-02
Noble gas - beta	NA	4.08E-03	2.0E+1	2.04E-02
Noble gas	Total body	2.59E-03	5.0E+0	5.18E-02
Noble gas	Skin	5.40E-03	1.5E+1	3.60E-02
Iodine & particulates	Thyroid	5.99E-02	1.5E+1	3.990E-01

Table 11: 1996 Population dose considering all sectors

Effluent	Organ	Estimated Population Dose (person-rem)
Liquid	Total body	5.90E-01
Liquid	Thyroid	6.30E-02
Gaseous	Total body	1.80E-03
Gaseous	Thyroid	2.00E-02

Table 12: 1996 Site boundary dose to maximum individual considering sectors on land

Effluent	Organ	Estimated dose (mrem)	Limit	% of limit
Liquid	Total body	9.07E-03	3.0E+0	3.00E-01
Liquid	Liver	1.77E-02	1.0E+1	1.77E-01
Noble gas - gamma	NA	2.21E-03	1.0E+1	2.21E-02
Noble gas - beta	NA	2.70E-03	2.0E+1	1.35E-02
Noble gas	Total body	1.37E-03	5.0E+0	2.74E-02
Noble gas	Skin	3.25E-03	1.5E+1	2.17E-02
Iodine & particulates	Thyroid	5.60E-02	1.5E+1	3.73E-01

Other dose calculations are performed for a hypothetical individual who is assumed to be on site for some specified amount of time. This person would receive the maximum dose during the time spent on site. 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 on site is to a person who is fishing on Lake Erie from the shore on PNPP property. The calculations assume that this person spends 60 hours per year fishing, and the dilution factor is 10. Ratioing this exposure pathway to doses calculated for offsite locations yields the dose values shown in Table 13, below.

Table 13: Maximum on site dose from liquid effluents

Quarter/Annual	Total Body Dose (mrem)	Organ Dose (mrem)
First Quarter	4.57E-04	5.37E-04
Second Quarter	8.32E-05	9.92E-05
Third Quarter	2.03E-05	2.36E-05
Fourth Quarter	0.00E+00	0.00E+00
Annual	5.59E-04	6.82E-04

Although several cases were evaluated to determine the highest hypothetical dose from gaseous effluents to members of the public on site (including traversing a public road within the site boundary, shoreline fishing, non-plant related training, car pooling, and job interviews), the on site activity with the highest dose potential is also shoreline fishing (assuming 60 hours per year fishing). The calculations account for this and the difference between annual average dispersion values for the on site point of concern, 6.6E-5 s/m3. The maximum on site dose values generated are shown in Table 14.

Table 14: Maximum on site dose from gaseous effluents

Quarter/Annual	Total Body Dose (mrem)	Organ Dose (mrem)
First Quarter	1.59E-04	5.59E-04
Second Quarter	7.67E-05	3.63E-03
Third Quarter	3.43E-05	2.40E-03
Fourth Quarter	4.45E-05	4.51E-04
Annual	3.10E-04	7.02E-03

Average total body dose to individual members of the public is determined by combining the dose from gaseous effluents to the population that lives within 50 miles of PNPP (2,420,000 people), with the dose from liquid effluents to the population that receives drinking water from intakes within 50 miles of PNPP (18,200,00 people). The results are shown in Table 15.

Table 15: Average individual total body dose (mrem)

Quarter/Annual	From Gaseous Effluents	From Liquid Effluents
First Quarter	3.35E-07	2.53E-04
Second Quarter	2.73E-07	5.38E-05
Third Quarter	7.02E-08	1.65E-05
Fourth Quarter	6.61E-08	0.00E+00
Annual	7.44E-07	3.24E-04

ABNORMAL RELEASES

There were no abnormal releases in 1996.

PROGRAM CHANGES AND NONCOMPLIANCES

Program Changes

The ODCM had three minor revisions made to it in 1996. The changes involved :

1. incorporation of the revised 10 CFR 20 limits for maximum-permissible-concentrations,
2. incorporation of Technical Specification Position Statements as part of the implementation of Improved Technical Specifications, and
3. removal of the radwaste low-flow discharge header flow monitor as an ODCM control item by abandonment-in-place.

A minor change was made to the Radwaste System during 1996. A pin hole leak was discovered in a weld joint on the inlet pipe to detergent drain filter 0G50D005B. Because the detergent drain filters are no longer required for radwaste operations, the filters were isolated and abandoned in-place.

Another notable change in 1996 was the implementation of "near-zero-release" at the Perry Plant. The last liquid radwaste release for 1996 took place on August 25 , there were no subsequent batch releases of liquid radwaste from the site for the remainder of 1996.

Noncompliances

There were three incidents when effluent monitoring instruments were inoperable for greater than the 30 day limit:

1. The Unit 2 Vent Flow Monitor was inoperable from 3/5/96 until 6/21/96, a total of 108 days. A loose access cover on the ventilation ductwork resulted in an apparent flow mismatch between indicated flow and the Emergency Response Information System (ERIS) computer datapoint. Once the access cover was replaced, the flow monitor was tested successfully and returned to operability.

2. The liquid radwaste-to-Emergency Service Water (ESW) monitor was inoperable from 7/19/96 until 11/27/96, a total of 131 days. This monitor has a history of problems with build-up of internal contamination, producing high monitor background readings. After returning to operable status, the monitor was not used due to the lack of batch radwaste releases.

3. The radioactive waste low flow discharge header flow monitor was inoperable for most of 1996, a total of 343 days (1/1/96 to 12/9/96). This monitor has never been used for a liquid radwaste release from the site. Removing it from operation was accomplished in 1996 by abandoning the monitor in-place in accordance with plant procedures. This change was also incorporated into the ODCM.

Corrections to 1995 Data

There were no corrections to the 1995 data.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

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. REMP requirements were established by the Nuclear Regulatory Commission (NRC).

A wide variety of samples is 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 Environmental 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. Precipitation and soil were added in 1985. Although these last two media were not required by the NRC, they were incorporated into the program to establish baseline data. In 1993, feed/silage sampling was dropped from the program based on the past ten years 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. The precipitation sample sites remain available if future samples are desired. Also in 1995, the frequency for collecting soil samples was changed from quarterly to biannually.

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 16 and Figures 1, 2 and 3 identify the PNPP REMP sampling locations.

Many REMP samples are collected in addition to those required by the PNPP Technical Specification / ODCM. In some cases (soil, for example), the sample type is not required to be collected at all. In other cases (air sampling and direct radiation monitoring, for example), the PNPP REMP includes more locations than are required. The Technical Specifications/ODCM requirements for each sample type are discussed in more detail below. Sample types and locations that are required by the Technical Specification / ODCM are shown in **BOLD** in Table 16.

Table 16: REMP sampling locations

#	Description	Miles	Direction	Media(1)
1	Haines Rd.	3.4	ENE	TLD, AIR
2	Site Boundary	0.7	E	TLD
3	Meteorological Tower	1.0	SE	TLD, AIR, SOIL
4	Site Boundary	0.7	S	TLD, AIR, SOIL
5	Quincy Substation	0.6	SW	TLD, AIR
6	Concord Service Center	11.0	SSW	TLD, AIR, SOIL, VG
7	Site Boundary	0.6	NE	TLD, AIR, SOIL, VG
8	Site Boundary	0.8	E	TLD
9	Site Boundary	0.7	ESE	TLD, SOIL
10	Parmly Rd.	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 Substation	5.1	ESE	TLD
16	Dayton Rd.	5.0	SE	TLD
17	Chadwick Rd.	5.2	SSE	TLD
18	Blair Rd.	5.0	S	TLD
19	Lane Rd.	5.3	SSW	TLD
20	Nursery Rd.	5.3	SW	TLD
21	Hardy Rd.	5.1	WSW	TLD
22	Main St.	6.9	SW	TLD
23	High St.	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, AIR, SOIL, VG
36	Lake County Water Plant	3.9	WSW	TLD, WATER
37	Gerlica Farm	1.5	ENE	FOOD PRODUCTS
41	Clark Rd.	1.1	SW	TLD
42	Parmly Rd.	0.8	S	TLD, VG
43	Parmly Rd.	1.0	SSE	TLD
45	Clark Rd.	0.9	SSW	TLD
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

#	Description	Miles	Direction	Media(1)
60	Lake Shoreline at Perry Park	1.0	WSW	WATER
61	Keller Milk Farm	7.4	SE	MILK
62	**Shreve Farm**	**1.2**	**ENE**	**FOOD PRODUCTS**
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
77	**Orosz Farm**	**1.2**	**E**	**FOOD PRODUCTS**

(1) AIR = Air Iodine and Particulate VG = Vegetation
TLD = Thermoluminescent Dosimeters

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.

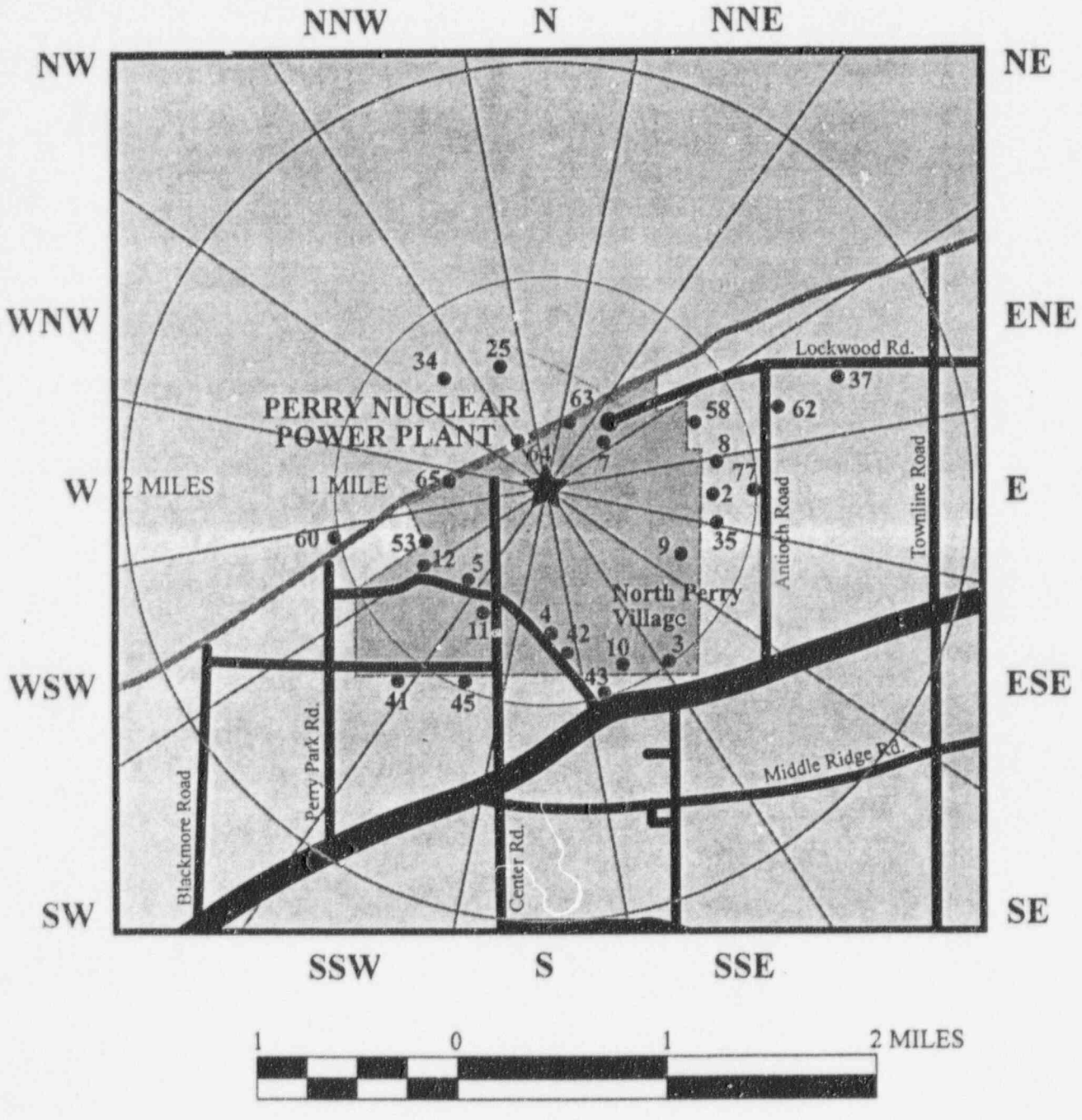
Gross beta analysis measures the total amount of beta emitting radioactivity present in a sample. Beta radiation may be released by many different radionuclides. Since beta decay results in a continuous energy spectrum rather than the discrete energy levels or "peaks" associated with gamma radiation,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

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

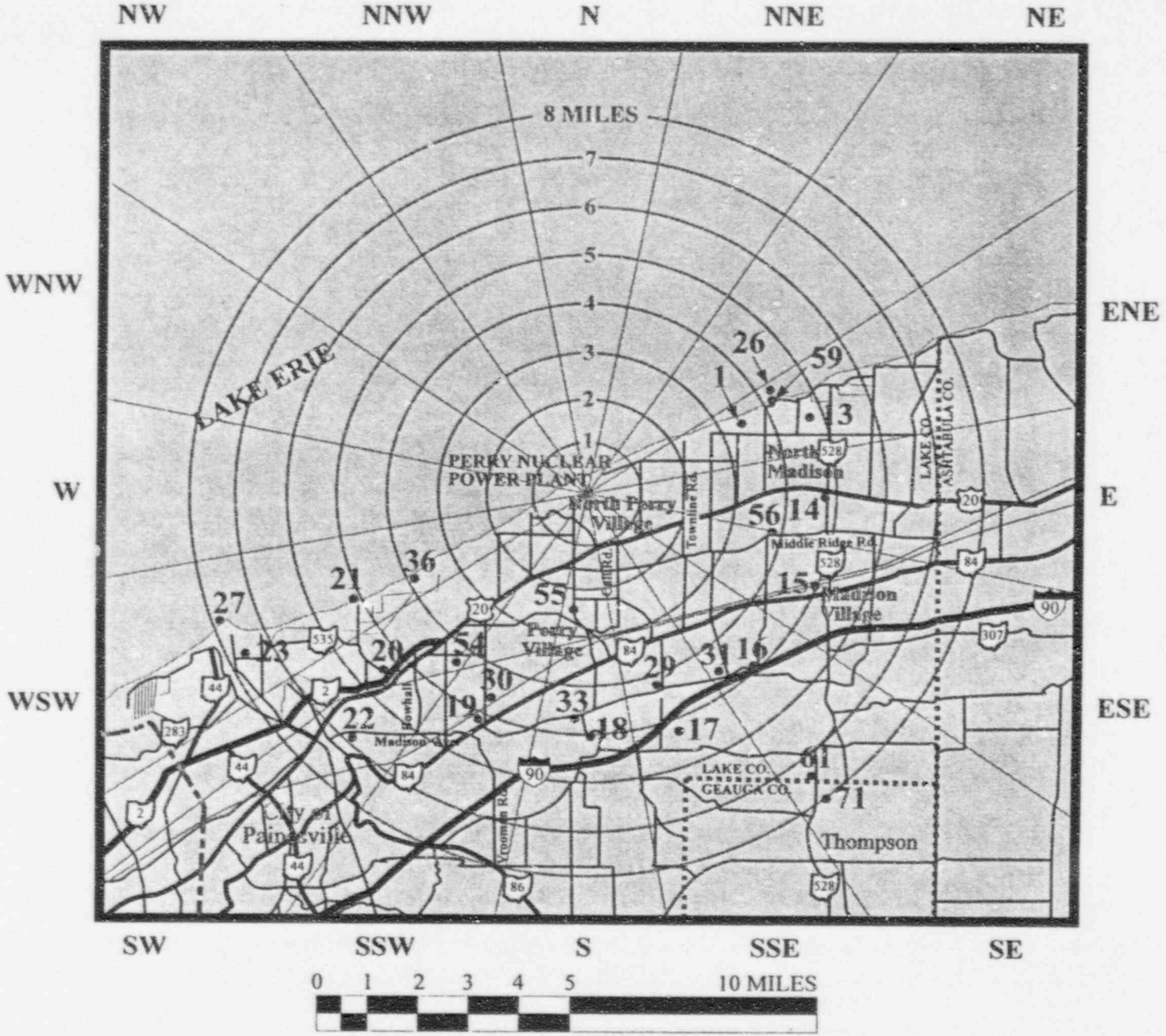
Iodine analysis measures the amount of radioactive iodine present in a sample. Some media (for example, air sample charcoal cartridges) are analyzed directly. With other media (for example, milk), iodine is extracted by chemical separation.

Tritium 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.

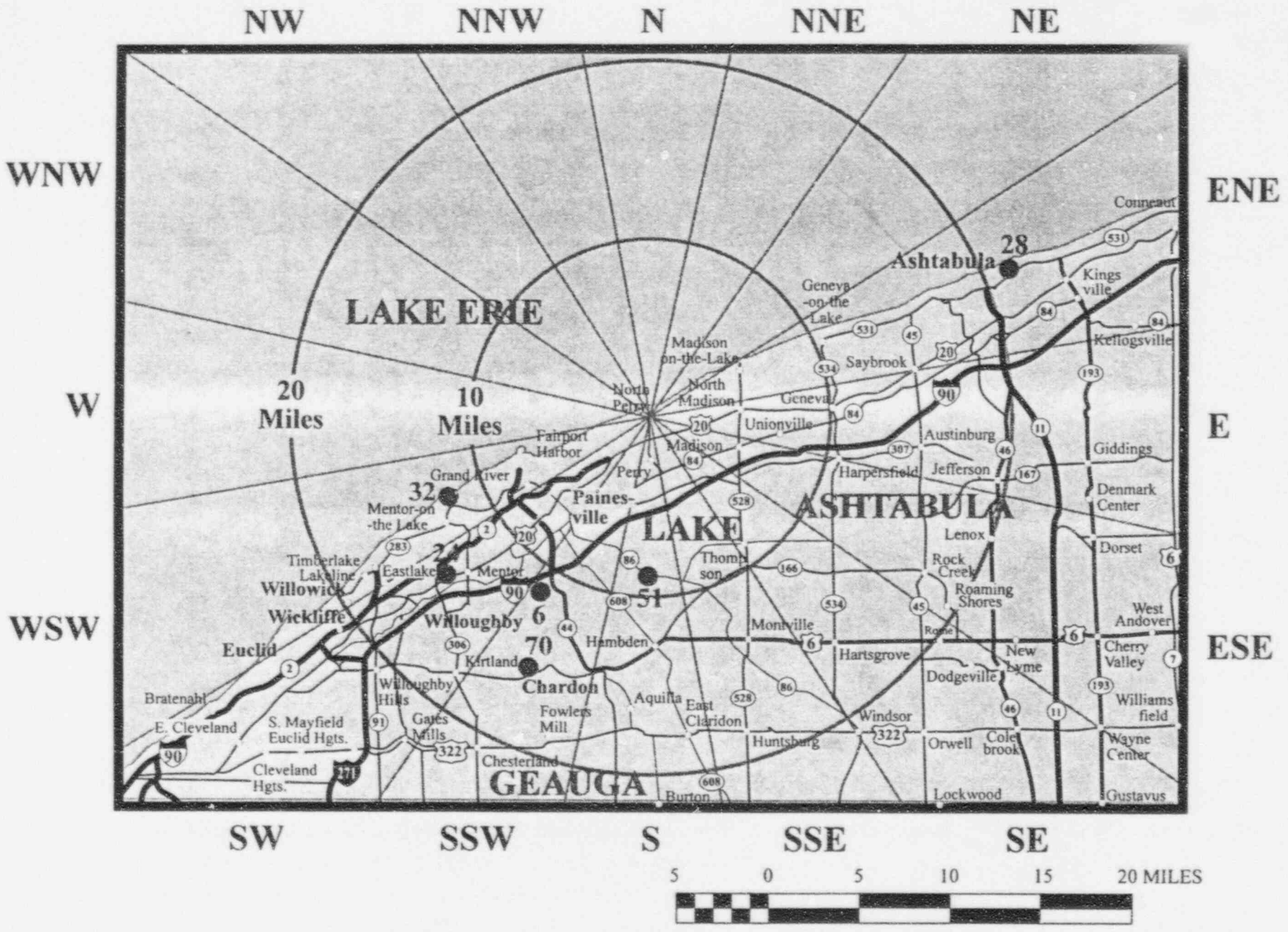
Gamma doses received by ThermoLuminescent Dosimeters (TLD) while in the field are determined by a special laboratory procedure. Thermoluminescence is a process by which ionizing radiation interacts with the sensitive phosphor material in the TLD. Energy is trapped in the TLD material and can be stored for months or years. This 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.



