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U.S. Nuclear Regulatory Commission
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Clinton Power Station
Facility Operating License No. NPF-62
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Subject: Annual Radiological Environmental Operating Report

AmerGen Energy Company, LLC (AmerGen) is submitting the 2003 Annual Radiological Environmental Operating Report for Clinton Power Station. This submittal is provided in accordance with the requirements of section 5.6.2 of the Clinton Power Station Technical Specifications. This report covers the period from January 1, 2003 through December 31, 2003.

Respectfully,

M. D. McDowell
Plant Manager
Clinton Power Station

EET/blf

Attachment

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety - Illinois Emergency Management Agency

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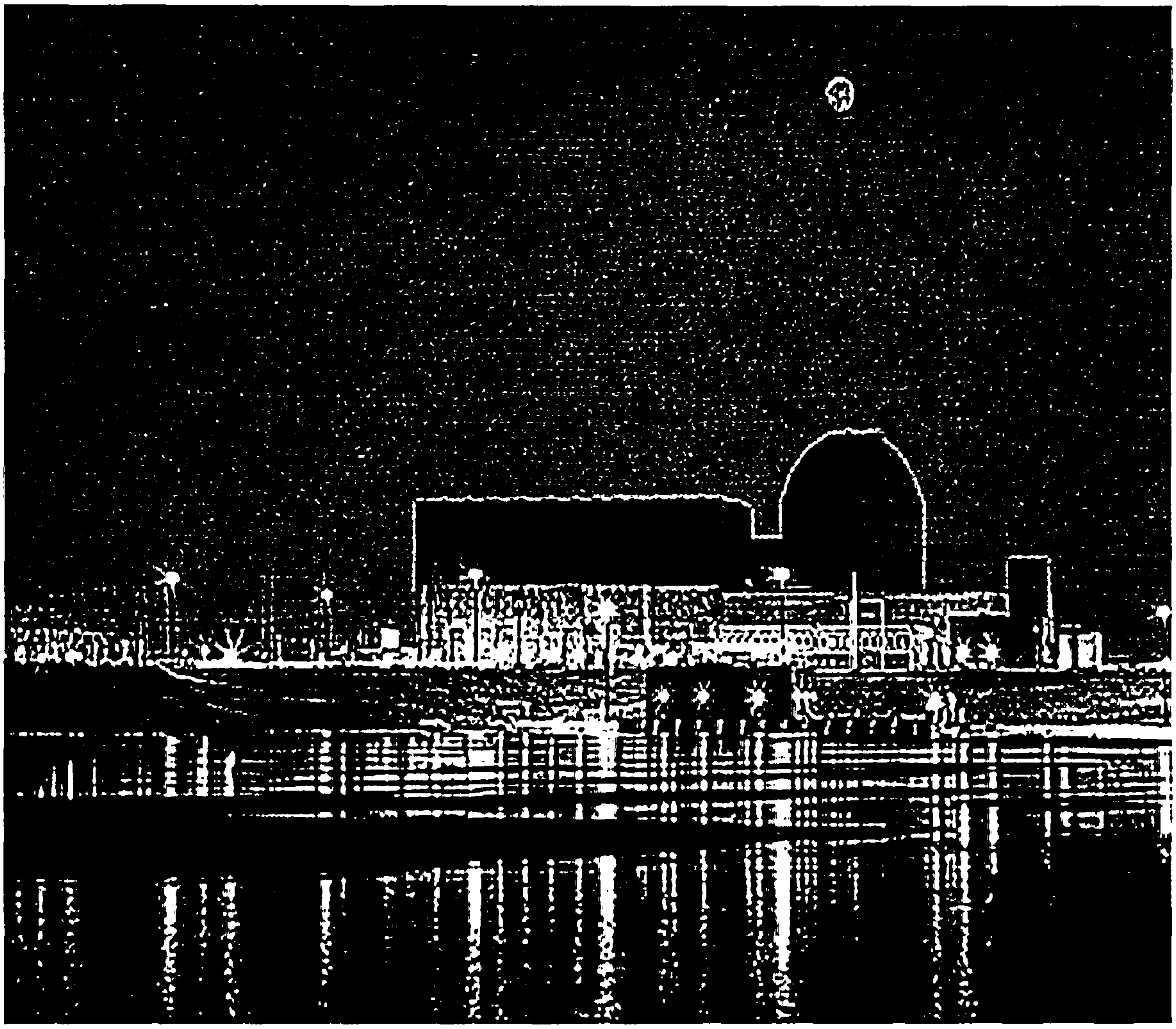
Clinton Power Station 2003 Annual Radiological Environmental Operating Report



Exelon Nuclear

01 January 2003 – 31 December 2003

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

CLINTON POWER STATION – DOCKET NUMBER 50-461

Prepared by:

Clinton Power Station

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EXECUTIVE SUMMARY

I. EXECUTIVE SUMMARY

This report describes the Annual Radiological Environmental Monitoring Program [REMP] conducted around the Clinton Power Station [CPS] during the 2003 calendar year. The REMP was performed as required by the CPS Operating License issued by the United States Nuclear Regulatory Commission [NRC]. The objective of the REMP is to assess the radiological impact upon the surrounding environment due to the operation of the Clinton Power Station.

During 2003, 1,443 environmental samples were collected and 1,686 analyses were performed on these samples. Environmental samples included measurements of air, land and water. Water samples included Clinton Lake surface water and public drinking water.

Analytical results from these environmental samples revealed the presence of natural radioactivity and radioactivity attributed to historical man-made events not associated with Clinton Power Station operation. The radioactivity levels detected were similar to the Pre-Operational levels found prior to the operation of CPS. The CPS Pre-Operational REMP Report documented natural background radionuclides and man-made radioactivity in the environment surrounding CPS.

Radiological environmental measurements taken during 2003 demonstrated that both operational and engineered controls on the radioactive effluents released from the plant functioned as they were designed. Any radioactivity that was detected in the environment at Indicator Locations was appropriately compared with both the measurements at Control Locations and Pre-Operational results.

There were zero (Ø) radioactive liquid releases from CPS during 2003. Releases of gaseous radioactive materials were accurately measured in plant effluents. There was no gaseous effluent releases that approached the limits specified in the CPS Offsite Dose Calculation Manual [ODCM]. The highest calculated offsite dose received by a member of the public due to the release of gaseous effluents from Clinton Power Station was less than 0.0036 mR [milli-Roentgen].

All comparisons among Operational Data and Pre-Operational Data showed that during 2003, the operation of Clinton Power Station had no measurable effects upon the surrounding environment.

INTRODUCTION

II. INTRODUCTION

The Radiological Environmental Monitoring Program [REMP] at Clinton Power Station [CPS] is designed to monitor the environment surrounding the plant for any radioactive material that may be released by CPS as a result of plant operations. The primary concern is what impact - if any - radioactive materials released from CPS may have on the general public.

A. CHARACTERISTICS OF RADIATION

Atoms whose nuclei contain an excess of energy are called radioactive atoms. They release this excess energy by expelling electromagnetic or particulate radiation from their atomic centers to become stable [non-radioactive]. This process is called "radioactive decay". Gamma rays and X-rays are examples of electromagnetic radiation and are similar in many ways to visible light, microwaves, and radio waves. Particulate radiation may be either electrically charged such as an alpha or beta particle, or has no charge, like a neutron.

The term 'half-life' refers to the time required for half of a given amount of a radionuclide to decay. Some radionuclides have a half-life as short as a fraction of a second, while others have a half-life as long as millions of years. Radionuclides may decay directly into stable elements or may undergo a series of decays until they ultimately reach a stable element.

Radionuclides are found in nature such as radioactive uranium, thorium, carbon, and potassium, and may also be produced artificially in accelerators and nuclear reactors such as radioactive iodine, cesium, and cobalt.

TYPICAL NATURALLY OCCURRING RADIONUCLIDES	TYPICAL MAN-MADE RADIONUCLIDES
Uranium	Iodine
Thorium	Cesium
Carbon	Cobalt
Potassium	Strontium
Lead	Barium

The activity of a radioactive source is the average number of nuclear disintegrations [decay] of the source per unit of time. The unit of activity is called the curie. For example, a one-curie radioactive source undergoes 2.2 trillion disintegrations per minute. When compared against nuclear power plant effluents and environmental radioactivity however, this is a very large unit of measure. Therefore, two sub-fractional units - the microcurie and the picocurie - are more commonly used terms.

1 curie (Ci)	=	2,220,000,000,000 disintegrations / minute
1 millicurie (mCi)	=	2,220,000,000 disintegrations / minute
1 microcurie (μCi)	=	2,220,000 disintegrations / minute
1 nanocurie (nCi)	=	2,220 disintegrations / minute
1 picocurie (pCi)	=	2.22 disintegrations / minute

The microcurie [μCi] is one millionth of a curie [Ci] and represents 2.2 million decays per minute. The picocurie [pCi] is one millionth of a microcurie and represents 2.2 decays per minute. Another way of comparing the pCi and the Ci is by using an analogy with distances. A picocurie would be the width of a pencil mark while a curie would be the equivalent of 100 trips around the earth.

Radioactivity is related to the half-life and the atomic mass of a radionuclide. For example, Uranium-235 (U^{235}) with a half-life of 704 million years requires over a half ton - 1,019 pounds - to equate to an activity of one curie. Whereas Iodine-131 (I^{131}) with a half-life of 8.04 days requires 0.0000000176 pounds to equate to an activity of one curie.

Any mechanism that can supply the energy necessary to ionize an atom, break a chemical bond or alter the chemistry of a living cell are capable of producing biological damage. Electromagnetic and particulate radiation can produce cellular damage in any of these ways. In assessing the biological effects of radiation, the type, energy, and amount of radiation must be considered.

External total body radiation involves exposure of all organs. Most background exposures are of this form. When radioactive elements enter the body through inhalation or ingestion, their distribution may not be uniform.

TARGET TISSUE	NUCLIDE
Bone	Strontium-90 (Sr^{90})
Kidney	Uranium-235 (U^{235})
Thyroid	Iodine-131 (I^{131})
Muscle and Liver Tissue	Cesium-137 (Cs^{137})
Gastrointestinal Tract	Cobalt-60 (Co^{60})

For example, radio-iodine selectively concentrates in the thyroid gland, whereas radio-cesium collects in muscle and liver tissue and radio-strontium collect in mineralized bone. The quantity and the duration of time that the radionuclide remains in the body also influence the total dose to organs by a given radionuclide. When factoring radioactive decay and human metabolism factors, some radionuclides stay in the body for very short periods of time while others remain for years.

