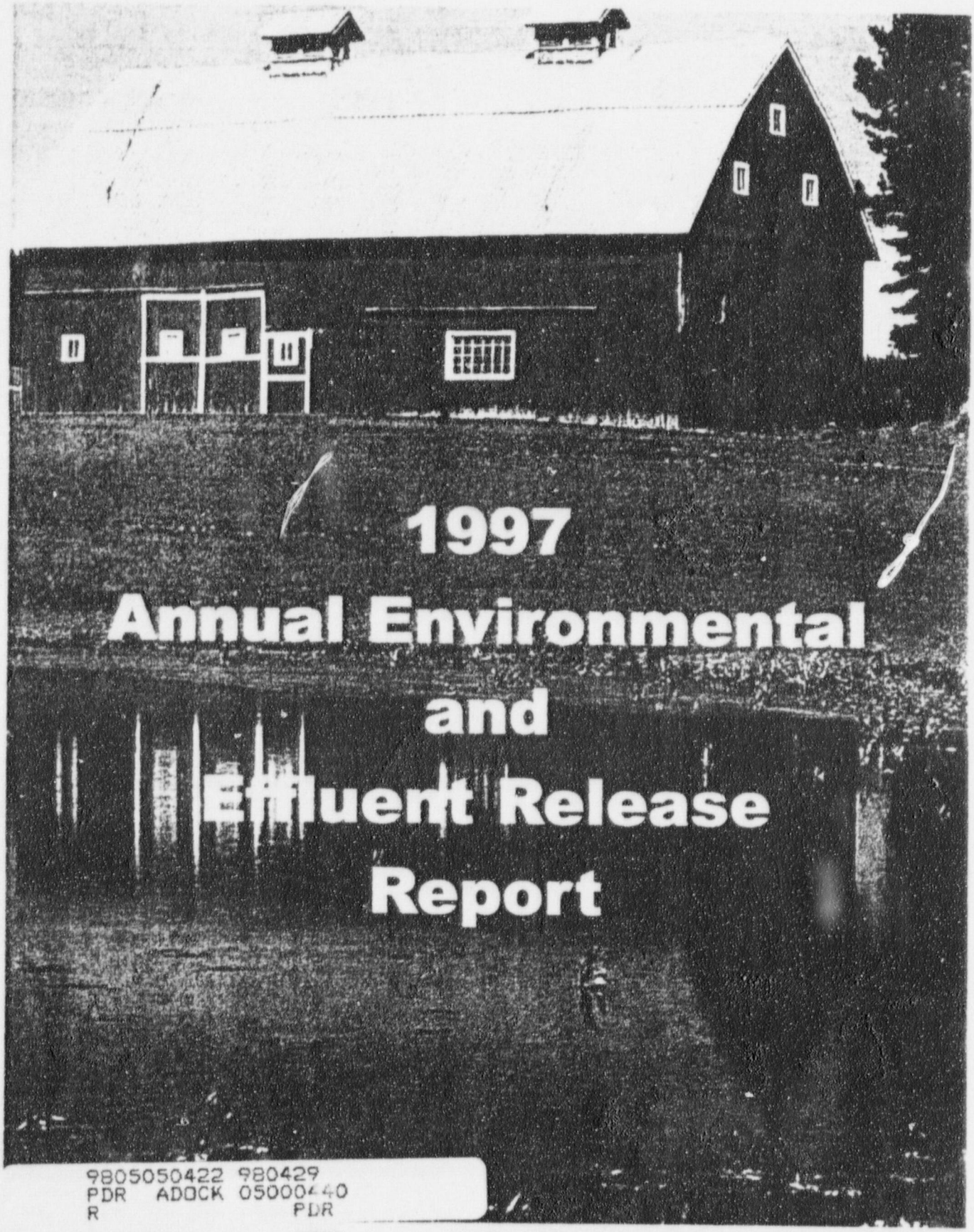
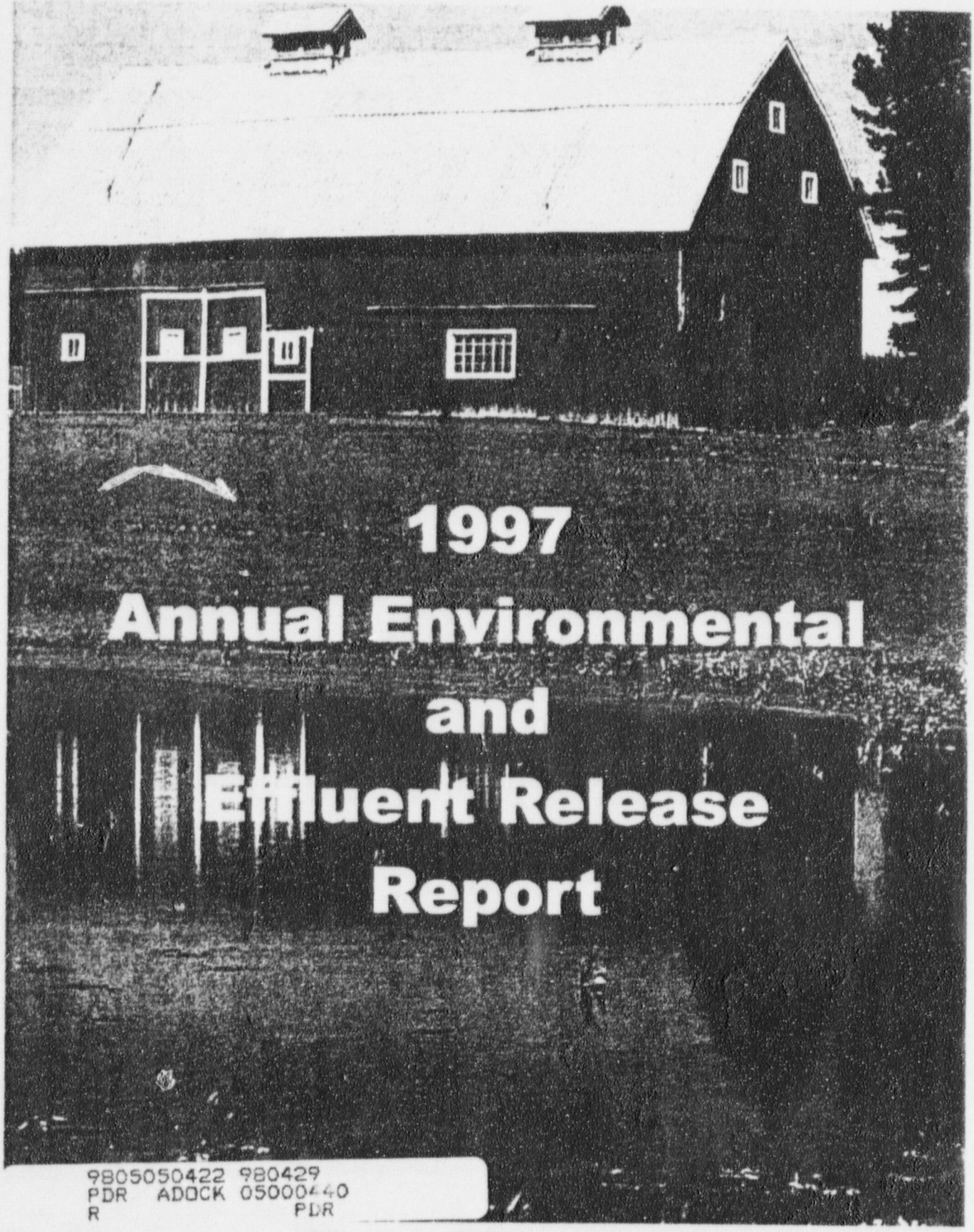
Perry Nuclear Power Plant



1997 Annual Environmental and Effluent Release Report

FirstEnergy

Perry Nuclear Power Plant



1997 Annual Environmental and Effluent Release Report

FirstEnergy

ANNUAL ENVIRONMENTAL AND EFFLUENT RELEASE REPORT FOR PERRY NUCLEAR POWER PLANT

JANUARY 1, 1997 TO DECEMBER 31, 1997

PREPARED BY:

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PERRY, OHIO

APRIL 1998

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, 1997. 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 1997 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 0.002 mrem (0.07% of the applicable limit). The hypothetical maximum individual dose potentially received by an individual resulting from PNPP gaseous effluents was 0.644 mrad (6.4% of the applicable limit). The summation of the hypothetical maximum individual dose from effluents in 1997 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 consisted of waste generated during water treatment, radioactive material generated during normal daily operations and maintenance, and irradiated components. PNPP complied with all regulations governing radioactive shipments in 1997, making 12 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 1997 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 1997 results are similar to those observed in both preoperational and operational programs from prior years. Only background environmental radioactivity was detected.

- 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 218.19pCi/kg in 1997, which is at the low end of the range of 208.5 to 1104.05pCi/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 indicated 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 1997 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 585.29 pCi/kg, which is well within the range of up to 864pCi/kg established since 1981.

- Direct radiation measurements showed no change from previous years. Indicator locations averaged 55.22 mrem/year and control locations averaged 54.70mrem/year. This shows that, in 1997, 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 1997 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 1997.

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. One special report was submitted in 1997.

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 occurringradionuclide 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 themicrocurie (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, therem 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 1997 Sampling Program results. However, the data on these radionuclides are included in Appendix B: 1997 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). 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, shredding and compacting, or incinerating 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 the Offsite Dose Calculation Manual. The limits are set to comply with 10CFR20 Appendix B, 10CFR50 Appendix I and 40CFR190. 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. There are no other nearby fuel cycle sources therefore, 40CFR190 limits were not exceeded. The limits are described below. None of these limits were exceeded in 1997.

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 2, Column 2 for radionuclides other than dissolved or entrained noble gases, as required by the ODCM. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-4 μCi/ml total activity. These values are the maximum effluent 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.

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 allradionuclides 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.

RELEASE SUMMARY

Effluents are sampled and analyzed to identify both the type and quantity ofradionuclides 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 1997.

Table 4 provides information on the nuclide composition for the liquid releases. If aradionuclide 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 were met or were below the levels required by the Technical Specifications/ODCM.

Table 3: Liquid batch releases

Item	Value
Number of batch releases	29
Total time period for batch releases (minutes)	6244
Maximum time for a batch release (minutes)	727
Average time period for a batch release (minutes)	215
Minimum time for a batch release (minutes)	1
Average stream flow during periods of release of effluent into a flowing stream (liters/minute)	1.72E+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	Note 1	5.74E-04	3.42E-03	2.45E-03	1.00E+1
2. Average diluted concentration during period	µCi/ml	N/A	2.37E-11	1.56E-10	1.02E-10	
3. Percent of applicable 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. Tritium						
1. Total release	Ci	Note 1	2.60E+0	4.28E+0	5.67E-01	1.00+E1
2. Average diluted concentration during period	µCi/ml	N/A	1.07E-07	1.95E-7	2.36E-08	
3. Percent of applicable limit	%	N/A	<<1%	<<1%	<<1%	
C. Dissolved and entrained gases						
1. Total release	Ci	None	7.48E-04	1.02E-03	<LLD	1.00E+1
2. Average diluted concentration during period	µCi/ml	N/A	3.09E-11	4.64E-11	<LLD	
3. Percent of applicable limit	%	N/A	<<1%	<<1%	<<1%	
D. Gross alpha radioactivity						
1. Total release	Ci	Note 1	<LLD	<LLD	<LLD	1.00E+1
E. Volume of waste released (prior to dilution)	liters	N/A	3.06E+05	5.13E+05	6.97E+04	1.00E+0
F. Volume of dilution water used during period	liters	3.86E+09	2.42E+10	2.20E+10	2.40E+10	2.80E+1

Note 1 No releases during first quarter of 1997

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	Note 1	2.60E+00	4.28E+00	5.67E-01
chromium-51	Ci	Note 1	<LLD	3.53E-04	2.29E-04
manganese-54	Ci	Note 1	<LLD	5.94E-05	2.08E-04
iron-55	Ci	Note 1	<LLD	<LLD	<LLD
cobalt-58	Ci	Note 1	<LLD	3.25E-05	1.20E-04
Iron- 59	Ci	Note 1	<LLD	2.04E-05	<LLD
cobalt-60	Ci	Note 1	1.19E-04	1.00E-03	9.14E-04
zinc-65	Ci	Note 1	4.55E-04	1.74E-03	9.00E-04
strontium-89	Ci	Note 1	<LLD	<LLD	<LLD
strontium-90	Ci	Note 1	<LLD	<LLD	<LLD
strontium-92	Ci	Note 1	<LLD	<LLD	<LLD
molybdenum-99	Ci	Note 1	<LLD	<LLD	<LLD
technetium-99m	Ci	Note 1	<LLD	<LLD	<LLD
iodine-131	Ci	Note 1	<LLD	<LLD	<LLD
iodine-133	Ci	Note 1	<LLD	<LLD	<LLD
xenon-133	Ci	Note 1	7.48E-04	9.59E-04	<LLD
xenon-133m	Ci	Note 1	<LLD	<LLD	<LLD
cesium-134	Ci	Note 1	<LLD	<LLD	<LLD
xenon-135	Ci	Note 1	<LLD	6.00E-05	<LLD
cesium-137	Ci	Note 1	<LLD	<LLD	<LLD
lanthanum-140	Ci	Note 1	<LLD	1.46E-04	6.21E-05
cerium-141	Ci	Note 1	<LLD	<LLD	2.24E-05
cerium-144	Ci	Note 1	<LLD	3.44E-05	<LLD
Total for period	Ci	Note 1	2.60E+00	4.28E+00	5.70E-01

Note 1 No releases during first quarter of 1997

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
Particulate 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	2.21E+1	2.22E+1	3.09E+1	1.50E+1	1.00E+1
2. Average release rate for period	µCi/sec	2.85E+0	2.83E+0	3.89E+0	1.88E+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	3.97E-03	1.99E-03	2.26E-03	8.16E-04	1.00E+1
2. Average release rate for period	µCi/sec	5.11E-04	2.53E-04	2.84E-04	1.03E-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	9.83E-03	6.32E-03	3.13E-03	1.01E-03	1.00E+1
2. Average release rate for period	µCi/sec	1.26E-03	8.04E-04	3.94E-04	1.27E-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	8.78E-02	<LLD	<LLD	1.35E-02
krypton-85	Ci	<LLD	<LLD	<LLD	<LLD
krypton-85m	Ci	1.96E-02	2.39E-01	1.17E-01	1.32E-01
krypton-87	Ci	<LLD	7.88E-01	5.79E-02	2.19E-01
krypton-88	Ci	<LLD	5.86E-01	1.63E-01	1.21E-01
xenon-131m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	3.16E+00	3.42E+00	3.91E+00	1.89E+00
xenon-133m	Ci	8.02E-02	1.03E-01	<LLD	3.63E-02
xenon-135	Ci	6.98E+00	4.35E+00	2.27E+01	6.97E+00
xenon-135m	Ci	1.18E+01	4.08E+00	3.92E+00	2.77E+00
xenon-137	Ci	<LLD	3.92E-00	<LLD	1.23E+00
xenon-138	Ci	4.70E-03	4.73E+00	<LLD	1.58E+00
Total for period	Ci	2.21E+01	2.22E+01	3.09E+01	1.50E+01
2. Iodines					
iodine-131	Ci	3.97E-03	1.99E-03	2.26E-03	8.16E-04
iodine-132	Ci	1.03E-03	6.90E-04	4.51E-04	3.14E-06
iodine-133	Ci	7.77E-03	4.20E-03	3.35E-03	6.55E-04
iodine-134	Ci	9.32E-04	5.69E-04	5.23E-04	<LLD
iodine-135	Ci	4.84E-03	3.20E-03	2.35E-03	<LLD
Total for period	Ci	1.85E-02	1.07E-02	8.93E-03	1.47E-03
3. Particulates					
manganese-56	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-56	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	7.92E-07	8.65E-06	1.93E-06
rubidium-88	Ci	<LLD	<LLD	<LLD	<LLD
rubidium-89	Ci	<LLD	1.05E-04	<LLD	<LLD
strontium-89	Ci	1.04E-04	2.23E-05	2.82E-05	8.50E-06
strontium-90	Ci	6.76E-07	1.00E-07	<LLD	<LLD
strontium-91	Ci	3.8[illegible]-04	3.18E-04	1.25E-04	<LLD
yttrium-91m	Ci	<LLD	<LLD	<LLD	<LLD
strontium-92	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
technetium-104	Ci	<LLD	<LLD	<LLD	<LLD
cesium-138	Ci	3.97E-03	2.57E-03	1.18E-03	9.32E-04
barium-139	Ci	5.18E-03	3.31E-03	1.79E-03	7.78E-05
barium-140	Ci	8.06E-05	<LLD	<LLD	<LLD
lanthanum-140	Ci	1.17E-04	<LLD	<LLD	<LLD
Total for period	Ci	9.83E-03	6.32E-03	3.13E-03	1.02E-03

Solid Waste

Twelve shipments of radioactive waste were transported from PNPP for disposal in 1997. Shipments were delivered to the Barnwell, South Carolina facility. In addition, PNPP waste was sent to the Barnwell disposal facility from SEG/GTS Duratek in Oak Ridge as partial shipments in conjunction with other utilities. The waste total in Table 9 below includes these shipments from SEG/GTSDuratek. No irradiated fuel was transported from PNPP in 1997.

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	53.1	± 25
	Ci	464	
b. Dry compressible waste, contaminated equipment, etc.	m^3	12.7	± 25
	Ci	1.7	
c. Irradiated components, control rods, etc.	m^3	0	± 25
	Ci	0	
d. Other (describe) None	m^3	0	± 25
	Ci	0	

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.	Cr-51	1.1	
	Mn-54	1.6	
	Fe-55	14.8	± 25
	Co-58	1.3	
	Co-60	21.3	
	Zn-65	57.4	
	Cs-137	1.0	
b. Dry compressible waste, contaminated equipment, etc.	Mn-54	1.5	
	Fe-55	58.2	
	Co-60	22.2	± 25
	Ni-63	1.0	
	Zn-65	6.7	
	Cs-137	1.0	
c. Irradiated components, control rods, etc.	None		
d. Other (describe)	None		

3. Solid waste disposition

Number of Shipments (1)	Mode of Transportation	Destination
12	Truck	Barnwell, South Carolina

(1) Additional shipments were made combined with waste from other utilities from SEG/GTS Duratek in Oak Ridge, Tennessee.