REMP sampling locations within two miles of the plant site.



REMP sampling locations between two and eight miles from the plant site.



REMP sampling locations greater than eight miles from the plant site.

Table 17 provides a list of the analyses performed on environmental samples collected for the PNPP REMP in 1996.

Table 17: Analyses performed on REMP samples.

Sample Type	Frequency	Analyses Performed
Atmospheric Monitoring		
Airborne Particulates	Weekly	Gross Beta
	Quarterly	Gamma Spectral
Airborne Radioiodine	Weekly	Iodine-131
Terrestrial Monitoring		
Milk	Bi/Monthly	Gamma Spectral, Iodine-131
Food Products	Monthly	Gamma Spectral
Vegetation	Monthly	Gamma Spectral
Soil	Biannually	Gamma Spectral
Aquatic Monitoring		
Water	Monthly	Gross Beta, Gamma Spectral
	Quarterly	Tritium
Fish	Biannually	Gamma Spectral
Sediment	Biannually	Gamma Spectral
Direct Radiation Monitoring		
TLD	Quarterly	Gamma Dose
	Annually	Gamma Dose

Sample results are often reported as below the Lower Limit of Detection (LLD). The LLD is 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 less than the LLD, it means that no radioactivity was detected and that had radioactivity been present at (or above) the stated LLD value, it statistically would have been detected. The NRC has established the values for the LLDs for REMP sample analyses. The vendor laboratory was able to comply with those values in 1996.

1996 SAMPLING PROGRAM

The contribution of radionuclides to the environment resulting from the operation of PNPP is assessed by comparing results from the 1996 program with preoperational 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: 1996 REMP Data Summary and Appendix B: 1996 REMP Data, for detailed results. The NRC requires special reporting if sample analysis results exceed set limits. No values exceeded these reporting levels in 1996.

Program Changes

The following program change occurred in 1996.

January The precipitation samples were removed from the REMP sampling program. These samples were not required. However, the precipitation sampling sites remain available if future samples are desired.

Missed Samples

On occasion, samples cannot be collected. This can be due to a variety of events, including equipment malfunction, animal husbandry practices, lost shipments, or vandalism. Table 18 provides information on samples missed in 1996.

Table 18: Missed REMP samples, 1996

Media	Location	Date	Reason Missed
Food Products	All	Apr. - Aug.	Vegetables not ready for harvest
Grass	All	Apr.	Insufficient growth to harvest
Grass	6	Oct.	Insufficient growth to harvest
Lake Water	59, 60	Jan. Feb. Mar.	Lake shoreline covered with ice
Milk	61	Jan. Feb. Mar. Apr. Oct. Nov. Dec.	Drying period for goats (1)
TLD	9, 54	1st qtr.	Lost in the field (2)
TLD	29	2nd qtr.	Lost in the field (2)
TLD	14	3rd qtr	Lost in the field (2)
TLD	24, 42	Annual	Lost in the field (2)

(1) The drying period for goats is an annual occurrence. Goats, unlike cows, cannot produce milk all year.

(2) Missing TLDs can be the result of vandalism. At locations where vandalism has been identified as a recurring problem, the TLD is relocated. Loss of the TLDs listed above was unusual; they were not relocated as a result of this single event.

Events may also occur which prevent a sample from being collected in the normal way, or prevent a complete sample from being collected. The following is a discussion of these events for 1996.

Food — There were no food products collected during the months of April through August because the local vegetable crop was not ready to harvest.

Water — The weekly grab samples could not be collected from Locations 59 and 60 during January, February and March due to ice on the shoreline.

Grass — The grass for all of the sample locations could not be collected during April due to lack of growth. In addition, a grass sample was not collected for Location 6 during October due to the lack of growth.

Atmospheric Monitoring

AIR

Air sampling is conducted to detect any increase in the concentration of airborne radionuclides. Five locations (four indicator and one control), are required by the PNPP Technical Specifications/ODCM. Air sampling pumps are used to draw continuous samples at a rate of approximately one cubic foot per minute. The air is drawn through glass fiber filters, to collect particulates, and charcoal cartridges, to adsorb iodine. The samples are collected on a weekly basis, 52 weeks a year, from each of seven air sampling stations. Six of the 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, iodine, and by gamma spectral analysis (quarterly). A total of 364 of each type of air sample (particulate and iodine) was collected in 1996.

Gross beta activity was detected in all air samples and ranged up to 0.04 pCi/m3. The annual average concentration of gross beta 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, as shown in Figure 5.

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.

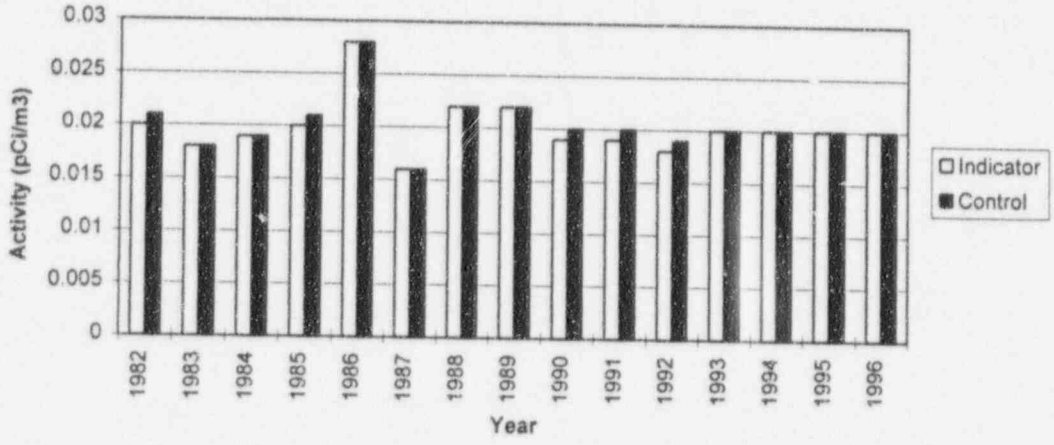


Figure 5: Annual average concentration of gross beta in air.

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 data from soil samples provides information on the deposition of radionuclides from the atmosphere. Neither vegetation nor soil samples are required by the PNPP Technical Specifications/ODCM.

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 milk locations (two within five miles of the plant, and one control). Since the milk sampling locations did not meet the requirements of the Technical Specifications/ODCM, food product sampling (discussed below) was performed. Milk was collected from the available locations even though they did not meet the Technical Specifications/ODCM requirements. If new locations that meet the Technical Specification / ODCM requirements are identified in the future, they will be added to the program.

Milk samples are analyzed for iodine and by gamma spectral analysis. A total of 49 milk samples were collected in 1996. 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 three farms in the vicinity of PNPP. The control location for food products is 16.2 miles from PNPP.

A total of 19 food product samples were collected in 1996 and analyzed by gamma spectral analysis. Seven food products were collected, including cabbage, broccoli, cauliflower, chinese cabbage, beet greens, red cabbage and turnip greens. Beryllium-7 and potassium-40, naturally occurring radionuclides, were found in several samples, as expected. No other radionuclides were detected above the LLDs.

VEGETATION

Vegetation (grass) was collected monthly during the growing season from four locations (three indicator and one control) in 1996. Grass is clipped from open areas using standard lawn trimming equipment. The control location for vegetation is eleven miles away. A total of 23 grass samples were collected in 1996 and analyzed by gamma spectral analysis. Two naturally occurring radionuclides were detected: beryllium-7 and potassium-40. No other radionuclides were detected above the LLDs.

SOIL

Soil samples are collected biannually from seven locations (six locations and one control). The control location is eleven miles away. Only the top inch of soil is sampled in an effort to identify possible trends in the local environmental radionuclide concentrations.

Fourteen soil samples were collected in 1996 and analyzed by gamma spectral analysis. One naturally occurring radionuclide, potassium-40 was detected in the samples, as expected. Cesium-137 activity was detected in all samples and ranged from 54.89 - 356.95 pCi/kg. The annual average concentration of cesium-137 was 243.07pCi/kg at the indicator locations and 145.62 pCi/kg at the control location. For all sample sites, the annual average concentrations were similar to those measured in previous years (Figure 6). The downward trend apparent in the figure represents the decrease in cesium-137 deposition from atmospheric weapons testing in the 1960's and '70's.

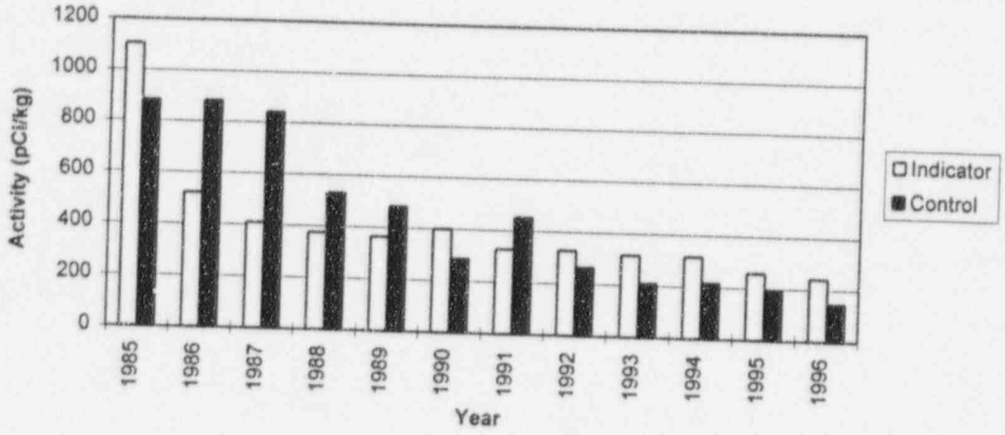


Figure 6: Annual average concentration of cesium-137 in soil

The difference between indicator and control location results is not surprising since the presence of radionuclides in soil is so dependent on site-specific factors such as soil type and drainage. These factors determine the ability of the soil to attract ions. For example, differences in soil types at the six indicator locations in 1996 resulted in cesium-137 concentrations ranging from 54.89 pCi/kg to 365.95 pCi/kg.

Aquatic Monitoring

Radionuclides may be present in Lake Erie from many sources (other than PNPP) including 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. Internal exposure can occur from ingestion of radionuclides, either directly from drinking the water, or as a result of the transfer of radionuclides through the aquatic food chain to 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 Technical Specifications/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 removed 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-four water samples were collected and analyzed for gross beta activity and by gamma spectral analysis in 1996. From these, monthly samples were composited into quarterly samples and analyzed for tritium. Gross beta activity was detected in all samples collected and ranged from 1.56 - 4.40 pCi/l. The annual average concentration of gross beta was 2.56 pCi/l at the indicator locations and 2.49 pCi/l at the control location. For all sample locations, the annual average concentrations were similar to those measured in previous years (Figure 7).

The significant difference between 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.

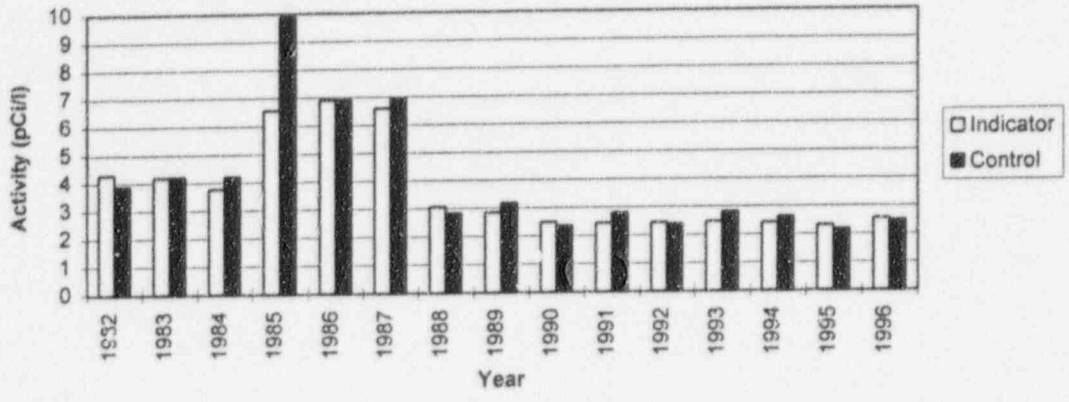


Figure 7: Annual average concentration of gross beta in water

No radionuclides were detected by gamma spectral analysis above the LLD. Tritium was not detected in any of the 18 samples above the LLD. These results are well within the range of those measured in previous years which have ranged from below the lower limit of detection to 2,200 pCi/l.

SEDIMENT

Sampling lake bottom sediments can provide an indication of the accumulation of undissolved radionuclides which may lead to internal exposure to humans through the ingestion of fish, through resuspension into drinking water, or as an external radiation source from shoreline exposure to fishermen and swimmers. Although only one location is required by the PNPP Technical Specification / ODCM, sediment is sampled twice each year from seven locations, two of which are also fish sampling locations. Sediment samples from offshore are collected using a hand dredge. Near shore samples are collected using a scoop. Fourteen sediment samples were collected in 1996 and analyzed by gamma spectrometry. The predominant radionuclide detected by gamma spectral analysis was potassium-40, which is naturally occurring. Potassium-40 has been detected in all samples since the program began in 1981. Cesium-137 was detected in eight samples and ranged from 87.02 - 1,254.30 pCi/kg. The annual average concentration was 367.97 pCi/kg at the indicator locations and 920.46 pCi/kg at the control location. These are within the range of concentrations measured in previous years (Figure 8).

The changes in cesium-137 concentration from year to year may be related to the movement of sediment on the lake bottom. Wave action and currents can cause significant sediment movement between sample collections. For this reason, it is unlikely the same bed of sediment is sampled at each collection. This would contribute to inconsistent data, as Figure 8 demonstrates.

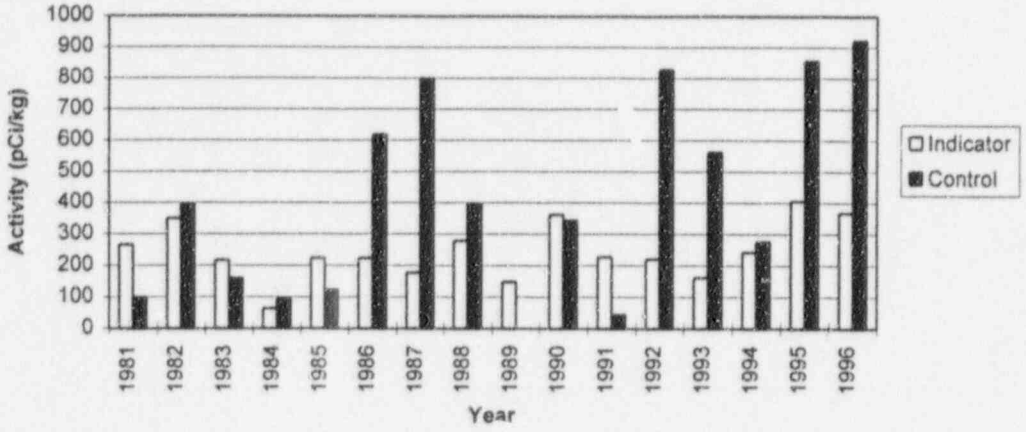


Figure 8: Annual average concentration of cesium-137 in sediment

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 Technical Specifications/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.

Twenty-five fish samples were collected in 1996 and analyzed by gamma spectral analysis. Eleven species of fish were represented, including walleye, drum, smallmouth bass, carp, white sucker, white perch, yellow perch, redhorse sucker, white bass, catfish, and gizzard shad. As expected, naturally occurring potassium-40 was found in all samples. No other radionuclides were detected above the LLD.

Direct Radiation Monitoring

THERMOLUMINESCENT DOSIMETERS

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. Control locations are over ten miles from the plant in the two least prevalent wind directions. Each location is equipped with three TLDs. Two are changed quarterly and one is changed annually.

A total of 246 TLDs were collected and analyzed in 1996. This includes 218 collected on a quarterly basis, and 28 collected annually. In 1996, the annual average dose for all indicator locations was 56.62 mR, and 54.70 mR for all control locations. The TLD results are higher prior to 1988 due to a change in vendor laboratory services. A comprehensive explanation of the difference is provided in the 1988 Annual Environmental Operating Report.

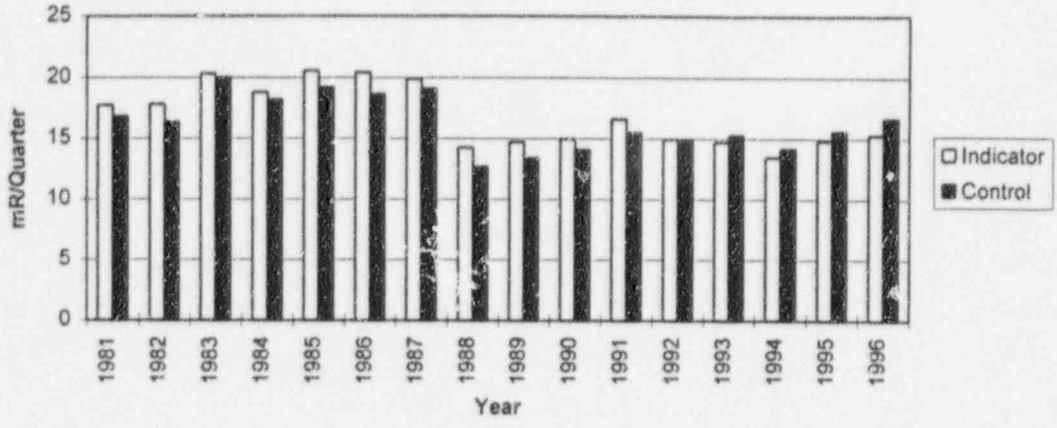


Figure 9: Average dose per quarter

INTERLABORATORY COMPARISON PROGRAM

The purpose of the Interlaboratory Cross-Check Comparison Program 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 (EPA values) are then compared to the vendor results. Results consistently outside established acceptance criteria indicate a need to check instruments or procedures.

In 1996, the vendor laboratory analyzed 32 samples of water for this program. All results were within the acceptable range. The results of this program are shown in Table 19. Results are expressed in pCi/l.

In addition to their participation in the EPA Interlaboratory Comparison Program, the vendor laboratory periodically conducts an internal cross-check program for dosimeters. No dosimeters were submitted for cross-check in 1996.

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. The quantity is not known by the sample analyst). Table 20 shows the results of this program for 1996. No samples were outside the acceptable range. All results are expressed in pCi/l except air filter results, which are in pCi/filter.

Table 19: 1996 EPA Cross-Check Intercomparison Program results.