The amount of radiation dose that an individual receives is expressed in Rem. Since human exposure to radiation typically involves very small exposures, the millirem [mRem] is the unit most commonly used. One millirem is equal to one thousandth of a Rem.

B. SOURCES OF RADIATION EXPOSURE

Many sources of radiation exposure exist. The most common and least controllable source is natural background radiation from cosmic rays and the earth which mankind has always lived with and always will. Every second of our lives, over seven thousand atoms undergo radioactive decay in the body of the average adult.

Radioactive elements have always been a part of our planet and everything that has come from the earth - including our own body - is therefore, naturally radioactive.

Natural Radionuclides in the Earth's Crust	
Potassium-40 (K^{40})	Radium-226 (Ra^{226})
Uranium-238 (U^{238})	Radon-222 (Rn^{222})
Thorium-232 (Th^{232})	Lead-204 (Pb^{204})

Examples of radioactive materials found in the Earth's crust today consists of radionuclides such as Potassium-40, Uranium-238, Thorium-232, Radium-226 and Radon-222. These radionuclides are introduced into the water, soil and air by such natural processes as volcanic activity, weathering, erosion and radioactive decay.

Some of the naturally occurring radionuclides - such as radon - are a significant source of radiation exposure to the general public. Radioactive radon is a chemically inert gas produced naturally in the ground as a part of the uranium and thorium decay series. Radon continues to undergo radioactive decay, producing new naturally radioactive materials called 'radon daughter products'. These new products - which are solid particles not gases - can adhere to surfaces such as dust particles contained in the air.

Concentrations of radon in the air vary and are affected by concentrations of uranium and thorium in the soil as well as altitude, soil porosity, temperature, pressure, soil moisture, rainfall, snow cover, atmospheric conditions and the time of the season. Radon can move through cracks and openings into basements of buildings and become trapped in small air volumes indoors. Thus, indoor radon concentrations are usually higher than those found outdoors. Building materials such as cinder blocks and concrete are radon sources. Radon can also be dissolved in well water and contribute to airborne radon in houses when released through showers or washing.

Dust containing radon daughter particles can be inhaled and deposited on the surface of an individual's lung. Radon daughters emit a high-energy alpha radiation dose to the inner lung lining. Table 1 illustrates the average annual effective dose due to radon radiation exposure.

About 300 cosmic rays originating from outer space pass through each person every second.

Cosmic-Ray-Activated Radionuclides	
Beryllium-7 (Be^7)	Tritium (H^3)
Beryllium-10 (Be^{10})	Sodium-22 (Na^{22})
Carbon-14 (C^{14})	Phosphorus-32 (P^{32})

The interaction of cosmic rays with atoms in the earth's atmosphere produces radionuclides such as Beryllium-7, Beryllium-10, Carbon-14, Tritium-3, and Sodium-22. Portions of these radionuclides become deposited on land or in water while the remainder stays suspended in the atmosphere.

Consequently, there are natural radioactive materials in the soil, water, air and building materials that contribute to radiation doses to the human body. Natural drinking water contains trace amounts of uranium and radium while milk contains measurable amounts of Potassium-40. Sources of natural radiation and their average contributing radiation doses are also summarized in Table 1. Figure 1 graphically shows the percentage contribution from principal sources of radiation exposure to the general population of the United States. Radiation exposure levels from natural radiation fluctuate with time and can also vary widely from location to location. The average individual in the United States receives approximately 300 mRem per year, just from naturally occurring background radiation sources.

In some areas of the United States, the dose from natural radiation is significantly higher. Residents of Colorado – 5,000 feet above sea level – will receive additional dose due to the increase of cosmic and terrestrial radiation levels. In fact, for every 1,000 feet in elevation above sea level, an individual will receive an additional one (1) mRem per year from cosmic radiation. In several areas of the world, high concentrations of mineral deposits result in natural background radiation levels of several thousand mRem per year.

In addition to natural background radiation, the average individual is exposed to radiation from a number of man-made sources. The largest of these sources come from medical diagnosis: X-rays, CAT-scans, fluoroscopic examinations and radio-pharmaceuticals. Approximately 160 million people in the United States are exposed to medical or dental X-rays in any given year. The annual dose to an individual from such irradiation averages approximately 53 mRem.

TABLE 1

COMMON SOURCES OF RADIATION

A. Average Annual Effective Dose Equivalent to the U.S. Population

1. Natural Sources	mRem
a. Radon	200
b. Cosmic, Terrestrial, Internal	100
2. Man-Made Sources	**mRem**
a. Medical	
X-ray Diagnosis	39
Nuclear Medicine	14
b. Consumer Products	10
c. Occupational	1
d. Miscellaneous Environmental	<1
e. Nuclear Fuel Cycle	<1
Approximate Total	**364**

PERCENTAGE OF CONTRIBUTION

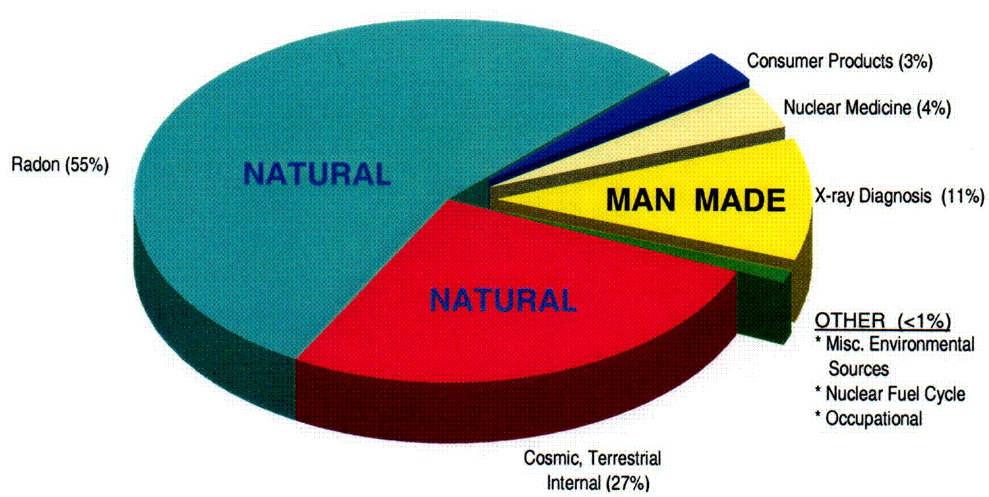

FIGURE 1: DOSE CONTRIBUTIONS TO THE U.S. POPULATION FROM PRINCIPAL SOURCES OF RADIATION EXPOSURE

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Smaller doses from man-made sources come from consumer products – such as televisions, smoke detectors, and fertilizers – as well as fallout from prior nuclear weapons testing, the production of nuclear power and its associated fuel cycle.

'Fallout' commonly refers to the radioactive debris that settles to the surface of the earth following the detonation of a nuclear weapon. Fallout is dispersed throughout the environment but can be washed down to the Earth's surface by rain or snow.

Radionuclides Found in Fallout	
Iodine-131 (I^{131})	Strontium-90 (Sr^{90})
Strontium-89 (Sr^{89})	Cesium-137 (Cs^{137})

There are approximately 200 radionuclides produced in the nuclear weapon detonation process with a number of these detected as fallout. The radionuclides found in fallout that produce the majority of the fallout radiation exposures to man are Iodine-131, Strontium-89, Strontium-90, and Cesium-137.

C. DESCRIPTION OF THE CLINTON POWER STATION

The Clinton Power Station [CPS] is located in Harp Township, DeWitt County, Illinois. It is approximately six (6) miles east of Clinton, Illinois.

The station – including the V-shaped cooling lake – coupled with the surrounding AmerGen Energy Company, LLC owned land encloses approximately 13,730 acres. This includes the 4,895 acre, man-made cooling lake and about 452 acres of property not owned by AmerGen. The plant is situated on approximately 150 acres on the northern arm of the lake. The cooling water discharge flume - which discharges to the eastern arm of the lake - occupies an additional 130 acres. Although the nuclear reactor, supporting equipment and associated electrical generation and distribution equipment lie in Harp Township, portions of the aforementioned 13,730 acre plot reside within Wilson, Rutledge, DeWitt, Creek, Nixon and Santa Anna Township[s].

The cooling lake was formed by constructing an earthen dam near the confluence of Salt Creek and at the North Fork of Salt Creek. The resulting lake has an average depth of 15.6 feet which includes an ultimate heat sink of approximately 590 acre-feet. The ultimate heat sink provides for a sufficient water volume and cooling capacity for approximately 30 days of operation without any makeup water.

Through arrangements made with the Illinois Department of Conservation, Clinton Lake and much of the area immediately adjacent to the lake are used for public recreation activities including swimming, Clinton Lake and accommodate up to 11,000 people per day during peak usage periods. The outflow from Clinton Lake falls into Salt Creek and then flows in a westerly direction for about 56 miles before joining in with the Sangamon River. The Sangamon River drains into the Illinois River that enters the Mississippi River near Grafton, Illinois. The closest use of downstream water for drinking purposes is approximately 242 river miles downstream from Clinton Lake at Alton, Illinois as verified from the Illinois Environmental Protection Agency Public Water Service. Although some farms throughout the Salt Creek drainage area use irrigation water downstream of Clinton Lake, this irrigation water is drawn from wells and not directly from the waters of Salt Creek.

Approximately 810,000 individuals live within 50 miles of the Clinton Power Station. Over half are located in the major metropolitan centers of Bloomington - Normal which is located approximately 23 miles to the north-northwest, Champaign - Urbana which is located approximately 31 miles towards the east, Decatur which is located approximately 22 miles to the south-southwest and Springfield which is located approximately 48 miles to the west-southwest. The nearest city is Clinton, the county seat of DeWitt County. The estimated population of Clinton is approximately 8,000 residents. Outside of the urban areas, most of the land within 50 miles of the Clinton Power Station is used for farming. The principal crops grown are corn and soybeans.