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: 1997 Site boundary dose to maximum individual considering all sectors

Effluent	Organ	Estimated dose (mrem)	Limit	% of limit
Liquid	Total body	2.15E-03	3.0E+0	7.20E-02
Liquid	Liver	3.86E-03	1.0E+1	3.90E-02
Noble gas - gamma	NA	6.44E-01	1.0E+1	6.40E+00
Noble gas - beta	NA	7.05E-01	2.0E+1	3.50E+00
Noble gas	Total body	3.90E-01	5.0E+0	7.80E+00
Noble gas	Skin	9.94E-01	1.5E+1	6.60E+00
Iodine & particulates	Thyroid	4.31E-01	1.5E+1	2.90E+00

Table 11: 1997 Population dose considering all sectors

Effluent	Organ	Estimated Population Dose (person-rem)
Liquid	Total body	1.40E-01
Liquid	Thyroid	3.30E-02
Gaseous	Total body	1.30E-02
Gaseous	Thyroid	1.80E-01

Table 12: 1997Site boundary dose to maximum individual considering sectors on land

Effluent	Organ	Estimated dose (mrem)	Limit	% of limit
Liquid	Total body	2.15E-03	3.0E+0	7.2E-02
Liquid	Liver	3.86E-03	1.0E+1	3.90E-02
Noble gas - gamma	NA	6.60E-02	1.0E+1	6.60E-01
Noble gas - beta	NA	6.24E-02	2.0E+1	3.10E-01
Noble gas	Total body	3.69E-02	5.0E+0	7.40E-01
Noble gas	Skin	8.70E-02	1.5E+1	5.80E-01
Iodine & particulates	Thyroid	9.99E-02	1.5E+1	6.7E-01

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

The highest hypothetical dose from liquid effluents to a member of the public inside the site boundary is to a person who is fishing on Lake Erie from the shore on PNPP property. The calculations assume that this person 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 dose from liquid effluents inside site boundary

Quarter/Annual	Total Body Dose (mrem)	Organ Dose (mrem)
First Quarter	0.00E+00	0.00E+00
Second Quarter	1.84E-04	2.84E-04
Third Quarter	1.29E-03	2.27E-03
Fourth Quarter	6.89E-04	1.34E-03
Annual	2.15E-03	3.86E-03

Although several cases were evaluated to determine the highest hypothetical dose from gaseous effluents to members of the public inside site boundary (including traversing a public road within the site boundary, shoreline fishing, non-plant related training, car pooling, and job interviews), the activity inside the site boundary 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 dose from gaseous effluents inside site boundary

Quarter/Annual	Total Body Dose (mrem)	Organ Dose (mrem)
First Quarter	2.89E-03	8.66E-03
Second Quarter	3.50E-03	2.69E-02
Third Quarter	1.56E-02	6.12E-02
Fourth Quarter	2.40E-02	8.55E-03
Annual	9.99E-02	3.69E-02

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	4.13E-07	0.00E+00
Second Quarter	4.58E-07	6.58E-06
Third Quarter	2.27E-06	4.73E-05
Fourth Quarter	3.47E-06	2.42E-05
Annual	5.37E-06	7.69E-05

ABNORMAL RELEASES

There were no abnormal releases in 1997.

PROGRAM CHANGES AND NONCOMPLIANCES

Program Changes

No changes were made to the Offsite Dose Calculation Manual or the Process Control Program in 1997

There was one change to the radwaste treatment system which involved revision 2 to Design Change Package 91-0155. Revision 0 and 1 of this design change deleted the low trip/alarm function associated with the Solid Radwaste Feed and Dewatering pump pressure switches 0G51-N0035A/B and 0G51N0055A/B. Revision 2 of this design change deletes the high trip/alarm associated with the Solid Radwaste Feed and Dewatering pump pressure switches 0G51N0035A/B and 0G51N0055A/B. The revision of this DCP has not changed the function of the solidradwaste system.

Noncompliances

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

1. The Emergency Service Water Loop B radiation monitor , 1D17-K0605, was out-of service from June 4, 1997 until July 14, 1997 which was a total of 40 days. The sample pump for this monitor had tripped and would not reset. The pump was inspected and no problems were discovered. The pump was then reset and no further problems have been encountered. During this period of time the plant was in a forced outage which delayed the initial attention to resolving this problem. Compensatory sampling was performed during the period of time in which the radiation monitor was out of service.

2. The Radwaste to Emergency Service Water radiation monitor, 0D17-K606, was out of service from 7/18/97 through the end of 1997 for a total of 166 days. The monitor was taken out of service due to spiking signals in the electronics of the monitor causing nuisance trips. A detailed investigation into this problem identified a problem with the ground on this instrument. The problem was corrected and the monitor has been returned to service.

3. The Radwaste High Flow Discharge Header Flow Monitor, G50-N0445, was inoperable from November 25,1997 through the end of 1997 for a total of 37 days. This monitor was originally taken out of service for a calibration surveillance however insufficient parts were available to perform the task. Once the parts were available to replace the turbine meter the power supply transformer failed which delayed restoring the monitor to service. All maintenance activities with this monitor have now been completed and the monitor has been returned to service.

There was one situation in which information and records were not maintained as required by the Environmental Protection Plan

1. The Environmental Protection Plan requires that if herbicides are used on site, their use shall conform to the U. S. EPA regulations and records of applications should be made available to the NRC for a period of five years. During 1997 there were five permits issued however, only information for two of these permits was submitted for closure. The information on the permits submitted for closure was incomplete and did not contain the application area or quantity of chemical used. Through conversations with individuals involved, the applications did take place. Corrective actions are being taken to improve this program to ensure this information is properly documented with future applications.

Corrections to 1995 and 1996 Data

The 1996 report did not contain information that demonstrated compliance with 40CFR190. There were no other nearby fuel cycle sources, therefore, 40CFR190 limits were not exceeded.

The 1995 and 1996 reports did not contain information for total flow during periods of liquidradwaste discharges. The amended information for the tables for 1995 and 1996 are contained in appendix C.

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 Specifications and 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 Specifications and 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**

#	Description	Miles	Direction	Media(1)
55	**Center Rd.**	**2.5**	**S**	**TLD**
56	**Madison High School**	**4.0**	**ESE**	**TLD**
58	**Antioch Rd.**	**0.8**	**ENE**	**TLD**
59	Lake Shoreline at Green Rd.	4.0	ENE	WATER
60	Lake Shoreline at Perry Park	1.0	WSW	WATER
61	Keller Milk Farm	7.4	SE	MILK
63	Minor Stream Mouth	0.08	NNE	SEDIMENT
64	Northwest Drain Mouth	0.09	NW	SEDIMENT
65	Major Stream Mouth	0.18	W	SEDIMENT
70	**H&H Farm Stand**	**16.2**	**SSW**	**FOOD PRODUCTS**
71	Mosley Farm	7.9	SE	MILK
77	**Orosz Farm**	**1.2**	**E**	**FOOD PRODUCTS**

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

(2) Sample location 62 was removed since the farmer was no longer growing produce. Sample location 37 was then added as the required ODCM location. The change to the ODCM was effective 1/5/98 and therefore is not a listed ODCM change for 1997.

SAMPLE ANALYSIS

When environmental samples are analyzed for radioactivity, several types of measurements are performed to provide information about the types of radiation andradionuclides 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 differentradionuclides. 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.

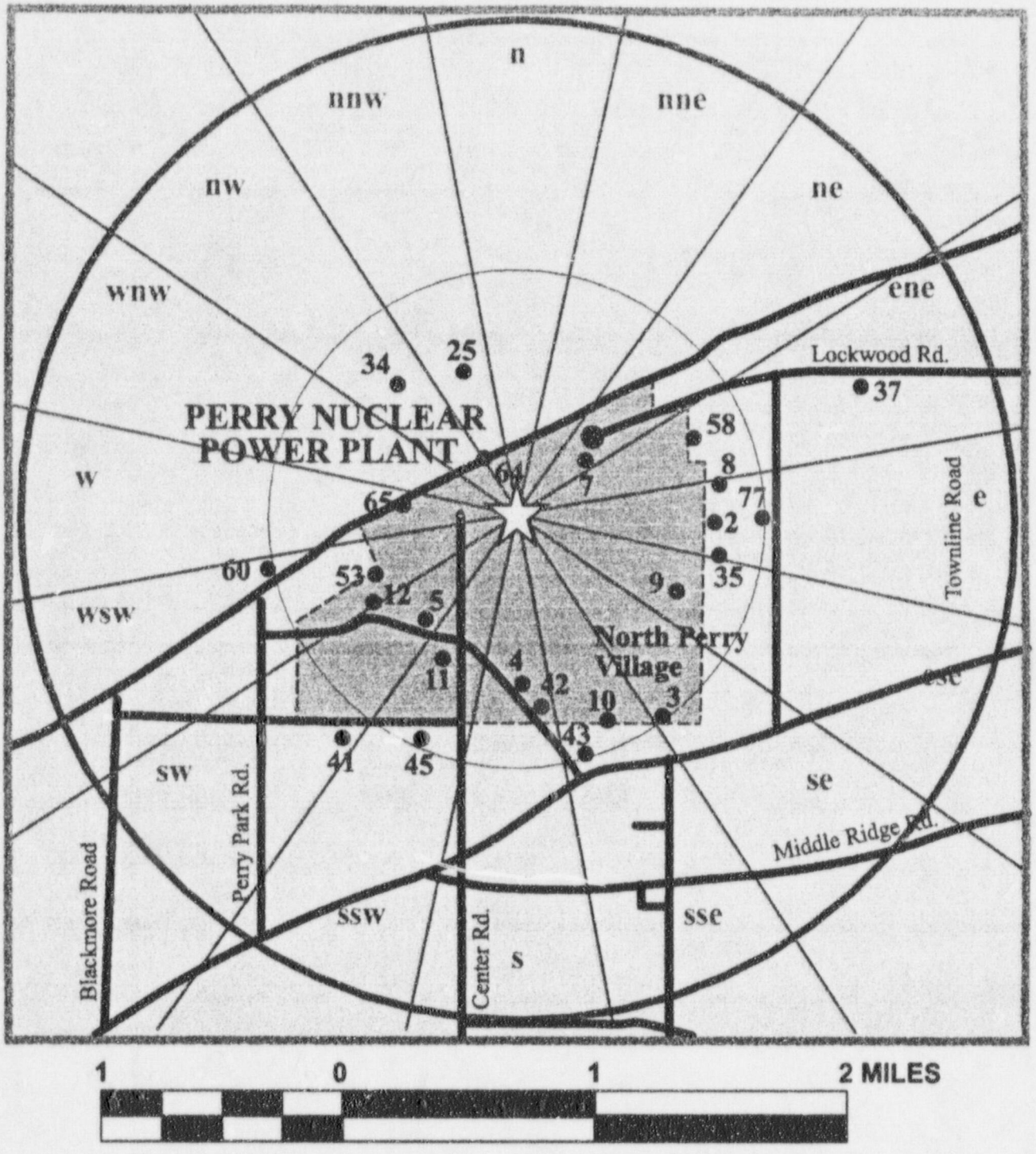
Gamma spectral analysis provides more specific information than does gross beta analysis. Gamma spectral analysis identifies each radionuclide present in the sample that emits gamma radiation, and the amount of radioactivity associated with it. Each radionuclide has a very specific "fingerprint" that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

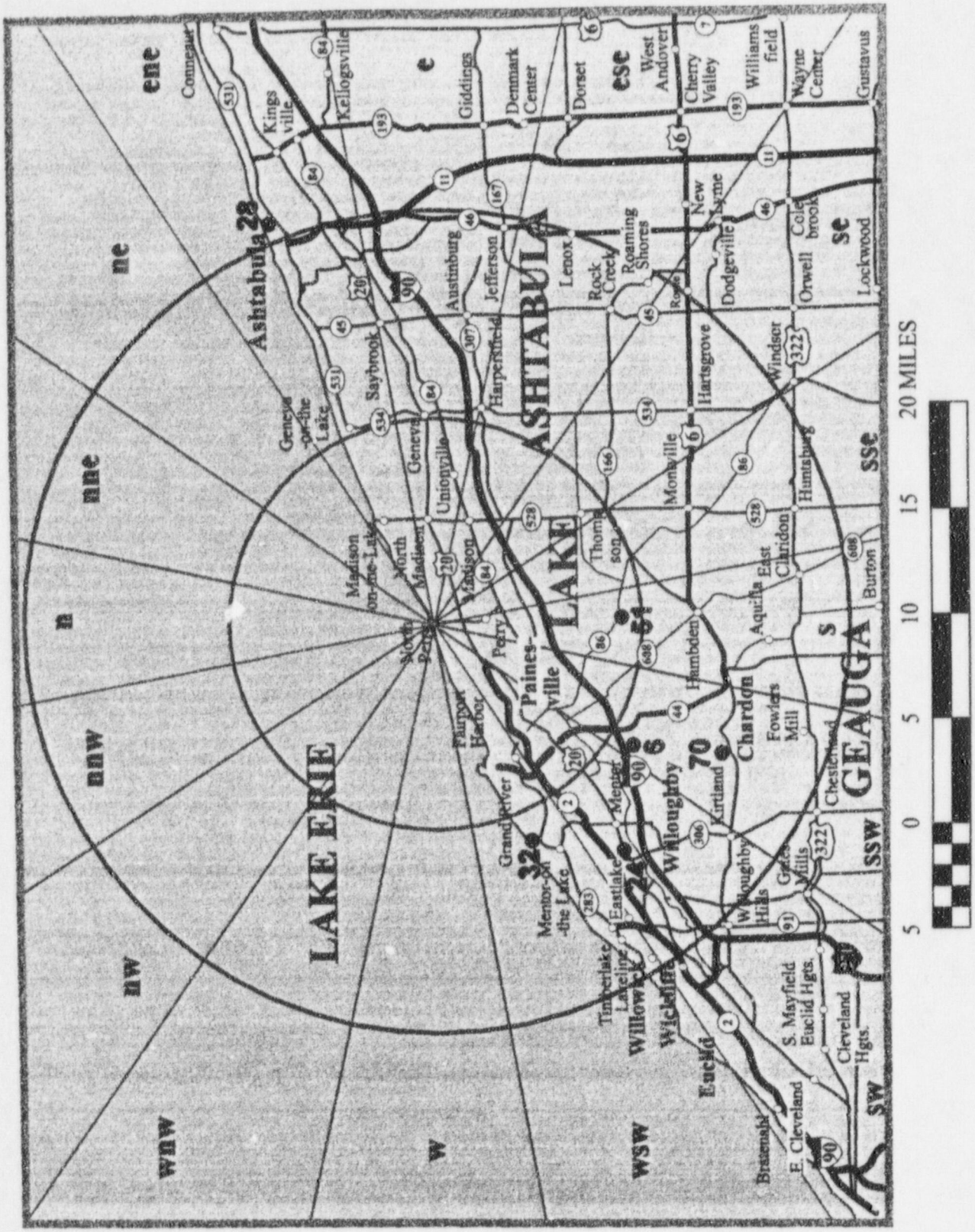
Tritium analysis measures the amount of theradionuclide tritium (H-3) present in a sample. Tritium is an isotope of hydrogen that emits low energy beta particles. Tritium occurs naturally and is also man-made.

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

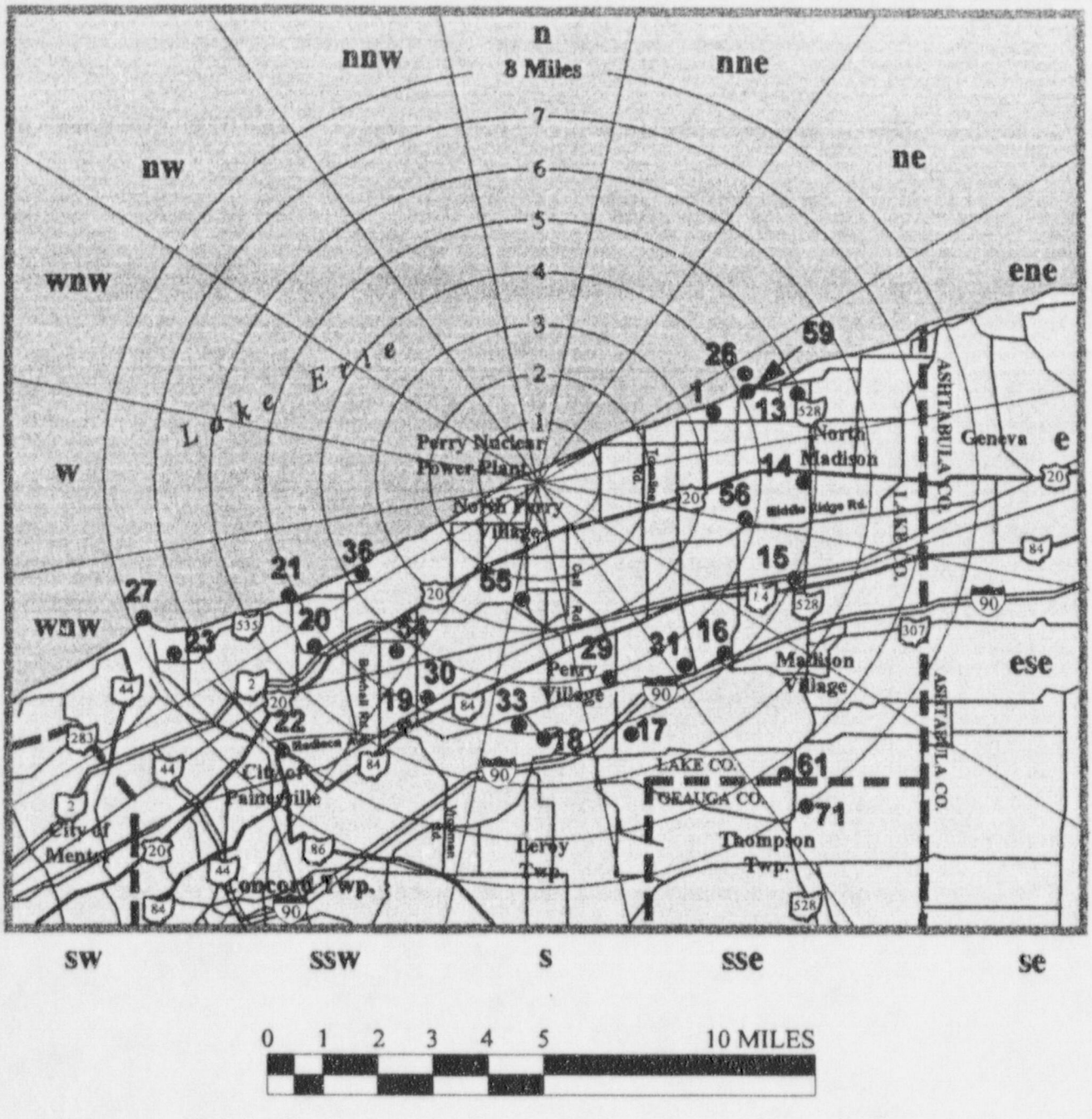
the TLD is heated, the phosphor releases the stored energy as light. The amount of light is directly proportional to the amount of radiation to which the TLD was exposed. The reading process also zeroes the TLD and prepares it for reuse.



REMP sampling locations within two miles of the plant site.



REMP sampling locations greater than eight miles from the plant.



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

Table 17 provides a list of the analyses performed on environmental samples collected for the PNPP REMP in 1997.

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 at a value above or equal to the ODCM table values. The NRC has established the values for the LLDs for REMP sample analysis. The vendor laboratory was able to comply with those values in 1997.