Date	Sample Type	Analysis	Vendor Result	EPA Value	Acceptable Range
Jan.	Water	Gross Alpha	19.6 ± 1,5	12.1 ± 5.0	3.4 - 20 8
		Gross Beta	7.9 ± 0.7	7.0 ± 5.0	(15.7
Feb.	Water	I-131	70.7 ± 1.5	67.0 ± 7.0	54.9 - 79.1
Mar.	Water	H-3	22,776.7 ± 185.0	22,002.0 ± 2,200	18,185.1 - 25,818 9
Apr..	Water	Gross Alpha	63.8 ± 2.4	74.8 ± 18.7	42.4 - 107.2
		Ra-226	2.9 ± 0.1	3.0 ± 0.5	2.1 - 3.9
		Ra-228	4.6 ± 0.2	5.0 ± 1.3	2.7 - 7.3
		Uranium	57.9 ± 0.5	58.4 ± 5.8	48.3 - 68.5

		Co-60	32.7 ± 0.6	31.0 ± 5.0	22.3 - 39.7
		Cs-134	43.0 ± 1.0	46.0 ± 5.0	37.3 - 54.7
		Cs-137	52.3 ± 2.1	50.0 ± 5.0	41.3 - 58.7
		Gross Beta	154.9 ± 6.8	166.9 ± 25.0	123.5 - 210.3
		Sr-89	42.0 ± 3.6	43.0 ± 5.0	34.3 - 51.7
		Sr-90	15.3 ± 2.9	16.0 ± 5.0	7.3 - 24.7
Jun.	Water	Ba-133	745.0 ± 19.5	745.0 ± 75.0	614.9 - 875.1
		Co-60	97.0 ± 3.6	99.0 ± 5.0	90.3 - 107.7
		Cs-134	72.3 ± 1.2	79.0 ± 5.0	70.3 - 87.7
		Cs-137	201.3 ± 2.3	197.0 ± 10.0	179.7 - 214.3
		Zn-65	298.0 ± 6.2	300.0 ± 30.0	248.0 - 352.0
		Ra-226	4.8 ± 0.1	4.9 ± 0.7	3.7 - 6.1
		Ra-228	8.7 ± 0.5	9.0 ± 2.3	5.0 - 13.0
		Uranium	20.4 ± 0.8	20.2 ± 3.0	15.0 - 25.4
Jul.	Water	Sr-89	24.0 ± 2.0	25.0 ± 5.0	16.3 - 33.7
		Sr-90	11.3 ± 1.2	12.0 ± 5.0	3.3 - 20.7
		Gross Alpha	20.1 ± 2.0	24.4 ± 6.1	13.8 - 35.0
		Gross Beta	40.4 ± 3.2	44.8 ± 5.0	36.1 - 53.5
Sep.	Water	Ra-226	13.6 ± 0.4	14.0 ± 2.1	10.4 - 17.6
		Ra-228	5.4 ± 0.4	4.7 ± 1.2	2.6 - 6.8
		Uranium	10.0 ± 0.2	10.1 ± 3.0	4.9 - 15.3
Oct.	Water	I-131	26.7 ± 2.3	27.0 ± 6.0	16.6 - 37.4
		Gross Alpha	10.2 ± 2.1	10.3 ± 5.0	1.6 - 19.0
		Bross Beta	32.0 ± 1.6	34.6 ± 5.0	25.9 - 43.3

CONCLUSION

No unusual radionuclide concentrations or exposure levels were detected during 1996. 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 soil 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.

There was no significant change in radionuclide concentrations at indicator locations for aquatic samples in 1996. Cesium-137 was detected in sediment. Results were within the range of past data.

Finally, direct radiation measurements are consistent with past data.

Table 20: 1995 Vendor "spiked" sample results

Date	Sample	Analysis	Result	Known Value	Acceptable Range
Feb.	Charcoal Canister	I-131	0.3 ± 0.0	0.3	0.2 - 0.4
	Air Filter	Cs-137	2.2 ± 0.0	1.9	1.1 - 2.7
	Air Filter	Gross Beta	6.8 ± 0.0	8.0	0.0 - 18.0
	Water	I-131	86.2 ± 0.7	95.9	76.7 - 115.1
	Water	I-131	96.2 ± 4.7	95.9	57.5 - 105.9
	Water	Gross Alpha	96.4 ± 6.6	82.8	41.4 - 124.2
	Water	Gross Beta	83.7 ± 3.3	85.7	75.7 - 95.7
	Water	H-3	18228.7 ± 391.3	17833.0	14266.4 - 21399.6
	Water	Co-60	231.0 ± 14.5	239.3	215.4 - 263.2
	Water	Cs-137	428.3 ± 24.1	428.3	385.5 - 471.1
	Milk	Cs-137	63.1 ± 3.2	53.5	43.5 - 63.5
	Milk	I-131	47.8 ± 0.7	48.0	36.0 - 60.0
	Milk	I-131	48.0 ± 2.9	48.0	28.8 - 58.0
	Vegetation	I-131	0.8 ± 0.0	0.8	0.5 - 1.1
Apr.	Milk	Cs-134	35.4 ± 2.5	37.1	27.1 - 47.1
	Milk	Cs-137	117.2 ± 5.4	106.6	95.9 - 117.3
	Water	C0-60	26.0 ± 3.4	23.4	13.4 - 33.4
	Water	Cs-134	36.1 ± 2.9	37.1	27.1 - 47.1
	Water	Cs-137	117.1 ± 6.4	106.6	95.9 - 117.3
	Water	Gross Alpha	76.9 ± 6.1	82.8	41.4 - 124.2
	Water	Gross Beta	132.3 ± 5.0	136.8	123.1 - 150.5
	Water	H-3	17538.9 ± 354.1	17937.0	14349.6 - 21524.4
	Water	I-129	15.7 ± 1.4	14.9	2.9 - 26.9
	Water	Fe-55	1.2 ± 0.5	1.1	0.0 - 21.1
	Water	Tc-99	70.5 ± 7.9	66.0	46.2 - 85.8
	Water	Am-241	77.4 ± 0.4	82.8	49.7 - 115.9
	Water	Cm-244	37.9 ± 1.7	36.4	21.8 - 51.0
	Water	Th-230	41.6 ± 1.9	45.0	27.0 - 63.0
	Water	U-238	46.2 ± 2.0	45.4	31.8 - 59.0
May	Fish	Cs-137	0.1 ± 0.0	0.1	0.1 - 0.1
	Water	I-131	23.9 ± 0.8	25.3	13.3 - 37.3
	Milk	I-131	23.5 ± 0.5	25.3	13.3 - 37.3
Jun.	Milk	Cs-134	28.1 ± 2.6	31.3	21.3 - 41.3
	Milk	Cs-137	47.0 ± 3.7	42.5	32.5 - 52.5
	Milk	I-131	39.4 ± 3.6	40.4	24.2 - 50.4
	Milk	I-131	35.7 ± 0.6	40.3	28.3 - 52.3
	Water	Gross Alpha	70.0 ± 3.6	82.7	41.4 - 124.1
	Water	Gross Beta	140.5 ± 3.2	136.1	122.5 - 149.7
Jul.	Air Filter	Cs-137	2.2 ± 0.0	1.9	1.1 - 2.7
	Water	Co-60	105.7 ± 15.4	112.6	101.3 - 123.9
	Water	Cs-134	127.1 ± 10.9	135.2	121.7 - 148.7
	Water	Cs-137	220.2 ± 20.2	211.9	190.7 - 233.1
	Milk	Cs-134	130.4 ± 11.4	135.2	121.7 - 148.7
	Milk	Cs-137	229.2 ± 21.6	211.9	190.7 - 233.1
	Water	Fe-55	2.0 ± 0.5	1.8	0.0 - 21.8
	Fish	Cs-137	0.1 ± 0.0	0.1	0.0 - 0.1
	Air Filter	Gross Beta	7.0 ± 0.0	7.8	0.0 - 17.8
Aug.	Water	H-3	49589.0 ± 589.5	51058.0	40846.4 - 61269.6

Date	Sample				
Oct.	Milk	I-131	35.0 ± 0.9	39.9	27.9 - 51.9
	Milk	Cs-134	19.5 ± 2.4	21.4	11.4 -31.4
	Milk	Cs-137	26.0 ± 3.9	24.1	14.1 - 34.1
	Milk	I-131	117.3 ± 6.4	114.1	68.5 - 125.5
	Milk	I-131	64.5 ± 14.4	79.9	63.9 - 95.8
	Water	I-131	82.2 ± 16.2	79.9	47.9 - 89.9
	Milk	I-131	235.5 ± 2.8	199.7	159.8 - 239.6
	Water	I-131	190.9 ± 14.1	199.7	119.8 - 219.7
	Milk	I-131	103.6 ± 1.5	114.1	91.3 - 136.9
	Air Filter	Gross Beta	6.0 ± 0.0	6.0	0.0 - 15.0
	Soil	Cs-134	0.2 ± 0.0	0.2	0.1 - 0.2
	Soil	Cs-137	0.5 ± 0.0	0.4	0.3 - 0.6
	Charcoal Canister	I-131	0.4 ± 0.0	0.4	0.2 - 0.5
	Charcoal Canister	I-131	0.5 ± 0.0	0.5	0.3 - 0.7
	Air Filter	Cs-137	2.1 ± 0.0	1.9	1.1 - 2.7
Nov.	Water	Co-60	42.4 ± 7.2	43.0	33.0 - 53.0
	Water	Cs-134	29.0 ± 6.6	30.1	20.1 - 40.1
	Water	Cs-137	35.1 ± 9.5	31.5	21.5 - 41.5
	Water	H-3	25383.5 ± 433.5	25075.0	20060.0 - 30090.0

(1) (2) The raw data was reviewed and found to be free of errors. The sample was repeated with similar results. An investigation was conducted to determine the cause of this deviation. No apparent cause was found for this discrepancy. It was determined the "spiked" sample was prepared improperly. Another "spiked" sample was prepared and analyzed. No further action is planned.

LAND USE CENSUS

INTRODUCTION

Each year a land use census 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. The Land Use Census is required by the PNPP Off Site Dose Calculation Manual, Section 3/4.12.2. The 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 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 1996 Census was conducted August 13 - 14.

The information has been tabulated below; garden, residence and milk animal locations are plotted on the map on page 38. Note that the W, WNW, NNW, NW N, and NNE sectors extend over Lake Erie, and therefore, were not included in the survey.

DISCUSSION AND RESULTS

In general, the predominant land use within the census area continues to be rural/agricultural.

There was one change in nearest residences within five miles of the plant in 1996. The new ENE sector residence is located at 4585 Lockwood Road at a distance of 1.0 miles from PNPP. Table 21 lists the nearest residence by sector. There were no changes to the nearest milk animal location in 1996. Information on the milk animal is shown in Table 22. There were three changes to nearest gardens recorded during the 1996 census. The new ENE sector garden is located at 4630 Lockwood Road at a distance of 1.2 miles from PNPP, the new E sector garden is located at 2656 Antioch Road at a distance of 1.2 miles from PNPP, and the new SSE sector garden is located at 3119 Parmly Road at a distance of 0.9 miles from PNPP. Table 23 lists the nearest gardens that occupy at least 500 square feet.

Table 21: Nearest residence by sector

Sector	Location Address	Miles from PNPP	X/Q Value (Sec/m3)	Map Locator #
NE	4385 Lockwood	0.8	2.17E-6	1
ENE*	4585 Lockwood	1.0	1.13E-6	2
E	2684 Antioch	1.1	6.77E-7	3
ESE	2774 Antioch	1.2	4.44E-7	4
SE	4495 N. Ridge	1.2	3.89E-7	5
SSE	3119 Parmly	0.9	1.89E-6	6
S	3121 Center	0.9	2.25E-6	7
SSW	3850 Clark	0.9	1.11E-6	8
SW	3440 Clark	1.2	4.98E-7	9
WSW	2815 Perry Park	1.0	1.72E-6	10

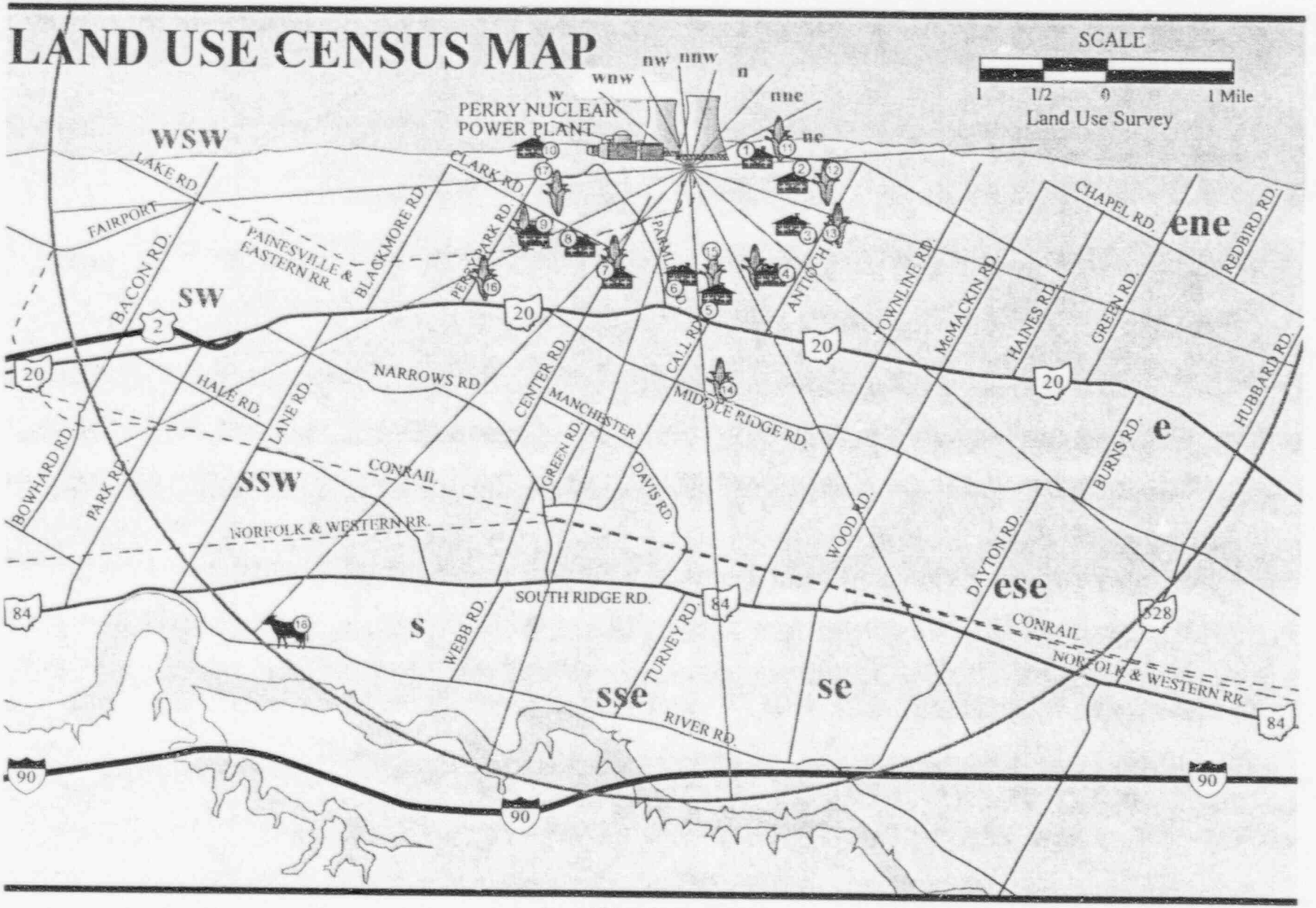
Table 22: Milk animal

Sector	Location Address	Miles from PNPP	Map Locator #
S	3588 River	4.8	18

Table 23: Nearest garden by sector

Sector	Location Address	Miles from PNPP	D/Q Value per m2	Map Locator #
NE	4398 Lockwood	0.8	1.09E-8	11
ENE*	4630 Lockwood	1.2	4.11E-9	12
E *	2656 Antioch	1.2	4.56E-9	13
ESE	2774 Antioch	1.2	3.41E-9	4
SE	4679 Middle Ridge	1.9	1.31E-9	14
SSE*	3119 Parmly	0.9	2.30E-9	15
S	3121 Center	0.9	1.31E-8	7
SSW	3515 N. Ridge	1.7	1.19E-9	16
SW	3440 Clark	1.2	2.24E-9	9
WSW	2975 Perry Park	1.2	2.31E-9	17

** - Indicates a new location for 1996.*



Land Use Census Map

CLAM/MUSSEL MONITORING

INTRODUCTION

Sampling for benthic macroinvertebrates (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 an NRC bulletin and concerns of the Atomic Safety and Licensing Board. The current monitoring is part of the Environmental Protection Plan (Operating License, Appendix B). The program consists of periodic sampling of areas at both the PNPP and Eastlake Power Plants. Its purpose is to detect *Corbicula*, should it appear in the study area.

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

Samples were collected quarterly in 1996 from the service water and emergency service water pump houses at PNPP, and semiannually from Lake Erie in the vicinity of the Eastlake Power Plant. Sample collection dates are listed in Table 24.

Table 24: 1996 Corbicula sampling dates and locations

Date	Sample Location
1/16	Service Water (SW) and Emergency Service Water (ESW) Forebays and trash baskets
4/15	SW and ESW Forebays and trash baskets
6/25	Lake Erie in the vicinity of the Eastlake Plant
7/26	SW and ESW Forebays and trash baskets
9/5	Lake Erie in the vicinity of the Eastlake Plant
10/23	SW and ESW Forebays and trash baskets
	Weekly Inspections of PNPP property shoreline, weather permitting

All samples were collected by Ponar hand dredge, hand scoop, or scraper. They were examined for bivalve shells and fragments, which were then identified to the lowest possible species.

In addition to sample collections, plant components that use raw water are inspected whenever opened for maintenance or repair. Internet environmental sites have been utilized specifically for the purpose of obtaining information on bivalves.

Results

No *Corbicula* were found in any sample collected during the 1996 monitoring program. All bivalves collected are listed in Table 25.

Table 25: Bivalves collected during the 1996 *Corbicula* monitoring program

Species/Location	PNPP	Eastlake
Ancylidoe	X	
Dreissena polymorpha	X	X
Dreissena bugensis	X	X
Gastropod	X	X
Limpets	X	X
Physacca	X	
Physa sp.	X	X
Pisidium sp.	X	
Pisidium adamsi	X	
Pisidium casertanum	X	X
Pisidium compressum	X	X
Pisidium equilaterale	X	
Pisidium ferrugineum	X	
Pisidium lilljeborgi	X	
Pisidium nitidum		X
Pisidium punctuation	X	
Pisidium subtruncatum	X	
Pisidium vanabile	X	
Sphaeridae	X	
Sphaerium corneum	X	
Sphaerium striatinum	X	
Sphaerium transversum	X	
Valvatidae	X	X

Conclusions

The collection in June 1987 was the only indication of *Corbicula* in the vicinity of PNPP. However, it has not been demonstrated that the presence of these clams is creating any operational problems at the Eastlake Power Plant or at PNPP.

DREISSENA PROGRAM

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* program began in 1989 with monitoring and testing. The current control program was designed and implemented in 1990.

Monitoring

In addition to visually inspecting plant raw water systems when they are opened for maintenance or repair, monitoring methods include the use of commercial divers, artificial substrates, sidestream monitors, and plankton nets.

Commercial divers monitor mussel infestation when they are inspecting forebays, basins, and the intake and discharge structures. They have also been used to take underwater videotapes of the water basins and intake tunnel. Artificial substrates include concrete blocks suspended by rope into the plant service water basin. The substrate is removed weekly for inspection for settlement.