D. NUCLEAR REACTOR OPERATIONS

The fuel of a nuclear reactor is made of the element uranium in the form of uranium oxide. The fuel produces power by the process called 'fission'. During fission, the uranium atom absorbs a neutron and splits to produce fission products, heat, radiation and free neutrons. The free neutrons travel in the reactor core and further absorption of neutrons by uranium permits the fission process to continue. As the fission process continues, more fission products, more radiation, more heat and more neutrons are produced and a sustained reaction occurs. The heat produced is extracted from the fuel to produce steam, which subsequently drives a turbine generator to produce electricity.

The fission products are predominantly radioactive. They are unstable elements that emit radiation as they change from unstable to stable elements. Stable atoms in the materials that make up the components and structures of the reactor may absorb neutrons that are not absorbed by the uranium fuel. In such cases, stable atoms often become radioactive. This process is called activation and the radioactive atoms, which result, are called activation products.

Fission Products	Activation Products
Cesium-137 (Cs^{137})	Cobalt-60 (Co^{60})
Barium-140 (Ba^{140})	Manganese-54 (Mn^{54})
Cerium-144 (Ce^{144})	Iron-59 (Fe^{59})
Strontium-90 (Sr^{90})	Zinc-65 (Zn^{65})

The reactor at the Clinton Power Station is a Boiling Water Reactor [BWR]. Figure 2 provides a basic plant schematic for the Clinton Power Station and shows the separation of the cooling water from plant water systems. In this type of reactor, the fuel is formed into small ceramic pellets that are loaded into sealed fuel rods.

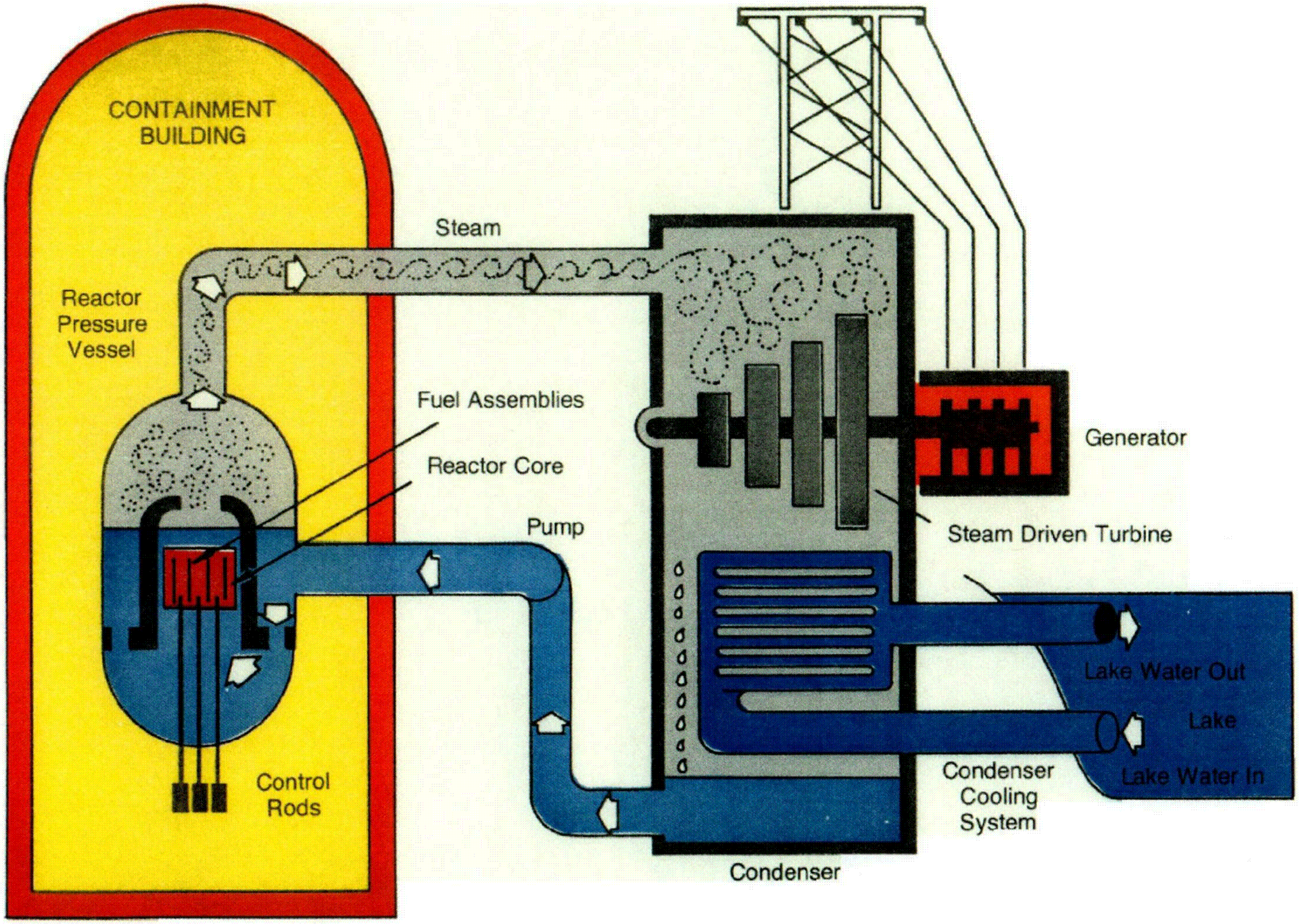

FIGURE 2: CLINTON POWER STATION BASIC PLANT SCHEMATIC

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The fuel rods are arranged in arrays, called bundles, which are supported within the massive steel reactor vessel.

The voids between the fuel rods are filled with water. The heat released during the fission of fuel atoms is transferred to the water surrounding the fuel rods. A type of pump that has no moving parts - a jet pump - and recirculation water pumps are used to force the water to circulate through the fuel bundles to assure even cooling and heat removal from the fuel rods. Some of the water that absorbs heat from the fuel rods is changed to steam. The steam is used to drive a turbine that is coupled to a generator, thereby completing the conversion of nuclear energy released during fission into electricity.

After the steam passes through the turbine, it is condensed back into water and returned to the reactor vessel to repeat the cycle. As the water circulates through the reactor pressure vessel, corrosion allows trace quantities of the component and structure surfaces to mix into the water. The corroded material also contains radioactive substances known as activated corrosion products. Radioactive fission and activation products are normally confined to the primary coolant system although small leaks from the primary system may occur.

E. CONTAINMENT OF RADIOACTIVITY

During normal operating conditions, essentially all of the radioactivity is contained within the first of several barriers - that collectively - prevent radioactivity from escaping into our environment.

The fuel cladding - metal tubes - provides the first barrier. The ceramic fuel pellets are sealed within zircaloy metal tubes. There is a small gap between the fuel and the cladding where noble gases and volatile nuclides collect.

The reactor pressure vessel and the steel piping of the primary coolant system provide the second barrier. The reactor pressure vessel is a 70 foot high vessel with steel walls ranging from four (4) to seven (7) inches thick that encases the reactor core. The reactor pressure vessel and the steel piping provide containment for all radionuclides in the primary coolant.

The Containment Building provides the third barrier. The Containment Building has a steel-lined, four (4) foot thick reinforced concrete wall which completely enclose the reactor pressure vessel and vital auxiliary equipment. This structure provides a third line of defense against the uncontrolled release of radioactive materials to the environment. The massive concrete walls also serve to absorb much of the radiation emitted during reactor operations or from radioactive materials created during reactor operations.

F. SOURCES OF RADIOACTIVE EFFLUENTS

In an operating nuclear power plant, most of the fission products are retained within the fuel and fuel cladding. However, the fuel manufacturing process leaves traces of uranium on the exterior of the fuel tubes. Fission products from the eventual fission of these traces may be released to the primary coolant. Other small amounts of radioactive fission products are able to diffuse or migrate through the fuel cladding and into the primary coolant. Trace quantities of the corrosion products from component and structural surfaces that have been activated, also get into the primary coolant.

Demineralizers from the water purification systems remove many soluble fission and activation products such as radioactive iodines, strontiums, cobalts and cesiums. Noble gas fission products, activated atmospheric gases introduced with reactor feedwater and some of the volatile fission products such as iodine and bromine, carry over from the reactor pressure vessel to the condenser.

The steam jet air ejectors remove the gases from the condenser and transfer them to the off-gas treatment system. Within the off-gas treatment system, these gases are held up by adsorption on specially treated charcoal beds to allow radioactive gases to decay before they are released through the main ventilation exhaust stack.

Small releases of radioactive liquids from valves, piping, or equipment associated with the primary coolant system may occur in the Containment, Auxiliary, Turbine, Rad Waste and Fuel Buildings. Noble gases become part of the gaseous wastes while the remaining radioactive liquids are collected in sumps and processed for reuse. Processed primary coolant water that does not meet chemical specifications for reuse may also become wastewater. These represent the principal sources of liquid effluents.

Information about radioactive effluents can be found in the Annual Radioactive Effluent Release Report. This report contains a detailed description of all radioactive releases from CPS and the resulting radiation doses for the reporting period.

G. RADIOACTIVE WASTE PROCESSING

In a normal operating nuclear power plant, radioactive liquid and gaseous wastes are collected, stored and then processed through treatment systems to remove or reduce most of their radioactivity (excluding tritium) prior to reuse within the plant or discharged to the environment. These processing systems are required by the Clinton Power Station [CPS] Offsite Dose Calculation Manual [ODCM] to be installed and operable to help ensure all releases of radioactive liquid and gaseous effluents are As Low As Reasonably Achievable [ALARA]. As a matter of Station Policy, CPS strives to be a zero (Ø) liquid release plant and was able to accomplish that commitment throughout 2003.

The liquid waste treatment systems consist of filters, demineralizers and evaporators. Liquid wastes are routed through the waste evaporators to be degassed and distilled thereby reducing their volume and concentrating their radioactivity. The distillates are further treated through demineralizers and filters and transferred to the waste evaporator condensate storage tanks. Liquid wastes are processed through the appropriate portions of the liquid waste treatment system to provide assurance that the releases of radioactive materials in liquid effluents will be kept ALARA.

Liquid wastes may be discharged into the plant cooling water stream that varies from approximately 5,000 gallons per minute - when the unit is shutdown - to 567,000 gallons per minute when the unit is at full power. If a planned release were to occur, liquid effluents would be thoroughly mixed with - and diluted by - the plant cooling water as it traverses down a 3.4 mile discharge canal before entering Clinton Lake east of DeWitt County Road 14.