1997 SAMPLING PROGRAM

The contribution of radionuclides to the environment resulting from the operation of PNPP is assessed by comparing results from the 1997 program withpreoperational 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: 1997 REMP Data Summary and Appendix B: 1997 REMP Data, for detailed results. The NRC requires special reporting if sample analysis results exceed set limits. No values exceeded these reporting levels in 1997.

Program Changes

The following program change occurred in 1997.

July Food product sample location # 62 was withdrawn from the program since thefarmer decided to no longer grow produce. Backup location # 37 now replaces # 62 and meets ODCM requirements.

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 1997.

Table 18: Missed REMP samples, 1997

Media	Location	Date	Reason Missed
Food Products	All	April-July	Vegetables not ready for harvest
Food Products	# 62	May	Farm withdrew from program
Food Products	# 37	August	Crop died due to lack of rain
Grass	All	April	Insufficient growth
Grass	# 6	May, June, September	Insufficient growth
Grass	# 42	August	Insufficient growth
Lake Water	# 59, # 60	January	Lake shoreline covered with ice
Milk	# 61	January, February, March, October, November, December	Drying period for goats (1)
Sediment	# 63	May, October	High lake level, no access
Sediment	# 65	October	High lake level, no access
TLD	# 23	Annual	Lost in field (2)
TLD	# 23	First Quarter	Lost in 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. The loss of two TLD's at location 23 was classified as a single event since they were located together and lost at the same time.

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 1997.

Food — There were no food products collected during the months of April through July because the local vegetable crop was not ready to harvest. Sample point number 62 , which was a required sample point in the ODCM, withdrew from the program by deciding not to grow produce. The alternate point, for location number 62, was location number 37 which lost all crops due to lack of rain. This problem was not discovered until the growing season was past, preventing alternative locations to be established in the 1997 season. The ODCM has since been revised to establish location number 37 as the required point, and an additional backup location has been chosen to ensure samples are available in the 1998 growing season.

Water — The weekly grab samples could not be collected from locations 59 and 60 during January due to ice on shoreline.

Grass — The grass for all of the sample locations could not be collected during April due to lack of growth. In addition, grass samples were not collected for Location 6 during (May, June, September) and location 42 (August) due to grounds personnel inadvertently mowing area set aside for sampling.

Sediment — Recent years has seen the lake level rise causing the access to locations 63 and 65 to be unsafe.

Atmospheric Monitoring

AIR
Air sampling is conducted to detect any increase in the concentration of airborneradionuclides. 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 collectparticulates, 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 1997.

Gross beta activity was detected in all air samples and ranged up to 0.05 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, noradionuclide 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.

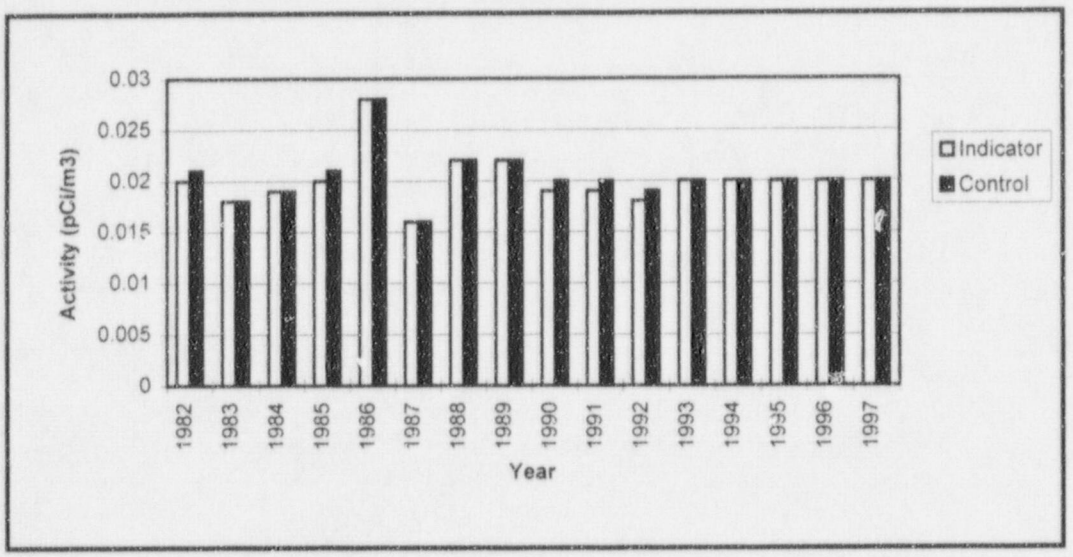


Figure 5: Annual average concentration of gross beta in air.

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 Specifications / 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 1997. 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 belowLLDs 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 absorbradionuclides 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 9 food product samples were collected in 1997 and analyzed by gamma spectral analysis. Seven food products were collected which included: cabbage, broccoli, cauliflower, dill, beet greens, and turnip greens. Beryllium-7 and potassium-40, naturally occurringradionuclides, 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 1997. Grass is clipped from open areas using standard lawn trimming equipment. The control location for vegetation is eleven miles away. A total of 20 grass samples were collected in 1997 and analyzed by gamma spectral analysis. Two naturally occurringradionuclides were detected: beryllium-7 and potassium-40. No otherradionuclides 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 1997 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 152.76 - 405.96 pCi/kg. The annual average concentration of cesium-137 was 230.20pCi/kg at the indicator locations and 158.11pCi/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.

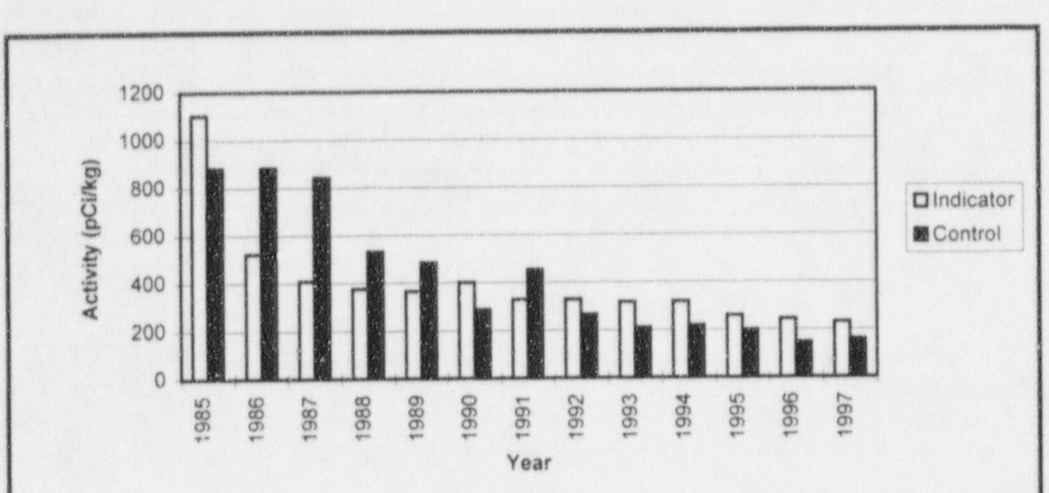


Figure 6: Annual average concentration of cesium-137 in soil

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 1997 resulted in cesium-137 concentrations ranging from 162.07pCi/kg to 405.96 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 ofradionuclides, either directly from drinking the water, or as a result of the transfer ofradionuclides 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 emptied monthly and the samples shipped to the laboratory for analysis. Samples from two locations are collected weekly and combined. Each month the combined sample is shipped for analysis.

Fifty-eight water samples were collected and analyzed for gross beta activity and by gamma spectral analysis in 1997. From these, monthly samples werecomposited into quarterly samples and analyzed for tritium. Gross beta activity was detected in 6 of 58 samples collected (for all locations) and 1 of 11 samples for control locations. The concentration range for samples with detectable activity (i.e., above ODCM LLD) ranged from 3.39 - 6.81 pCi/l. The annual average concentration of gross beta was 4.39 pCi/l at the indicator locations and 6.81 pCi/l at the control location using the mean of values > LLD. The mean using the LLD value for samples with activity less than the LLD resulted in the annual average concentration of gross beta at 3.14 pCi/l at the indicator location and 3.35 pCi/l at the control location. (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.

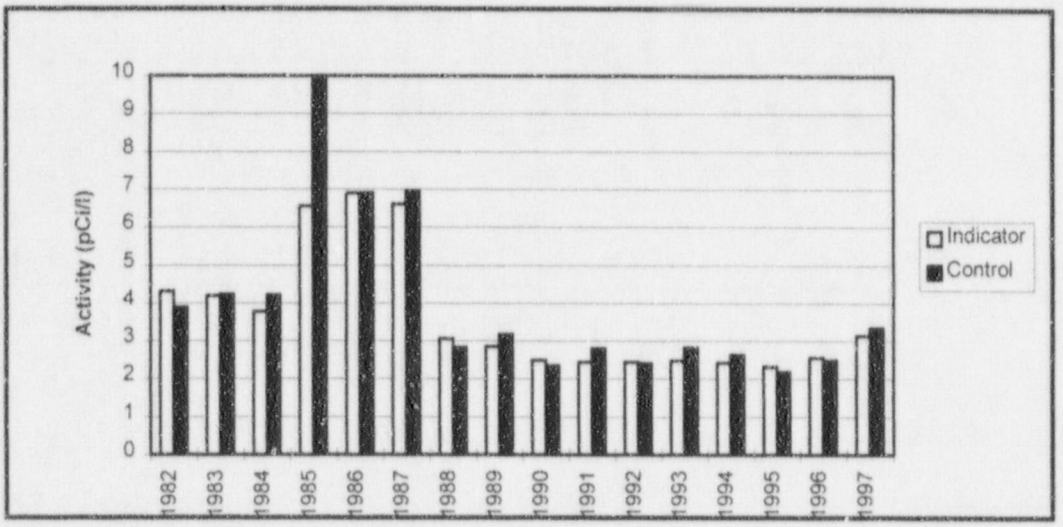


Figure 7: Annual average concentration of gross beta in water

No radionuclides were detected by gamma spectral analysis above the LLD. Tritium was not detected in any of the 20 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 2,200pCi/l.

SEDIMENT

Sampling lake bottom sediments can provide an indication of the accumulation ofundissolved 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. Eleven sediment samples were collected in 1997 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 six samples and ranged from 218.57 - 1,203.30 pCi/kg. The annual average concentration was 394.12 pCi/kg at the indicator locations and 967.64 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.

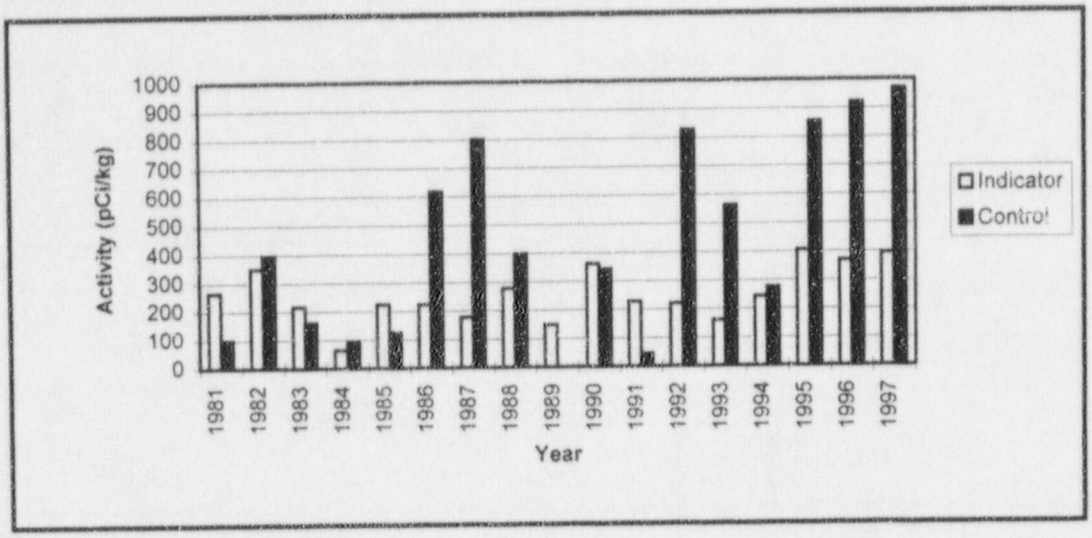


Figure 8: Annual average concentration of cesium-137 in sediment

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-seven fish samples were collected in 1997 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, rainbow trout, sheephead, 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 250 TLDs were collected and analyzed in 1997. This includes 222 collected on a quarterly basis, and 28 collected annually. In 1997, the annual average dose for all indicator locations was 55.22 mR, and 57.40 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.

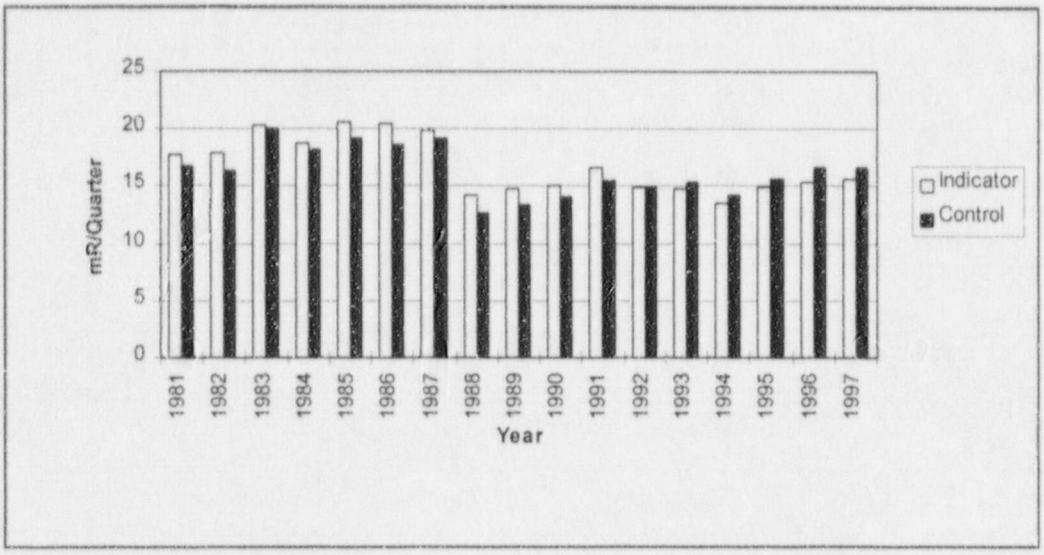


Figure 9: Average dose per quarter

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 1997, the vendor laboratory analyzed 42 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. The Eleventh International Intercomparison of Environmental Dosimeters was conducted in 1997 and wasoragnized by the Department of Energy's Environmental Measurements Laboratory in collaboration with Brookhaven National Laboratory and the National Institute of Standards and Technology. Results for the Eleventh International Intercomparison were originally reported in error. The results are being re-evaluated and will be reported in 1998 report.

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 1997. 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: 1997 EPA Cross-Check Intercomparison Program results.

Date	Sample Type	Analysis	Vendor Result	EPA Value	Acceptable Range
Jan.	Water	Sr-89	9.7 ± 0.6	12.0 ± 5.0	3.3 - 20.7
		Sr-90	24.0 ± 1.0	25.0 ± 5.0	16.3-33.7
		Gross Alpha	10.0 ± 1.4	5.2 ± 5.0	0.0 - 13.9
		Gross Beta	15.8 ± 2.0	14.7 ± 5.0	6.0 - 23.4
Feb.	Water	I-131	86.0 ± 2.0	86.0 ± 9.0	70.4 -101.6
		I-131	79.3 ± 2.0	86.0 ± 9.0	70.4 - 101.6
		Ra-226	6.7 ± 0.2	5.9 ± 0.9	4.3 - 7.5
		Ra-228	8.4 ± 1.1	8.2 ± 2.1	4.6 - 11.8
		Uranium	26.5 ± 1.3	27.0 ± 3.0	21.8 - 32.3
Mar.	Water	H-3	7,594.0± 279.7	7900.0 ± 790.0	6529.4 - 9270.6
Apr.	Water	Gross Alpha	44.3 ± 1.6	48.0 ± 12.0	27.2 - 68.8
		Ra-226	10.7 ± 0.9	13.0 ± 2.0	9.5 - 16.5
		Ra-228	4.7 ± 0.4	3.1 ± 0.8	1.7 - 4.5 Note 1
		Uranium	26.8 ± 0.3	24.0 ± 3.0	18.8 - 29.2
		Co-60	21.7 ± 0.6	21.0 ± 5.0	12.3 - 29.7
		Cs-134	27.3 ±1.2	31.0 ± 5.0	22.3 - 39.7
		Cs-137	21.7 ± 1.5	22.0 ± 5.0	13.3 - 30.7
		Gross Beta	98.2 ± 2.1	102.1 ± 15.3	75.6 - 128.6
		Sr-89	21.3 ± 1.2	24.0 ± 5.0	15.3 - 32.7
		Sr-90	12.7 ± 0.6	13.0 ± 5.0	4.3-21.7
Jun.	Water	Ba-133	24.7 ± 1.2	25.0 ± 5.0	16.3 - 33.7
		Co-60	18.7 ± 0.6	18.0 ± 5.0	9.3 - 26.7
		Cs-134	19.7 ± 0.6	22.0 ± 5.0	13.3 - 30.7
		Cs-137	52.0 ± 2.0	49.0 ± 5.0	40.3 - 57.7
		Zn-65	101.0 ± 2.0	100.0 ± 10.0	82.7 - 117.3
		Ra-226	2.7 ± 0.1	3.0 ± 0.5	2.1 - 3.9
		Ra-228	2.3 ± 0.3	3.1 ± 0.8	1.7 - 4.5
		Uranium	38.1 ± 1.0	40.3 ± 4.0	33.4 - 47.2
Jul	Water	Sr-89	37.7 ± 3.2	44.0 ± 5.0	35.3 - 52.7
		Sr-90	16.0 ± 1.0	16.0 ± 5.0	7.3 - 24.7
		I-131	10.7 ± 1.2	10.0 ± 6.0	0.0 - 20.4
		Gross Alpha	3.1 ± 0.3	3.1 ± 5.0	0.0 - 11.8
		Gross Beta	13.9 ± 0.2	15.1 ± 5.0	6.4 - 23.8
Aug.	Water	H-3	11,348.7 ± 241.4	11,010.0 ± 1,101.0	9,099.8-12,920.2
Sept.	Water	Ra-226	20.0 ± 0.8	20.0 ± 3.0	14.8 - 25.2
		Ra-228	7.0 ± 0.1	8.0 ± 2.0	4.5 - 11.5
		Uranium	5.0 ± 0.1	5.1 ± 3.0	0.0 - 10.3
Nov.	Water	Ba-133	97.3 ± 5.0	99.0 ± 10.0	81.7 - 116.3
		Co-60	28.3 ± 1.7	27.0 ± 5.0	18.3 - 35.7
		Cs-134	9.7 ± 1.0	10.0 ± 5.0	1.3 - 18.7

Date	Sample Type	Analysis	Vendor Result	EPA Value	Acceptable Range
Nov.	Water	Cs-137	78.0 ± 3.5	74.0 ± 5.0	65.3 - 82.7
		Zn-65	76.7 ± 2.1	75.0 ± 8.0	61.1 - 88.9

Note 1 This analysis was repeated with the technician under observation of the Lab Supervisor. The results of the reanalysis was 3.1 ± 0.5 which was within the acceptable range.