Sidestream monitors are flow-through containers that receive water diverted from plant systems. PNPP used them in three in-plant locations during the mussel season, May through October. They are fitted with slides and inspected weekly for veliger settlement. A plankton net is used to obtain weekly samples of incoming service water that are subsequently examined for veligers.

Treatment

Chemicals used for mussel control in 1996 included chlorine and a commercial molluscicide. The system provides chlorine to plant service water, emergency service water, and circulating water systems. Sodium sulfite is added to plant discharge water to dechlorinate it before discharge to Lake Erie.

The use of commercial molluscicides requires approval of the Ohio Environmental Protection Agency (OEPA). The chemical selected for use at Perry Nuclear Power Plant in 1996 was didecyl dimethyl ammonium chloride. One treatment was applied near the end of the settlement period. 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. Mortality observed 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 treatments will be continued to minimize the possibility that PNPP will experience future problems due to zebra mussels.

HERBICIDE USAGE

Herbicides are used sparingly on the PNPP site. An application must be made to the PNPP Environmental Unit prior to spraying to ensure that only approved chemicals are used, and only in approved areas.

Table 26 provides a compilation of herbicide usage at the PNPP for 1996. All usage was in compliance with Ohio Environmental Protection Agency regulations. No adverse environmental impacts as a result of this usage were noted during weekly site environmental inspections. Surflan AS and Round Up were used in equal portions to make up the total quantity except where noted.

Table 26: Herbicide usage

Date Applied	Location	Acres	Gallons	Chem Conc. %
5/14/96	Perimeter E Field	2.3	100	2
5/14/96	Warehouse 6 gravel area	1	30	2
7/10/96	Protected area perimeter	6	200	2
7/10/96	Warehouse 3 gravel area	3	100	2
9/17/96	Perimeter E Field	2.3	250	2

SPECIAL REPORTS

NONCOMPLIANCES

NPDES Permit Noncompliances

The National Pollutant Discharge Elimination System, or NPDES permit, is issued by the Ohio Environmental Protection Agency (OEPA). It establishes monitoring requirements and limits for discharges from the plant. It also specifies the locations from which the plant is allowed to discharge. There was one notification made to the OEPA in 1996.

On October 14, 1996, the September NPDES Report was mailed to the OEPA as required by the NPDES Permit . This report was not received by the OEPA and a notification was mailed to PNPP. A duplicate report was generated and mailed to the OEPA on November 15, 1996. To prevent recurrence, subsequent NPDES Reports have been sent by Certified Mail.

EPP Noncompliances

The Environmental Protection Plan, or EPP, is a part of the PNPP Operating License. It requires non-radiological environmental monitoring programs and reporting. There were no EPP noncompliances identified in 1996.

UNREVIEWED ENVIRONMENTAL QUESTIONS

All proposed changes in plant design or operation, as well as tests or experiments conducted during 1996 were reviewed for potential environmental impact in accordance with the EPP and administrative quality assurance procedures. The reviews ensured that no changes were performed which could cause an adverse environmental impact. Therefore, there were no potentially significant unreviewed environmental questions in 1996.

NONROUTINE REPORTS

There was one nonroutine report in 1996.

The fourth quarter industrial waste permit, September 1996 data, identified analysis results for mercury at 2.1 ppb, which was above the limit of 2.0 ppb. A letter was mailed to the Lake County Department of Utilities on January 14, 1997 detailing the investigation conducted at PNPP. The investigation could not identify any mercury process at PNPP, coupled with a history free of mercury contamination, an error in the sampling or analysis was considered the most probable explanation.

APPENDIX A: 1996 REMP DATA SUMMARY

Air Gamma Spectral Summary Report 1996
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	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
Air	Be-7 28	N/A	0.07 28.00 / 28.00 0.05 - 0.11	0.07 24.00 / 24.00 0.05 - 0.11	5 0.60 SW	0.08 4 / 4 0.05 - 0.11	0.08 4 / 4 0.05 - 0.09
Air	Co-58 28	N/A	LLD	-	-	-	-
Air	Co-60 28	N/A	LLD	-	-	-	-
Air	Cs-134 28	0.04	LLD	-	-	-	-
Air	Cs-137 28	0.05	LLD	-	-	-	-

Air Gross Beta Summary Report 1996
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	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
Air pCi/m3	Gross Beta 364	0.01	0.02 364 / 364 0.01 - 0.04	0.02 312 / 312 0.01 - 0.04	5 0.60 SW	0.02 52 / 52 0.01 - 0.05	0.02 52 / 52 0.01 - 0.03

Air Iodine Summary Report 1996
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:		Mean of Results from All Control Locations and Number Detected/Number Collected and Range
					Location # and Distance and Direction	Mean and Number Detected/Number Collected and Range	
Air	I-131 364	0.05	LLD	-	-	-	-

Fish Gamma Spectral Summary Report 1996
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	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
Fish	Co-58 25	97.00	LLD	-	-	-	-
Fish	Co-60 25	97.00	LLD	-	-	-	-
Fish	Cs-134 25	97.00	LLD	-	-	-	-
Fish	Cs-137 25	112.00	LLD	-	-	-	-
Fish	Fe-59 25	195.00	LLD	-	-	-	-
Fish	K-40 25	N/A	2,198.26 25.00 / 25.00 1,319.70 - 2,955.40	2,322.50 11.00 / 11.00 1,693.80 - 2,955.40	25 0.60 NNW	2,766.70 2 / 11 1,693.80 - 2,955.40	1,319.70 11 / 14 1,319.70 - 2,692.70
Fish	Mn-54 25	97.00	LLD	-	-	-	-
Fish	Zn-65 25	195.00	LLD	-	-	-	-

Food Products Gamma Spectral Summary Report 1996
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	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
Food Products	Be-7 19	N/A	555.11 4.00 / 19.00 245.20 - 774.07	555.11 4.00 / 13.00 245.20 - 774.07	37 1.50 ENE	774.07 1 / 5 774.07 - 774.07	LLD /
Food Products	Co-58 19	N/A	LLD	-	-	-	-
Food Products	Co-60 19	N/A	LLD	-	-	-	-
Food Products	Cs-134 19	45.00	LLD	-	-	-	-
Food Products	Cs-137 19	60.00	LLD	-	-	-	-
Food Products	I-131 19	0.05	LLD	-	-	-	-
Food Products	K-40 19	N/A	3,200.79 19.00 / 19.00 1,430.30 - 6,340.00	3,869.08 13.00 / 13.00 1,430.30 - 6,340.00	37 1.50 ENE	5,400.00 2 / 5 1,430.30 - 6,340.00	3,960.25 14 / 6 1,650.90 - 4,628.10

Milk Gamma Spectral Summary Report 1996
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	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
Milk	Ba-140 49	45.00	LLD	-	-	-	-
Milk	Cs-134 49	11.00	LLD	-	-	-	-
Milk	Cs-137 49	13.00	LLD	-	-	-	-
Milk	K-40 49	N/A	1,497.88 49.00 / 49.00 1,157.60 - 2,128.80	1,519.01 30.00 / 30.00 1,157.60 - 2,128.80	61 7.40 SE	1,879.55 11 / 11 1,782.10 - 2,128.80	1,464.52 19 / 19 1,305.40 - 1,579.90
Milk	La-140 49	11.00	LLD	-	-	-	-

Milk Iodine Summary Report :996
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	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
Milk	I-131 49	0.75	LLD	-	-	-	-

Sediment Gamma Spectral Summary Report 1996
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	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	Co-58 14	50.00	LLD	-	-	-	-
Sediment	Co-60 14	40.00	LLD	-	-	-	-
Sediment	Cs-134 14	112.00	LLD	-	-	-	-
Sediment	Cs-137 14	135.00	506.09 8.00 / 14.00 87.02 - 1,254.30	367.97 6.00 / 12.00 87.02 - 1,054.40	32 15.80 WSW	920.46 2 / 2 -	920.46 2 / 2 586.62 - 1,254.30
Sediment	K-40 14	N/A	14,291.79 14.00 / 14.00 5,848.20 - 26,192.00	13,009.58 12.00 / 12.00 5,848.20 - 22,126.50	32 15.80 WSW	21,985.00 2 / 2 -	21,985.00 2 / 2 17,778.00 - 26,192.00

Soil Gamma Spectral Summary Report 1996
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	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
Soil	Co-58 14	300.00	LLD	-	-	-	-
Soil	Co-60 14	40.00	LLD	-	-	-	-
Soil	Cs-134 14	60.00	LLD	-	-	-	-
Soil	Cs-137 14	80.00	229.14 14.00 / 14.00 54.89 - 356.95	243.07 12.00 / 12.00 54.89 - 356.95	9 0.70 ESE	353.46 2 / 2 349.97 - 356.95	145.62 2 / 2 139.41 - 151.82
Soil	K-40 14	N/A	11,582.07 14.00 / 14.00 9,471.95 - 15,055.00	11,095.25 12.00 / 12.00 9,471.95 - 13,043.00	6 11.00 SSW	14,503.00 2 / 2 -	14,503.00 2 / 2 13,951.00 - 15,055.00

TLD Gamma Dose Summary Report 1996
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	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 TLD mrem/qtr	Direct 109	1.00	15.41 109 / 109 11.07 - 22.46	15.31 101 / 101 11.07 - 22.46	29 4.30 SSE	19.13 4 / 4 15.79 - 22.46	16.66 8 / 8 14.64 - 19.18
TLD TLB mrem/qtr	Direct 109	1.00	14.71 109 / 109 9.94 - 19.43	14.60 101 / 101 9.94 - 19.43	21 5.10 WSW	17.93 4 / 4 16.86 - 19.28	16.08 8 / 8 14.73 - 17.83
TLD TLA mrem/yr	Direct 28	1.00	56.48 28 / 28 46.42 - 72.70	56.62 26 / 26 46.42 - 72.70	29 4.30 SSE	72.70 1 / 1 72.70 - 72.70	54.70 2 / 2 51.00 - 58.41

Vegetation Gamma Spectral Summary Report 1996
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	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
Vegetation	Be-7 23	N/A	2,908.92 23.00 / 23.00 650.00 - 7,621.30	2,868.56 18.00 / 18.00 650.00 - 7,621.30	7 0.60 NE	3,174.50 6 / 6 999.29 - 4,613.20	3,054.20 5 / 5 2,117.50 - 3,937.10
Vegetation	Co-58 23	N/A	LLD	-	-	-	-
Vegetation	Co-60 23	N/A	LLD	-	-	-	-
Vegetation	Cs-134 23	0.05	LLD	-	-	-	-
Vegetation	Cs-137 23	0.06	LLD	-	-	-	-
Vegetation	I-131 23	0.05	LLD	-	-	-	-
Vegetation	K-40 23	N/A	5,247.40 23.00 / 23.00 2,797.80 - 9,837.10	5,194.22 18.00 / 18.00 2,797.80 - 9,837.10	35 0.60 E	6,069.58 6 / 6 3,039.10 - 9,837.10	5,438.84 5 / 5 3,206.50 - 7,228.00

Water Gamma Spectral Summary Report 1996
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	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
Water	Ba-140 54	45.00	LLD	-	-	-	-
Water	Co-58 54	11.00	LLD	-	-	-	-
Water	Co-60 54	11.00	LLD	-	-	-	-
Water	Cs-134 54	11.00	LLD	-	-	-	-
Water	Cs-137 54	13.00	LLD	-	-	-	-
Water	Fe-59 54	22.00	LLD	-	-	-	-
Water	La-140 54	11.00	LLD	-	-	-	-
Water	Mn-54 54	11.00	LLD	-	-	-	-
Water	Nb-95 54	11.00	LLD	-	-	-	-
Water	Zn-65 54	22.00	LLD	-	-	-	-

Water Gamma Spectral Summary Report 1996
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	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
Water	Zr-95 54	22.00	LLD	-	-	-	-

Water Gross Beta Summary Report 1996
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	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
Water pCi/l	Gross Beta 54	3.00	2.54 54 / 54 1.56 - 4.40	2.56 42 / 42 1.93 - 4.40	60 1.00 WSW	3.00 9 / 9 1.96 - 4.40	2.49 12 / 12 1.56 - 3.05

Water Tritium Summary Report 1996
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:		Mean of Results from All Control Locations and Number Detected/Number Collected and Range
					Location # and Distance and Direction	Mean and Number Detected/Number Collected and Range	
Water	T-3 18	1,300.00	LLD	-	-	-	-

APPENDIX B: 1996 REMP DATA

Air Gamma Spectral Detail Report 1996

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 Period End	Be-7	Co-58	Co-60	Cs-134	Cs-137
1	Air	4/ 3/96	0.081 +/- 0.021	LLD	LLD	LLD	LLD
1	Air	7/ 3/96	0.070 +/- 0.008	LLD	LLD	LLD	LLD
1	Air	10/ 2/96	0.063 +/- 0.008	LLD	LLD	LLD	LLD
1	Air	1/ 2/97	0.050 +/- 0.007	LLD	LLD	LLD	LLD
3	Air	4/ 3/96	0.097 +/- 0.015	LLD	LLD	LLD	LLD
3	Air	7/ 3/96	0.082 +/- 0.009	LLD	LLD	LLD	LLD
3	Air	10/ 2/96	0.075 +/- 0.007	LLD	LLD	LLD	LLD
3	Air	1/ 2/97	0.052 +/- 0.006	LLD	LLD	LLD	LLD
4	Air	4/ 3/96	0.103 +/- 0.012	LLD	LLD	LLD	LLD
4	Air	7/ 3/96	0.082 +/- 0.012	LLD	LLD	LLD	LLD
4	Air	10/ 2/96	0.069 +/- 0.011	LLD	LLD	LLD	LLD
4	Air	1/ 2/97	0.048 +/- 0.005	LLD	LLD	LLD	LLD

Air Gamma Spectral Detail Report 1996

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 Period End	Be-7	Co-58	Co-60	Cs-134	Cs-137
5	Air	4/ 3/96	0.105 +/- 0.016	LLD	LLD	LLD	LLD
5	Air	7/ 3/96	0.087 +/- 0.008	LLD	LLD	LLD	LLD
5	Air	10/ 2/96	0.076 +/- 0.008	LLD	LLD	LLD	LLD
5	Air	1/ 2/97	0.047 +/- 0.006	LLD	LLD	LLD	LLD
6	Air	4/ 3/96	0.094 +/- 0.013	LLD	LLD	LLD	LLD
6	Air	7/ 3/96	0.087 +/- 0.010	LLD	LLD	LLD	LLD
6	Air	10/ 2/96	0.073 +/- 0.006	LLD	LLD	LLD	LLD
6	Air	1/ 2/97	0.054 +/- 0.007	LLD	LLD	LLD	LLD
7	Air	4/ 3/96	0.092 +/- 0.018	LLD	LLD	LLD	LLD
7	Air	7/ 3/96	0.076 +/- 0.001	LLD	LLD	LLD	LLD
7	Air	10/ 2/96	0.063 +/- 0.008	LLD	LLD	LLD	LLD
7	Air	1/ 2/97	0.054 +/- 0.005	LLD	LLD	LLD	LLD

Air Gamma Spectral Detail Report 1996

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 Period End	Be-7	Co-58	Co-60	Cs-134	Cs-137
35	Air	4/ 3/96	0.087 +/- 0.015	LLD	LLD	LLD	LLD
35	Air	7/ 3/96	0.082 +/- 0.001	LLD	LLD	LLD	LLD
35	Air	10/ 2/96	0.070 +/- 0.008	LLD	LLD	LLD	LLD
35	Air	1/ 2/97	0.054 +/- 0.006	LLD	LLD	LLD	LLD

Air Gross Beta Detail Report 1996

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				
		1	3	4	5	6
Collection Period	Sample Type	7	35			
1/ 3/96 to 1/10/96	Air	0.033 +/- 0.004 0.029 +/- 0.004	0.025 +/- 0.004 0.030 +/- 0.005	0.027 +/- 0.004	0.027 +/- 0.004	0.027 +/- 0.004
1/10/96 to 1/17/96	Air	0.036 +/- 0.005 0.035 +/- 0.004	0.035 +/- 0.005 0.032 +/- 0.005	0.034 +/- 0.004	0.032 +/- 0.004	0.030 +/- 0.004
1/17/96 to 1/24/96	Air	0.019 +/- 0.004 0.017 +/- 0.004	0.017 +/- 0.004 0.018 +/- 0.005	0.019 +/- 0.004	0.018 +/- 0.004	0.017 +/- 0.004
1/24/96 to 1/31/96	Air	0.022 +/- 0.004 0.021 +/- 0.004	0.025 +/- 0.005 0.021 +/- 0.005	0.025 +/- 0.004	0.024 +/- 0.004	0.023 +/- 0.004
1/31/96 to 2/ 7/96	Air	0.026 +/- 0.004 0.030 +/- 0.004	0.030 +/- 0.004 0.030 +/- 0.005	0.026 +/- 0.004	0.031 +/- 0.004	0.030 +/- 0.004
2/ 7/96 to 2/14/96	Air	0.015 +/- 0.004 0.016 +/- 0.004	0.018 +/- 0.004 0.018 +/- 0.004	0.017 +/- 0.004	0.016 +/- 0.004	0.013 +/- 0.004
2/14/96 to 2/21/96	Air	0.014 +/- 0.004 0.015 +/- 0.004	0.014 +/- 0.005 0.015 +/- 0.005	0.020 +/- 0.004	0.014 +/- 0.004	0.015 +/- 0.004
2/21/96 to 2/28/96	Air	0.010 +/- 0.004 0.009 +/- 0.004	0.010 +/- 0.004 0.012 +/- 0.004	0.015 +/- 0.004	0.010 +/- 0.004	0.008 +/- 0.004
2/28/96 to 3/ 6/96	Air	0.025 +/- 0.004 0.021 +/- 0.004	0.020 +/- 0.004 0.024 +/- 0.004	0.019 +/- 0.004	0.022 +/- 0.004	0.024 +/- 0.004
3/ 6/96 to 3/13/96	Air	0.020 +/- 0.004 0.018 +/- 0.004	0.020 +/- 0.005 0.019 +/- 0.005	0.018 +/- 0.004	0.019 +/- 0.004	0.017 +/- 0.004
3/13/96 to 3/20/96	Air	0.017 +/- 0.005 0.018 +/- 0.004	0.015 +/- 0.005 0.018 +/- 0.005	0.017 +/- 0.004	0.012 +/- 0.004	0.017 +/- 0.004
3/20/96 to 3/27/96	Air	0.020 +/- 0.005 0.018 +/- 0.004	0.020 +/- 0.005 0.017 +/- 0.005	0.019 +/- 0.004	0.018 +/- 0.004	0.014 +/- 0.004
3/27/96 to 4/ 3/96	Air	0.018 +/- 0.005 0.018 +/- 0.004	0.020 +/- 0.005 0.020 +/- 0.005	0.020 +/- 0.004	0.018 +/- 0.004	0.017 +/- 0.004
4/ 3/96 to 4/10/96	Air	0.018 +/- 0.005 0.015 +/- 0.004	0.017 +/- 0.005 0.020 +/- 0.005	0.014 +/- 0.004	0.016 +/- 0.004	0.018 +/- 0.004
4/10/96 to 4/17/96	Air	0.015 +/- 0.002 0.014 +/- 0.002	0.013 +/- 0.002 0.014 +/- 0.002	0.014 +/- 0.002	0.015 +/- 0.002	0.014 +/- 0.002