The Clinton Power Station Offsite Dose Calculation Manual requires that liquid effluents will not have a higher concentration of any radioisotope than which is established for continuous exposure to the general public. This requirement is satisfied at the point in which the liquid effluent is first introduced to the cooling water flow. Thus, this additional dilution – which occurs along the 3.4 mile cooling water canal - further reduces the original concentration[s] of radioisotopes by 1/73 [at minimum flow during unit shutdown] and by 1/1890 [at maximum flow during unit operation] prior to the water entering Clinton Lake.

The concentrated radioactive solids captured from the liquid waste treatment system are processed and temporarily stored on-site until scheduled for shipment off-site for disposal at a licensed low-level waste disposal facility.

The gaseous effluents from the main condenser are held up in the off-gas charcoal beds for a minimum of 46 hours. With most of the radionuclides present having a radioactive half-life of less than eight (8) hours, this hold up process allows for their radioactive decay. If the gaseous effluents from the ventilation exhaust system for the Containment Building and Secondary Containment structure exceed conservatively established set points, these effluents are processed through charcoal beds and High Efficiency Particulate Air [HEPA] filters within the Standby Gas Treatment System before being released to the environment.

The combination of HEPA filters and charcoal bed filtration is rated to be 95% efficient for removing iodines and greater than 99% efficient for removing any particulate material that is larger than one micron [one millionth of one inch] in diameter.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

III. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. Program Description

The Clinton Power Station is required to maintain a Radiological Environmental Monitoring Program [REMP] in accordance with the Code of Federal Regulations (CFR) Title 10, Section 20.1501 and Criterion 64 of CFR Title 10, Part 50, Appendix A. The program was developed using the following guidance published by the United States Nuclear Regulatory Commission [USNRC]:

- Regulatory Guide 4.1, "Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants"
- USNRC Radiological Assessment Branch Technical Position on Radiological Environmental Monitoring (1979)

The REMP is an extensive program of sampling, measuring and analyzing that was instituted to monitor the radiological impact of reactor operation[s] on the surrounding environment. Objectives of the program include the following:

- identification, measurement and evaluation of existing radionuclides in the environment of the Clinton Power Station and fluctuations in radioactivity levels that may occur
- evaluation of the measurements to determine the impact of Clinton Power Station operations relative to the local radiation environment
- collection of data needed to refine environmental radiation transport models used in offsite dose calculations
- verification that radioactive material containment systems are functioning to minimize environmental releases to levels that are ALARA
- demonstration of compliance with regulations and the Clinton Power Station Offsite Dose Calculation Manual

Implicit in these objectives are the requirements to trend and assess radiation exposure rates and radioactivity concentrations in the environment that may contribute to radiation exposure to the public. The program consists of two (2) phases, Pre-Operational [Pre-Op] and Operational.

The Pre-Operational portion of the program was initiated in May 1980 and was completed on 27 February 1987 to establish the baseline for the local radiation environment. Assessment of the operational impact of the Clinton Power Station on the radiation environment is based on data collected since the beginning of reactor operation[s]. The operational phase implements confirmatory measurements to verify that the in-station controls for the release of radioactive material are functioning as designed.

AmerGen Energy Company, LLC currently maintains a contract with Environmental Inc. Midwest Laboratory, for the analysis of all radiological environmental samples. Environmental Inc. is located in Northbrook, Illinois. Samples are currently collected by AmerGen Energy Company personnel and then shipped to the Environmental, Inc. laboratory for analysis. After analysis, environmental samples are saved at the laboratory for a specified period of time in case any additional follow up analysis is required. Analytical results are then reported back monthly to CPS for review by the ODCM Program Manager.

Current regulatory guidance recommends evaluating direct pathways, or the highest trophic level in a dietary pathway, that contribute to an individual's dose. Figure 3 shows the basic pathways of gaseous and liquid radioactive effluents to the public. The "important pathways" selected are based primarily on how radionuclides move through the environment that will eventually expose the public – taking into consideration - man's use of the environment. The scope of the program includes the monitoring of five (5) environmental elements:

- direct radiation
- atmospheric
- aquatic
- terrestrial environments
- ground and surface water

Each pathway is monitored at "Indicator" and "Control" Locations. Indicator Locations are generally within a ten (10) mile radius of the station that is expected to mimic station effects, if any exist. Control Locations are located greater than ten (10) miles from the plant - far enough away – so as not to be influenced by station operations. These Control Location samples provide the basis by which to measure any fluctuations in radioactivity from Indicator Locations relative to natural phenomena and fallout. Thus any increase in radioactive material concentration from an Indicator Location may be - due in part - to station operations.

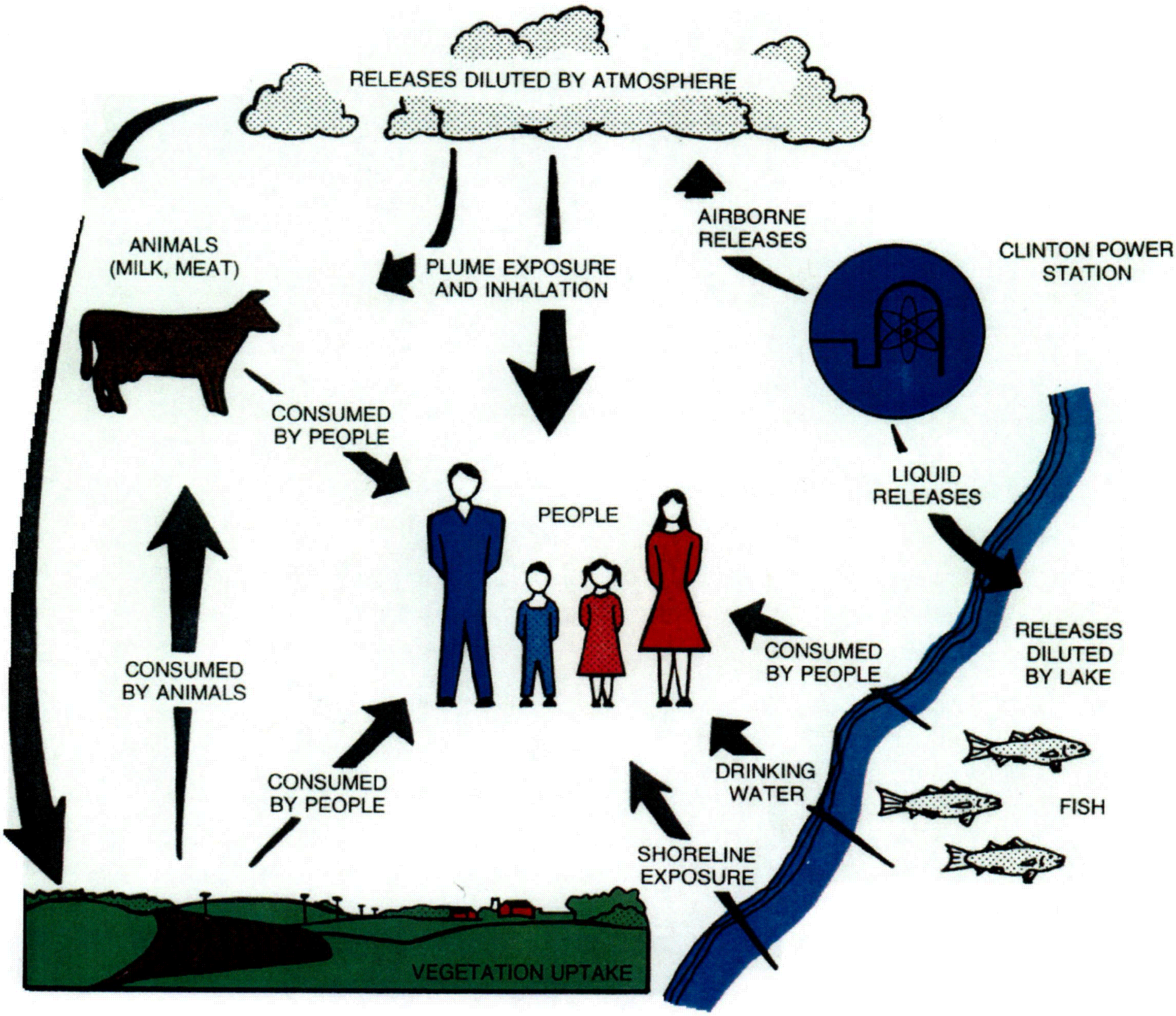

FIGURE 3: POTENTIAL EXPOSURE PATHWAYS OF MAN DUE TO RELEASES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT

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Sampling locations were established by considering site meteorology, area population distribution, site hydrology, and land use characteristics of the local area. These locations were selected primarily on the basis of where the highest predicted environmental concentrations would occur.

Locations of sampling stations are shown on maps in Figures 4 through 7. Table[s] 2-A and 2-B provide information on sample location, media sampled at each of these location[s], and a brief description of each location where samples were taken. The location is listed according to distance (in miles) and the meteorological compass sector in relationship to the Station Heating, Ventilation, and Air Conditioning [HVAC] Vent.