CONCLUSION

No unusual radionuclide concentrations or exposure levels were detected during 1997. Atmospheric monitoring results were consistent with past results. The prevalentradionuclide 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 significan change in radionuclide concentrations at indicator locations for aquatic samples in 1997. 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: 1997 Vendor "spiked" sample results

Date	Sample	Analysis	Result	Known Value	Acceptable Range
Jan.	Water	Th-230	3.120 ± 0.104	3.070	1.842 - 4.298
		Th-232	3.355 ± 0.108	3.070	1.842 - 4.298
Feb.	Water	Gross Beta	43.881 ± 1.305	41.860	31.860 - 51.860
	Milk	Cs-134	48.649 ± 4.940	56.400	46.400 - 66.400
		Cs-137	54.700 ± 8.450	52.300	42.300 - 62.300
		Sr-89	49.849 ± 7.940	40.030	30.030 - 50.030
		Sr-90	48.856 ± 1.740	50.300	40.240 - 60.360
	Water	H-3	27229.744 ± 452.056	28234.000	22587.200 - 33880.800
		Co-60	65.219 ± 8.790	62.950	52.950 - 72.950
		Cs-134	52.996 ± 8.000	56.430	46.430 - 66.430
		Cs-137	60.419 ± 12.900	52.320	42.320 - 62.320
		I-131	72.182 ± 1.009	66.300	53.040 - 79.560
		I-131(g)	68.816 ± 14.800	66.300	39.780 - 76.300
	Charcoal Canister	I-131(g)	1.171 ± 0.023	1.080	0.648 - 1.512
	Air Filter	Gross Beta	6.320 ± 0.041	5.740	0.000- 15.740
	Water	Ra-226	19.770 ± 0.189	17.300	12.110 - 22.490
		Ra-228	36.784 ± 2.571	31.300	21.910 - 40.690
		Sr-90	35.822 ± 2.020	33.520	26.816 - 40.224
		I-129	15.525 ± 0.854	14.942	2.942 - 26.942
		Fe-55	1.418 ± 0.530	1.535	0.000 - 21.535
Mar.	Air Filter	Cs-137	2.151 ± 0.025	1.900	1.140 - 2.660
Apr.	Milk	Cs-134	50.282 ± 8.920	53.600	43.600 - 63.600
		Cs-137	56.090 ± 14.900	52.100	42.100 - 62.100
	Water	Co-60	54.077 ± 4.280	51.300	41.300 - 61.300
		Cs-134	47.636 ± 4.150	53.200	43.200 - 63.200
		Cs-137	60.688 ± 5.760	52.100	42.100 - 62.100
		Gross Alpha	34.554 ± 2.677	41.300	20.650 - 61.950
		Gross Beta	38.729 ± 1.658	41.700	31.700 - 51.700
		H-3	25445.478 ± 428.384	26257.000	21005.600 - 31508.400
May	Fish	Cs-134	0.199 ± 0.020	0.222	0.133 - 0.311
		Cs-137	0.234 ± 0.037	0.227	0.136 - 0.318
Jun	Water	I-131	76.174 ± 0.776	71.800	57.440 - 86.160
		I-131(g)	66.587 ± 8.750	71.800	43.080 - 81.800
	Milk	I-131	79.851 ± 0.833	71.800	57.440 - 86.160
		I-131(g)	78.887 ± 7.750	71.800	43.080 - 81.800
	Charcoal Canister	I-131(g)	81.869 ± 0.317	76.600	45.960 - 86.600
July	Milk	Cs-134	38.265 ± 5.450	39.500	29.500 - 49.500
		Cs-137	46.472 ± 10.600	41.500	31.500 - 51.500
		I-131	75.247 ± 0.831	83.230	66.584 - 99.876
		I-131(g)	84.872 ± 7.010	83.230	49.938 - 93.230
		Sr-90	33.610 ± 1.430	33.210	26.568 - 39.852
	Water	Co-60	26.270 ± 4.360	24.900	14.900 - 34.900
		Cs-134	36.591 ± 5.040	39.540	29.540 - 49.540
		Cs-137	45.552 ± 7.770	41.480	31.480 - 51.480
		I-131(g)	85.221 ± 9.660	83.230	49.938 - 93.230
		Sr-90	36.285 ± 1.629	33.210	26.569 - 39.852

Date	Sample	Analysis	Result	Known Value	Acceptable Range
July	Milk	I-131(g)	84.870 ± 7.010	83.230	49.938 - 93.230
	Water	Fe-55	4.548 ± 0.640	5.477	0.000 - 25.477
		H-3	41026.000 ± 329.000	41578.000	33262.400 - 49893.600
		Gross Alpha	49.266 ± 2.081	41.305	20.653 - 61.958
		Gross Beta	44.450 ± 1.334	41.406	31.406 - 51.406
	Fish	Cs-134	0.641 ± 0.030	0.700	0.420 - 0.980
		Cs-137	0.632 ± 0.042	0.527	0.316 - 0.738
Oct.	Water	Co-60	30.424 ± 7.530	33.642	23.642 - 43.642
		Cs-134	37.410 ± 6.690	36.086	26.086 - 46.086
		Cs-137	52.845 ± 11.300	41.221	31.221 - 51.221 Note 1
		I-131	78.126 ± 1.201	78.302	62.642 - 93.962
	Milk	Cs-134	15.166 ± 3.250	18.043	8.042- 28.043
		Cs-137	91.110 ± 8.370	82.440	72.440 - 92.440
		I-131	73.529 ± 1.253	78.320	62.642 - 93.962
		I-131(g)	74.613 ± 8.810	78.302	46.981 - 88.302
		Sr-89	31.281 ± 4.601	39.490	29.490 - 49.490
	Charcoal Canister	I-131(g)	0.450 ± 0.050	0.440	0.264 - 0.616
	Air Filter	Gross Beta (ss)	3.080 ± 0.030	3.040	1.824 - 4.256
Nov.	Fish	Cs-134	0.306 ± 0.025	0.318	0.191 - 0.445
		Cs-137	0.738 ± 0.049	0.649	0.389 - 0.909
	Water	Gross Alpha	51.420 ± 6.385	41.280	20.640 - 61.920
		Gross Beta	48.938 ± 3.735	43.164	33.164 - 53.164
Dec.	Water	Gross Alpha	40.480 ± 4.598	41.280	20.640 - 61.920
		Co-60	44.900 ± 8.290	42.080	32.080 - 52.080
		Cs-134	40.010 ± 7.010	37.850	27.850 - 47.850

(1) The Cs-137 spike is suspect. No errors were found in the spectroscopy program and the Cs-134 and Co-60 test results on the same sample were very good. Sample results prepared with a new standard are acceptable.

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 1997 Census was conducted August 12 - 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 no change in nearest residences within five miles of the plant in 1997. Table 21 lists the nearest residence by sector. There were no changes to the nearest milk animal location in 1997. Information on the milk animal is shown in Table 22. There were no changes to nearest gardens recorded during the 1997 census. Table 23 lists the nearest gardens that occupy at least 500 square feet.

Table 21: Nearest residence by sector

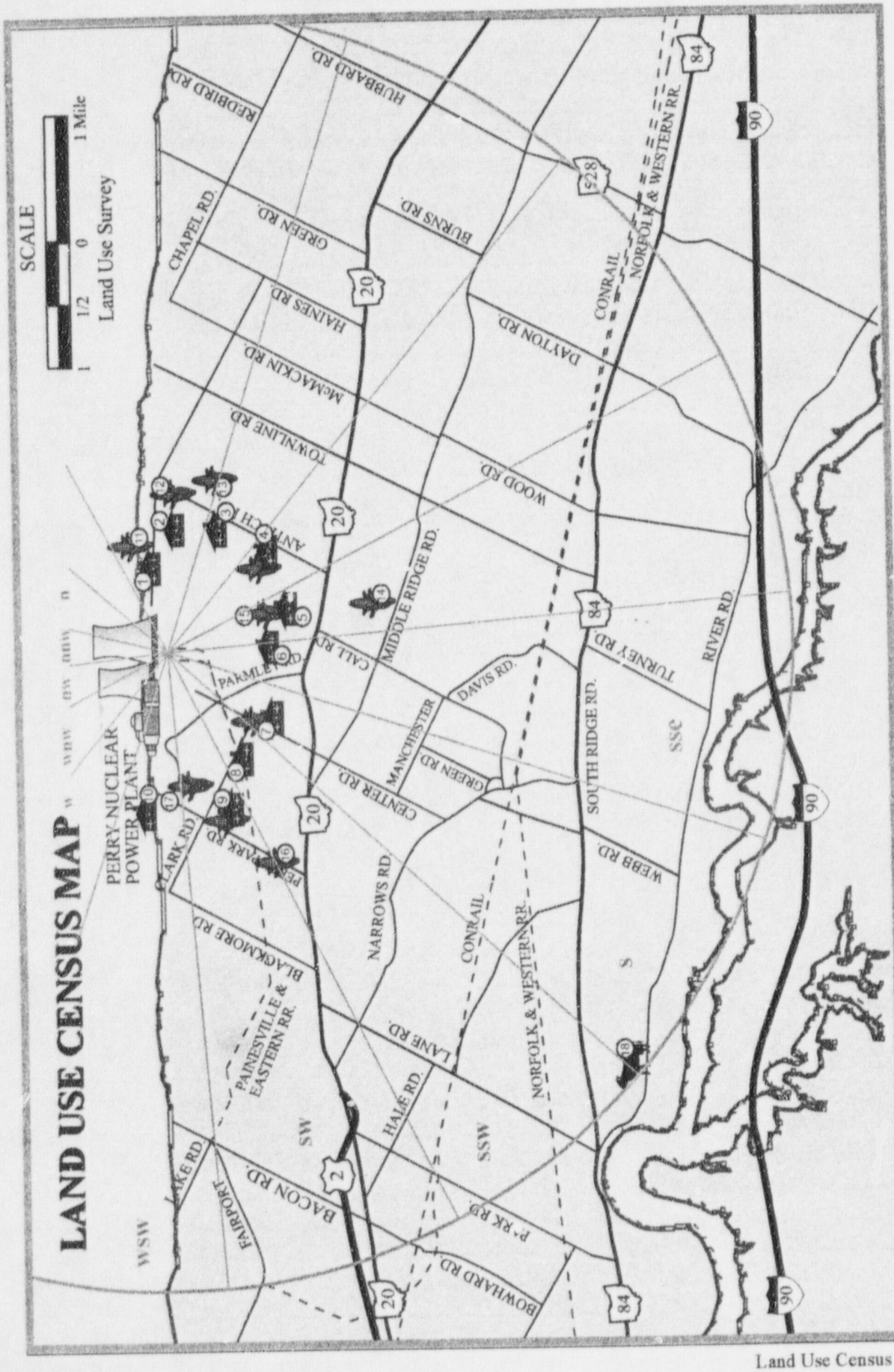
Sector	Location Address	Miles from PNPP	X/Q Value (Sec/m3)	Map Locator #
NE	4385 Lockwood	0.8	2.17E-6	1
ENE	4585 Lockwood	1.0	1.13E-6	2
E	2684 Antioch	1.1	6.77E-7	3
ESE	2774 Antioch	1.2	4.44E-7	4
SE	4495 N. Ridge	1.2	3.89E-7	5
SSE	3119 Parmly	0.9	1.89E-6	6
S	3121 Center	0.9	2.25E-6	7
SSW	3850 Clark	0.9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



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 1997 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: 1997 Corbicula sampling dates and locations

Date	Sample Location
1/24	Service Water (SW) and Emergency Service Water (ESW) Forebays and trash baskets
4/28	SW and ESW Forebays and trash baskets
6/11	Lake Erie in the vicinity of the Eastlake Plant
7/10	SW and ESW Forebays and trash baskets
9/2	Lake Erie in the vicinity of the Eastlake Plant
10/13	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 1997 monitoring program. All bivalves collected are listed in Table 25.

Table 25: Bivalves collected during the 1997 *Corbicula* monitoring program

Species/Location	PNPP	Eastlake
Ancylidoe	X	
Dreissena polymorpha	X	X
Dreissena bugensis	X	X
Gastropod		X
Limpets	X	X
Pelecypoda		X
Physa sp.	X	X
Pisidium amnicum	X	X
Pisidium sp.	X	X
Pisidium casertanum	X	X
Pisidium compressum	X	X
Pisidium equilaterale	X	X
Pisidium ferrugineum	X	
Pisidium lilljeborgi	X	X
Pisidium nitidum	X	X
Pisidium subtruncatum	X	X
Pisidium vanabile	X	X
Sphaeridae		X
Sphaerium corneum		X
Sphaerium nitidium	X	
Sphaerium striatinum		X
Sphaerium transversum	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 inspectingforebays, 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, and are normally used in three in-plant locations during the mussel season. They are fitted with slides and inspected weekly for veliger settlement. A plankton net was used on a limited basis in 1997

Treatment

Chemicals used for mussel control in 1997 included chlorine and a commercialmolluscicide. The system provides chlorine to plant service water, emergency service water, and circulating water systems. Sodium sulfite is added to plant discharge water todechlorinate 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 1997 was N-alkyl, dimethylbenzyl ammonium chloride. One treatment was applied near the end of cycle 6, prior to shutdown for refueling. The active ingredients were detoxified by adsorption ontobentonite 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 nade to the PNPP Chemistry Unit prior to spraying to ensure that only approved chemicals are used, and only in approved areas.

In 1997 there were five herbicide applications initiated for spraying purposes. Of these five only the information for two was submitted for closure and the information that was submitted was not complete. Three of the permits were misplaced by the handler of the herbicides, preventing a complete compilation of herbicide usage. 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 at 2% concentration for all locations except the E field perimeter, where Prametol was used at a maximum of 20% concentration. The data available is provided below.

Table 26: Documented Herbicide Usage

Date Applied	Location	Acres	Gallons	Chemical Conc. %
6/10/97	Inside Protected Area	unknown	unknown	2
6/11/97	Inside Protected Area	unknown	unknown	2

Table 26a shows the areas for which approval was given to use herbicides but the documentation was not returned. Through conversations with the involved individuals it has been determined that the herbicide application did take place in these areas however, efforts to retrieve of the documentation were unsuccessful. Corrective actions are being taken to improve this program to ensure this information is properly documented with future applications.

Table 26a: Undocumented Herbicide Use

Date Applied	Location	Acres	Gallons	Chemical Conc. %
unknown	Perimeter of E Field	unknown	unknown	20
unknown	Owner Controlled Area	unknown	unknown	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 1997.

On 8/6/97 it was discovered that the service water system, automatic strainer backwash drains directly to Lake Erie via the storm drain system. Since the backflush water could potentially be chlorinated during the backwash evolution, there was a potential to route chlorinated water directly to Lake Erie via a non-permitted point source. This situation was reported to the Ohio Environmental Protection Agency (OEPA) on 9/12/97. Report # 97-09-43-3749 was assigned by the OEPA. To date the situation has been corrected by disabling the backwash during chlorination.

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 1997.

UNREVIEWED ENVIRONMENTAL QUESTIONS

All proposed changes in plant design or operation, as well as tests or experiments conducted during 1997 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 1997.

NONROUTINE REPORTS

There was no nonroutine reports in 1997.

APPENDIX A: 1997 REMP DATA SUMMARY

Air Gamma Spectral Summary Report 1997
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	Be-7 28	N/A	0.07 28 / 28 0.05 - 0.09	0.07 24 / 24 0.05 - 0.09	3 1.00 SE	0.07 4 / 4 0.06 - 0.08	0.07 4 / 4 0.05 - 0.09
Air pCi/m3	Co-58 28	N/A	LLD	-	-	-	-
Air pCi/m3	Co-60 28	N/A	LLD	-	-	-	-
Air pCi/m3	Cs-134 28	0.04	LLD	-	-	-	-
Air pCi/m3	Cs-137 28	0.05	LLD	-	-	-	-

Air Gross Beta Summary Report 1997
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	0.02 363 / 364 0.01 - 0.05	0.02 311 / 312 0.01 - 0.05	6 11.00 SSW	0.02 52 / 52 0.01 - 0.04	0.02 52 / 52 0.01 - 0.04

Air Iodine Summary Report 1997
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	I-131 364	0.05	LLD	-	-	-	-

Fish Gamma Spectral Summary Report 1997
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 Numbe: 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 pCi/kg wet	Co-58 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Co-60 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Cs-134 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Cs-137 27	112.00	LLD	-	-	-	-
Fish pCi/kg wet	Fe-59 27	195.00	LLD	-	-	-	-
Fish pCi/kg wet	K-40 27	N/A	2,147.78 27 / 27 1,519.70 - 2,876.60	2,124.15 12 / 12 1,519.70 - 2,876.60	32 15.80 WSW	2,166.69 15 / 15 1,598.50 - 2,627.50	2,166.69 15 / 15 1,598.50 - 2,627.50
Fish pCi/kg wet	Mn-54 27	97.00	LLD	-	-	-	-
Fish pCi/kg wet	Zn-65 27	195.00	LLD	-	-	-	-

Food Products Gamma Spectral Summary Report 1997
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 pCi/kg wet	Be-7 9	N/A	552.53 3 / 9 247.60 - 1,154.10	552.53 3 / 5 247.60 - 1,154.10	77 1.20 E	552.53 3 / 5 247.60 - 1,154.10	LLD 0 / 4
Food Products pCi/kg wet	Co-58 9	N/A	LLD	-	-	-	-
Food Products pCi/kg wet	Co-60 9	N/A	LLD	-	-	-	-
Food Products pCi/kg wet	Cs-134 9	45.00	LLD	-	-	-	-
Food Products pCi/kg wet	Cs-137 9	60.00	LLD	-	-	-	-
Food Products pCi/kg wet	I-131 9	45.00	LLD	-	-	-	-
Food Products pCi/kg wet	K-40 9	N/A	3,754.94 9 / 9 2,032.80 - 5,699.50	4,175.36 5 / 5 2,677.40 - 5,699.50	77 1.20 E	4,175.36 5 / 5 2,677.40 - 5,699.50	3,229.43 4 / 4 2,032.80 - 5,077.50

Milk Gamma Spectral Summary Report 1997
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 pCi/L	Ba-140 49	45.00	LLD	-	-	-	-
Milk pCi/L	Cs-134 49	11.00	LLD	-	-	-	-
Milk pCi/L	Cs-137 49	13.00	LLD	-	-	-	-
Milk pCi/L	K-40 49	N/A	1,505.10 49 / 49 1,014.90 - 2,225.40	1,536.35 30 / 30 1,014.90 - 2,225.40	61 7.40 SE	1,917.58 11 / 11 1,767.90 - 2,225.40	1,455.76 19 / 19 1,342.40 - 1,627.10
Milk pCi/L	La-140 49	11.00	LLD	-	-	-	-