Air Gross Beta Detail Report 1996

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				
		1	3	4	5	6
Collection Period	Sample Type	7	35			
4/17/96 to 4/24/96	Air	0.012 +/- 0.002 0.014 +/- 0.002	0.015 +/- 0.002 0.014 +/- 0.002	0.014 +/- 0.002	0.013 +/- 0.002	0.014 +/- 0.002
4/24/96 to 5/ 1/96	Air	0.012 +/- 0.002 0.012 +/- 0.002	0.013 +/- 0.002 0.013 +/- 0.002	0.013 +/- 0.002	0.012 +/- 0.002	0.012 +/- 0.002
5/ 1/96 to 5/ 8/96	Air	0.011 +/- 0.002 0.012 +/- 0.002	0.010 +/- 0.002 0.012 +/- 0.002	0.015 +/- 0.002	0.012 +/- 0.002	0.013 +/- 0.002
5/ 8/96 to 5/15/96	Air	0.012 +/- 0.002 0.013 +/- 0.002	0.011 +/- 0.002 0.012 +/- 0.002	0.013 +/- 0.002	0.012 +/- 0.002	0.013 +/- 0.002
5/15/96 to 5/22/96	Air	0.013 +/- 0.002 0.011 +/- 0.002	0.015 +/- 0.002 0.014 +/- 0.002	0.015 +/- 0.002	0.014 +/- 0.002	0.013 +/- 0.002
5/22/96 to 5/29/96	Air	0.010 +/- 0.002 0.011 +/- 0.002	0.012 +/- 0.002 0.011 +/- 0.002	0.012 +/- 0.002	0.012 +/- 0.002	0.011 +/- 0.002
5/29/96 to 6/ 5/96	Air	0.011 +/- 0.002 0.011 +/- 0.002	0.014 +/- 0.002 0.011 +/- 0.002	0.014 +/- 0.002	0.015 +/- 0.002	0.013 +/- 0.002
6/ 5/96 to 6/12/96	Air	0.008 +/- 0.002 0.009 +/- 0.002	0.010 +/- 0.002 0.010 +/- 0.002	0.010 +/- 0.002	0.010 +/- 0.002	0.010 +/- 0.002
6/12/96 to 6/19/96	Air	0.017 +/- 0.002 0.018 +/- 0.002	0.016 +/- 0.002 0.016 +/- 0.002	0.020 +/- 0.002	0.017 +/- 0.002	0.019 +/- 0.002
6/19/96 to 6/26/96	Air	0.009 +/- 0.002 0.009 +/- 0.002	0.010 +/- 0.002 0.011 +/- 0.002	0.013 +/- 0.002	0.012 +/- 0.002	0.014 +/- 0.002
6/26/96 to 7/ 3/96	Air	0.020 +/- 0.002 0.019 +/- 0.002	0.020 +/- 0.002 0.019 +/- 0.002	0.018 +/- 0.002	0.021 +/- 0.002	0.022 +/- 0.002
7/ 3/96 to 7/10/96	Air	0.016 +/- 0.002 0.018 +/- 0.002	0.015 +/- 0.002 0.014 +/- 0.002	0.015 +/- 0.002	0.016 +/- 0.002	0.017 +/- 0.002
7/10/96 to 7/17/96	Air	0.014 +/- 0.004 0.014 +/- 0.002	0.018 +/- 0.002 0.016 +/- 0.002	0.017 +/- 0.003	0.014 +/- 0.003	0.018 +/- 0.002
7/17/96 to 7/24/96	Air	0.014 +/- 0.002 0.014 +/- 0.002	0.016 +/- 0.002 0.015 +/- 0.002	0.013 +/- 0.002	0.016 +/- 0.002	0.014 +/- 0.002
7/24/96 to 7/31/96	Air	0.012 +/- 0.002 0.012 +/- 0.002	0.014 +/- 0.002 0.013 +/- 0.002	0.013 +/- 0.002	0.014 +/- 0.002	0.013 +/- 0.002

Air Gross Beta Detail Report 1996

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				
		1	3	4	5	6
Collection Period	Sample Type	7	35			
7/31/96 to 8/ 7/96	Air	0.016 +/- 0.002 0.018 +/- 0.002	0.018 +/- 0.002 0.017 +/- 0.002	0.016 +/- 0.002	0.019 +/- 0.002	0.018 +/- 0.002
8/ 7/96 to 8/14/96	Air	0.013 +/- 0.002 0.015 +/- 0.002	0.016 +/- 0.002 0.014 +/- 0.002	0.014 +/- 0.002	0.016 +/- 0.002	0.015 +/- 0.002
8/14/96 to 8/21/96	Air	0.017 +/- 0.002 0.017 +/- 0.002	0.021 +/- 0.002 0.018 +/- 0.002	0.018 +/- 0.002	0.020 +/- 0.002	0.020 +/- 0.002
8/21/96 to 8/28/96	Air	0.022 +/- 0.002 0.023 +/- 0.002	0.023 +/- 0.002 0.023 +/- 0.002	0.022 +/- 0.002	0.024 +/- 0.003	0.025 +/- 0.003
8/28/96 to 9/ 4/96	Air	0.015 +/- 0.002 0.015 +/- 0.002	0.022 +/- 0.002 0.015 +/- 0.002	0.022 +/- 0.002	0.023 +/- 0.002	0.025 +/- 0.002
9/ 4/96 to 9/11/96	Air	0.019 +/- 0.002 0.022 +/- 0.002	0.022 +/- 0.002 0.019 +/- 0.002	0.019 +/- 0.002	0.022 +/- 0.003	0.019 +/- 0.002
9/11/96 to 9/18/96	Air	0.009 +/- 0.002 0.014 +/- 0.002	0.013 +/- 0.002 0.012 +/- 0.002	0.012 +/- 0.002	0.014 +/- 0.002	0.014 +/- 0.002
9/18/96 to 9/25/96	Air	0.020 +/- 0.002 0.021 +/- 0.002	0.022 +/- 0.002 0.023 +/- 0.002	0.020 +/- 0.002	0.024 +/- 0.003	0.021 +/- 0.002
9/25/96 to 10/ 2/96	Air	0.020 +/- 0.002 0.022 +/- 0.002	0.022 +/- 0.002 0.021 +/- 0.002	0.019 +/- 0.002	0.023 +/- 0.002	0.021 +/- 0.002
10/ 2/96 to 10/ 9/96	Air	0.017 +/- 0.002 0.019 +/- 0.003	0.017 +/- 0.002 0.019 +/- 0.002	0.017 +/- 0.002	0.019 +/- 0.002	0.021 +/- 0.003
10/ 9/96 to 10/16/96	Air	0.020 +/- 0.002 0.020 +/- 0.002	0.023 +/- 0.002 0.019 +/- 0.002	0.020 +/- 0.002	0.024 +/- 0.002	0.021 +/- 0.002
10/16/96 to 10/23/96	Air	0.013 +/- 0.002 0.014 +/- 0.002	0.017 +/- 0.002 0.014 +/- 0.002	0.014 +/- 0.002	0.018 +/- 0.002	0.015 +/- 0.002
10/23/96 to 10/30/96	Air	0.022 +/- 0.002 0.022 +/- 0.002	0.021 +/- 0.002 0.023 +/- 0.002	0.023 +/- 0.002	0.023 +/- 0.002	0.022 +/- 0.002
10/30/96 to 11/ 6/96	Air	0.022 +/- 0.002 0.022 +/- 0.002	0.022 +/- 0.002 0.020 +/- 0.002	0.022 +/- 0.002	0.021 +/- 0.002	0.024 +/- 0.002
11/ 6/96 to 11/13/96	Air	0.012 +/- 0.002 0.017 +/- 0.004	0.010 +/- 0.002 0.011 +/- 0.002	0.011 +/- 0.002	0.010 +/- 0.002	0.012 +/- 0.002
11/13/96 to 11/20/96	Air	0.020 +/- 0.002 0.022 +/- 0.002	0.021 +/- 0.002 0.022 +/- 0.002	0.023 +/- 0.002	0.021 +/- 0.002	0.024 +/- 0.002

Air Gross Beta Detail Report 1996

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				
		1	3	4	5	6
Collection Period	Sample Type	7	35			
11/20/96 to 11/27/96	Air	0.012 +/- 0.002 0.015 +/- 0.002	0.013 +/- 0.002 0.018 +/- 0.002	0.015 +/- 0.002	0.014 +/- 0.002	0.016 +/- 0.002
11/27/96 to 12/ 4/96	Air	0.020 +/- 0.003 0.025 +/- 0.003	0.023 +/- 0.003 0.021 +/- 0.003	0.023 +/- 0.003	0.023 +/- 0.003	0.024 +/- 0.003
12/ 4/96 to 12/11/96	Air	0.021 +/- 0.002 0.023 +/- 0.003	0.022 +/- 0.002 0.022 +/- 0.002	0.022 +/- 0.002	0.020 +/- 0.002	0.023 +/- 0.003
12/11/96 to 12/19/96	Air	0.020 +/- 0.002 0.019 +/- 0.002	0.017 +/- 0.002 0.020 +/- 0.002	0.021 +/- 0.002	0.021 +/- 0.002	0.019 +/- 0.002
12/19/96 to 12/26/96	Air	0.027 +/- 0.002 0.027 +/- 0.003	0.028 +/- 0.002 0.028 +/- 0.003	0.027 +/- 0.002	0.028 +/- 0.002	0.026 +/- 0.003
12/26/96 to 1/ 2/97	Air	0.026 +/- 0.003 0.026 +/- 0.003	0.025 +/- 0.002 0.025 +/- 0.002	0.024 +/- 0.002	0.025 +/- 0.002	0.028 +/- 0.003

Air Iodine Detail Report 1996

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 Date	I-131
1	Air	1/ 3/96 to 1/10/96	LLD
1	Air	1/10/96 to 1/17/96	LLD
1	Air	1/17/96 to 1/24/96	LLD
1	Air	1/24/96 to 1/31/96	LLD
1	Air	1/31/96 to 2/ 7/96	LLD
1	Air	2/ 7/96 to 2/14/96	LLD
1	Air	2/14/96 to 2/21/96	LLD
1	Air	2/21/96 to 2/28/96	LLD
1	Air	2/28/96 to 3/ 6/96	LLD
1	Air	3/ 6/96 to 3/13/96	LLD
1	Air	3/13/96 to 3/20/96	LLD
1	Air	3/20/96 to 3/27/96	LLD
1	Air	3/27/96 to 4/ 3/96	LLD
1	Air	4/ 3/96 to 4/10/96	LLD
1	Air	4/10/96 to 4/17/96	LLD
1	Air	4/17/96 to 4/24/96	LLD
1	Air	4/24/96 to 5/ 1/96	LLD
1	Air	5/ 1/96 to 5/ 8/96	LLD
1	Air	5/ 8/96 to 5/15/96	LLD
1	Air	5/15/96 to 5/22/96	LLD
1	Air	5/22/96 to 5/29/96	LLD
1	Air	5/29/96 to 6/ 5/96	LLD
1	Air	6/ 5/96 to 6/12/96	LLD
1	Air	6/12/96 to 6/19/96	LLD
1	Air	6/19/96 to 6/26/96	LLD
1	Air	6/26/96 to 7/ 3/96	LLD
1	Air	7/ 3/96 to 7/10/96	LLD
1	Air	7/10/96 to 7/17/96	LLD
1	Air	7/17/96 to 7/24/96	LLD
1	Air	7/24/96 to 7/31/96	LLD
1	Air	7/31/96 to 8/ 7/96	LLD
1	Air	8/ 7/96 to 8/14/96	LLD
1	Air	8/14/96 to 8/21/96	LLD
1	Air	8/21/96 to 8/28/96	LLD
1	Air	8/28/96 to 9/ 4/96	LLD
1	Air	9/ 4/96 to 9/11/96	LLD
1	Air	9/11/96 to 9/18/96	LLD
1	Air	9/18/96 to 9/25/96	LLD
1	Air	9/25/96 to 10/ 2/96	LLD
1	Air	10/ 2/96 to 10/ 9/96	LLD
1	Air	10/ 9/96 to 10/16/96	LLD
1	Air	10/16/96 to 10/23/96	LLD
1	Air	10/23/96 to 10/30/96	LLD
1	Air	10/30/96 to 11/ 6/96	LLD
1	Air	11/ 6/96 to 11/13/96	LLD
1	Air	11/13/96 to 11/20/96	LLD
1	Air	11/20/96 to 11/27/96	LLD
1	Air	11/27/96 to 12/ 4/96	LLD
1	Air	12/ 4/96 to 12/11/96	LLD
1	Air	12/11/96 to 12/19/96	LLD
1	Air	12/19/96 to 12/26/96	LLD

Air Iodine Detail Report 1996

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 Date			I-131
1	Air	12/26/96	to	1/ 2/97	LLD
3	Air	1/ 3/96	to	1/10/96	LLD
3	Air	1/10/96	to	1/17/96	LLD
3	Air	1/17/96	to	1/24/96	LLD
3	Air	1/24/96	to	1/31/96	LLD
3	Air	1/31/96	to	2/ 7/96	LLD
3	Air	2/ 7/96	to	2/14/96	LLD
3	Air	2/14/96	to	2/21/96	LLD
3	Air	2/21/96	to	2/28/96	LLD
3	Air	2/28/96	to	3/ 6/96	LLD
3	Air	3/ 6/96	to	3/13/96	LLD
3	Air	3/13/96	to	3/20/96	LLD
3	Air	3/20/96	to	3/27/96	LLD
3	Air	3/27/96	to	4/ 3/96	LLD
3	Air	4/ 3/96	to	4/10/96	LLD
3	Air	4/10/96	to	4/17/96	LLD
3	Air	4/17/96	to	4/24/96	LLD
3	Air	4/24/96	to	5/ 1/96	LLD
3	Air	5/ 1/96	to	5/ 8/96	LLD
3	Air	5/ 8/96	to	5/15/96	LLD
3	Air	5/15/96	to	5/22/96	LLD
3	Air	5/22/96	to	5/29/96	LLD
3	Air	5/29/96	to	6/ 5/96	LLD
3	Air	6/ 5/96	to	6/12/96	LLD
3	Air	6/12/96	to	6/19/96	LLD
3	Air	6/19/96	to	6/26/96	LLD
3	Air	6/26/96	to	7/ 3/96	LLD
3	Air	7/ 3/96	to	7/10/96	LLD
3	Air	7/10/96	to	7/17/96	LLD
3	Air	7/17/96	to	7/24/96	LLD
3	Air	7/24/96	to	7/31/96	LLD
3	Air	7/31/96	to	8/ 7/96	LLD
3	Air	8/ 7/96	to	8/14/96	LLD
3	Air	8/14/96	to	8/21/96	LLD
3	Air	8/21/96	to	8/28/96	LLD
3	Air	8/28/96	to	9/ 4/96	LLD
3	Air	9/ 4/96	to	9/11/96	LLD
3	Air	9/11/96	to	9/18/96	LLD
3	Air	9/18/96	to	9/25/96	LLD
3	Air	9/25/96	to	10/ 2/96	LLD
3	Air	10/ 2/96	to	10/ 9/96	LLD
3	Air	10/ 9/96	to	10/16/96	LLD
3	Air	10/16/96	to	10/23/96	LLD
3	Air	10/23/96	to	10/30/96	LLD
3	Air	10/30/96	to	11/ 6/96	LLD
3	Air	11/ 6/96	to	11/13/96	LLD
3	Air	11/13/96	to	11/20/96	LLD
3	Air	11/20/96	to	11/27/96	LLD
3	Air	11/27/96	to	12/ 4/96	LLD
3	Air	12/ 4/96	to	12/11/96	LLD
3	Air	12/11/96	to	12/19/96	LLD

Air Iodine Detail Report 1996

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 Date	I-131
3	Air	12/19/96 to 12/26/96	LLD
3	Air	12/26/96 to 1/ 2/97	LLD
4	Air	1/ 3/96 to 1/10/96	LLD
4	Air	1/10/96 to 1/17/96	LLD
4	Air	1/17/96 to 1/24/96	LLD
4	Air	1/24/96 to 1/31/96	LLD
4	Air	1/31/96 to 2/ 7/96	LLD
4	Air	2/ 7/96 to 2/14/96	LLD
4	Air	2/14/96 to 2/21/96	LLD
4	Air	2/21/96 to 2/28/96	LLD
4	Air	2/28/96 to 3/ 6/96	LLD
4	Air	3/ 6/96 to 3/13/96	LLD
4	Air	3/13/96 to 3/20/96	LLD
4	Air	3/20/96 to 3/27/96	LLD
4	Air	3/27/96 to 4/ 3/96	LLD
4	Air	4/ 3/96 to 4/10/96	LLD
4	Air	4/10/96 to 4/17/96	LLD
4	Air	4/17/96 to 4/24/96	LLD
4	Air	4/24/96 to 5/ 1/96	LLD
4	Air	5/ 1/96 to 5/ 8/96	LLD
4	Air	5/ 8/96 to 5/15/96	LLD
4	Air	5/15/96 to 5/22/96	LLD
4	Air	5/22/96 to 5/29/96	LLD
4	Air	5/29/96 to 6/ 5/96	LLD
4	Air	6/ 5/96 to 6/12/96	LLD
4	Air	6/12/96 to 6/19/96	LLD
4	Air	6/19/96 to 6/26/96	LLD
4	Air	6/26/96 to 7/ 3/96	LLD
4	Air	7/ 3/96 to 7/10/96	LLD
4	Air	7/10/96 to 7/17/96	LLD
4	Air	7/17/96 to 7/24/96	LLD
4	Air	7/24/96 to 7/31/96	LLD
4	Air	7/31/96 to 8/ 7/96	LLD
4	Air	8/ 7/96 to 8/14/96	LLD
4	Air	8/14/96 to 8/21/96	LLD
4	Air	8/21/96 to 8/28/96	LLD
4	Air	8/28/96 to 9/ 4/96	LLD
4	Air	9/ 4/96 to 9/11/96	LLD
4	Air	9/11/96 to 9/18/96	LLD
4	Air	9/18/96 to 9/25/96	LLD
4	Air	9/25/96 to 10/ 2/96	LLD
4	Air	10/ 2/96 to 10/ 9/96	LLD
4	Air	10/ 9/96 to 10/16/96	LLD
4	Air	10/16/96 to 10/23/96	LLD
4	Air	10/23/96 to 10/30/96	LLD
4	Air	10/30/96 to 11/ 6/96	LLD
4	Air	11/ 6/96 to 11/13/96	LLD
4	Air	11/13/96 to 11/20/96	LLD
4	Air	11/20/96 to 11/27/96	LLD
4	Air	11/27/96 to 12/ 4/96	LLD
4	Air	12/ 4/96 to 12/11/96	LLD