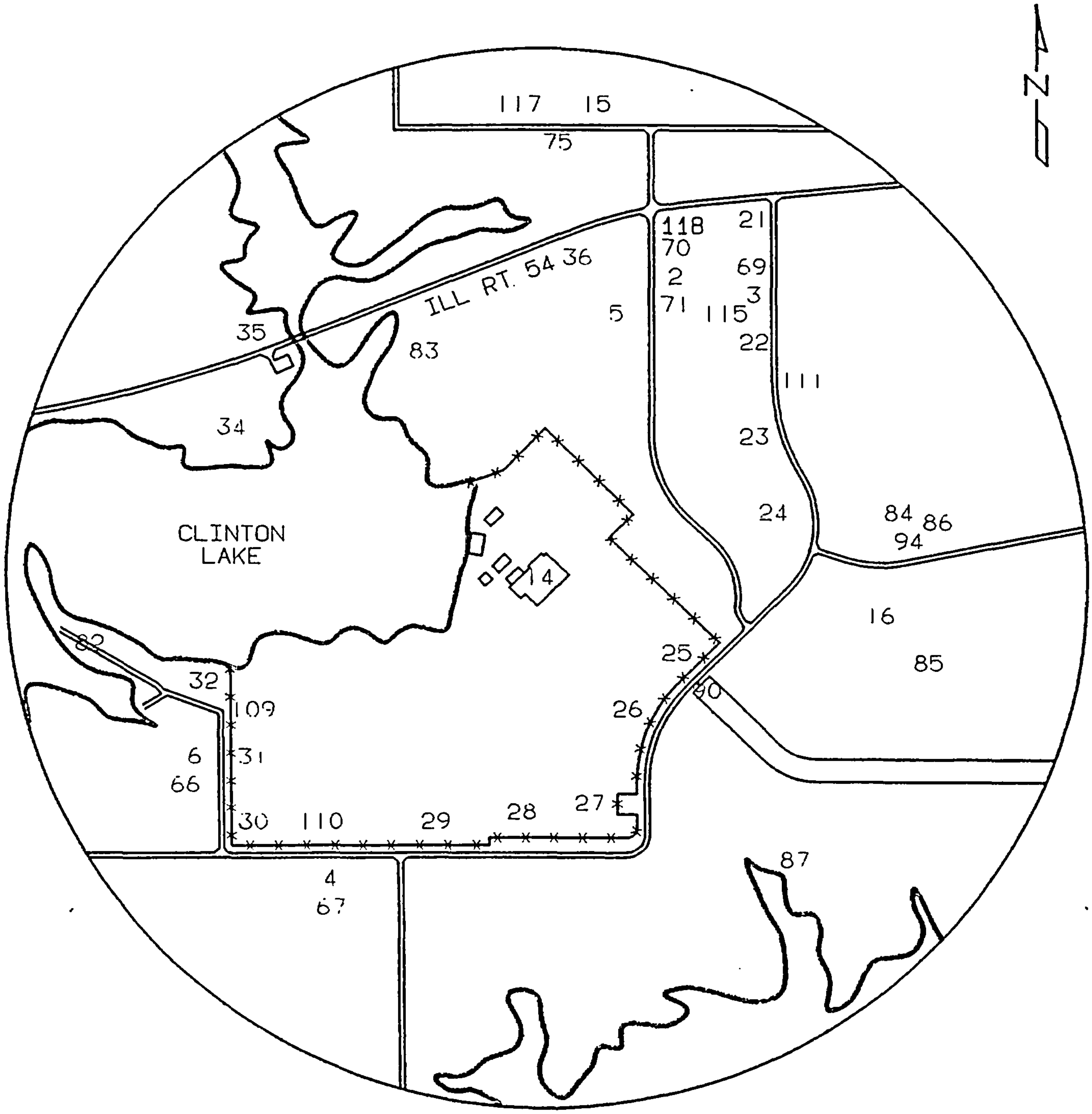


FIGURE 4: REMP SAMPLE LOCATIONS WITHIN 1 MILE

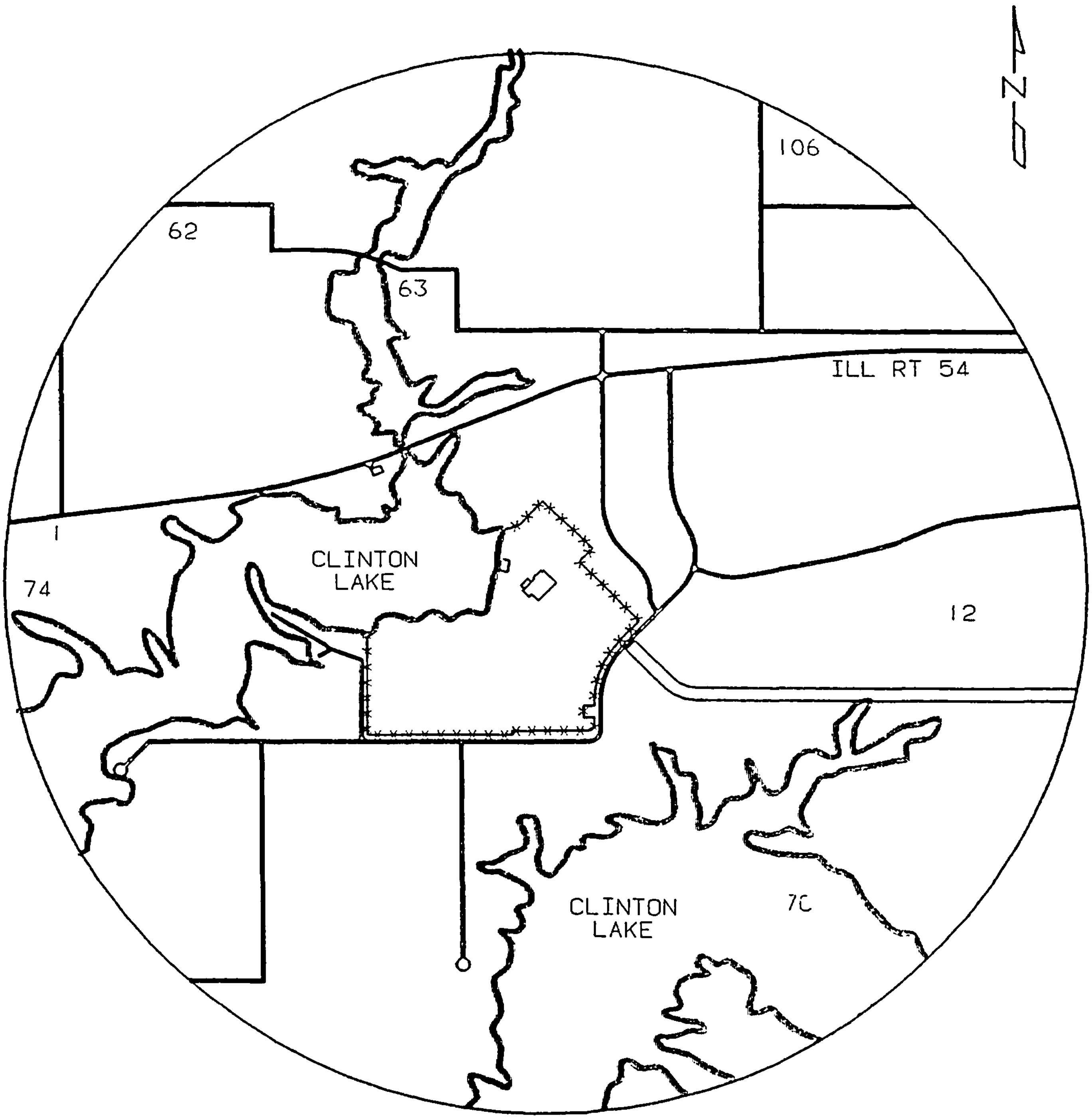


FIGURE 5: REMP SAMPLE LOCATIONS FROM 1 - 2 MILES

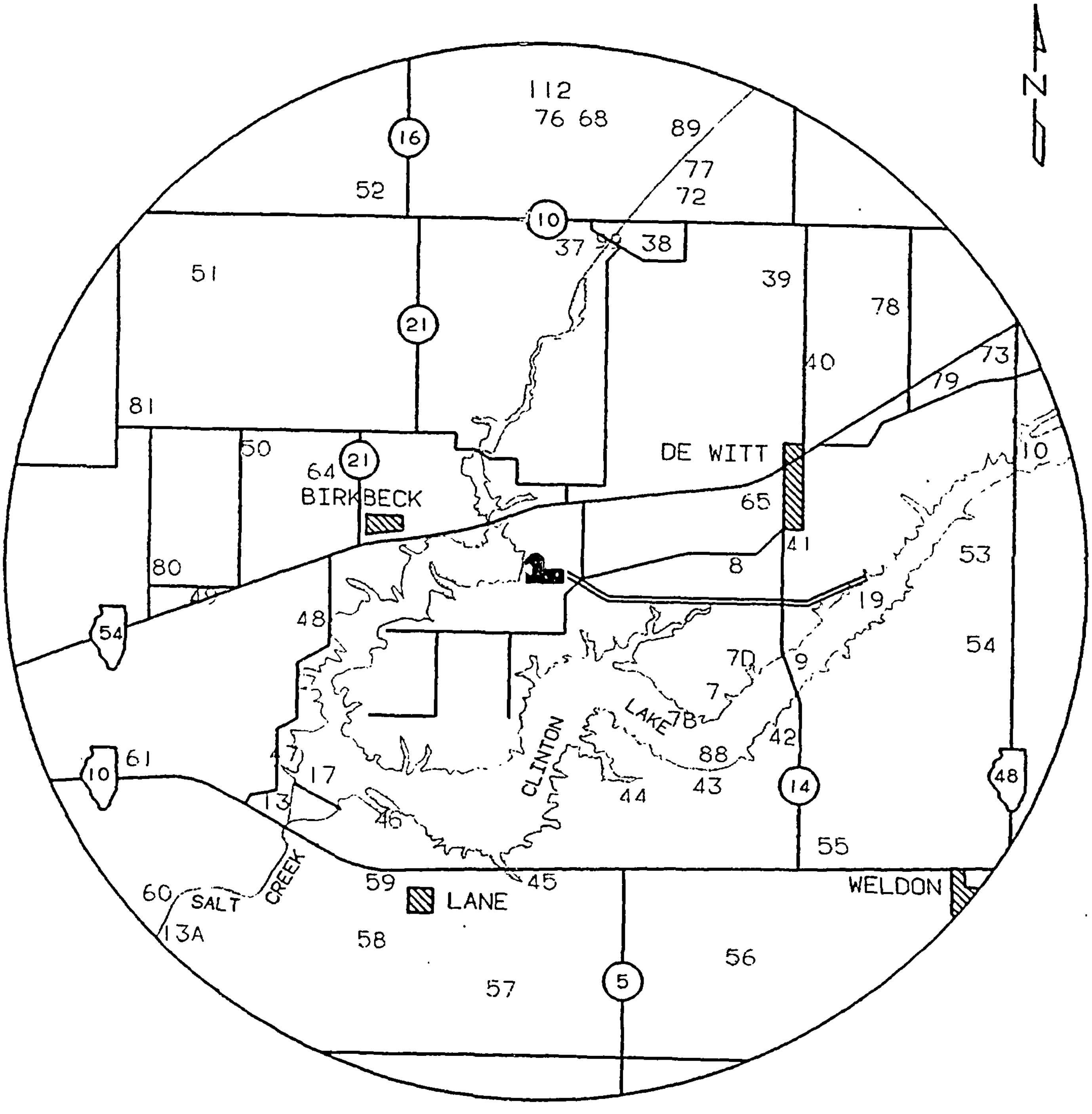


FIGURE 6: REMP SAMPLE LOCATIONS FROM 2 - 5 MILES

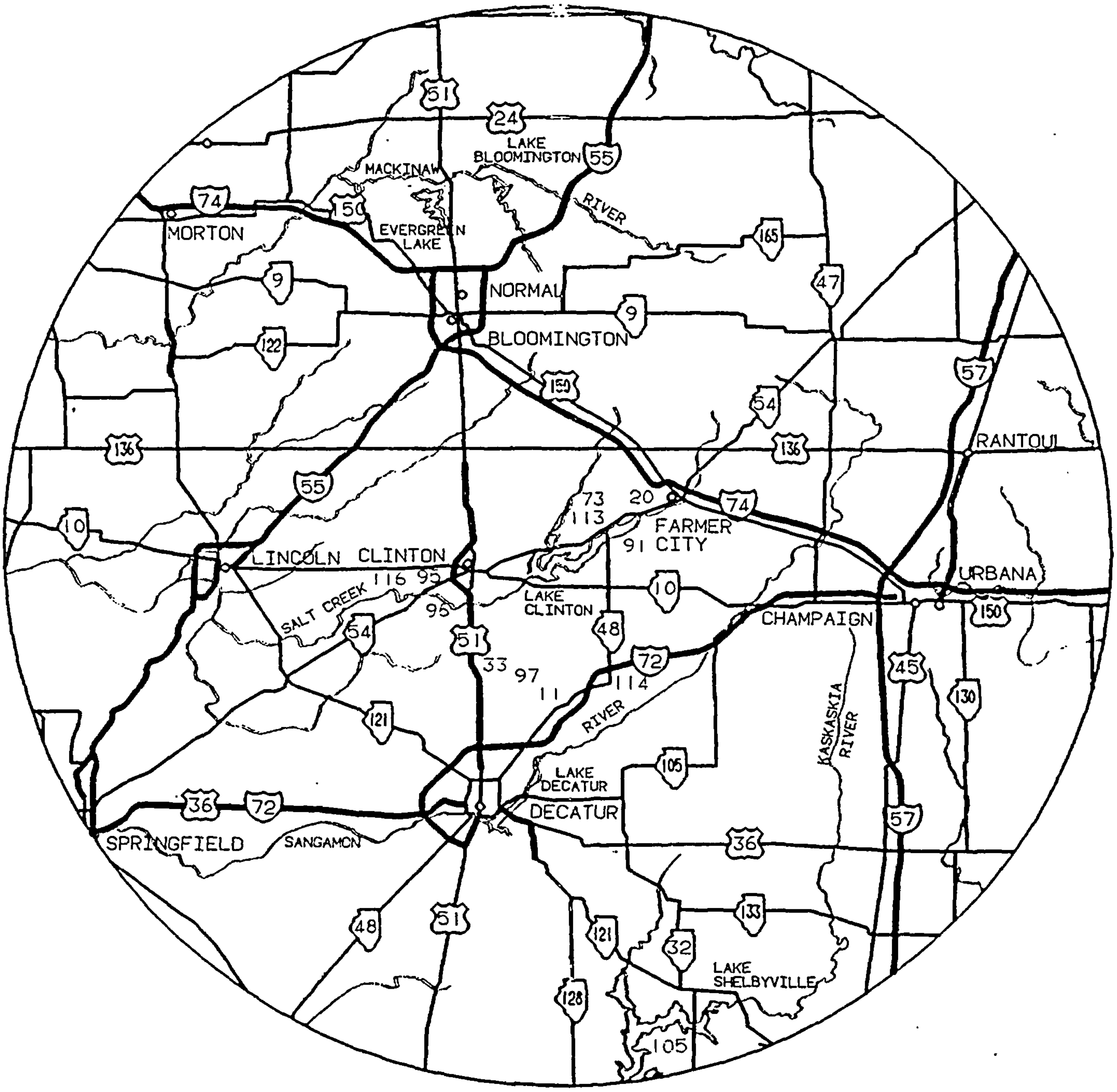


FIGURE 7: REMP SAMPLE LOCATIONS GREATER THAN 5 MILES

TABLE 2-A

CPS RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SAMPLING LOCATIONS

TLD Sites

Station Code	Description	Sector	Distance (miles)	Station Code	Description	Sector	Distance (miles)
CL-15	Supplemental Control	N	0.9	CL-44	Inner Ring	SSE	2.3
CL-36	Inner Ring	N	0.6	CL-56	Outer Ring	SSE	4.1
CL-37	Special Interest	N	3.4	CL-114	Supplemental Control	SSE	12.5
CL-75	Special Interest	N	0.9	CL-11	Control	S	16
CL-76	Outer Ring	N	4.6	CL-45	Inner Ring	S	2.8
CL-3	Supplemental Control	NE	0.7	CL-57	Outer Ring	S	4.6
CL-22	Inner Ring	NE	0.6	CL-46	Inner Ring	SSW	2.8
CL-78	Outer Ring	NE	4.8	CL-58	Outer Ring	SSW	4.3
CL-2	Supplemental Control	NNE	0.7	CL-97	Supplemental Control	SSW	10.3
CL-5	Inner Ring	NNE	0.7	CL-4	Supplemental Control	SW	0.8
CL-77	Outer Ring	NNE	4.5	CL-33	Supplemental Control	SW	11.7
CL-99	Supplemental Control	NNE	3.5	CL-47	Inner Ring	SW	3.3
CL-23	Inner Ring	ENE	0.5	CL-60	Outer Ring	SW	4.5
CL-65	Special Interest	ENE	2.6	CL-6	Supplemental Control	WSW	0.8
CL-79	Outer Ring	ENE	4.5	CL-48	Inner Ring	WSW	2.3
CL-91	Supplemental Control	ENE	6.1	CL-61	Outer Ring	WSW	4.5
CL-8	Supplemental Control	E	2.2	CL-1	Inner ring	W	1.8
CL-24	Inner Ring	E	0.5	CL-49	Special Interest	W	3.5
CL-41	Special Interest	E	2.4	CL-74	Special Interest	W	1.9
CL-53	Outer Ring	E	4.3	CL-80	Outer Ring	W	4.1
CL-84	Supplemental Control	E	0.6	CL-34	Inner Ring	WNW	0.8
CL-42	Inner Ring	ESE	2.8	CL-64	Special Interest	WNW	2.1
CL-54	Outer Ring	ESE	4.6	CL-81	Outer Ring	WNW	4.5
CL-7	Supplemental Control	SE	2.3	CL-35	Inner Ring	NW	0.7
CL-43	Inner Ring	SE	2.8	CL-51	Outer Ring	NW	4.4
CL-55	Outer Ring	SE	4.1	CL-52	Outer Ring	NNW	4.3
CL-90	Supplemental Control	SE	0.4	CL-63	Inner Ring	NNW	1.3

TABLE 2-B

CPS RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SAMPLING LOCATIONS

Station Code	Description	Air	Surface Water	Drinking Water	Food Products	Milk	Ground Water
CL-1	Camp Quest (1.8 miles W)	•					
CL-2	Site's main access road (0.7 miles NNE)	√					