Milk Iodine Summary Report 1997
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 pCi/L	I-131 49	0.75	LLD	-	-	-	-

Sediment Gamma Spectral Summary Report 1997
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 pCi/kg dry	Co-58 11	50.00	LLD	-	-	-	-
Sediment pCi/kg dry	Co-60 11	40.00	LLD	-	-	-	-
Sediment pCi/kg dry	Cs-134 11	112.00	LLD	-	-	-	-
Sediment pCi/kg dry	Cs-137 11	135.00	585.29 6 / 11 218.57 - 1,203.30	394.12 4 / 9 218.57 - 524.31	32 15.80 WSW	967.64 2 / 2 731.97 - 1,203.30	967.64 2 / 2 731.97 - 1,203.30
Sediment pCi/kg dry	K-40 11	N/A	14,656.27 11 / 11 8,187.60 - 21,042.00	13,613.78 9 / 9 8,187.60 - 18,049.00	32 15.80 WSW	19,347.50 2 / 2 17,653.00 - 21,042.00	19,347.50 2 / 2 17,653.00 - 21,042.00

Soil Gamma Spectral Summary Report 1997
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 pCi/kg dry	Co-58 14	300.00	LLD	-	-	-	-
Soil pCi/kg dry	Co-60 14	40.00	LLD	-	-	-	-
Soil pCi/kg dry	Cs-134 14	60.00	LLD	-	-	-	-
Soil pCi/kg dry	Cs-137 14	80.00	218.19 12 / 14 152.76 - 405.96	230.20 10 / 12 162.07 - 405.96	7 0.60 NE	294.12 2 / 2 290.87 - 297.37	158.11 2 / 2 152.76 - 163.46
Soil pCi/kg dry	K-40 14	N/A	9,879.09 14 / 14 4,354.30 - 15,864.00	8,992.60 12 / 12 4,354.30 - 12,620.00	6 11.00 SSW	15,198.00 2 / 2 14,532.00 - 15,864.00	15,198.00 2 / 2 14,532.00 - 15,864.00

TLD Gamma Dose Summary Report 1997

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 Collecte and Range
TLD TLD	Direct 111	1.00	15.65 111 / 111 10.17 - 20.00	15.57 103 / 103 10.17 - 20.00	36 3.90 WSW	19.17 4 / 4 17.92 - 19.70	16.61 8 / 8 15.42 - 17.80
TLD TLB	Direct 111	1.00	15.06 111 / 111 11.30 - 19.60	14.95 103 / 103 11.30 - 19.60	21 5.10 WSW	18.30 4 / 4 17.53 - 19.60	16.50 8 / 8 14.91 - 17.91
TLD TLA	Direct 28	1.00	55.38 28 / 28 46.26 - 73.61	55.22 26 / 26 46.26 - 73.61	36 3.90 WSW	73.61 1 / 1 73.61 - 73.61	57.40 2 / 2 56.38 - 58.42

Vegetation Gamma Spectral Summary Report 1997
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 pCi/kg wet	Be-7 20	N/A	2,656.89 20 / 20 1,024.20 - 7,760.00	2,804.94 17 / 17 1,024.20 - 7,760.00	35 0.60 E	3,801.25 6 / 6 1,637.40 - 7,760.00	1,817.97 3 / 3 1,637.70 - 2,120.80
Vegetation pCi/kg wet	Co-58 20	N/A	LLD	-	-	-	-
Vegetation pCi/kg wet	Co-60 20	N/A	LLD	-	-	-	-
Vegetation pCi/kg wet	Cs-134 20	N/A	LLD	-	-	-	-
Vegetation pCi/kg wet	Cs-137 20	N/A	LLD	-	-	-	-
Vegetation pCi/kg wet	I-131 20	N/A	LLD	-	-	-	-
Vegetation pCi/kg wet	K-40 20	N/A	5,276.32 20 / 20 2,942.60 - 8,733.60	5,135.26 17 / 17 2,942.60 - 8,733.60	6 11.00 SSW	6,075.63 3 / 3 5,567.20 - 6,385.90	6,075.63 3 / 3 5,567.20 - 6,385.90

Water Gamma Spectral Summary Report 1997
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	Ba-140 58	45.00	LLD	-	-	-	-
Water pCi/L	Co-58 58	11.00	LLD	-	-	-	-
Water pCi/L	Co-60 58	11.00	LLD	-	-	-	-
Water pCi/L	Cs-134 58	11.00	LLD	-	-	-	-
Water pCi/L	Cs-137 58	13.00	LLD	-	-	-	-
Water pCi/L	Fe-59 58	22.00	LLD	-	-	-	-
Water pCi/L	La-140 58	11.00	LLD	-	-	-	-
Water pCi/L	Mn-54 58	11.00	LLD	-	-	-	-
Water pCi/L	Nb-95 58	11.00	LLD	-	-	-	-
Water pCi/L	Zn-65 58	22.00	LLD	-	-	-	-
Water pCi/L	Zr-95 58	22.00	LLD	-	-	-	-

Water Gross Beta Summary Report 1997
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 58	3.00	4.39 6 / 58 3.39 - 6.81	4.39 6 / 46 3.39 - 6.81	59 4.00 ENE	6.81 1 / 11 6.81 - 6.81	LLD 0 / 12

Water Tritium Summary Report 1997
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	H-3 20	1,500.00	LLD	-	-	-	-

APPENDIX B: 1997 REMP DATA

Air Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
1	Air	4/2/97	0.079 +/- 0.011	LLD	LLD	LLD	LLD
1	Air	7/2/97	0.072 +/- 0.007	LLD	LLD	LLD	LLD
1	Air	10/1/97	0.066 +/- 0.013	LLD	LLD	LLD	LLD
1	Air	12/30/97	0.054 +/- 0.008	LLD	LLD	LLD	LLD
3	Air	4/2/97	0.073 +/- 0.009	LLD	LLD	LLD	LLD
3	Air	7/2/97	0.081 +/- 0.008	LLD	LLD	LLD	LLD
3	Air	10/1/97	0.083 +/- 0.008	LLD	LLD	LLD	LLD
3	Air	12/30/97	0.059 +/- 0.009	LLD	LLD	LLD	LLD
4	Air	4/2/97	0.081 +/- 0.009	LLD	LLD	LLD	LLD
4	Air	7/2/97	0.039 +/- 0.010	LLD	LLD	LLD	LLD
4	Air	10/1/97	0.074 +/- 0.008	LLD	LLD	LLD	LLD

Air Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
4	Air	12/30/97	0.05[illegible] +/- 0.007	LLD	LLD	LLD	LLD
5	Air	4/2/97	0.077 +/- 0.009	LLD	LLD	LLD	LLD
5	Air	7/2/97	0.081 +/- 0.006	LLD	LLD	LLD	LLD
5	Air	10/1/97	0.070 +/- 0.011	LLD	LLD	LLD	LLD
5	Air	12/30/97	0.060 +/- 0.009	LLD	LLD	LLD	LLD
6	Air	4/2/97	0.077 +/- 0.008	LLD	LLD	LLD	LLD
6	Air	7/2/97	0.086 +/- 0.007	LLD	LLD	LLD	LLD
6	Air	10/1/97	0.070 +/- 0.007	LLD	LLD	LLD	LLD
6	Air	12/30/97	0.054 +/- 0.008	LLD	LLD	LLD	LLD
7	Air	4/2/97	0.080 +/- 0.006	LLD	LLD	LLD	LLD
7	Air	7/2/97	0.081 +/- 0.007	LLD	LLD	LLD	LLD

Air Gamma Spectral Detail Report 1997

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 T	Collection Date	Be-7	Co-58	Co-60	Cs-134	Cs-137
7	Air	10/1/97	0.072 +/- 0.007	LLD	LLD	LLD	LLD
7	Air	12/30/97	0.055 +/- 0.010	LLD	LLD	LLD	LLD
35	Air	4/2/97	0.078 +/- 0.007	LLD	LLD	LLD	LLD
35	Air	7/2/97	0.087 +/- 0.008	LLD	LLD	LLD	LLD
35	Air	10/1/97	0.073 +/- 0.008	LLD	LLD	LLD	LLD
35	Air	12/30/97	0.050 +/- 0.007	LLD	LLD	LLD	LLD

Air Gross Beta Detail Report 1997

Radiological Environmental Monitoring Program Data Sumnary

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 Date	Sample Type	7	35			
1/ 8/97	Air	0.020 +/- 0.003 0.021 +/- 0.003	0.022 +/- 0.003 0.021 +/- 0.003	0.022 +/- 0.003	0.021 +/- 0.003	0.026 +/- 0.003
1/15/97	Air	0.034 +/- 0.003 0.035 +/- 0.003	0.034 +/- 0.003 0.036 +/- 0.003	0.033 +/- 0.003	0.030 +/- 0.003	0.034 +/- 0.003
1/22/97	Air	0.025 +/- 0.004 0.027 +/- 0.003	0.027 +/- 0.004 0.023 +/- 0.003	0.026 +/- 0.004	0.025 +/- 0.002	0.028 +/- 0.003
1/29/97	Air	0.023 +/- 0.00? 0.023 +/- 0.002	0.022 +/- 0.002 0.025 +/- 0.002	0.023 +/- 0.002	0.023 +/- 0.002	0.026 +/- 0.003
2/ 5/97	Air	0.032 +/- 0.003 0.035 +/- 0.003	0.032 +/- 0.003 0.036 +/- 0.003	0.034 +/- 0.003	0.033 +/- 0.003	0.038 +/- 0.003
2/12/97	Air	0.021 +/- 0.003 0.023 +/- 0.003	0.018 +/- 0.003 0.020 +/- 0.003	0.022 +/- 0.003	0.019 +/- 0.003	0.022 +/- 0.003
2/19/97	Air	0.025 +/- 0.003 0.027 +/- 0.003	0.029 +/- 0.003 0.025 +/- 0.003	0.027 +/- 0.003	0.031 +/- 0.003	0.023 +/- 0.003
2/26/97	Air	0.020 +/- 0.002 0.017 +/- 0.002	0.018 +/- 0.002 0.020 +/- 0.002	0.018 +/- 0.002	0.016 +/- 0.002	0.017 +/- 0.002
3/ 5/97	Air	0.012 +/- 0.002 0.015 +/- 0.002	0.012 +/- 0.002 0.013 +/- 0.002	0.015 +/- 0.002	0.012 +/- 0.002	0.011 +/- 0.002
3/12/97	Air	0.024 +/- 0.002 0.023 +/- 0.002	0.021 +/- 0.002 0.023 +/- 0.002	0.022 +/- 0.002	0.021 +/- 0.002	0.021 +/- 0.002
3/19/97	Air	0.025 +/- 0.003 0.021 +/- 0.003	0.021 +/- 0.003 0.023 +/- 0.003	0.022 +/- 0.003	0.023 +/- 0.003	0.021 +/- 0.003
3/26/97	Air	0.017 +/- 0.002 0.014 +/- 0.002	0.016 +/- 0.002 0.015 +/- 0.002	0.017 +/- 0.002	0.016 +/- 0.002	0.013 +/- 0.002
4/ 2/97	Air	0.018 +/- 0.002 0.018 +/- 0.002	0.017 +/- 0.002 0.015 +/- 0.002	0.018 +/- 0.002	0.018 +/- 0.002	0.017 +/- 0.002
4/ 9/97	Air	0.020 +/- 0.002 0.020 +/- 0.002	0.020 +/- 0.002 0.019 +/- 0.002	0.020 +/- 0.002	0.021 +/- 0.002	0.019 +/- 0.002
4/16/97	Air	0.023 +/- 0.003 0.028 +/- 0.003	0.020 +/- 0.002 0.022 +/- 0.003	0.022 +/- 0.003	0.024 +/- 0.003	0.024 +/- 0.003

Air Gross Beta Detail Report 1997

Radiological Environmental Monitoring Program Data Summary

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

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

		Location				
Collection Date	Sample Type	1 7	3 35	4	5	6
4/22/97	Air	0.022 +/- 0.003 0.021 +/- 0.003	0.021 +/- 0.003 0.021 +/- 0.003	0.022 +/- 0.003	0.021 +/- 0.003	0.020 +/- 0.003
4/30/97	Air	0.015 +/- 0.002 0.014 +/- 0.002	0.013 +/- 0.002 0.016 +/- 0.002	0.015 +/- 0.002	0.016 +/- 0.002	0.013 +/- 0.002
5/ 7/97	Air	0.020 +/- 0.003 0.019 +/- 0.003	0.021 +/- 0.003 0.017 +/- 0.002	0.020 +/- 0.003	0.019 +/- 0.003	0.020 +/- 0.003
5/14/97	Air	0.014 +/- 0.002 0.013 +/- 0.002	0.014 +/- 0.002 LLD	0.014 +/- 0.002	0.015 +/- 0.002	0.012 +/- 0.002
5/21/97	Air	0.011 +/- 0.002 0.010 +/- 0.002	0.011 +/- 0.002 0.009 +/- 0.002	0.011 +/- 0.002	0.011 +/- 0.002	0.011 +/- 0.002
5/28/97	Air	0.010 +/- 0.002 0.009 +/- 0.002	0.009 +/- 0.002 0.008 +/- 0.002	0.011 +/- 0.002	0.010 +/- 0.002	0.010 +/- 0.002
6/ 4/97	Air	0.010 +/- 0.002 0.010 +/- 0.002	0.009 +/- 0.002 0.010 +/- 0.002	0.011 +/- 0.002	0.010 +/- 0.002	0.011 +/- 0.002
6/11/97	Air	0.015 +/- 0.002 0.015 +/- 0.002	0.015 +/- 0.002 0.016 +/- 0.002	0.014 +/- 0.002	0.015 +/- 0.002	0.017 +/- 0.002
6/18/97	Air	0.015 +/- 0.002 0.016 +/- 0.002	0.017 +/- 0.002 0.017 +/- 0.002	0.019 +/- 0.002	0.016 +/- 0.002	0.017 +/- 0.002
6/25/97	Air	0.021 +/- 0.002 0.021 +/- 0.002	0.020 +/- 0.002 0.021 +/- 0.002	0.022 +/- 0.002	0.022 +/- 0.002	0.024 +/- 0.002
7/ 2/97	Air	0.017 +/- 0.002 0.018 +/- 0.002	0.018 +/- 0.002 0.016 +/- 0.003	0.020 +/- 0.003	0.019 +/- 0.002	0.020 +/- 0.003
7/ 9/97	Air	0.014 +/- 0.002 0.015 +/- 0.002	0.013 +/- 0.002 0.013 +/- 0.002	0.023 +/- 0.003	0.018 +/- 0.002	0.017 +/- 0.002
7/16/97	Air	0.016 +/- 0.002 0.017 +/- 0.002	0.017 +/- 0.002 0.015 +/- 0.002	0.015 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.003
7/23/97	Air	0.019 +/- 0.002 0.021 +/- 0.002	0.017 +/- 0.002 0.019 +/- 0.002	0.019 +/- 0.002	0.019 +/- 0.002	0.020 +/- 0.002
7/30/97	Air	0.019 +/- 0.002 0.022 +/- 0.002	0.019 +/- 0.002 0.020 +/- 0.002	0.021 +/- 0.002	0.021 +/- 0.002	0.019 +/- 0.002

Air Gross Beta Detail Report 1997

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 Date	Sample Type	7	35			
8/ 6/97	Air	0.021 +/- 0.003 0.020 +/- 0.003	0.021 +/- 0.003 0.020 +/- 0.003	0.021 +/- 0.003	0.021 +/- 0.003	0.023 +/- 0.003
8/13/97	Air	0.026 +/- 0.003 0.023 +/- 0.003	0.025 +/- 0.003 0.023 +/- 0.003	0.028 +/- 0.003	0.022 +/- 0.003	0.021 +/- 0.003
8/20/97	Air	0.013 +/- 0.002 0.013 +/- 0.002	0.014 +/- 0.002 0.013 +/- 0.002	0.013 +/- 0.002	0.015 +/- 0.002	0.014 +/- 0.002
8/27/97	Air	0.019 +/- 0.003 0.021 +/- 0.003	0.021 +/- 0.003 0.022 +/- 0.003	0.018 +/- 0.003	0.020 +/- 0.003	0.022 +/- 0.003
9/ 3/97	Air	0.022 +/- 0.002 0.020 +/- 0.002	0.023 +/- 0.002 0.023 +/- 0.002	0.020 +/- 0.002	0.022 +/- 0.002	0.023 +/- 0.002
9/10/97	Air	0.024 +/- 0.002 0.026 +/- 0.003	0.024 +/- 0.002 0.022 +/- 0.002	0.025 +/- 0.003	0.024 +/- 0.002	0.022 +/- 0.002
9/17/97	Air	0.023 +/- 0.003 0.028 +/- 0.003	0.023 +/- 0.003 0.025 +/- 0.003	0.021 +/- 0.003	0.027 +/- 0.003	0.028 +/- 0.003
9/24/97	Air	0.022 +/- 0.003 0.018 +/- 0.002	0.023 +/- 0.003 0.017 +/- 0.002	0.013 +/- 0.002	0.019 +/- 0.002	0.017 +/- 0.003
10/ 1/97	Air	0.016 +/- 0.002 0.017 +/- 0.002	0.016 +/- 0.002 0.016 +/- 0.002	0.014 +/- 0.002	0.017 +/- 0.002	0.017 +/- 0.002
10/ 8/97	Air	0.039 +/- 0.003 0.044 +/- 0.003	0.038 +/- 0.003 0.041 +/- 0.003	0.035 +/- 0.003	0.038 +/- 0.003	0.042 +/- 0.003
10/15/97	Air	0.028 +/- 0.003 0.026 +/- 0.003	0.025 +/- 0.003 0.028 +/- 0.003	0.024 +/- 0.003	0.025 +/- 0.003	0.028 +/- 0.003
10/22/97	Air	0.013 +/- 0.002 0.014 +/- 0.002	0.011 +/- 0.002 0.013 +/- 0.002	0.014 +/- 0.002	0.010 +/- 0.002	0.013 +/- 0.002
10/29/97	Air	0.018 +/- 0.003 0.016 +/- 0.002	0.019 +/- 0.002 0.016 +/- 0.002	0.016 +/- 0.002	0.017 +/- 0.002	0.018 +/- 0.002
11/ 5/97	Air	0.023 +/- 0.002 0.027 +/- 0.002	0.026 +/- 0.002 0.025 +/- 0.002	0.026 +/- 0.002	0.025 +/- 0.002	0.028 +/- 0.002
11/12/97	Air	0.020 +/- 0.002 0.017 +/- 0.002	0.020 +/- 0.002 0.019 +/- 0.002	0.020 +/- 0.002	0.022 +/- 0.002	0.020 +/- 0.002