Air Iodine Detail Report 1996

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 Date			I-131
4	Air	12/11/96	to	12/19/96	LLD
4	Air	12/19/96	to	12/26/96	LLD
4	Air	12/26/96	to	1/ 2/97	LLD
5	Air	1/ 3/96	to	1/10/96	LLD
5	Air	1/10/96	to	1/17/96	LLD
5	Air	1/17/96	to	1/24/96	LLD
5	Air	1/24/96	to	1/31/96	LLD
5	Air	1/31/96	to	2/ 7/96	LLD
5	Air	2/ 7/96	to	2/14/96	LLD
5	Air	2/14/96	to	2/21/96	LLD
5	Air	2/21/96	to	2/28/96	LLD
5	Air	2/28/96	to	3/ 6/96	LLD
5	Air	3/ 6/96	to	3/13/96	LLD
5	Air	3/13/96	to	3/20/96	LLD
5	Air	3/20/96	to	3/27/96	LLD
5	Air	3/27/96	to	4/ 3/96	LLD
5	Air	4/ 3/96	to	4/10/96	LLD
5	Air	4/10/96	to	4/17/96	LLD
5	Air	4/17/96	to	4/24/96	LLD
5	Air	4/24/96	to	5/ 1/96	LLD
5	Air	5/ 1/96	to	5/ 8/96	LLD
5	Air	5/ 8/96	to	5/15/96	LLD
5	Air	5/15/96	to	5/22/96	LLD
5	Air	5/22/96	to	5/29/96	LLD
5	Air	5/29/96	to	6/ 5/96	LLD
5	Air	6/ 5/96	to	6/12/96	LLD
5	Air	6/12/96	to	6/19/96	LLD
5	Air	6/19/96	to	6/26/96	LLD
5	Air	6/26/96	to	7/ 3/96	LLD
5	Air	7/ 3/96	to	7/10/96	LLD
5	Air	7/10/96	to	7/17/96	LLD
5	Air	7/17/96	to	7/24/96	LLD
5	Air	7/24/96	to	7/31/96	LLD
5	Air	7/31/96	to	8/ 7/96	LLD
5	Air	8/ 7/96	to	8/14/96	LLD
5	Air	8/14/96	to	8/21/96	LLD
5	Air	8/21/96	to	8/28/96	LLD
5	Air	8/28/96	to	9/ 4/96	LLD
5	Air	9/ 4/96	to	9/11/96	LLD
5	Air	9/11/96	to	9/18/96	LLD
5	Air	9/18/96	to	9/25/96	LLD
5	Air	9/25/96	to	10/ 2/96	LLD
5	Air	10/ 2/96	to	10/ 9/96	LLD
5	Air	10/ 9/96	to	10/16/96	LLD
5	Air	10/16/96	to	10/23/96	LLD
5	Air	10/23/96	to	10/30/96	LLD
5	Air	10/30/96	to	11/ 6/96	LLD
5	Air	11/ 6/96	to	11/13/96	LLD
5	Air	11/13/96	to	11/20/96	LLD
5	Air	11/20/96	to	11/27/96	LLD
5	Air	11/27/96	to	12/ 4/96	LLD

Air Iodine Detail Report 1996

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 Date			I-131
5	Air	12/ 4/96	to	12/11/96	LLD
5	Air	12/11/96	to	12/19/96	LLD
5	Air	12/19/96	to	12/26/96	LLD
5	Air	12/26/96	to	1/ 2/97	LLD
6	Air	1/ 3/96	to	1/10/96	LLD
6	Air	1/10/96	to	1/17/96	LLD
6	Air	1/17/96	to	1/24/96	LLD
6	Air	1/24/96	to	1/31/96	LLD
6	Air	1/31/96	to	2/ 7/96	LLD
6	Air	2/ 7/96	to	2/14/96	LLD
6	Air	2/14/96	to	2/21/96	LLD
6	Air	2/21/96	to	2/28/96	LLD
6	Air	2/28/96	to	3/ 6/96	LLD
6	Air	3/ 6/96	to	3/13/96	LLD
6	Air	3/13/96	to	3/20/96	LLD
6	Air	3/20/96	to	3/27/96	LLD
6	Air	3/27/96	to	4/ 3/96	LLD
6	Air	4/ 3/96	to	4/10/96	LLD
6	Air	4/10/96	to	4/17/96	LLD
6	Air	4/17/96	to	4/24/96	LLD
6	Air	4/24/96	to	5/ 1/96	LLD
6	Air	5/ 1/96	to	5/ 8/96	LLD
6	Air	5/ 8/96	to	5/15/96	LLD
6	Air	5/15/96	to	5/22/96	LLD
6	Air	5/22/96	to	5/29/96	LLD
6	Air	5/29/96	to	6/ 5/96	LLD
6	Air	6/ 5/96	to	6/12/96	LLD
6	Air	6/12/96	to	6/19/96	LLD
6	Air	6/19/96	to	6/26/96	LLD
6	Air	6/26/96	to	7/ 3/96	LLD
6	Air	7/ 3/96	to	7/10/96	LLD
6	Air	7/10/96	to	7/17/96	LLD
6	Air	7/17/96	to	7/24/96	LLD
6	Air	7/24/96	to	7/31/96	LLD
6	Air	7/31/96	to	8/ 7/96	LLD
6	Air	8/ 7/96	to	8/14/96	LLD
6	Air	8/14/96	to	8/21/96	LLD
6	Air	8/21/96	to	8/28/96	LLD
6	Air	8/28/96	to	9/ 4/96	LLD
6	Air	9/ 4/96	to	9/11/96	LLD
6	Air	9/11/96	to	9/18/96	LLD
6	Air	9/18/96	to	9/25/96	LLD
6	Air	9/25/96	to	10/ 2/96	LLD
6	Air	10/ 2/96	to	10/ 9/96	LLD
6	Air	10/ 9/96	to	10/16/96	LLD
6	Air	10/16/96	to	10/23/96	LLD
6	Air	10/23/96	to	10/30/96	LLD
6	Air	10/30/96	to	11/ 6/96	LLD
6	Air	11/ 6/96	to	11/13/96	LLD
6	Air	11/13/96	to	11/20/96	LLD
6	Air	11/20/96	to	11/27/96	LLD

Air Iodine Detail Report 1996

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 Date	I-131
6	Air	11/27/96 to 12/ 4/96	LLD
6	Air	12/ 4/96 to 12/11/96	LLD
6	Air	12/11/96 to 12/19/96	LLD
6	Air	12/19/96 to 12/26/96	LLD
6	Air	12/26/96 to 1/ 2/97	LLD
7	Air	1/ 3/96 to 1/10/96	LLD
7	Air	1/10/96 to 1/17/96	LLD
7	Air	1/17/96 to 1/24/96	LLD
7	Air	1/24/96 to 1/31/96	LLD
7	Air	1/31/96 to 2/ 7/96	LLD
7	Air	2/ 7/96 to 2/14/96	LLD
7	Air	2/14/96 to 2/21/96	LLD
7	Air	2/21/96 to 2/28/96	LLD
7	Air	2/28/96 to 3/ 6/96	LLD
7	Air	3/ 6/96 to 3/13/96	LLD
7	Air	3/13/96 to 3/20/96	LLD
7	Air	3/20/96 to 3/27/96	LLD
7	Air	3/27/96 to 4/ 3/96	LLD
7	Air	4/ 3/96 to 4/10/96	LLD
7	Air	4/10/96 to 4/17/96	LLD
7	Air	4/17/96 to 4/24/96	LLD
7	Air	4/24/96 to 5/ 1/96	LLD
7	Air	5/ 1/96 to 5/ 8/96	LLD
7	Air	5/ 8/96 to 5/15/96	LLD
7	Air	5/15/96 to 5/22/96	LLD
7	Air	5/22/96 to 5/29/96	LLD
7	Air	5/29/96 to 6/ 5/96	LLD
7	Air	6/ 5/96 to 6/12/96	LLD
7	Air	6/12/96 to 6/19/96	LLD
7	Air	6/19/96 to 6/26/96	LLD
7	Air	6/26/96 to 7/ 3/96	LLD
7	Air	7/ 3/96 to 7/10/96	LLD
7	Air	7/10/96 to 7/17/96	LLD
7	Air	7/17/96 to 7/24/96	LLD
7	Air	7/24/96 to 7/31/96	LLD
7	Air	7/31/96 to 8/ 7/96	LLD
7	Air	8/ 7/96 to 8/14/96	LLD
7	Air	8/14/96 to 8/21/96	LLD
7	Air	8/21/96 to 8/28/96	LLD
7	Air	8/28/96 to 9/ 4/96	LLD
7	Air	9/ 4/96 to 9/11/96	LLD
7	Air	9/11/96 to 9/18/96	LLD
7	Air	9/18/96 to 9/25/96	LLD
7	Air	9/25/96 to 10/ 2/96	LLD
7	Air	10/ 2/96 to 10/ 9/96	LLD
7	Air	10/ 9/96 to 10/16/96	LLD
7	Air	10/16/96 to 10/23/96	LLD
7	Air	10/23/96 to 10/30/96	LLD
7	Air	10/30/96 to 11/ 6/96	LLD
7	Air	11/ 6/96 to 11/13/96	LLD
7	Air	11/13/96 to 11/20/96	LLD

Air Iodine Detail Report 1996

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 Date	I-131
7	Air	11/20/96 to 11/27/96	LLD
7	Air	11/27/96 to 12/ 4/96	LLD
7	Air	12/ 4/96 to 12/11/96	LLD
7	Air	12/11/96 to 12/19/96	LLD
7	Air	12/19/96 to 12/26/96	LLD
7	Air	12/26/96 to 1/ 2/97	LLD
35	Air	1/ 3/96 to 1/10/96	LLD
35	Air	1/10/96 to 1/17/96	LLD
35	Air	1/17/96 to 1/24/96	LLD
35	Air	1/24/96 to 1/31/96	LLD
35	Air	1/31/96 to 2/ 7/96	LLD
35	Air	2/ 7/96 to 2/14/96	LLD
35	Air	2/14/96 to 2/21/96	LLD
35	Air	2/21/96 to 2/28/96	LLD
35	Air	2/28/96 to 3/ 6/96	LLD
35	Air	3/ 6/96 to 3/13/96	LLD
35	Air	3/13/96 to 3/20/96	LLD
35	Air	3/20/96 to 3/27/96	LLD
35	Air	3/27/96 to 4/ 3/96	LLD
35	Air	4/ 3/96 to 4/10/96	LLD
35	Air	4/10/96 to 4/17/96	LLD
35	Air	4/17/96 to 4/24/96	LLD
35	Air	4/24/96 to 5/ 1/96	LLD
35	Air	5/ 1/96 to 5/ 8/96	LLD
35	Air	5/ 8/96 to 5/15/96	LLD
35	Air	5/15/96 to 5/22/96	LLD
35	Air	5/22/96 to 5/29/96	LLD
35	Air	5/29/96 to 6/ 5/96	LLD
35	Air	6/ 5/96 to 6/12/96	LLD
35	Air	6/12/96 to 6/19/96	LLD
35	Air	6/19/96 to 6/26/96	LLD
35	Air	6/26/96 to 7/ 3/96	LLD
35	Air	7/ 3/96 to 7/10/96	LLD
35	Air	7/10/96 to 7/17/96	LLD
35	Air	7/17/96 to 7/24/96	LLD
35	Air	7/24/96 to 7/31/96	LLD
35	Air	7/31/96 to 8/ 7/96	LLD
35	Air	8/ 7/96 to 8/14/96	LLD
35	Air	8/14/96 to 8/21/96	LLD
35	Air	8/21/96 to 8/28/96	LLD
35	Air	8/28/96 to 9/ 4/96	LLD
35	Air	9/ 4/96 to 9/11/96	LLD
35	Air	9/11/96 to 9/18/96	LLD
35	Air	9/18/96 to 9/25/96	LLD
35	Air	9/25/96 to 10/ 2/96	LLD
35	Air	10/ 2/96 to 10/ 9/96	LLD
35	Air	10/ 9/96 to 10/16/96	LLD
35	Air	10/16/96 to 10/23/96	LLD
35	Air	10/23/96 to 10/30/96	LLD
35	Air	10/30/96 to 11/ 6/96	LLD
35	Air	11/ 6/96 to 11/13/96	LLD

Air Iodine Detail Report 1996

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 Date	I-131
35	Air	11/13/96 to 11/20/96	LLD
35	Air	11/20/96 to 11/27/96	LLD
35	Air	11/27/96 to 12/ 4/96	LLD
35	Air	12/ 4/96 to 12/11/96	LLD
35	Air	12/11/96 to 12/19/96	LLD
35	Air	12/19/96 to 12/26/96	LLD
35	Air	12/26/96 to 1/ 2/97	LLD

Fish Gamma Spectral Detail Report 1996

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 +/- 2 Sigma

Location	Sample Type	Collection Period End	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
25	Carp	5/17/96	LLD 1,693.80 +/- 296.00	LLD LLD	LLD LLD	LLD	LLD
25	Drum	5/17/96	LLD 2,097.70 +/- 319.00	LLD LLD	LLD LLD	LLD	LLD
25	Redhorse	5/17/96	LLD 2,488.40 +/- 263.00	LLD LLD	LLD LLD	LLD	LLD
25	Smallmouth bass	5/17/96	LLD 2,525.60 +/- 425.00	LLD LLD	LLD LLD	LLD	LLD
25	Walleye	5/17/96	LLD 2,955.40 +/- 260.00	LLD LLD	LLD LLD	LLD	LLD
25	White bass	5/17/96	LLD 2,157.10 +/- 280.00	LLD LLD	LLD LLD	LLD	LLD
25	White perch	5/17/96	LLD 2,371.70 +/- 363.00	LLD LLD	LLD LLD	LLD	LLD
25	White sucker	5/17/96	LLD 2,284.70 +/- 290.00	LLD LLD	LLD LLD	LLD	LLD
25	Yellow perch	5/17/96	LLD 1,809.90 +/- 407.00	LLD LLD	LLD LLD	LLD	LLD
25	smallmouth bass	10/ 8/96	LLD 2,585.20 +/- 383.00	LLD LLD	LLD LLD	LLD	LLD
25	walleye	10/ 8/96	LLD 2,578.00 +/- 449.00	LLD LLD	LLD LLD	LLD	LLD
32	Drum	5/17/96	LLD 1,867.70 +/- 225.00	LLD LLD	LLD LLD	LLD	LLD

Fish Gamma Spectral Detail Report 1996

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 +/- 2 Sigma

Location	Sample Type	Collection Period End	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	Smallmouth bass	5/17/96	LLD 2,687.10 +/- 228.32	LLD LLD	LLD LLD	LLD	LLD
32	Walleye	5/17/96	LLD 2,692.70 +/- 371.00	LLD LLD	LLD LLD	LLD	LLD
32	White bass	5/17/96	LLD 2,561.70 +/- 264.00	LLD LLD	LLD LLD	LLD	LLD
32	White perch	5/17/96	LLD 2,045.40 +/- 275.00	LLD LLD	LLD LLD	LLD	LLD
32	White sucker	5/17/96	LLD 2,047.20 +/- 374.00	LLD LLD	LLD LLD	LLD	LLD
32	Yellow perch	5/17/96	LLD 2,656.10 +/- 561.00	LLD LLD	LLD LLD	LLD	LLD
32	carp	10/ 8/96	LLD 1,319.70 +/- 306.00	LLD LLD	LLD LLD	LLD	LLD
32	catfish	10/ 8/96	LLD 2,208.20 +/- 246.00	LLD LLD	LLD LLD	LLD	LLD
32	drum	10/ 8/96	LLD 1,483.60 +/- 392.00	LLD LLD	LLD LLD	LLD	LLD
32	gizzard shad	10/ 8/96	LLD 1,906.80 +/- 296.11	LLD LLD	LLD LLD	LLD	LLD
32	redhorse	10/ 8/96	LLD 2,352.60 +/- 430.00	LLD LLD	LLD LLD	LLD	LLD
32	white bass	10/ 8/96	LLD 2,264.20 +/- 472.00	LLD LLD	LLD LLD	LLD	LLD

Fish Gamma Spectral Detail Report 1996

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 +/- 2 Sigma

Location	Sample Type	Collection Period End	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	white sucker	10/ 8/96	LLD 2,303.40 +/- 366.00	LLD LLD	LLD LLD	LLD	LLD

Food Products Gamma Spectral Detail Report 1996

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 Period End	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
37	BEET GREENS	9/11/96	LLD LLD	LLD 4,460.00 +/- 310.00	LLD	LLD	LLD
37	CHINESE CABBA	9/11/96	LLD LLD	LLD 1,542.30 +/- 251.00	LLD	LLD	LLD
37	TURNIP GREENS	9/11/96	LLD LLD	LLD 5,107.00 +/- 454.00	LLD	LLD	LLD
37	beet greens	10/15/96	774.07 +/- 131.00 LLD	LLD 6,340.00 +/- 371.00	LLD	LLD	LLD
37	chinese cabbage	10/15/96	LLD LLD	LLD 1,430.30 +/- 278.00	LLD	LLD	LLD
62	BEET GREENS	9/11/96	LLD LLD	LLD 5,022.70 +/- 345.00	LLD	LLD	LLD
62	BROCCOLI	9/11/96	LLD LLD	LLD 3,924.90 +/- 267.00	LLD	LLD	LLD
62	CABBAGE	9/11/96	LL. LLD	LLD 2,401.80 +/- 290.00	LLD	LLD	LLD
62	cabbage	10/15/96	LLD LLD	LLD 1,824.35 +/- 179.30	LLD	LLD	LLD
70	BROCCOLI	9/11/96	LLD LLD	LLD 3,292.40 +/- 389.00	LLD	LLD	LLD
70	CABBAGE	9/11/96	LLD LLD	LLD 1,887.80 +/- 240.00	LLD	LLD	LLD
70	CAULIFLOWER	9/11/96	LLD LLD	LLD 2,824.30 +/- 340.00	LLD	LLD	LLD

Food Products Gamma Spectral Detail Report 1996
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 Period End	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
70	broccoli	10/15/96	LLD LLD	LLD 4,628.10 +/- 498.00	LLD	LLD	LLD
70	cabbage	10/15/96	LLD LLD	LLD 1,650.90 +/- 262.00	LLD	LLD	LLD
70	red cabbage	10/15/96	LLD LLD	LLD 2,582.90 +/- 341.00	LLD	LLD	LLD
77	BEET GREENS	9/11/96	LLD LLD	LLD 5,090.60 +/- 306.00	LLD	LLD	LLD
77	TURNIP GREENS	9/11/96	245.20 +/- 91.70 LLD	LLD 2,819.30 +/- 260.00	LLD	LLD	LLD
77	beet greens	10/15/96	555.75 +/- 162.00 LLD	LLD 4,855.20 +/- 341.00	LLD	LLD	LLD
77	turnip greens	10/15/96	645.42 +/- 148.00 LLD	LLD 5,479.60 +/- 392.00	LLD	LLD	LLD

Milk Gamma Spectral Detail Report 1996

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 Period End	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	1/15/96	LLD	LLD	LLD	1,332.6 +/- 144.0	LLD
51	Milk	2/12/96	LLD	LLD	LLD	1,421.1 +/- 104.0	LLD
51	Milk	3/11/96	LLD	LLD	LLD	1,530.3 +/- 162.0	LLD
51	Milk	4/ 8/96	LLD	LLD	LLD	1,557.9 +/- 132.0	LLD
51	Milk	4/22/96	LLD	LLD	LLD	1,489.4 +/- 161.0	LLD
51	Milk	5/ 6/96	LLD	LLD	LLD	1,549.7 +/- 122.0	LLD
51	Milk	5/20/96	LLD	LLD	LLD	1,579.9 +/- 178.0	LLD
51	Milk	6/10/96	LLD	LLD	LLD	1,392.0 +/- 149.0	LLD
51	Milk	6/24/96	LLD	LLD	LLD	1,448.3 +/- 147.0	LLD
51	Milk	7/ 8/96	LLD	LLD	LLD	1,481.5 +/- 140.0	LLD
51	Milk	7/22/96	LLD	LLD	LLD	1,305.4 +/- 148.0	LLD
51	Milk	8/ 5/96	LLD	LLD	LLD	1,479.8 +/- 121.0	LLD

Milk Gamma Spectral Detail Report 1996

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 Period End	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	8/19/96	LLD	LLD	LLD	1,571.6 +/- 176.0	LLD
51	Milk	9/ 9/96	LLD	LLD	LLD	1,483.5 +/- 154.0	LLD
51	Milk	9/24/96	LLD	LLD	LLD	1,345.3 +/- 117.0	LLD
51	Milk	10/ 9/96	LLD	LLD	LLD	1,518.8 +/- 163.0	LLD
51	Milk	10/21/96	LLD	LLD	LLD	1,458.1 +/- 119.0	LLD
51	Milk	11/11/96	LLD	LLD	LLD	1,404.8 +/- 113.0	LLD
51	Milk	12/ 9/96	LLD	LLD	LLD	1,475.9 +/- 168.0	LLD
61	Milk	4/22/96	LLD	LLD	LLD	1,876.7 +/- 186.0	LLD
61	Milk	5/ 6/96	LLD	LLD	LLD	1,880.7 +/- 140.0	LLD
61	Milk	5/20/96	LLD	LLD	LLD	1,782.1 +/- 180.0	LLD
61	Milk	6/10/96	LLD	LLD	LLD	1,860.7 +/- 146.0	LLD
61	Milk	6/24/96	LLD	LLD	LLD	1,793.0 +/- 167.0	LLD