CL-3	Site's secondary access road (0.7 miles NE)	√					
CL-4	Residence near recreation area (0.8 miles SW)	•					
CL-6	CPS recreation area (0.7 miles WSW)	•					
CL-7	Mascoutin Recreation Area (2.3 miles SE)	•					
CL-7D	Mascoutin Recreation Area (2.3 miles ESE)						√
CL-8	DeWitt Cemetery (2.2 miles E)	√					
CL-11*	Illinois Power substation (16 miles S)	√					
CL-12	DeWitt Pumphouse (1.6 miles E)						√
CL-13	Salt Creek bridge on Rt.10 (3.6 miles SW)		•				
CL-14	Station Plant Service Building			√			
CL-15	Near residence on Rt. 900N (0.9 miles N)	√					
CL-90	Start of discharge flume (0.4 miles SE)		√				
CL-91	Parnell Boat Access (6.1 miles ENE)		√				
CL-94	Old Clinton Road (0.6 miles E)	•					
CL-99	North Fork canoe access area (3.5 miles NNE)		•				
CL-114*	Residence in Cisco (12.5 miles SSE)				√		
CL-115	Site's secondary access road (0.7 miles NE)				√		
CL-116	Pasture in rural Kenney (14 miles WSW)					√	
CL-117	Resident north of site (0.9 miles N)				√		
CL-118	Site's main access road (0.7 miles NNE)				√		

Station Code	Description	Grass	Fish	Shoreline Sediment
CL-1	Camp Quest (1.8 miles W)	•		
CL-2	Site's main access road (0.7 miles NNE)	•		
CL-7B	SE of site on Clinton Lake (2.1 miles SE)			√
CL-8	DeWitt Cemetery (2.2 miles E)	•		
CL-19	End of the discharge flume (3.4 miles E)		√	
CL-105*	Lake Shelbyville (50 miles S)		√	
CL-116	Pasture in rural Kenney (14 miles WSW)	•		

*Control Location √ ODCM *required* samples • Supplemental non-ODCM *required* samples

Note: Location[s] are listed by distance [in miles] along with meteorological sector from the Station's HVAC Vent.

TABLE 3-A

CPS REMP REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m^3)	Fish (pCi/kg - wet)	Milk (pCi/l)	Food Products (pCi/kg - wet)
H^3	20,000[a]	---	---	---	---
Mn^{54}	1,000	---	30,000	---	---
Fe^{59}	400	---	10,000	---	---
Co^{58}	1,000	---	30,000	---	---
Co^{60}	300	---	10,000	---	---
Zn^{65}	300	---	20,000	---	---
Zr/Nb^{95}	400[c]	---	---	---	---
I^{131}	2[b]	0.9	---	3	100
Cs^{134}	30	10	1,000	60	1,000
Cs^{137}	50	20	2,000	70	2,000
Ba/La^{140}	200[c]	---	---	300	---

a If no drinking water pathway exists, a value of 30,000 pCi/l may be used.
b If no drinking water pathway exists, a value of 20 pCi/l may be used.
c Total for parent and daughter.