Air Gross Beta Detail Report 1997

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 Date	Sample Type	7	35			
11/19/97	Air	0.020 +/- 0.002 0.016 +/- 0.002	0.016 +/- 0.002 0.015 +/- 0.002	0.017 +/- 0.002	0.018 +/- 0.002	0.019 +/- 0.002
11/25/97	Air	0.043 +/- 0.004 0.041 +/- 0.003	0.044 +/- 0.003 0.042 +/- 0.003	0.038 +/- 0.003	0.046 +/- 0.004	0.042 +/- 0.003
12/ 3/97	Air	0.027 +/- 0.002 0.026 +/- 0.002	0.024 +/- 0.002 0.027 +/- 0.002	0.024 +/- 0.002	0.030 +/- 0.002	0.023 +/- 0.002
12/10/97	Air	0.012 +/- 0.002 0.012 +/- 0.002	0.013 +/- 0.002 0.010 +/- 0.002	0.011 +/- 0.002	0.012 +/- 0.002	0.012 +/- 0.002
12/17/97	Air	0.025 +/- 0.003 0.023 +/- 0.002	0.022 +/- 0.002 0.022 +/- 0.002	0.018 +/- 0.002	0.023 +/- 0.002	0.024 +/- 0.002
12/23/97	Air	0.038 +/- 0.003 0.034 +/- 0.003	0.035 +/- 0.003 0.036 +/- 0.003	0.029 +/- 0.003	0.039 +/- 0.004	0.035 +/- 0.003
12/30/97	Air	0.020 +/- 0.003 0.017 +/- 0.002	0.020 +/- 0.003 0.020 +/- 0.002	0.018 +/- 0.002	0.022 +/- 0.003	0.020 +/- 0.003

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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

Air Iodine Detail Report 1997

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	11/19/97	LLD
35	Air	11/25/97	LLD
35	Air	12/ 3/97	LLD
35	Air	12/10/97	LLD
35	Air	12/17/97	LLD
35	Air	12/23/97	LLD
35	Air	12/30/97	LLD

Fish Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
25	Carp	5/23/97	LLD 2,090.40 +/- 353.00	LLD LLD	LLD LLD	LLD	LLD
25	Freshwater Drum	5/23/97	LLD 1,798.10 +/- 473.00	LLD LLD	LLD LLD	LLD	LLD
25	Redhorse	5/23/97	LLD 1,802.30 +/- 500.00	LLD LLD	LLD LLD	LLD	LLD
25	Smallmouth Bass	5/23/97	LLD 2,390.00 +/- 420.00	LLD LLD	LLD LLD	LLD	LLD
25	Walleye	5/23/97	LLD 2,876.60 +/- 407.00	LLD LLD	LLD LLD	LLD	LLD
25	White Bass	5/23/97	LLD 1,519.70 +/- 296.00	LLD LLD	LLD LLD	LLD	LLD
25	White Perch	5/23/97	LLD 2,071.90 +/- 222.00	LLD LLD	LLD LLD	LLD	LLD
25	White Sucker	5/23/97	LLD 1,920.70 +/- 320.00	LLD LLD	LLD LLD	LLD	LLD
25	Carp	10/7/97	LLD 1,705.40 +/- 215.00	LLD LLD	LLD LLD	LLD	LLD
25	Redhorse	10/7/97	LLD 1,906.35 +/- 244.29	LLD LLD	LLD LLD	LLD	LLD
25	Smallmouth Bass	10/7/97	LLD 2,577.10 +/- 374.00	LLD LLD	LLD LLD	LLD	LLD
25	Walleye	10/7/97	LLD 2,831.30 +/- 428.00	LLD LLD	LLD LLD	LLD	LLD

Fish Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	Carp	5/23/97	LLD 1,632.70 +/- 315.00	LLD LLD	LLD LLD	LLD	LLD
32	Sheephead	5/23/97	LLD 2,148.10 +/- 223.40	LLD LLD	LLD LLD	LLD	LLD
32	Walleye	5/23/97	LLD 2,467.80 +/- 321.00	LLD LLD	LLD LLD	LLD	LLD
32	White Perch	5/23/97	LLD 2,118.90 +/- 272.00	LLD LLD	LLD LLD	LLD	LLD
32	White Sucker	5/23/97	LLD 1,598.50 +/- 369.00	LLD LLD	LLD LLD	LLD	LLD
32	Yellow Perch	5/23/97	LLD 2,037.70 +/- 407.00	LLD LLD	LLD LLD	LLD	LLD
32	Carp	10/7/97	LLD 2,096.10 +/- 420.00	LLD LLD	LLD LLD	LLD	LLD
32	Freshwater Drum	10/7/97	LLD 2,466.90 +/- 489.00	LLD LLD	LLD LLD	LLD	LLD
32	Gizzard Shad	10/7/97	LLD 1,852.60 +/- 425.00	LLD LLD	LLD LLD	LLD	LLD
32	Rainbow Trout	10/7/97	LLD 2,515.70 +/- 309.00	LLD LLD	LLD LLD	LLD	LLD
32	Redhorse	10/7/97	LLD 2,145.20 +/- 325.00	LLD LLD	LLD LLD	LLD	LLD
32	Smallmouth Bass	10/7/97	LLD 2,627.50 +/- 313.00	LLD LLD	LLD LLD	LLD	LLD

Fish Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Co-58 K-40	Co-60 Mn-54	Cs-134 Zn-65	Cs-137	Fe-59
32	Walleye	10/7/97	LLD 1,979.30 +/- 376.00	LLD LLD	LLD LLD	LLD	LLD
32	White Bass	10/7/97	LLD 2,227.70 +/- 262.00	LLD LLD	LLD LLD	LLD	LLD
32	White Sucker	10/7/97	LLD 2,585.60 +/- 332.00	LLD LLD	LLD LLD	LLD	LLD

Food Products Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
70	Broccoli	8/ 6/97	LLD LLD	LLD 5,077.50 +/- 501.00	LLD	LLD	LLD
70	Cabbage	8/ 6/97	LLD LLD	LLD 2,931.50 +/- 396.00	LLD	LLD	LLD
70	cabbage	9/11/97	LLD LLD	LLD 2,032.80 +/- 338.00	LLD	LLD	LLD
70	cauliflower	9/11/97	LLD LLD	LLD 2,875.90 +/- 447.00	LLD	LLD	LLD
77	Beet greens	8/ 6/97	LLD LLD	LLD 5,699.50 +/- 375.00	LLD	LLD	LLD
77	Dill	8/ 6/97	LLD LLD	LLD 4,573.60 +/- 442.00	LLD	LLD	LLD
77	beet greens	9/11/97	247.60 +/- 98.90 LLD	LLD 3,819.60 +/- 355.00	LLD	LLD	LLD
77	dill	9/11/97	1,154.10 +/- 261.00 LLD	LLD 4,106.70 +/- 533.00	LLD	LLD	LLD
77	turnip greens	9/11/97	255.90 +/- 103.00 LLD	LLD 2,677.40 +/- 260.00	LLD	LLD	LLD

Milk Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	1/13/97	LLD	LLD	LLD	1,461 +/- 178	LLD
51	Milk	2/10/97	LLD	LLD	LLD	1,454 +/- 176	LLD
51	Milk	3/10/97	LLD	LLD	LLD	1,438 +/- 154	LLD
51	Milk	4/ 7/97	LLD	LLD	LLD	1,422 +/- 130	LLD
51	Milk	4/21/97	LLD	LLD	LLD	1,517 +/- 119	LLD
51	Milk	5/ 5/97	LLD	LLD	LLD	1,588 +/- 185	LLD
51	Milk	5/19/97	LLD	LLD	LLD	1,385 +/- 136	LLD
51	Milk	6/ 9/97	LLD	LLD	LLD	1,527 +/- 171	LLD
51	Milk	6/23/97	LLD	LLD	LLD	1,370 +/- 181	LLD
51	Milk	7/ 7/97	LLD	LLD	LLD	1,388 +/- 161	LLD
51	Milk	7/21/97	LLD	LLD	LLD	1,424 +/- 136	LLD
51	Milk	8/ 4/97	LLD	LLD	LLD	1,627 +/- 194	LLD

Milk Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
51	Milk	8/18/97	LLD	LLD	LLD	1,471 +/- 127	LLD
51	Milk	9/ 8/97	LLD	LLD	LLD	1,342 +/- 120	LLD
51	Milk	9/22/97	LLD	LLD	LLD	1,397 +/- 89	LLD
51	Milk	10/ 7/97	LLD	LLD	LLD	1,437 +/- 225	LLD
51	Milk	10/20/97	LLD	LLD	LLD	1,406 +/- 169	LLD
51	Milk	11/10/97	LLD	LLD	LLD	1,490 +/- 157	LLD
51	Milk	12/ 8/97		LLD	LLD	1,515 +/- 233	LLD
61	Milk	4/21/97	LLD	LLD	LLD	1,832 +/- 175	LLD
61	Milk	5/ 5/97	LLD	LLD	LLD	1,914 +/- 151	LLD
61	Milk	5/19/97	LLD	LLD	LLD	1,902 +/- 197	LLD
61	Milk	6/ 9/97	LLD	LLD	LLD	1,921 +/- 118	LLD
61	Milk	6/23/97	LLD	LLD	LLD	1,919 +/- 154	LLD

Milk Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
61	Milk	7/ 7/97	LLD	LLD	LLD	1,890 +/- 205	LLD
61	Milk	7/21/97	LLD	LLD	LLD	1,768 +/- 222	LLD
61	Milk	8/ 4/97	LLD	LLD	LLD	1,898 +/- 146	LLD
61	Milk	8/18/97	LLD	LLD	LLD	1,817 +/- 168	LLD
61	Milk	9/ 8/97	LLD	LLD	LLD	2,007 +/- 137	LLD
61	Milk	9/22/97	LLD	LLD	LLD	2,225 +/- 180	LLD
71	Milk	1/13/97	LLD	LLD	LLD	1,444 +/- 193	LLD
71	Milk	2/11/97	LLD	LLD	LLD	1,359 +/- 122	LLD
71	Milk	3/10/97	LLD	LLD	LLD	1,160 +/- 115	LLD
71	Milk	4/ 7/97	LLD	LLD	LLD	1,576 +/- 176	LLD
71	Milk	4/22/97	LLD	LLD	LLD	1,184 +/- 145	LLD
71	Milk	5/ 5/97	LLD	LLD	LLD	1,182 +/- 162	LLD

Milk Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
71	Milk	5/19/97	LLD	LLD	LLD	1,295 +/- 156	LLD
71	Milk	6/ 9/97	LLD	LLD	LLD	1,319 +/- 153	LLD
71	Milk	6/23/97	LLD	LLD	LLD	1,233 +/- 171	LLD
71	Milk	7/ 7/97	LLD	LLD	LLD	1,219 +/- 155	LLD
71	Milk	7/22/97	LLD	LLD	LLD	1,164 +/- 133	LLD
71	Milk	8/ 4/97	LLD	LLD	LLD	1,255 +/- 138	LLD
71	Milk	8/18/97	LLD	LLD	LLD	1,309 +/- 143	LLD
71	Milk	9/ 8/97	LLD	LLD	LLD	1,015 +/- 113	LLD
71	Milk	9/22/97	LLD	LLD	LLD	1,507 +/- 139	LLD
71	Milk	10/ 7/97	LLD	LLD	LLD	1,466 +/- 170	LLD
71	Milk	10/21/97	LLD	LLD	LLD	1,473 +/- 111	LLD
71	Milk	11/10/97	LLD	LLD	LLD	1,452 +/- 157	LLD

Milk Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Ba-140	Cs-134	Cs-137	K-40	La-140
71	Milk	12/ 8/97	LLD	LLD	LLD	1,387 +/- 155	LLD

Milk Iodine Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	I-131
51	Milk	1/13/97	LLD
51	Milk	2/10/97	LLD
51	Milk	3/10/97	LLD
51	Milk	4/ 7/97	LLD
51	Milk	4/21/97	LLD
51	Milk	5/ 5/97	LLD
51	Milk	5/19/97	LLD
51	Milk	6/ 9/97	LLD
51	Milk	6/23/97	LLD
51	Milk	7/ 7/97	LLD
51	Milk	7/21/97	LLD
51	Milk	8/ 4/97	LLD
51	Milk	8/18/97	LLD
51	Milk	9/ 8/97	LLD
51	Milk	9/22/97	LLD
51	Milk	10/ 7/97	LLD
51	Milk	10/20/97	LLD
51	Milk	11/10/97	LLD
51	Milk	12/ 8/97	LLD
61	Milk	1/13/97	
61	Milk	2/10/97	
61	Milk	3/10/97	
61	Milk	4/ 7/97	
61	Milk	4/21/97	LLD
61	Milk	5/ 5/97	LLD
61	Milk	5/19/97	LLD
61	Milk	6/ 9/97	LLD
61	Milk	6/23/97	LLD
61	Milk	7/ 7/97	LLD
61	Milk	7/21/97	LLD
61	Milk	8/ 4/97	LLD
61	Milk	8/18/97	LLD
61	Milk	9/ 8/97	LLD
61	Milk	9/22/97	LLD
61	Milk	10/ 7/97	
61	Milk	11/10/97	
61	Milk	12/ 8/97	
71	Milk	1/13/97	LLD
71	Milk	2/11/97	LLD
71	Milk	3/10/97	LLD
71	Milk	4/ 7/97	LLD
71	Milk	4/22/97	LLD
71	Milk	5/ 5/97	LLD
71	Milk	5/19/97	LLD
71	Milk	6/ 9/97	LLD
71	Milk	6/23/97	LLD
71	Milk	7/ 7/97	LLD
71	Milk	7/22/97	LLD

Milk Iodine Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	I-131
71	Milk	8/ 4/97	LLD
71	Milk	8/18/97	LLD
71	Milk	9/ 8/97	LLD
71	Milk	9/22/97	LLD
71	Milk	10/ 7/97	LLD
71	Milk	10/21/97	LLD
71	Milk	11/10/97	LLD
71	Milk	12/ 8/97	LLD

Sediment Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Co-58	Co-60	Cs-134	Cs-137	K-40
25	Sediment	5/22/97	LLD	LLD	LLD	LLD	15,649.00 +/- 653.00
25	Sediment	10/ 6/97	LLD	LLD	LLD	218.57 +/- 47.50	15,963.00 +/- 843.00
26	Sediment	5/22/97	LLD	LLD	LLD	LLD	13,246.00 +/- 765.00
26	Sediment	10/ 6/97	LLD	LLD	LLD	524.31 +/- 50.20	15,763.00 +/- 829.00
27	Sediment	5/22/97	LLD	LLD	LLD	329.13 +/- 51.00	18,049.00 +/- 956.00
27	Sediment	10/ 6/97	LLD	LLD	LLD	504.45 +/- 45.00	17,270.00 +/- 865.00
32	Sediment	5/22/97	LLD	LLD	LLD	731.97 +/- 58.50	17,653.00 +/- 881.00
32	Sediment	10/ 6/97		LLD	LLD	1,203.30 +/- 56.90	21,042.00 +/- 789.00
64	Sediment	5/28/97	LLD	LLD	LLD	LLD	9,647.70 +/- 634.00
64	Sediment	10/ 2/97	LLD	LLD	LLD	LLD	8,187.60 +/- 477.00

Sediment Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Co-58	Co-60	Cs-134	Cs-137	K-40
65	Sediment	5/28/97	LLD	LLD	LLD	LLD	8,748.70 +/- 594.00

Soil Gamma Spectral Detail Report 1997

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 Date	Co-58	Co-60	Cs-134	Cs-137	K-40
3	Soil	4/21/97	LLD	LLD	LLD	210.72 +/- 46.20	9,341.20 +/- 714.00
3	Soil	9/8/97	LLD	LLD	LLD	215.24 +/- 20.50	9,699.90 +/- 382.00
4	Soil	4/21/97	LLD	LLD	LLD	LLD	5,504.30 +/- 378.00
4	Soil	9/8/97	LLD	LLD	LLD	LLD	12,620.00 +/- 430.00
6	Soil	4/21/97	LLD	LLD	LLD	163.46 +/- 29.70	14,532.00 +/- 631.00
6	Soil	9/8/97	LLD	LLD	LLD	152.76 +/- 25.70	15,864.00 +/- 563.00
7	Soil	4/21/97	LLD	LLD	LLD	290.87 +/- 36.70	11,331.00 +/- 589.00
7	Soil	9/8/97	LLD	LLD	LLD	297.37 +/- 20.60	10,894.00 +/- 341.00
9	Soil	4/21/97	LLD	LLD	LLD	162.07 +/- 24.90	4,354.30 +/- 366.0
9	Soil	9/8/97	LLD	LLD	LLD	405.96 +/- 55.70	10,942.00 +/- 865.00

Soil Gamma Spectral Detail Report 1997

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 Date	Co-58	Co-60	Cs-134	Cs-137	K-40
12	Soil	4/21/97	LLD	LLD	LLD	162.17 +/- 29.70	4,619.70 +/- 407.00
12	Soil	9/8/97	LLD	LLD	LLD	215.72 +/- 24.10	6,982.80 +/- 354.00
35	Soil	4/21/97	LLD	LLD	LLD	174.84 +/- 41.90	10,040.00 +/- 704.00
35	Soil	9/8/97	LLD	LLD	LLD	167.07 +/- 29.40	11,582.00 +/- 522.00

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
1	TLD	1/ 6/97 to 4/ 1/97	13.32 +/- 0.35
1	TLD	4/ 1/97 to 7/ 1/97	13.82 +/- 0.19
1	TLD	7/ 1/97 to 10/ 6/97	14.10 +/- 0.20
1	TLD	10/ 6/97 to 1/ 5/98	15.12 +/- 0.31
3	TLD	1/ 6/97 to 4/ 1/97	14.69 +/- 0.36
3	TLD	4/ 1/97 to 7/ 1/97	14.39 +/- 0.20
3	TLD	7/ 1/97 to 10/ 6/97	15.40 +/- 0.20
3	TLD	10/ 6/97 to 1/ 5/98	15.04 +/- 0.20
4	TLD	1/ 6/97 to 4/ 1/97	15.52 +/- 0.41
4	TLD	4/ 1/97 to 7/ 1/97	16.28 +/- 0.33
4	TLD	7/ 1/97 to 10/ 6/97	17.00 +/- 0.20
4	TLD	10/ 6/97 to 1/ 5/98	16.33 +/- 0.18
5	TLD	1/ 6/97 to 4/ 1/97	14.02 +/- 0.35
5	TLD	4/ 1/97 to 7/ 1/97	14.52 +/- 0.20
5	TLD	7/ 1/97 to 10/ 6/97	14.60 +/- 0.20
5	TLD	10/ 6/97 to 1/ 5/98	16.61 +/- 0.21
6	TLD	1/ 6/97 to 4/ 1/97	17.14 +/- 0.34
6	TLD	4/ 1/97 to 7/ 1/97	16.80 +/- 0.42
6	TLD	7/ 1/97 to 10/ 6/97	17.80 +/- 0.20
6	TLD	10/ 6/97 to 1/ 5/98	17.41 +/- 0.19
7	TLD	1/ 6/97 to 4/ 1/97	15.82 +/- 0.39
7	TLD	4/ 1/97 to 7/ 1/97	15.29 +/- 0.22
7	TLD	7/ 1/97 to 10/ 6/97	16.10 +/- 0.30
7	TLD	10/ 6/97 to 1/ 5/98	16.42 +/- 0.17
8	TLD	1/ 6/97 to 4/ 1/97	11.94 +/- 0.34
8	TLD	4/ 1/97 to 7/ 1/97	12.33 +/- 0.30
8	TLD	7/ 1/97 to 10/ 6/97	13.20 +/- 0.20
8	TLD	10/ 6/97 to 1/ 5/98	13.67 +/- 0.19
9	TLD	1/ 6/97 to 4/ 1/97	10.17 +/- 0.37
9	TLD	4/ 1/97 to 7/ 1/97	13.61 +/- 0.21
9	TLD	7/ 1/97 to 10/ 6/97	11.90 +/- 0.30
9	TLD	10/ 6/97 to 1/ 5/98	15.24 +/- 0.35
10	TLD	1/ 6/97 to 4/ 1/97	17.28 +/- 0.35
10	TLD	4/ 1/97 to 7/ 1/97	17.76 +/- 0.19
10	TLD	7/ 1/97 to 10/ 6/97	18.20 +/- 0.20
10	TLD	10/ 6/97 to 1/ 5/98	17.66 +/- 0.22
11	TLD	1/ 6/97 to 4/ 1/97	15.67 +/- 0.40
11	TLD	4/ 1/97 to 7/ 1/97	15.33 +/- 0.20
11	TLD	7/ 1/97 to 10/ 6/97	17.00 +/- 0.20