Milk Gamma Spectral Detail Report 1996

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 Period End	Ba-140	Cs-134	Cs-137	K-40	La-140
61	Milk	7/ 8/96	LLD	LLD	LLD	1,843.7 +/- 144.0	LLD
61	Milk	7/22/96	LLD	LLD	LLD	1,856.4 +/- 168.0	LLD
61	Milk	8/ 5/96	LLD	LLD	LLD	1,862.1 +/- 188.0	LLD
61	Milk	8/19/96	LLD	LLD	LLD	2,128.8 +/- 174.0	LLD
61	Milk	9/ 9/96	LLD	LLD	LLD	1,883.9 +/- 193.0	LLD
61	Milk	9/24/96	LLD	LLD	LLD	1,906.9 +/- 132.0	LLD
71	Milk	1/15/96	LLD	LLD	LLD	1,284.7 +/- 111.0	LLD
71	Milk	2/12/96	LLD	LLD	LLD	1,293.3 +/- 124.0	LLD
71	Milk	3/11/96	LLD	LLD	LLD	1,259.5 +/- 107.0	LLD
71	Milk	4/ 8/96	LLD	LLD	LLD	1,380.2 +/- 161.0	LLD
71	Milk	4/22/96	LLD	LLD	LLD	1,448.1 +/- 109.0	LLD
71	Milk	5/ 6/96	LLD	LLD	LLD	1,334.5 +/- 170.0	LLD

Milk Gamma Spectral Detail Report 1996

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 Period End	Ba-140	Cs-134	Cs-137	K-40	La-140
71	Milk	5/20/96	LLD	LLD	LLD	1,394.0 +/- 121.0	LLD
71	Milk	6/10/96	LLD	LLD	LLD	1,261.3 +/- 108.0	LLD
71	Milk	6/24/96	LLD	LLD	LLD	1,269.0 +/- 132.0	LLD
71	Milk	7/ 8/96	LLD	LLD	LLD	1,157.6 +/- 138.0	LLD
71	Milk	7/22/96	LLD	LLD	LLD	1,167.8 +/- 148.0	LLD
71	Milk	8/ 5/96	LLD	LLD	LLD	1,279.0 +/- 159.0	LLD
71	Milk	8/19/96	LLD	LLD	LLD	1,404.4 +/- 128.0	LLD
71	Milk	9/ 9/96	LLD	LLD	LLD	1,285.5 +/- 167.0	LLD
71	Milk	9/24/96	LLD	LLD	LLD	1,311.4 +/- 145.0	LLD
71	Milk	10/ 9/96	LLD	LLD	LLD	1,249.7 +/- 142.0	LLD
71	Milk	10/21/96	LLD	LLD	LLD	1,296.1 +/- 121.0	LLD
71	Milk	11/12/96	LLD	LLD	LLD	1,258.1 +/- 174.0	LLD

Milk Gamma Spectral Detail Report 1996

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 Period End	Ba-140	Cs-134	Cs-137	K-40	La-140
71	Milk	12/ 9/96	LLD	LLD	LLD	1,561.0 +/- 144.0	LLD

Milk Iodine Detail Report 1996

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 Period End	I-131
51	Milk	1/15/96	LLD
51	Milk	2/12/96	LLD
51	Milk	3/11/96	LLD
51	Milk	4/ 8/96	LLD
51	Milk	4/22/96	LLD
51	Milk	5/ 6/96	LLD
51	Milk	5/20/96	LLD
51	Milk	6/10/96	LLD
51	Milk	6/24/96	LLD
51	Milk	7/ 8/96	LLD
51	Milk	7/22/96	LLD
51	Milk	8/ 5/96	LLD
51	Milk	8/19/96	LLD
51	Milk	9/ 9/96	LLD
51	Milk	9/24/96	LLD
51	Milk	10/ 9/96	LLD
51	Milk	10/21/96	LLD
51	Milk	11/11/96	LLD
51	Milk	12/ 9/96	LLD
61	Milk	4/22/96	LLD
61	Milk	5/ 6/96	LLD
61	Milk	5/20/96	LLD
61	Milk	6/10/96	LLD
61	Milk	6/24/96	LLD
61	Milk	7/ 8/96	LLD
61	Milk	7/22/96	LLD
61	Milk	8/ 5/96	LLD
61	Milk	8/19/96	LLD
61	Milk	9/ 9/96	LLD
61	Milk	9/24/96	LLD
71	Milk	1/15/96	LLD
71	Milk	2/12/96	LLD
71	Milk	3/11/96	LLD
71	Milk	4/ 8/96	LLD
71	Milk	4/22/96	LLD
71	Milk	5/ 6/96	LLD
71	Milk	5/20/96	LLD
71	Milk	6/10/96	LLD
71	Milk	6/24/96	LLD
71	Milk	7/ 8/96	LLD
71	Milk	7/22/96	LLD
71	Milk	8/ 5/96	LLD
71	Milk	8/19/96	LLD
71	Milk	9/ 9/96	LLD
71	Milk	9/24/96	LLD
71	Milk	10/ 9/96	LLD
71	Milk	10/21/96	LLD
71	Milk	11/12/96	LLD

Milk Iodine Detail Report 1996

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 Period End	I-131
71	Milk	12/ 9/96	LLD

Sediment Gamma Spectral Detail Report 1996

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 Period End	Co-58	Co-60	Cs-134	Cs-137	K-40
25	Sediment	5/16/96	LLD	LLD	LLD	186.59 +/- 40.40	15,914.00 +/- 989.00
25	Sediment	10/ 7/96	LLD	LLD	LLD	LLD	13,203.00 +/- 561.00
26	Sediment	5/16/96	LLD	LLD	LLD	178.86 +/- 35.60	15,718.00 +/- 962.00
26	Sediment	10/ 7/96	LLD	LLD	LLD	LLD	13,501.00 +/- 615.00
27	Sediment	5/16/96	LLD	LLD	LLD	611.06 +/- 31.69	22,126.50 +/- 586.55
27	Sediment	10/ 7/96	LLD	LLD	LLD	1,054.40 +/- 63.90	16,630.00 +/- 840.00
32	Sediment	5/16/96	LLD	LLD	LLD	586.62 +/- 62.30	17,778.00 +/- 874.00
32	Sediment	10/ 7/96	LLD	LLD	LLD	1,254.30 +/- 58.20	26,192.00 +/- 864.00
63	Sediment	5/20/96	LLD	LLD	LLD	LLD	8,859.30 +/- 639.00
63	Sediment	10/10/96	LLD	LLD	LLD	LLD	10,194.00 +/- 563.00
64	Sediment	5/20/96	LLD	LLD	LLD	LLD	10,484.00 +/- 558.00
64	Sediment	10/10/96	LLD	LLD	LLD	LLD	5,848.20 +/- 409.00

Sediment Gamma Spectral Detail Report 1996

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 Period End	Co-58	Co-60	Cs-134	Cs-137	K-40
65	Sediment	5/20/96	LLD	LLD	LLD	LLD	11,027.00 +/- 629.00
65	Sediment	10/10/96	LLD	LLD	LLD	LLD	12,610.00 +/- 648.00

Soil Gamma Spectral Detail Report 1996

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/kg +/- 2 Sigma

Location	Sample Type	Collection Period End	Co-58	Co-60	Cs-134	Cs-137	K-40
3	Soil	4/ 3/96	LLD	LLD	LLD	217.51 +/- 21.00	10,719.00 +/- 383.00
3	Soil	10/ 4/96	LLD	LLD	LLD	230.87 +/- 25.17	9,471.95 +/- 433.57
4	Soil	4/ 3/96	LLD	LLD	LLD	LLD	13,043.00 +/- 536.00
4	Soil	10/ 4/96	LLD	LLD	LLD	LLD	12,820.00 +/- 535.00
6	Soil	4/ 3/96	LLD	LLD	LLD	151.82 +/- 18.70	15,055.00 +/- 505.00
6	Soil	10/ 4/96	LLD	LLD	LLD	139.41 +/- 26.90	13,951.00 +/- 571.00
7	Soil	4/ 3/96	LLD	LLD	LLD	334.17 +/- 38.00	11,735.00 +/- 623.00
7	Soil	10/ 4/96	LLD	LLD	LLD	301.13 +/- 25.40	11,307.00 +/- 506.00
9	Soil	4/ 3/96	LLD	LLD	LLD	349.97 +/- 24.30	10,845.00 +/- 450.00
9	Soil	10/ 4/96	LLD	LLD	LLD	356.95 +/- 27.70	10,470.00 +/- 510.00
12	Soil	4/ 3/96	LLD	LLD	LLD	331.22 +/- 25.10	11,248.00 +/- 466.00
12	Soil	10/ 4/96	LLD	LLD	LLD	326.01 +/- 31.70	10,577.00 +/- 522.00

Soil Gamma Spectral Detail Report 1996

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/kg dry +/- 2 Sigma

Location	Sample Type	Collection Period End	Co-58	Co-60	Cs-134	Cs-137	K-40
35	Soil	4/ 3/96	LLD	LLD	LLD	181.33 +/- 16.83	10,466.00 +/- 299.91
35	Soil	10/ 4/96	LLD	LLD	LLD	166.69 +/- 21.80	10,441.00 +/- 484.00

TLD Gamma Dose Detail Report 1996

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 mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period	Exposure
1	TLD	1/ 5/96 to 4/ 4/96	11.07 +/- 0.40
1	TLD	4/ 4/96 to 7/ 1/96	14.89 +/- 0.22
1	TLD	7/ 1/96 to 10/ 4/96	14.11 +/- 0.24
1	TLD	10/ 4/96 to 1/ 6/97	14.05 +/- 0.21
3	TLD	1/ 5/96 to 4/ 4/96	13.21 +/- 0.21
3	TLD	4/ 4/96 to 7/ 1/96	16.54 +/- 0.23
3	TLD	7/ 1/96 to 10/ 4/96	16.26 +/- 0.31
3	TLD	10/ 4/96 to 1/ 6/97	15.67 +/- 0.21
4	TLD	1/ 5/96 to 4/ 4/96	13.57 +/- 0.25
4	TLD	4/ 4/96 to 7/ 1/96	16.21 +/- 0.22
4	TLD	7/ 1/96 to 10/ 4/96	17.38 +/- 0.20
4	TLD	10/ 4/96 to 1/ 6/97	15.69 +/- 0.21
5	TLD	1/ 5/96 to 4/ 4/96	13.51 +/- 0.21
5	TLD	4/ 4/96 to 7/ 1/96	15.29 +/- 0.22
5	TLD	7/ 1/96 to 10/ 4/96	15.53 +/- 0.22
5	TLD	10/ 4/96 to 1/ 6/97	16.04 +/- 0.19
6	TLD	1/ 8/96 to 4/ 4/96	15.48 +/- 0.33
6	TLD	4/ 4/96 to 7/ 1/96	17.16 +/- 0.29
6	TLD	7/ 1/96 to 10/ 4/96	19.18 +/- 0.19
6	TLD	10/ 4/96 to 1/ 6/97	16.44 +/- 0.21
7	TLD	1/ 5/96 to 4/ 4/96	13.55 +/- 0.20
7	TLD	4/ 4/96 to 7/ 1/96	15.39 +/- 0.21
7	TLD	7/ 1/96 to 10/ 4/96	16.41 +/- 0.27
7	TLD	10/ 4/96 to 1/ 6/97	14.85 +/- 0.20
8	TLD	1/ 5/96 to 4/ 4/96	11.41 +/- 0.23
8	TLD	4/ 4/96 to 7/ 1/96	13.11 +/- 0.35
8	TLD	7/ 1/96 to 10/ 4/96	13.57 +/- 0.20
8	TLD	10/ 4/96 to 1/ 6/97	12.55 +/- 0.30
9	TLD	1/ 5/96 to 4/ 4/96	
9	TLD	4/ 4/96 to 7/ 1/96	14.60 +/- 0.21
9	TLD	7/ 1/96 to 10/ 4/96	11.84 +/- 0.31
9	TLD	10/ 4/96 to 1/ 6/97	12.74 +/- 0.24
10	TLD	1/ 5/96 to 4/ 4/96	16.74 +/- 0.20
10	TLD	4/ 4/96 to 7/ 1/96	17.90 +/- 0.20
10	TLD	7/ 1/96 to 10/ 4/96	19.33 +/- 0.23
10	TLD	10/ 4/96 to 1/ 6/97	17.04 +/- 0.33
11	TLD	1/ 5/96 to 4/ 4/96	13.50 +/- 0.22
11	TLD	4/ 4/96 to 7/ 1/96	13.57 +/- 0.21
11	TLD	7/ 1/96 to 10/ 4/96	16.46 +/- 0.23

TLD Gamma Dose Detail Report 1996

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 mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period			Exposure		
11	TLD	10/ 4/96	to	1/ 6/97	14.01	+/-	0.18
12	TLD	1/ 5/96	to	4/ 4/96	12.62	+/-	0.96
12	TLD	4/ 4/96	to	7/ 1/96	16.47	+/-	0.23
12	TLD	7/ 1/96	to	10/ 4/96	17.14	+/-	0.54
12	TLD	10/ 4/96	to	1/ 6/97	14.94	+/-	0.21
13	TLD	1/ 5/96	to	4/ 4/96	13.50	+/-	0.22
13	TLD	4/ 4/96	to	7/ 1/96	15.22	+/-	0.21
13	TLD	7/ 1/96	to	10/ 4/96	16.76	+/-	0.35
13	TLD	10/ 4/96	to	1/ 6/97	14.89	+/-	0.21
14	TLD	1/ 5/96	to	4/ 4/96	13.50	+/-	0.25
14	TLD	4/ 4/96	to	7/ 1/96	14.87	+/-	0.23
14	TLD	7/ 1/96	to	10/ 4/96			
14	TLD	10/ 4/96	to	1/ 6/97	12.71	+/-	0.31
15	TLD	1/ 5/96	to	4/ 4/96	13.39	+/-	0.21
15	TLD	4/ 4/96	to	7/ 1/96	13.43	+/-	0.34
15	TLD	7/ 1/96	to	10/ 4/96	15.96	+/-	0.24
15	TLD	10/ 4/96	to	1/ 6/97	14.02	+/-	0.19
21	TLD	1/ 7/96	to	4/ 4/96	15.48	+/-	0.39
21	TLD	4/ 4/96	to	7/ 1/96	17.59	+/-	0.29
21	TLD	7/ 1/96	to	10/ 4/96	19.76	+/-	0.23
21	TLD	10/ 4/96	to	1/ 6/97	17.63	+/-	0.17
23	TLD	1/ 7/96	to	4/ 4/96	14.91	+/-	0.23
23	TLD	4/ 4/96	to	7/ 1/96	16.55	+/-	0.17
23	TLD	7/ 1/96	to	10/ 4/96	20.23	+/-	0.26
23	TLD	10/ 4/96	to	1/ 6/97	16.60	+/-	0.19
24	TLD	1/ 6/96	to	4/ 4/96	14.64	+/-	0.25
24	TLD	4/ 4/96	to	7/ 1/96	17.42	+/-	0.28
24	TLD	7/ 1/96	to	10/ 4/96	17.75	+/-	0.24
24	TLD	10/ 4/96	to	1/ 6/97	15.20	+/-	0.20
29	TLD	1/ 5/96	to	4/ 4/96	15.79	+/-	0.25
29	TLD	4/ 4/96	to	7/ 1/96	22.46	+/-	0.28
29	TLD	7/ 1/96	to	10/ 4/96	19.73	+/-	0.22
29	TLD	10/ 4/96	to	1/ 6/97	18.54	+/-	0.20
30	TLD	1/ 5/96	to	4/ 4/96	12.61	+/-	0.21
30	TLD	4/ 4/96	to	7/ 1/96	14.76	+/-	0.19
30	TLD	7/ 1/96	to	10/ 4/96	15.77	+/-	0.29
30	TLD	10/ 4/96	to	1/ 6/97	14.20	+/-	0.20
31	TLD	1/ 5/96	to	4/ 4/96	14.82	+/-	0.23
31	TLD	4/ 4/96	to	7/ 1/96	16.82	+/-	0.32
31	TLD	7/ 1/96	to	10/ 4/96	18.55	+/-	0.25

TLD Gamma Dose Detail Report 1996

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 mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period			Exposure		
31	TLD	10/ 4/96	to	1/ 6/97	16.97	+/-	0.21
33	TLD	1/ 5/96	to	4/ 4/96	15.16	+/-	0.29
33	TLD	4/ 4/96	to	7/ 1/96	18.08	+/-	0.41
33	TLD	7/ 1/96	to	10/ 4/96	19.08	+/-	0.21
33	TLD	10/ 4/96	to	1/ 6/97	18.39	+/-	0.19
35	TLD	1/ 5/96	to	4/ 4/96	11.36	+/-	0.21
35	TLD	4/ 4/96	to	7/ 1/96	14.20	+/-	0.17
35	TLD	7/ 1/96	to	10/ 4/96	14.46	+/-	0.22
35	TLD	10/ 4/96	to	1/ 6/97	13.85	+/-	0.19
36	TLD	1/ 7/96	to	4/ 4/96	15.16	+/-	0.32
36	TLD	4/ 4/96	to	7/ 1/96	19.74	+/-	0.21
36	TLD	7/ 1/96	to	10/ 4/96	20.67	+/-	0.37
36	TLD	10/ 4/96	to	1/ 6/97	19.53	+/-	0.20
53	TLD	1/ 5/96	to	4/ 4/96	13.57	+/-	0.25
53	TLD	4/ 4/96	to	7/ 1/96	15.86	+/-	0.27
53	TLD	7/ 1/96	to	10/ 4/96	16.28	+/-	0.29
53	TLD	10/ 4/96	to	1/ 6/97	16.85	+/-	0.21
54	TLD	1/ 5/96	to	4/ 4/96			
54	TLD	4/ 4/96	to	7/ 1/96	15.70	+/-	0.30
54	TLD	7/ 1/96	to	10/ 4/96	14.02	+/-	0.20
54	TLD	10/ 4/96	to	1/ 6/97	15.27	+/-	0.19
55	TLD	1/ 7/96	to	4/ 4/96	11.37	+/-	0.25
55	TLD	4/ 4/96	to	7/ 1/96	14.54	+/-	0.20
55	TLD	7/ 1/96	to	10/ 4/96	15.47	+/-	0.21
55	TLD	10/ 4/96	to	1/ 6/97	14.14	+/-	0.20
56	TLD	1/ 5/96	to	4/ 4/96	12.39	+/-	0.22
56	TLD	4/ 4/96	to	7/ 1/96	12.92	+/-	0.46
56	TLD	7/ 1/96	to	10/ 4/96	15.01	+/-	0.24
56	TLD	10/ 4/96	to	1/ 6/97	12.75	+/-	0.20
58	TLD	1/ 5/96	to	4/ 4/96	12.36	+/-	0.20
58	TLD	4/ 4/96	to	7/ 1/96	12.98	+/-	0.38
58	TLD	7/ 1/96	to	10/ 4/96	15.58	+/-	0.31
58	TLD	10/ 4/96	to	1/ 6/97	12.51	+/-	0.29