TABLE 3-B

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS[d]
LOWER LIMIT OF DETECTION (LLD)

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m^3)	Fish (pCi/kg – wet)	Milk (pCi/l)	Food Products (pCi/kg - wet)	Sediment (pCi/kg - dry)
Gross Beta	4	0.01				
H^3	2,000[e]					
Mn^{54}	15		130			
Fe^{59}	30		260			
Co^{58}, Co^{60}	15		130			
Zn^{65}	30		260			
Zr^{95}	30					
Nb^{95}	15					
I^{131}	1[f]	0.07		1	60	
Cs^{134}	15	0.05	130	15	60	150
Cs^{137}	18	0.06	150	18	80	180
Ba^{140}	60			60		
La^{140}	15			15		

d This list does not mean these nuclides are the only ones considered. Other nuclides are identified and reported when applicable.
e If no drinking water pathway exists, a value of 3,000 pCi/l may be used.
f If no drinking water pathway exists, a value of 15 pCi/l may be used.

Sample Analysis

Concentrations of radioactivity present in the environment will vary due to factors such as weather conditions, variations in the sampling collection technique and during sample analysis.

Several types of measurements may be performed to provide information about the types of radiation and radionuclides present. Analyses that are performed on environmental samples collected for the CPS REMP include the following:

- Gross beta analysis
- Gamma spectroscopy analysis
- Tritium analysis
- Strontium analysis
- Gamma dose (TLDs only)

A gross alpha and beta analysis measures the total amount of alpha and beta emitting radioactivity present in a sample. Both radiation[s] may be released by many different radionuclides. Gross activity measurements - while useful as a general trend indicator - are not used to establish specific radionuclide concentrations. Therefore, gross activity analysis will only indicate whether the sample contains normal or abnormal concentrations of alpha or beta emitting radioactivity and serves as a precursor in which to identify samples that may require additional follow up analysis.

Samples are primarily analyzed for plant-contributed radionuclides released to the environment. Irrespective of station operations and since naturally occurring radionuclides are abundant in all environmental samples, any positive result for a certain radionuclide, including gross alpha / beta measurements, will be discussed further in this section of the report.

B. Direct Radiation Monitoring

Radionuclides present in the air – in addition to those deposited in or on top of the ground – cause human exposure by immersion in the atmosphere or by deposition on the ground. TLDs [Thermo-Luminescent Dosimeters] are used to measure the ambient gamma radiation levels at 54 locations surrounding Clinton Power Station.

TLDs are crystalline devices that store energy when they are exposed to radiation. They can be processed months after their exposure with a minimal loss of this collected information. This makes them well suited for quarterly environmental radiation measurements.

During TLD processing, stored energy is released as light and measured by a TLD reader. The light intensity is proportional to the radiation dose the TLD was exposed to. The TLDs used for environmental monitoring around the Clinton Power Station are capable of measuring environmental levels of radiation as low as approximately 20 mRem per quarter.

Monitoring stations are placed near the site boundary and approximately five (5) miles from the reactor, in locations representing the 16 meteorological compass sectors. Other locations are chosen to measure the radiation levels at places of special interest such as nearby residences, meeting places and population centers.

Control Locations are located further than ten (10) miles from the station so that they will not be influenced by station operations.

TLD measurements register the gamma ray exposure in milli-Roentgen [mR]. For reporting purposes mR is numerically equivalent to that of mRem. Consequently, these terms are used interchangeably throughout this Annual Report.

A total of 213 TLD measurements were made throughout 2003. The average quarterly dose from our Indicator Location[s] was 20.7 mrem. At our Control Locations, the average quarterly dose was 20.7 mRem. These quarterly measurements ranged from 18.0 to 22.9 mRem for Indicator TLDs and 20.1 to 21.8 mRem for Control TLDs.

Figure 8 compares the 2003 quarterly TLD results with our Pre-Operational TLD quarterly averages.

Average doses (± 2 standard deviations) - broken down by calendar quarter - are shown in Table 4 for both Indicator and Control Locations.

TABLE 4

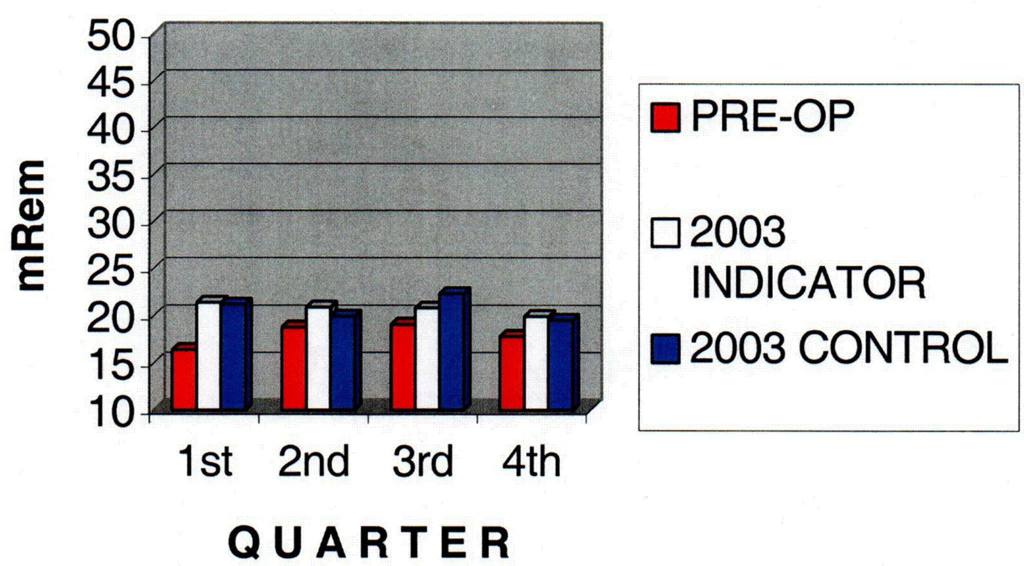
AVERAGE QUARTERLY TLD RESULTS

Average ± 2σ (mRem/quarter)

QUARTERLY PERIOD	2002 INDICATOR	2003 INDICATOR	PREOP ALL SITES
1st	17.7 ± 3.0	21.4 ± 2.3	16.4 ± 2.9
2nd	21.9 ± 3.8	20.9 ± 3.6	18.8 ± 3.2
3rd	[see below] ▲	20.8 ± 2.6	19.1 ± 4.7
4th	24.3 ± 3.1	19.9 ± 3.5	17.8 ± 2.2
QUARTERLY PERIOD	**2002 CONTROL**	**2003 CONTROL**	**PREOP ALL SITES**
1st	16.5 ± 1.0	21.2 ± 2.5	16.4 ± 2.9
2nd	21.3 ± 3.0	19.9 ± 4.1	18.8 ± 3.2
3rd	[see below] ▲	22.3 ± 3.7	19.1 ± 4.7
4th	24.6 ± 4.5	19.5 ± 5.0	17.8 ± 2.2

▲ Clinton's 2002 3rd Quarter ODCM REMP TLD results – both Indicator and Control - were determined to be inconclusive from our Vendor. ODCM REMP TLD results were irradiated from an external source of radiation most likely due to security package scanning during air transportation from California to Illinois prior to placement in the environment. This resulted in inconclusive readings after adding this unknown exposure to their quarterly environmental exposure.

FIGURE 8: DIRECT RADIATION COMPARISON



Given the above observations – and after factoring statistical variances - there were no significant increases in environmental gamma radiation levels resulting from station operations of the Clinton Power Station.

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C. Atmospheric Monitoring

The inhalation and ingestion of radionuclides in the air is a direct exposure pathway to man. A network of ten (10) active Air Sampling Stations around the Clinton Power Station monitor this pathway. There are nine (9) 'Indicator' Air Sampling Station locations strategically placed in areas that are most likely to reveal any measurable effects due to the release of radioactive effluents from the Clinton Power Station. The 'Control' Air Sampling Station location is located approximately 16 miles south of the station in an area that is totally independent from any of the effects from station operation[s]. Historical meteorological data further supports that this 'Control' Air Sampling Station location is upwind from the station.

Mechanical air samplers are used to draw a continuous volume of air through a filter and charcoal cartridge collecting any particulates and radioiodines that may be present in the atmosphere. These samplers are equipped with a pressure-sensing flow regulator to maintain a constant sampling rate of air flow of about one (1) cubic foot per minute (CFM). The total volume is then calculated based upon the amount of time the air sampler was in operation coupled with this flow rate. The air sampling equipment is maintained and calibrated by Clinton Power Station personnel using reference standards that are traceable back to the National Institute of Standards and Technology (NIST).

Air samples are collected every week and analyzed for gross beta and I^{131} activities. Quarterly, all air particulate filters collected throughout this period are combined and counted for gamma isotopic activity. Since the intent of particulate sampling is to measure airborne radioactivity released from the station, the counting of short-lived daughter products - produced by the decay of naturally occurring radon and thoron - may otherwise mask any station contributions. Therefore, particulate filters are not analyzed for at least five (5) days after their collection. This allows for the radioactive decay of naturally occurring short-lived daughter products, thus reducing any contribution interference to the overall gross beta activity.

Results from the gross beta airborne particulate analysis provides for comparisons between both Indicator and Control Locations – including those locations relative to spatial and temporal differences - throughout the year. These results are reported in units of pico-curies per cubic meter [pCi/m^3]. The calculated annual average was 0.026 pCi/m^3 for all Indicator Locations and 0.027 pCi/m^3 for the Control Location. These results are consistent with our Pre-Operational annual averages for both Indicator and Control Locations that were 0.027 pCi/m^3.

The location with the highest calculated annual average was measured at Indicator Location CL-3 that is located 0.7 miles northeast of Clinton Power Station. This location had a monthly average concentration of 0.027 pCi/m^3. Individual location averages for 2003 are presented in Table 5

Minor fluctuations in the gross beta concentrations were noted throughout 2003. The general trend for average weekly gross beta concentrations from the Indicator Locations correlated to the trend for the Control Locations throughout the monitoring period. This correlation is evidenced by the similarity of the trends in the average monthly gross beta concentrations contained within Figure 9. There were no significant differences observed between these individual locations. Monthly averages for both Indicator and Control Locations for the 2003 year are presented in Table 6.

Fluctuations observed in the gross beta activity over the year can be attributed to changes in the environment, specifically during seasonal changes.

All gross beta concentrations for 2003 were found to be within normal background levels and no significant increases were noted as a result of station operations.

Naturally occurring Be^7 [Beryllium] was the only gamma-emitting radionuclide detected in the analysis of particulate filters.