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
11	TLD	10/ 6/97 to 1/ 5/98	14.57 +/- 0.22
12	TLD	1/ 6/97 to 4/ 1/97	15.47 +/- 0.47
12	TLD	4/ 1/97 to 7/ 1/97	14.08 +/- 0.22
12	TLD	7/ 1/97 to 10/ 6/97	15.80 +/- 0.30
12	TLD	10/ 6/97 to 1/ 5/98	17.55 +/- 0.18
13	TLD	1/ 6/97 to 4/ 1/97	15.29 +/- 0.38
13	TLD	4/ 1/97 to 7/ 1/97	14.36 +/- 0.32
13	TLD	7/ 1/97 to 10/ 6/97	15.90 +/- 0.30
13	TLD	10/ 6/97 to 1/ 5/98	14.90 +/- 0.41
14	TLD	1/ 6/97 to 4/ 1/97	12.52 +/- 0.38
14	TLD	4/ 1/97 to 7/ 1/97	13.88 +/- 0.18
14	TLD	7/ 1/97 to 10/ 6/97	14.40 +/- 0.20
14	TLD	10/ 6/97 to 1/ 5/98	14.13 +/- 0.21
15	TLD	1/ 6/97 to 4/ 1/97	14.95 +/- 0.38
15	TLD	4/ 1/97 to 7/ 1/97	14.43 +/- 0.18
15	TLD	7/ 1/97 to 10/ 6/97	14.80 +/- 0.20
15	TLD	10/ 6/97 to 1/ 5/98	14.20 +/- 0.21
21	TLD	1/ 6/97 to 4/ 1/97	17.20 +/- 0.34
21	TLD	4/ 1/97 to 7/ 1/97	18.60 +/- 0.19
21	TLD	7/ 1/97 to 10/ 6/97	18.30 +/- 0.20
21	TLD	10/ 6/97 to 1/ 5/98	19.53 +/- 0.38
23	TLD	1/ 6/97 to 4/ 1/97	
23	TLD	4/ 1/97 to 7/ 1/97	16.71 +/- 0.22
23	TLD	7/ 1/97 to 10/ 6/97	16.20 +/- 0.40
23	TLD	10/ 6/97 to 1/ 5/98	17.83 +/- 0.19
24	TLD	1/ 6/97 to 4/ 1/97	15.77 +/- 0.49
24	TLD	4/ 1/97 to 7/ 1/97	15.42 +/- 0.23
24	TLD	7/ 1/97 to 10/ 6/97	17.10 +/- 0.20
24	TLD	10/ 6/97 to 1/ 5/98	15.44 +/- 0.25
29	TLD	1/ 6/97 to 4/ 1/97	18.50 +/- 0.35
29	TLD	4/ 1/97 to 7/ 1/97	18.58 +/- 0.21
29	TLD	7/ 1/97 to 10/ 6/97	20.00 +/- 0.30
29	TLD	10/ 6/97 to 1/ 5/98	19.46 +/- 0.35
30	TLD	1/ 6/97 to 4/ 1/97	13.57 +/- 0.36
30	TLD	4/ 1/97 to 7/ 1/97	14.46 +/- 0.20
30	TLD	7/ 1/97 to 10/ 6/97	15.20 +/- 0.30
30	TLD	10/ 6/97 to 1/ 5/98	15.18 +/- 0.35
31	TLD	1/ 6/97 to 4/ 1/97	16.31 +/- 0.48
31	TLD	4/ 1/97 to 7/ 1/97	16.42 +/- 0.31

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
31	TLD	7/ 1/97 to 10/ 6/97	17.10 +/- 0.20
31	TLD	10/ 6/97 to 1/ 5/98	17.89 +/- 0.26
33	TLD	1/ 6/97 to 4/ 1/97	15.99 +/- 0.38
33	TLD	4/ 1/97 to 7/ 1/97	18.64 +/- 0.20
33	TLD	7/ 1/97 to 10/ 6/97	17.60 +/- 0.20
33	TLD	10/ 6/97 to 1/ 5/98	19.41 +/- 0.29
35	TLD	1/ 6/97 to 4/ 1/97	13.23 +/- 0.36
35	TLD	4/ 1/97 to 7/ 1/97	14.20 +/- 0.29
35	TLD	7/ 1/97 to 10/ 6/97	14.00 +/- 0.20
35	TLD	10/ 6/97 to 1/ 5/98	14.91 +/- 0.20
36	TLD	1/ 6/97 to 4/ 1/97	17.92 +/- 0.39
36	TLD	4/ 1/97 to 7/ 1/97	19.41 +/- 0.22
36	TLD	7/ 1/97 to 10/ 6/97	19.70 +/- 0.50
36	TLD	10/ 6/97 to 1/ 5/98	19.64 +/- 0.22
53	TLD	1/ 6/97 to 4/ 1/97	14.69 +/- 0.35
53	TLD	4/ 1/97 to 7/ 1/97	16.15 +/- 0.20
53	TLD	7/ 1/97 to 10/ 6/97	15.60 +/- 0.30
53	TLD	10/ 6/97 to 1/ 5/98	17.57 +/- 0.22
54	TLD	1/ 6/97 to 4/ 1/97	13.67 +/- 0.35
54	TLD	4/ 1/97 to 7/ 1/97	15.37 +/- 0.19
54	TLD	7/ 1/97 to 10/ 6/97	14.80 +/- 0.30
54	TLD	10/ 6/97 to 1/ 5/98	16.40 +/- 0.21
55	TLD	1/ 6/97 to 4/ 1/97	13.50 +/- 0.36
55	TLD	4/ 1/97 to 7/ 1/97	14.98 +/- 0.20
55	TLD	7/ 1/97 to 10/ 6/97	14.80 +/- 0.20
55	TLD	10/ 6/97 to 1/ 5/98	16.19 +/- 0.17
56	TLD	1/ 6/97 to 4/ 1/97	13.97 +/- 0.36
56	TLD	4/ 1/97 to 7/ 1/97	13.58 +/- 0.19
56	TLD	7/ 1/97 to 10/ 6/97	14.60 +/- 0.20
56	TLD	10/ 6/97 to 1/ 5/98	14.57 +/- 0.20
58	TLD	1/ 6/97 to 4/ 1/97	13.04 +/- 0.36
58	TLD	4/ 1/97 to 7/ 1/97	13.53 +/- 0.19
58	TLD	7/ 1/97 to 10/ 6/97	14.70 +/- 0.20
58	TLD	10/ 6/97 to 1/ 5/98	14.18 +/- 0.25

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
1	TLB	1/ 6/97 to 4/ 1/97	11.55 +/- 0.42
1	TLB	4/ 1/97 to 7/ 1/97	12.98 +/- 0.20
1	TLB	7/ 1/97 to 10/ 6/97	11.30 +/- 0.36
1	TLB	10/ 6/97 to 1/ 5/98	14.17 +/- 0.36
3	TLB	1/ 6/97 to 4/ 1/97	15.10 +/- 0.21
3	TLB	4/ 1/97 to 7/ 1/97	13.51 +/- 0.22
3	TLB	7/ 1/97 to 10/ 6/97	14.30 +/- 0.20
3	TLB	10/ 6/97 to 1/ 5/98	15.50 +/- 0.20
4	TLB	1/ 6/97 to 4/ 1/97	16.52 +/- 0.41
4	TLB	4/ 1/97 to 7/ 1/97	14.67 +/- 0.23
4	TLB	7/ 1/97 to 10/ 6/97	15.90 +/- 0.40
4	TLB	10/ 6/97 to 1/ 5/98	16.02 +/- 0.21
5	TLB	1/ 6/97 to 4/ 1/97	15.82 +/- 0.23
5	TLB	4/ 1/97 to 7/ 1/97	13.46 +/- 0.21
5	TLB	7/ 1/97 to 10/ 6/97	15.30 +/- 0.30
5	TLB	10/ 6/97 to 1/ 5/98	14.16 +/- 0.23
6	TLB	1/ 6/97 to 4/ 1/97	17.91 +/- 0.22
6	TLB	4/ 1/97 to 7/ 1/97	14.91 +/- 0.23
6	TLB	7/ 1/97 to 10/ 6/97	16.70 +/- 0.26
6	TLB	10/ 6/97 to 1/ 5/98	15.89 +/- 0.25
7	TLB	1/ 6/97 to 4/ 1/97	15.12 +/- 0.27
7	TLB	4/ 1/97 to 7/ 1/97	13.11 +/- 0.18
7	TLB	7/ 1/97 to 10/ 6/97	15.30 +/- 0.30
7	TLB	10/ 6/97 to 1/ 5/98	14.95 +/- 0.21
8	TLB	1/ 6/97 to 4/ 1/97	13.63 +/- 0.21
8	TLB	4/ 1/97 to 7/ 1/97	11.77 +/- 0.17
8	TLB	7/ 1/97 to 10/ 6/97	13.80 +/- 0.20
8	TLB	10/ 6/97 to 1/ 5/98	13.92 +/- 0.27
9	TLB	1/ 6/97 to 4/ 1/97	12.35 +/- 0.48
9	TLB	4/ 1/97 to 7/ 1/97	11.53 +/- 0.29
9	TLB	7/ 1/97 to 10/ 6/97	13.00 +/- 0.20
9	TLB	10/ 6/97 to 1/ 5/98	13.70 +/- 0.22
10	TLB	1/ 6/97 to 4/ 1/97	14.99 +/- 0.21
10	TLB	4/ 1/97 to 7/ 1/97	16.80 +/- 0.17
10	TLB	7/ 1/97 to 10/ 6/97	15.40 +/- 0.20
10	TLB	10/ 6/97 to 1/ 5/98	16.34 +/- 0.27
11	TLB	1/ 6/97 to 4/ 1/97	16.27 +/- 0.34
11	TLB	4/ 1/97 to 7/ 1/97	13.02 +/- 0.20
11	TLB	7/ 1/97 to 10/ 6/97	15.00 +/- 0.40

TLD Gamma Dose Detail Report 1997

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

Location	Sample Type	Collection Period	Exposure
11	TLB	10/ 6/97 to 1/ 5/98	14.46 +/- 0.29
12	TLB	1/ 6/97 to 4/ 1/97	14.06 +/- 0.20
12	TLB	4/ 1/97 to 7/ 1/97	14.56 +/- 0.27
12	TLB	7/ 1/97 to 10/ 6/97	15.10 +/- 0.20
12	TLB	10/ 6/97 to 1/ 5/98	15.92 +/- 0.21
13	TLB	1/ 6/97 to 4/ 1/97	11.79 +/- 0.26
13	TLB	4/ 1/97 to 7/ 1/97	13.44 +/- 0.21
13	TLB	7/ 1/97 to 10/ 6/97	12.60 +/- 0.20
13	TLB	10/ 6/97 to 1/ 5/98	14.07 +/- 0.41
14	TLB	1/ 6/97 to 4/ 1/97	11.85 +/- 0.25
14	TLB	4/ 1/97 to 7/ 1/97	13.73 +/- 0.18
14	TLB	7/ 1/97 to 10/ 6/97	12.20 +/- 0.20
14	TLB	10/ 6/97 to 1/ 5/98	14.15 +/- 0.27
15	TLB	1/ 6/97 to 4/ 1/97	11.94 +/- 0.23
15	TLB	4/ 1/97 to 7/ 1/97	13.43 +/- 0.21
15	TLB	7/ 1/97 to 10/ 6/97	11.40 +/- 0.20
15	TLB	10/ 6/97 to 1/ 5/98	13.26 +/- 0.21
21	TLB	1/ 6/97 to 4/ 1/97	17.53 +/- 0.20
21	TLB	4/ 1/97 to 7/ 1/97	17.73 +/- 0.22
21	TLB	7/ 1/97 to 10/ 6/97	19.60 +/- 0.50
21	TLB	10/ 6/97 to 1/ 5/98	18.34 +/- 0.24
23	TLB	1/ 6/97 to 4/ 1/97	
23	TLB	4/ 1/97 to 7/ 1/97	15.66 +/- 0.31
23	TLB	7/ 1/97 to 10/ 6/97	14.60 +/- 0.20
23	TLB	10/ 6/97 to 1/ 5/98	16.48 +/- 0.22
24	TLB	1/ 6/97 to 4/ 1/97	17.76 +/- 0.22
24	TLB	4/ 1/97 to 7/ 1/97	15.42 +/- 0.37
24	TLB	7/ 1/97 to 10/ 6/97	17.60 +/- 0.20
24	TLB	10/ 6/97 to 1/ 5/98	15.81 +/- 0.21
29	TLB	1/ 6/97 to 4/ 1/97	18.09 +/- 0.21
29	TLB	4/ 1/97 to 7/ 1/97	18.04 +/- 0.21
29	TLB	7/ 1/97 to 10/ 6/97	18.10 +/- 0.29
29	TLB	10/ 6/97 to 1/ 5/98	18.53 +/- 0.32
30	TLB	1/ 6/97 to 4/ 1/97	14.63 +/- 0.20
30	TLB	4/ 1/97 to 7/ 1/97	12.56 +/- 0.19
30	TLB	7/ 1/97 to 10/ 6/97	15.20 +/- 0.30
30	TLB	10/ 6/97 to 1/ 5/98	14.02 +/- 0.35
31	TLB	1/ 6/97 to 4/ 1/97	17.62 +/- 0.20
31	TLB	4/ 1/97 to 7/ 1/97	15.51 +/- 0.25

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Quarterly

Location	Sample Type	Collection Period	Exposure
31	TLB	7/ 1/97 to 10/ 6/97	19.40 +/- 0.30
31	TLB	10/ 6/97 to 1/ 5/98	16.17 +/- 0.22
33	TLB	1/ 6/97 to 4/ 1/97	17.74 +/- 0.19
33	TLB	4/ 1/97 to 7/ 1/97	17.85 +/- 0.23
33	TLB	7/ 1/97 to 10/ 6/97	19.20 +/- 0.30
33	TLB	10/ 6/97 to 1/ 5/98	18.42 +/- 0.28
35	TLB	1/ 6/97 to 4/ 1/97	13.85 +/- 0.20
35	TLB	4/ 1/97 to 7/ 1/97	13.62 +/- 0.29
35	TLB	7/ 1/97 to 10/ 6/97	14.20 +/- 0.20
35	TLB	10/ 6/97 to 1/ 5/98	13.97 +/- 0.31
36	TLB	1/ 6/97 to 4/ 1/97	16.74 +/- 0.35
36	TLB	4/ 1/97 to 7/ 1/97	16.97 +/- 0.20
36	TLB	7/ 1/97 to 10/ 6/97	19.30 +/- 0.30
36	TLB	10/ 6/97 to 1/ 5/98	17.46 +/- 0.23
53	TLB	1/ 6/97 to 4/ 1/97	13.82 +/- 0.18
53	TLB	4/ 1/97 to 7/ 1/97	13.22 +/- 0.24
53	TLB	7/ 1/97 to 10/ 6/97	15.50 +/- 0.20
53	TLB	10/ 6/97 to 1/ 5/98	15.37 +/- 0.22
54	TLB	1/ 6/97 to 4/ 1/97	16.39 +/- 0.29
54	TLB	4/ 1/97 to 7/ 1/97	15.35 +/- 0.31
54	TLB	7/ 1/97 to 10/ 6/97	17.40 +/- 0.20
54	TLB	10/ 6/97 to 1/ 5/98	15.06 +/- 0.23
55	TLB	1/ 6/97 to 4/ 1/97	13.64 +/- 0.22
55	TLB	4/ 1/97 to 7/ 1/97	17.92 +/- 0.19
55	TLB	7/ 1/97 to 10/ 6/97	15.10 +/- 0.30
55	TLB	10/ 6/97 to 1/ 5/98	15.85 +/- 0.24
56	TLB	1/ 6/97 to 4/ 1/97	13.72 +/- 0.22
56	TLB	4/ 1/97 to 7/ 1/97	12.20 +/- 0.19
56	TLB	7/ 1/97 to 10/ 6/97	14.20 +/- 0.20
56	TLB	10/ 6/97 to 1/ 5/98	12.27 +/- 0.24
58	TLB	1/ 6/97 to 4/ 1/97	13.57 +/- 0.20
58	TLB	4/ 1/97 to 7/ 1/97	13.59 +/- 0.21
58	TLB	7/ 1/97 to 10/ 6/97	14.60 +/- 0.20
58	TLB	10/ 6/97 to 1/ 5/98	15.36 +/- 0.22

TLD Gamma Dose Detail Report 1997

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

Location	Sample Type	Collection Period	Exposure
1	TLA	1/ 6/97 to 1/ 5/98	48.21 +/- 0.71
3	TLA	1/ 6/97 to 1/ 5/98	47.82 +/- 0.79
4	TLA	1/ 6/97 to 1/ 5/98	56.63 +/- 0.62
5	TLA	1/ 6/97 to 1/ 5/98	48.39 +/- 0.79
6	TLA	1/ 6/97 to 1/ 5/98	58.42 +/- 0.61
7	TLA	1/ 6/97 to 1/ 5/98	57.33 +/- 0.79
8	TLA	1/ 6/97 to 1/ 5/98	46.26 +/- 0.62
9	TLA	1/ 6/97 to 1/ 5/98	46.32 +/- 0.61
10	TLA	1/ 6/97 to 1/ 5/98	61.35 +/- 1.14
11	TLA	1/ 6/97 to 1/ 5/98	48.06 +/- 0.72
12	TLA	1/ 6/97 to 1/ 5/98	53.79 +/- 1.08
13	TLA	1/ 6/97 to 1/ 5/98	52.39 +/- 0.72
14	TLA	1/ 6/97 to 1/ 5/98	50.40 +/- 0.60
15	TLA	1/ 6/97 to 1/ 5/98	49.91 +/- 0.62
21	TLA	1/ 6/97 to 1/ 5/98	67.06 +/- 0.61
23	TLA	4/14/97 to 1/ 5/98	52.82 +/- 0.66
24	TLA	1/ 6/97 to 1/ 5/98	56.38 +/- 0.68
29	TLA	1/ 6/97 to 1/ 5/98	62.00 +/- 0.60
30	TLA	1/ 6/97 to 1/ 5/98	51.66 +/- 0.63
31	TLA	1/ 6/97 to 1/ 5/98	64.92 +/- 0.66
33	TLA	1/ 6/97 to 1/ 5/98	64.81 +/- 0.74
35	TLA	1/ 6/97 to 1/ 5/98	51.92 +/- 0.65
36	TLA	1/ 6/97 to 1/ 5/98	73.61 +/- 0.69