TLD Gamma Dose Detail Report 1996

Radiological Environmental Monitoring Program Detail Data
Perry N uclear Power Plant, Lake County Ohio Docket no. : 50-440/50-441
Sample Frequency is: Quarterly Results in mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period			Exposure		
1	TLB	1/ 5/96	to	4/ 4/96	9.99	+/-	0.21
1	TLB	4/ 4/96	to	7/ 1/96	15.39	+/-	0.20
1	TLB	7/ 1/96	to	10/ 4/96	11.49	+/-	0.26
1	TLB	10/ 4/96	to	1/ 6/97	15.17	+/-	0.17
3	TLB	1/ 5/96	to	4/ 4/96	12.39	+/-	0.21
3	TLB	4/ 4/96	to	7/ 1/96	16.14	+/-	0.24
3	TLB	7/ 1/96	to	10/ 4/96	15.15	+/-	0.27
3	TLB	10/ 4/96	to	1/ 6/97	16.01	+/-	0.20
4	TLB	1/ 5/96	to	4/ 4/96	12.70	+/-	0.21
4	TLB	4/ 4/96	to	7/ 1/96	15.52	+/-	0.31
4	TLB	7/ 1/96	to	10/ 4/96	17.04	+/-	0.20
4	TLB	10/ 4/96	to	1/ 6/97	17.85	+/-	0.18
5	TLB	1/ 5/96	to	4/ 4/96	13.00	+/-	0.21
5	TLB	4/ 4/96	to	7/ 1/96	14.91	+/-	0.24
5	TLB	7/ 1/96	to	10/ 4/96	15.74	+/-	0.34
5	TLB	10/ 4/96	to	1/ 6/97	14.77	+/-	0.18
6	TLB	1/ 8/96	to	4/ 4/96	14.73	+/-	0.32
6	TLB	4/ 4/96	to	7/ 1/96	16.08	+/-	0.29
6	TLB	7/ 1/96	to	10/ 4/96	17.15	+/-	0.21
6	TLB	10/ 4/96	to	1/ 6/97	15.54	+/-	0.21
7	TLB	1/ 5/96	to	4/ 4/96	12.97	+/-	0.22
7	TLB	4/ 4/96	to	7/ 1/96	14.46	+/-	0.21
7	TLB	7/ 1/96	to	10/ 4/96	15.91	+/-	0.35
7	TLB	10/ 4/96	to	1/ 6/97	14.37	+/-	0.18
8	TLB	1/ 5/96	to	4/ 4/96	11.81	+/-	0.18
8	TLB	4/ 4/96	to	7/ 1/96	12.88	+/-	0.28
8	TLB	7/ 1/96	to	10/ 4/96	13.98	+/-	0.20
8	TLB	10/ 4/96	to	1/ 6/97	12.72	+/-	0.22
9	TLB	1/ 5/96	to	4/ 4/96			
9	TLB	4/ 4/96	to	7/ 1/96	12.84	+/-	0.25
9	TLB	7/ 1/96	to	10/ 4/96	12.73	+/-	0.22
9	TLB	10/ 4/96	to	1/ 6/97	12.73	+/-	0.18
10	TLB	1/ 5/96	to	4/ 4/96	12.19	+/-	0.18
10	TLB	4/ 4/96	to	7/ 1/96	17.40	+/-	0.53
10	TLB	7/ 1/96	to	10/ 4/96	15.46	+/-	0.25
10	TLB	10/ 4/96	to	1/ 6/97	16.82	+/-	0.47
11	TLB	1/ 5/96	to	4/ 4/96	12.56	+/-	0.17
11	TLB	4/ 4/96	to	7/ 1/96	13.74	+/-	0.18
11	TLB	7/ 1/96	to	10/ 4/96	15.62	+/-	0.32
11	TLB	10/ 4/96	to	1/ 6/97	13.50	+/-	0.18

TLD Gamma Dose Detail Report 1996

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 mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period	Exposure
12	TLB	1/ 5/96 to 4/ 4/96	11.15 +/- 0.34
12	TLB	4/ 4/96 to 7/ 1/96	15.05 +/- 0.19
12	TLB	7/ 1/96 to 10/ 4/96	15.24 +/- 0.22
12	TLB	10/ 4/96 to 1/ 6/97	15.53 +/- 0.20
13	TLB	1/ 5/96 to 4/ 4/96	10.16 +/- 0.27
13	TLB	4/ 4/96 to 7/ 1/96	14.14 +/- 0.27
13	TLB	7/ 1/96 to 10/ 4/96	12.88 +/- 0.21
13	TLB	10/ 4/96 to 1/ 6/97	14.15 +/- 0.18
14	TLB	1/ 5/96 to 4/ 4/96	9.94 +/- 0.34
14	TLB	4/ 4/96 to 7/ 1/96	13.72 +/- 0.19
14	TLB	7/ 1/96 to 10/ 4/96	12.82 +/- 0.22
14	TLB	10/ 4/96 to 1/ 6/97	13.94 +/- 0.19
15	TLB	1/ 5/96 to 4/ 4/96	1 38 +/- 0.35
15	TLB	4/ 4/96 to 7/ 1/96	12.74 +/- 0.28
15	TLB	7/ 1/96 to 10/ 4/96	13.10 +/- 0.34
15	TLB	10/ 4/96 to 1/ 6/97	13.86 +/- 0.20
21	TLB	1/ 7/96 to 4/ 4/96	16.86 +/- 0.23
21	TLB	4/ 4/96 to 7/ 1/96	17.18 +/- 0.27
21	TLB	7/ 1/96 to 10/ 4/96	19.28 +/- 0.22
21	TLB	10/ 4/96 to 1/ 6/97	18.40 +/- 0.19
23	TLB	1/ 7/96 to 4/ 4/96	14.96 +/- 0.31
23	TLB	4/ 4/96 to 7/ 1/96	15.79 +/- 0.19
23	TLB	7/ 1/96 to 10/ 4/96	18.02 +/- 0.22
23	TLB	10/ 4/96 to 1/ 6/97	16.73 +/- 0.22
24	TLB	1/ 6/96 to 4/ 4/96	14.99 +/- 0.36
24	TLB	4/ 4/96 to 7/ 1/96	16.24 +/- 0.24
24	TLB	7/ 1/96 to 10/ 4/96	17.83 +/- 0.21
24	TLB	10/ 4/96 to 1/ 6/97	16.07 +/- 0.18
29	TLB	1/ 5/96 to 4/ 4/96	15.07 +/- 0.23
29	TLB	4/ 4/96 to 7/ 1/96	
29	TLB	7/ 1/96 to 10/ 4/96	18.74 +/- 0.34
29	TLB	10/ 4/96 to 1/ 6/97	18.35 +/- 0.20
30	TLB	1/ 5/96 to 4/ 4/96	12.18 +/- 0.21
30	TLB	4/ 4/96 to 7/ 1/96	13.91 +/- 0.26
30	TLB	7/ 1/96 to 10/ 4/96	15.64 +/- 0.33
30	TLB	10/ 4/96 to 1/ 6/97	13.92 +/- 0.18
31	TLB	1/ 5/96 to 4/ 4/96	14.66 +/- 0.40
31	TLB	4/ 4/96 to 7/ 1/96	15.98 +/- 0.27
31	TLB	7/ 1/96 to 10/ 4/96	18.52 +/- 0.25
31	TLB	10/ 4/96 to 1/ 6/97	16.82 +/- 0.31

TLD Gamma Dose Detail Report 1996

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 mrem/qtr +/- 2 Sigma

Location	Sample Type	Collection Period			Exposure		
33	TLB	1/ 5/96	to	4/ 4/96	14.91	+/-	0.30
33	TLB	4/ 4/96	to	7/ 1/96	18.04	+/-	0.17
33	TLB	7/ 1/96	to	10/ 4/96	18.32	+/-	0.34
33	TLB	10/ 4/96	to	1/ 6/97	17.72	+/-	0.16
35	TLB	1/ 5/96	to	4/ 4/96	10.83	+/-	0.25
35	TLB	4/ 4/96	to	7/ 1/96	13.47	+/-	0.17
35	TLB	7/ 1/96	to	10/ 4/96	13.60	+/-	0.19
35	TLB	10/ 4/96	to	1/ 6/97	13.77	+/-	0.17
36	TLB	1/ 7/96	to	4/ 4/96	14.32	+/-	0.24
36	TLB	4/ 4/96	to	7/ 1/96	19.14	+/-	0.19
36	TLB	7/ 1/96	to	10/ 4/96	18.17	+/-	0.23
36	TLB	10/ 4/96	to	1/ 6/97	19.43	+/-	0.20
53	TLB	1/ 5/96	to	4/ 4/96	11.71	+/-	0.17
53	TLB	4/ 4/96	to	7/ 1/96	14.42	+/-	0.22
53	TLB	7/ 1/96	to	10/ 4/96	15.62	+/-	0.28
53	TLB	10/ 4/96	to	1/ 6/97	14.34	+/-	0.19
54	TLB	1/ 5/96	to	4/ 4/96			
54	TLB	4/ 4/96	to	7/ 1/96	15.41	+/-	0.27
54	TLB	7/ 1/96	to	10/ 4/96	17.11	+/-	0.24
54	TLB	10/ 4/96	to	1/ 6/97	15.21	+/-	0.19
55	TLB	1/ 7/96	to	4/ 4/96	10.72	+/-	0.34
55	TLB	4/ 4/96	to	7/ 1/96	15.11	+/-	0.23
55	TLB	7/ 1/96	to	10/ 4/96	15.11	+/-	0.22
55	TLB	10/ 4/96	to	1/ 6/97	15.21	+/-	0.20
56	TLB	1/ 5/96	to	4/ 4/96	10.87	+/-	0.22
56	TLB	4/ 4/96	to	7/ 1/96	12.47	+/-	0.39
56	TLB	7/ 1/96	to	10/ 4/96	14.36	+/-	0.29
56	TLB	10/ 4/96	to	1/ 6/97	12.72	+/-	0.20
58	TLB	1/ 5/96	to	4/ 4/96	11.90	+/-	0.17
58	TLB	4/ 4/96	to	7/ 1/96	13.62	+/-	0.20
58	TLB	7/ 1/96	to	10/ 4/96	15.08	+/-	0.21
58	TLB	10/ 4/96	to	1/ 6/97	14.19	+/-	0.19

TLD Gamma Dose Detail Report 1996

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Annual Results in mrem/yr +/- 2 Sigma

Location	Sample Type	Collection Period	Exposure
1	TLA	1/ 5/96 to 1/ 6/97	52.60 +/- 0.40
3	TLA	1/ 5/96 to 1/ 6/97	54.31 +/- 0.16
4	TLA	1/ 5/96 to 1/ 6/97	60.85 +/- 0.22
5	TLA	1/ 5/96 to 1/ 6/97	50.35 +/- 0.19
6	TLA	1/ 8/96 to 1/ 6/97	58.41 +/- 0.15
7	TLA	1/ 5/96 to 1/ 6/97	55.46 +/- 0.21
8	TLA	1/ 5/96 to 1/ 6/97	48.71 +/- 0.35
9	TLA	4/ 8/96 to 1/ 6/97	46.42 +/- 0.19
10	TLA	1/ 5/96 to 1/ 6/97	70.60 +/- 0.12
11	TLA	1/ 5/96 to 1/ 6/97	50.62 +/- 0.14
12	TLA	1/ 5/96 to 1/ 6/97	56.73 +/- 0.20
13	TLA	1/ 5/96 to 1/ 6/97	54.73 +/- 0.13
14	TLA	1/ 5/96 to 1/ 6/97	54.71 +/- 0.14
15	TLA	1/ 5/96 to 1/ 6/97	52.20 +/- 0.12
21	TLA	1/ 7/96 to 1/ 6/97	60.51 +/- 0.32
23	TLA	1/ 7/96 to 1/ 6/97	57.97 +/- 0.09
24	TLA	1/ 6/96 to 1/ 6/97	51.00 +/- 0.15
29	TLA	1/ 5/96 to 1/ 6/97	72.70 +/- 0.32
30	TLA	1/ 5/96 to 1/ 6/97	52.63 +/- 0.21
31	TLA	1/ 5/96 to 1/ 6/97	64.67 +/- 0.39
33	TLA	1/ 5/96 to 1/ 6/97	64.61 +/- 0.35
35	TLA	1/ 5/96 to 1/ 6/97	50.65 +/- 0.16
36	TLA	1/ 7/96 to 1/ 6/97	68.82 +/- 0.21

TLD Gamma Dose Detail Report 1996

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Annual Results in mrem/yr +/- 2 Sigma

Location	Sample Type	Collection Period	Exposure
53	TLA	1/ 5/96 to 1/ 6/97	55.09 +/- 0.14
54	TLA	4/ 8/96 to 1/ 6/97	51.04 +/- 0.19
55	TLA	1/ 7/96 to 1/ 6/97	63.64 +/- 0.20
56	TLA	1/ 5/96 to 1/ 6/97	51.21 +/- 0.22
58	TLA	1/ 5/96 to 1/ 6/97	50.27 +/- 0.16

Vegetation Gamma Spectral Detail Report 1996

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 Period End	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
6	Vegetation	5/20/96	2,117.50 +/- 353.00 LLD	LLD 6,600.50 +/- 704.00	LLD	LLD	LLD
6	Vegetation	6/19/96	3,766.70 +/- 329.00 LLD	LLD 5,575.40 +/- 507.00	LLD	LLD	LLD
6	Vegetation	7/18/96	3,061.60 +/- 343.00 LLD	LLD 4,583.80 +/- 517.00	LLD	LLD	LLD
6	Vegetation	8/20/96	3,937.10 +/- 419.00 LLD	LLD 7,228.00 +/- 685.00	LLD	LLD	LLD
6	Vegetation	9/20/96	2,388.10 +/- 245.00 LLD	LLD 3,206.50 +/- 341.00	LLD	LLD	LLD
7	Vegetation	5/20/96	4,613.20 +/- 424.00 LLD	LLD 6,586.20 +/- 681.00	LLD	LLD	LLD
7	Vegetation	6/19/96	3,620.80 +/- 310.00 LLD	LLD 4,753.40 +/- 484.00	LLD	LLD	LLD
7	Vegetation	7/18/96	2,721.20 +/- 382.00 LLD	LLD 5,385.40 +/- 559.00	LLD	LLD	LLD
7	Vegetation	8/20/96	999.29 +/- 166.00 LLD	LLD 5,978.70 +/- 450.00	LLD	LLD	LLD
7	Vegetation	9/20/96	2,830.80 +/- 216.00 LLD	LLD 3,660.60 +/- 321.00	LLD	LLD	LLD
7	Vegetation	10/15/96	4,261.70 +/- 272.00 LLD	LLD 4,981.10 +/- 380.00	LLD	LLD	LLD
35	Vegetation	5/20/96	3,122.00 +/- 404.00 LLD	LLD 5,945.90 +/- 72 [illegible]0	LLD	LLD	LLD

Vegetation Gamma Spectral Detail Report 1996

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 Period End	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
35	Vegetation	6/19/96	2,880.30 +/- 578.00 LLD	LLD 9,837.10 +/- 857.00	LLD	LLD	LLD
35	Vegetation	7/18/96	1,689.50 +/- 242.00 LLD	LLD 5,594.40 +/- 509.00	LLD	LLD	LLD
35	Vegetation	8/20/96	942.65 +/- 271.00 LLD	LLD 5,516.50 +/- 702.00	LLD	LLD	LLD
35	Vegetation	9/20/96	2,400.60 +/- 198.00 LLD	LLD 3,039.10 +/- 256.00	LLD	LLD	LLD
35	Vegetation	10/15/96	7,621.30 +/- 288.00 LLD	LLD 6,484.50 +/- 373.00	LLD	LLD	LLD
42	Vegetation	5/20/96	1,751.50 +/- 239.00 LLD	LLD 5,091.30 +/- 408.00	LLD	LLD	LLD
42	Vegetation	6/19/96	5,317.10 +/- 237.62 LLD	LLD 4,923.20 +/- 312.97	LLD	LLD	LLD
42	Vegetation	7/18/96	906.21 +/- 241.00 LLD	LLD 4,350.40 +/- 518.00	LLD	LLD	LLD
42	Vegetation	8/20/96	650.00 +/- 263.00 LLD	LLD 4,908.20 +/- 527.00	LLD	LLD	LLD
42	Vegetation	9/20/96	2,000.60 +/- 191.00 LLD	LLD 2,797.80 +/- 310.00	LLD	LLD	LLD
42	Vegetation	10/15/96	3,305.30 +/- 273.00 LLD	LLD 3,662.20 +/- 401.00	LLD	LLD	LLD

Water Gamma Spectral Detail Report 1996

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 End	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
28	Water	1/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	2/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	3/28/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	4/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	5/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	6/27/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	7/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	8/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	9/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	10/31/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	11/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	12/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1996

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 End	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
34	Water	1/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	2/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	3/28/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	4/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	5/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	6/27/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	7/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	8/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	9/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	10/31/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	11/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	12/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1996

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 End	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
36	Water	1/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	2/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	3/28/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	4/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	5/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	6/27/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	7/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	8/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	9/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	10/31/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	11/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	12/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1996

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 End	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
59	Water	4/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	5/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	6/27/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	7/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	8/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	9/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	10/31/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	11/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	12/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	4/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	5/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	6/27/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1996

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 End	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
60	Water	7/25/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	8/29/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	9/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	10/31/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	11/26/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	12/30/96	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gross Beta Detail Report 1996

Radiological Environmental Monitoring Program Data Summary

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

Sample Frequency is: Monthly Resuits in pCi/l +/- 2 Sigma

		Location				
Collection Period	Sample Type	28	34	36	59	60
12/28/95 to 1/25/96	Water	LLD	LLD	LLD		
1/25/96 to 2/29/96	Water	LLD	LLD	LLD		
2/29/96 to 3/28/96	Water	3.04 +/- 0.67	LLD	LLD		
3/28/96 to 4/[illegible]/96	Water	LLD	LLD	LLD	3.12 +/- 0.67	4.40 +/- 0.73
4/26/96 to 5/30/96	Water	LLD	LLD	LLD	LLD	LLD
5/30/96 to 6/27/96	Water	LLD	LLD	LLD	LLD	LLD
6/27/96 to 7/25/96	Water	3.05 +/- 0.66	LLD	LLD	LLD	3.31 +/- 0.67
7/25/96 to 8/29/96	Water	LLD	LLD	LLD	LLD	LLD
8/29/96 to 9/26/96	Water	LLD	LLD	LLD	LLD	LLD
9/26/96 to 10/31/96	Water	LLD	LLD	LLD	3.31 +/- 0.62	4.38 +/- 0.68
10/31/96 to 11/26/96	Water	LLD	LLD	LLD	LLD	LLD
11/26/96 to 12/30/96	Water	LLD	LLD	LLD	3.14 +/- 0.63	3.09 +/- 0.67

Water Tritium Detail Report 1996

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 Period End	H-3
28	Water	3/28/96	LLD
28	Water	6/27/96	LLD
28	Water	9/26/96	LLD
28	Water	12/30/96	LLD
34	Water	3/28/96	LLD
34	Water	6/27/96	LLD
34	Water	9/26/96	LLD
34	Water	12/30/96	LLD
36	Water	3/28/96	LLD
36	Water	6/27/96	LLD
36	Water	9/26/96	LLD
36	Water	12/30/96	LLD
59	Water	6/27/96	LLD
59	Water	9/26/96	LLD
59	Water	12/30/96	LLD
60	Water	6/27/96	LLD
60	Water	9/26/96	LLD
60	Water	12/30/96	LLD

FOR MORE INFORMATION, WRITE OR CALL:

PERRY NUCLEAR POWER PLANT

ENVIRONMENTAL UNIT

10 CENTER ROAD P.O. BOX 97

PERRY, OHIO 44081

(216) 280-5601