TLD Gamma Dose Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

Sample Frequency is: Annual

Location	Sample Type	Collection Period	Exposure
53	TLA	1/ 6/97 to 1/ 5/98	56.82 +/- 0.72
54	TLA	1/ 6/97 to 1/ 5/98	54.95 +/- 0.62
55	TLA	1/ 6/97 to 1/ 5/98	64.28 +/- 0.62
56	TLA	1/ 6/97 to 1/ 5/98	53.73 +/- 0.62
58	TLA	1/ 6/97 to 1/ 5/98	50.43 +/- 0.62

Vegetation Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
6	Vegetation	7/ 8/97	1,695.40 +/- 255.00 LLD	LLD 6,273.80 +/- 524.00	LLD	LLD	LLD
6	Vegetation	8/12/97	2,120.80 +/- 278.00 LLD	LLD 6,385.90 +/- 491.00	LLD	LLD	LLD
6	Vegetation	10/ 7/97	1,637.70 +/- 275.00 LLD	LLD 5,567.20 +/- 580.00	LLD	LLD	LLD
7	Vegetation	5/13/97	1,955.10 +/- 244.00 LLD	LLD 4,029.00 +/- 393.00	LLD	LLD	LLD
7	Vegetation	6/10/97	2,325.00 +/- 231.00 LLD	LLD 6,942.40 +/- 484.00	LLD	LLD	LLD
7	Vegetation	7/ 8/97	1,024.20 +/- 264.00 LLD	LLD 5,438.50 +/- 611.00	LLD	LLD	LLD
7	Vegetation	8/12/97	3,286.00 +/- 136.00 LLD	LLD 8,733.60 +/- 274.00	LLD	LLD	LLD
7	Vegetation	9/10/97	2,465.90 +/- 197.00 LLD	LLD 3,883.40 +/- 297.00	LLD	LLD	LLD
7	Vegetation	10/ 7/97	2,897.90 +/- 298.00 LLD	LLD 4,626.30 +/- 432.00	LLD	LLD	LLD
35	Vegetation	5/13/97	7,760.00 +/- 486.00 LLD	LLD 5,016.50 +/- 557.00	LLD	LLD	LLD
35	Vegetation	6/10/97	2,464.10 +/- 313.00 LLD	LLD 5,687.20 +/- 529.00	LLD	LLD	LLD

Vegetation Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Date	Be-7 I-131	Co-58 K-40	Co-60	Cs-134	Cs-137
35	Vegetation	7/ 8/97	1,637.40 +/- 261.00 LLD	LLD 5,839.80 +/- 475.00	LLD	LLD	LLD
35	Vegetation	8/12/97	3,912.30 +/- 230.00 LLD	LLD 6,337.30 +/- 373.00	LLD	LLD	LLD
35	Vegetation	9/10/97	3,008.30 +/- 300.00 LLD	LLD 2,942.60 +/- 422.00	LLD	LLD	LLD
35	Vegetation	10/ 7/97	4,025.40 +/- 515.00 LLD	LLD 5,942.40 +/- 847.00	LLD	LLD	LLD
42	Vegetation	5/13/97	3,477.50 +/- 348.00 LLD	LLD 5,114.20 +/- 526.00	LLD	LLD	LLD
42	Vegetation	6/10/97	2,258.80 +/- 296.00 LLD	LLD 3,636.80 +/- 499.00	LLD	LLD	LLD
42	Vegetation	7/ 8/97	1,069.90 +/- 259.00 LLD	LLD 4,721.50 +/- 526.00	LLD	LLD	LLD
42	Vegetation	9/10/97	1,347.85 +/- 111.42 LLD	LLD 3,677.35 +/- 203.40	LLD	LLD	LLD
42	Vegetation	10/ 7/97	2,758.30 +/- 287.00 LLD	LLD 4,730.50 +/- 494.00	LLD	LLD	LLD

Water Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
28	Water	12/30/96 to 1/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	1/30/97 to 2/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	2/27/97 to 3/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	3/27/97 to 4/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	4/24/97 to 5/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	6/26/97 to 6/26/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	7/31/97 to 7/31/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	8/28/97 to 8/28/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	8/28/97 to 9/25/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	9/25/97 to 10/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	10/30/97 to 11/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
28	Water	11/24/97 to 12/29/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
34	Water	12/30/96 to 1/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	1/30/97 to 2/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	2/27/97 to 3/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	3/27/97 to 4/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	4/24/97 to 5/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	5/30/97 to 6/26/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	6/26/97 to 7/31/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	7/31/97 to 8/28/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	8/28/97 to 9/25/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	9/25/97 to 10/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	10/30/97 to 11/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
34	Water	11/24/97 to 12/29/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
36	Water	12/30/96 to 1/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	1/30/97 to 2/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	2/27/97 to 3/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	3/27/97 to 4/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	4/24/97 to 5/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	5/30/97 to 6/26/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	6/26/97 to 7/31/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	7/31/97 to 8/28/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	8/28/97 to 9/25/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	9/25/97 to 10/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	10/30/97 to 11/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
36	Water	11/24/97 to 12/29/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectral Detail Report 1997

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	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
59	Water	2/27/97 to 2/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	2/27/97 to 3/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	3/27/97 to 4/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	4/24/97 to 5/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	5/30/97 to 6/26/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	6/26/97 to 7/31/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	7/31/97 to 8/28/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	8/28/97 to 9/25/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	9/25/97 to 10/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	10/30/97 to 11/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
59	Water	12/ 4/97 to 12/29/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	2/27/97 to 2/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gamma Spectrai Detail Report 1997

Radiological Environmental Monitoring Program Detail Data

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

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

Location	Sample Type	Collection Period	Ba-140 Fe-59 Zr-95	Co-58 La-140	Co-60 Mn-54	Cs-134 Nb-95	Cs-137 Zn-65
60	Water	2/27/97 to 3/27/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	3/27/97 to 4/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	4/24/97 to 5/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	5/30/97 to 6/26/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	6/26/97 to 7/31/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	7/31/97 to 8/28/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	8/28/97 to 9/25/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	9/25/97 to 10/30/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	10/30/97 to 11/24/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD
60	Water	12/ 4/97 to 12/29/97	LLD LLD LLD	LLD LLD	LLD LLD	LLD LLD	LLD LLD

Water Gross Beta Detail Report 1997

Radiological Environmental Monitoring Program Data Summary

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

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

		Location				
Collection Period	Sample Type	28	34	36	59	60
12/30/96 to 1/30/97	Water	LLD	LLD	LLD		
1/30/97 to 2/27/97	Water	LLD	LLD	LLD		
2/27/97 to 2/27/97	Water				6.81 +/- 0.80	5.40 +/- 0.78
2/27/97 to 3/27/97	Water	LLD	LLD	LLD	LLD	LLD
3/27/97 to 4/24/97	Water	LLD	LLD	LLD	LLD	3.65 +/- 0.70
4/24/97 to 5/30/97	Water	LLD	LLD	LLD	LLD	LLD
5/30/97 to 6/26/97	Water		LLD	LLD	LLD	LLD
6/26/97 to 6/26/97	Water	LLD				
6/26/97 to 7/31/97	Water		LLD	3.47 +/- 0.70	LLD	LLD
7/31/97 to 7/31/97	Water	LLD				
7/31/97 to 8/28/97	Water		LLD	LLD	LLD	LLD
8/28/97 to 8/28/97	Water	LLD				

Water Gross Beta Detail Report 1997

Radiological Environmental Monitoring Program Data Summary

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

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

		Location				
Collection Period	Sample Type	28	34	36	59	60
8/28/97 to 9/25/97	Water	LLD	LLD	LLD	LLD	LLD
9/25/97 to 10/30/97	Water	LLD	LLD	LLD	LLD	LLD
10/30/97 to 11/24/97	Water	LLD	LLD	3.65 +/- 0.69	LLD	LLD
11/24/97 to 12/29/97	Water	LLD	LLD	3.39 +/- 0.64		
12/ 4/97 to 12/29/97	Water				LLD	LLD

Water Tritium Detail Report 1997

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

Location	Sample Type	Collection Date	H-3
28	Water	3/27/97	LLD
28	Water	6/26/97	LLD
28	Water	9/25/97	LLD
28	Water	12/29/97	LLD
34	Water	3/27/97	LLD
34	Water	6/26/97	LLD
34	Water	9/25/97	LLD
34	Water	12/29/97	LLD
36	Water	3/27/97	LLD
36	Water	6/26/97	LLD
36	Water	9/25/97	LLD
36	Water	12/29/97	LLD
59	Water	3/27/97	LLD
59	Water	6/26/97	LLD
59	Water	9/25/97	LLD
59	Water	12/29/97	LLD
60	Water	3/27/97	LLD
60	Water	6/26/97	LLD
60	Water	9/25/97	LLD
60	Water	12/29/97	LLD

APPENDIX C : CORRECTIONS TO 1995 AND 1996 DATA

Table 3: Liquid batch releases

Item	Value
Number of batch releases	97
Total time period for batch releases (minutes)	1.965E+4
Maximum time for a batch release (minutes)	434
Average time period for a batch release (minutes)	202.6
Minimum time for a batch release (minutes)	2
Average stream flow during periods of release of effluent into a flowing stream (liters/minute)	2.09E+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	4.63E-3	4.53E-3	5.68E-3	1.50E-2	1.00E+1
2. Average diluted concentration during period	µCi/ml	1.42E-9	6.72E-10	2.09E-10	1.77E-9	
3. Percent of applicable 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. Tritium						
1. Total release	Ci	1.55E+0	2.31E+0	3.03E+0	3.53E+0	1.00+E1
2. Average diluted concentration during period	µCi/ml	4.76E-7	3.43E-07	1.11E-7	4.16E-07	
3. Percent of applicable limit	%	<<1%	<<1%	<<1%	<<1%	
C. Dissolved and entrained gases						
1. Total release	Ci	8.18E-4	3.49E-3	7.07E-03	6.86E-3	1.00E+1
2. Average diluted concentration during period	µCi/ml	2.51E-10	5.18E-10	2.60E-10	8.09E-10	
3. Percent of applicable limit	%	<<1%	<<1%	<<1%	<<1%	
D. Gross alpha radioactivity						
1. Total release	Ci	4.58E-5	<LLD	<LLD	<LLD	1.00E+1
E. Volume of waste released (prior to dilution)	liters	1.59E+6	2.30E+06	4.25E+06	3.05E+06	1.00E+0
F. Volume of dilution water used during period	liters	3.26E+09	6.74E+9	2.72E+10	8.48E+9	2.80E+1

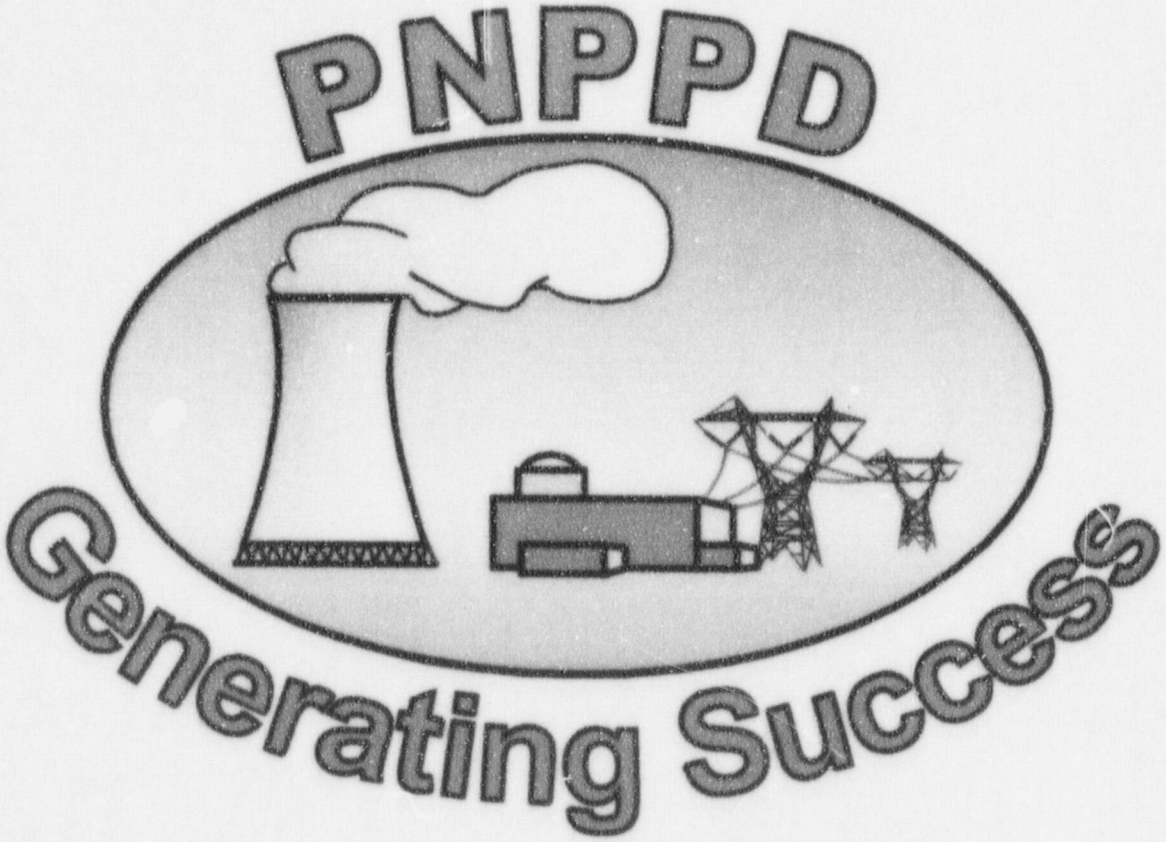
Table 3: Liquid batch releases

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	Note 1	1.00E+1
2. Average diluted concentration during period	µCi/ml	2.02E-9	5.61E-10	6.20E-11	N/A	
3. Percent of applicable 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. 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	3.98E-07	1.33E-07	4.06E-8	N/A	
3. Percent of applicable limit	%	<<1%	<<1%	<<1%	N/A	
C. Dissolved and entrained gases						
1. Total release	Ci	4.46E-03	7.30E-05	2.75E-05	N/A	1.00E+1
2. Average diluted concentration during period	µCi/ml	3.72E-10	4.80E-12	8.65E-13	N/A	
3. Percent of applicable limit	%	<<1%	<<1%	<<1%	N/A	
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	5.40E+06	2.70E+06	2.21E+06	0.00E+00	1.00E+0
F. Volume of dilution water used during period	liters	1.20E+10	1.52E+10	3.18E+10	3.11E+09	2.80E+1

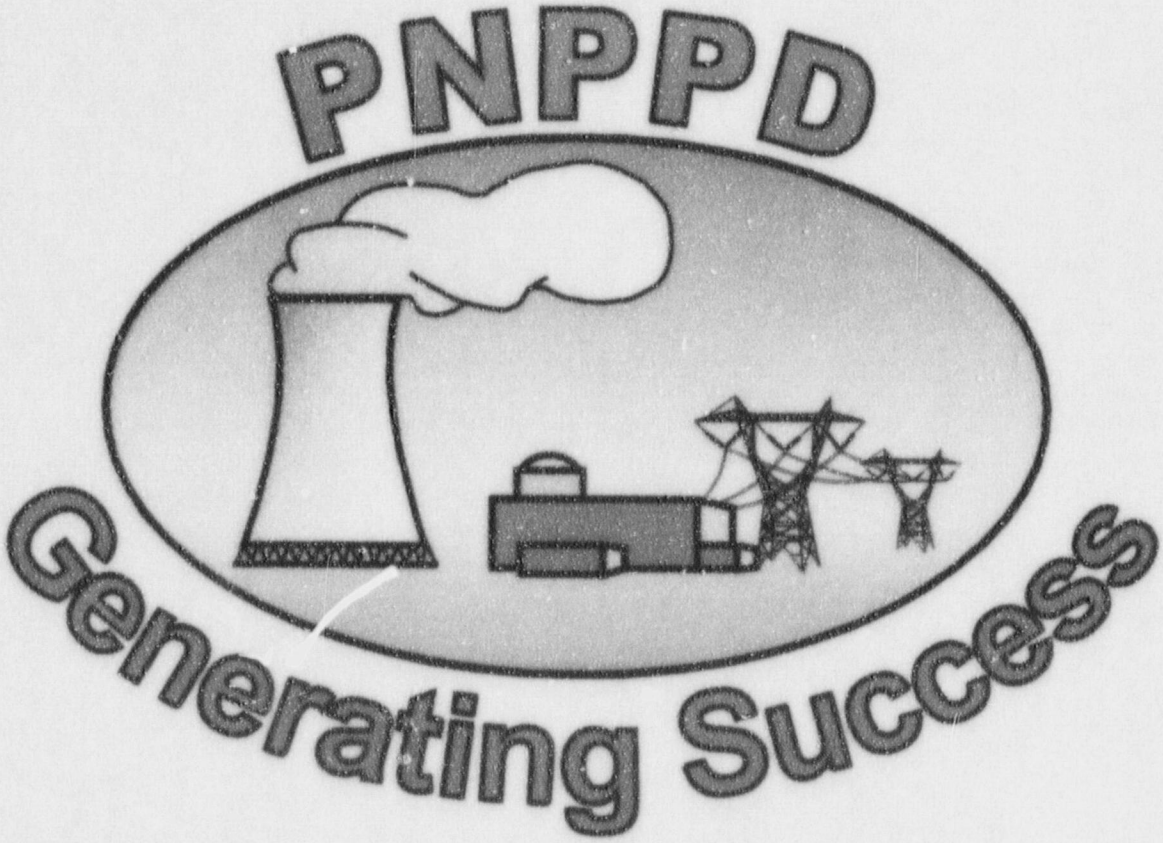
Note 1 No releases in fourth quarter



For more information, write or call:

Perry Nuclear Power Plant
Radwaste, Evironmental and Chemistry Section
10 North Center Road P.O Box 97
Perry OH 44081

(440) 280-5599



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