No measurable contribution to the overall level of airborne particulate radioactivity was identified as a result of station operations. The radioactivity that was detected - naturally occurring Be^7 - is normally found in the environment and is consistent with the expected concentrations of natural radioactivity and fallout from prior atmospheric nuclear weapons testing.

ANNUAL AVERAGE GROSS BETA CONCENTRATIONS IN AIR PARTICULATES

Average ± 2σ (pCi/m^3)

Station	Description	2002	2003
CL-1	Camp Quest	0.025 ± 0.010	0.026 ± 0.009
CL-2	Site's Main Access Road	0.026 ± 0.010	0.026 ± 0.009
CL-3	Site's Secondary Access Road	0.026 ± 0.011	0.027 ± 0.009
CL-4	Residence near Recreation Area	0.025 ± 0.010	0.025 ± 0.009
CL-6	CPS Recreation Area	0.025 ± 0.010	0.025 ± 0.009
CL-7	Mascoutin Recreation Area	0.025 ± 0.010	0.025 ± 0.009
CL-8	DeWitt Cemetery	0.026 ± 0.011	0.027 ± 0.010
CL-11*	Illinois Power Substation	0.026 ± 0.012	0.027 ± 0.008
CL-15	Near Residence on Route 900N	0.025 ± 0.011	0.025 ± 0.008
CL-94	Old Clinton Road	0.025 ± 0.010	0.026 ± 0.008

* Control Station

TABLE 6

AVERAGE MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATES

Average ± 2σ (pCi/m^3)

MONTH	2002 Indicator	2003 Indicator	2002 Control	2003 Control
January	0.032 ±0.003	0.031 ±0.002	0.032 ±0.013	0.032 ±0.009
February	0.023 ±0.001	0.025 ±0.003	0.022 ±0.014	0.025 ±0.011
March	0.023 ±0.003	0.027 ±0.002	0.022 ±0.013	0.027 ±0.016
April	0.020 ±0.002	0.019 ±0.002	0.018 ±0.009	0.020 ±0.010
May	0.017 ±0.002	0.018 ±0.002	0.018 ±0.007	0.020 ±0.011
June	0.021 ±0.002	0.022 ±0.003	0.023 ±0.010	0.027 ±0.007
July	0.027 ±0.004	0.023 ±0.003	0.030 ±0.016	0.027 ±0.007
August	0.022 ±0.002	0.027 ±0.002	0.022 ±0.013	0.027 ±0.017
September	0.029 ±0.004	0.030 ±0.004	0.031 ±0.017	0.031 ±0.015
October	0.027 ±0.003	0.027 ±0.001	0.030 ±0.015	0.029 ±0.015
November	0.030 ±0.003	0.030 ±0.001	0.031 ±0.023	0.033 ±0.015
December	0.032 ±0.003	0.030 ±0.003	0.034 ±0.017	0.028 ±0.006

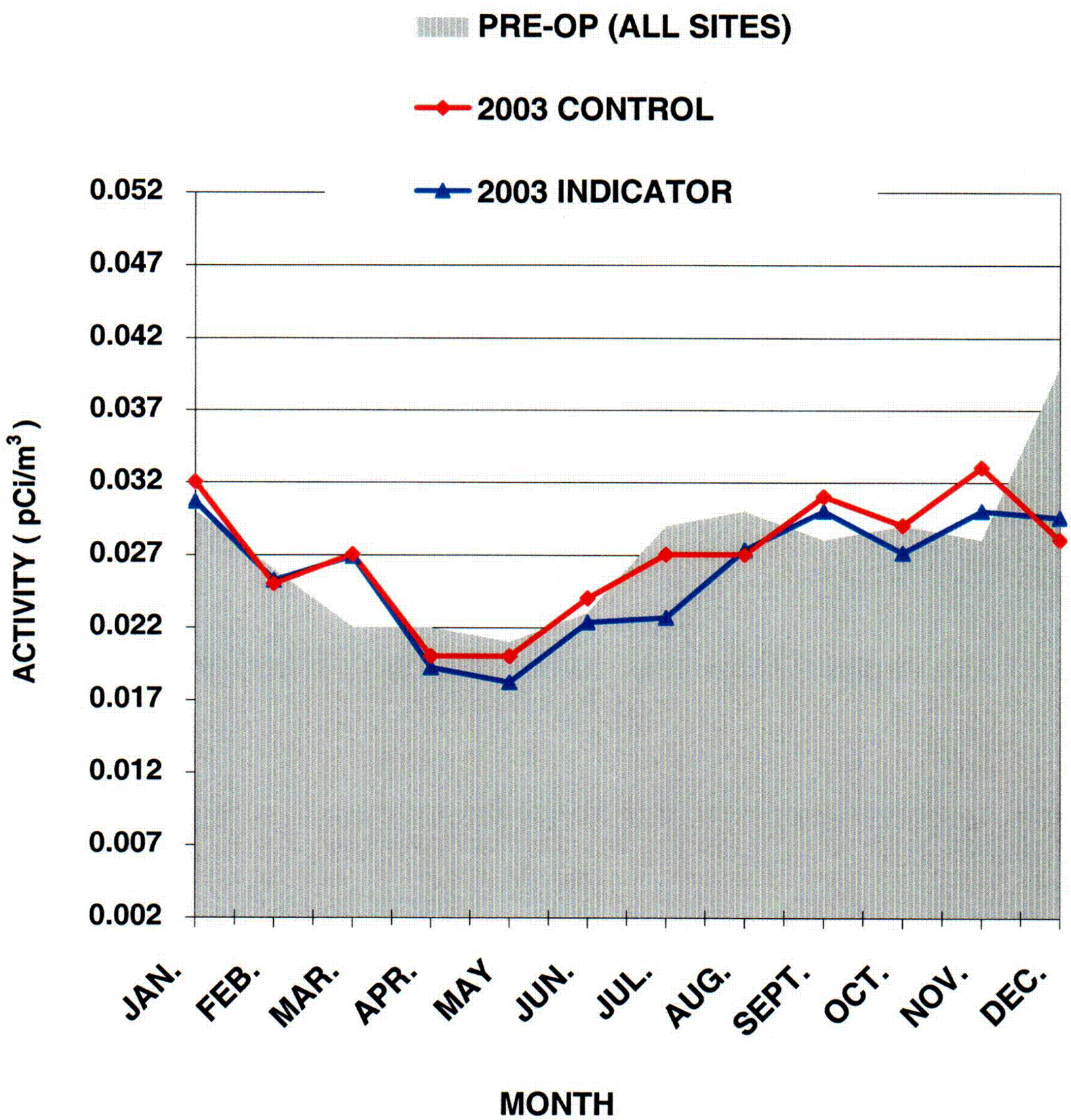

FIGURE 9: AIR PARTICULATE GROSS BETA ACTIVITY COMPARISON

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D. Aquatic Monitoring

The Clinton Power Station utilizes a man-made lake as the source of cooling water and returns this cooling water back to the same lake while most nuclear power stations use once-through flow methods from a river, an ocean or body of water much larger than Clinton Lake. If regulated radioactive liquid effluents were to be discharged from the Clinton Power Station into the cooling water outfall, long-lived radioisotopes could build up over a period time as the same water is reused on recurring trips through the station. Cooling water that exits from the plant will travel back into the eastern arm of Clinton Lake and then into the northern arm of the lake before returning back into the plant. Although the only user of Clinton Lake as a source of drinking water is CPS itself, Clinton Lake is a major recreational facility used for fishing, swimming, water skiing, boating and hunting.

Clinton Lake constitutes the primary environmental exposure pathway for radioactive materials from liquid effluents. Aquatic monitoring provides for the collection of fish and shoreline sediments to detect the presence of any radioisotopes related to the operation of the Clinton Power Station. These samples are analyzed for naturally occurring and man-made radioactive materials. Indicator samples were taken from various locations throughout Clinton Lake whereas the Control samples are obtained from Lake Shelbyville - approximately 50 miles south of Clinton Power Station – thus serving as an excellent data comparison to our station operations.

The overall concentration[s] of naturally occurring radioisotopes in samples collected near the Clinton Power Station were comparable to the concentrations in samples collected from the Control Location at Lake Shelbyville. The operation of Clinton Power Station had no measurable contribution to the radioactive inventory towards the aquatic environment.

Fish

Various samples of fish are collected from Clinton Lake and Lake Shelbyville. From both lakes; our primary interest consists of largemouth bass, crappie, carp, and bluegill. The selections of these species are the fish most commonly harvested from the lakes by sporting fishermen. Fish will ingest both floating sediments and during feeding - prey on other organisms - that will also ingest sediments that may otherwise retain radionuclides. A radiological analysis from fish samples provides key information on the potential ingestion of radionuclides by humans via the aquatic pathway. These samples are collected semi-annually and analyzed by gamma spectroscopy.

The gamma spectroscopy analysis revealed that fish samples – from Clinton Lake and Lake Shelbeyville from 50 miles away – both identified the presence of naturally occurring K^{40} [Potassium] in all species. All other analytical results were less than the Lower Limit of Detection (LLD) for each radionuclide of interest.

Shoreline Sediments

Samples of shoreline sediments are collected at Clinton Lake. Radiological analyses of shoreline sediments provide information on any potential shoreline exposure to humans, determining long-term trends, and the accumulation of long-lived radionuclides from our environment. Samples are collected semi-annually and then analyzed for gamma isotopic activities.

Shoreline sediment samples are dried prior to analysis and the results are reported in pCi/g [pico-curies per gram] dry weight. Only naturally occurring radioisotopes were present in samples taken at Clinton Lake.

E. Terrestrial Monitoring

In addition to direct radiation, radionuclides that are present in our atmosphere expose individuals when they are deposited on plant and soil surfaces. Consuming animal products - such as meat and milk - subsequently ingest them either directly by man or indirectly. To monitor this food ingestion pathway, samples of green leafy vegetables, grass and milk are analyzed.

Surface vegetation samples are collected monthly during the growing season from a number of locations for the purpose of monitoring the potential buildup of atmospherically deposited radionuclides. Because the radionuclides of interest – relative to Clinton Power Station operations - are already present within our environment as a result of several decades of worldwide fallout or because they are naturally occurring, the presence of these radionuclides is anticipated from all of the samples that are collected. These samples are analyzed by gamma spectroscopy.

The gamma spectroscopy analysis revealed the presence of naturally occurring K^{40} [Potassium] and Be^{7} [Beryllium] in several samples. All other analytical results were less than the Lower Limit of Detection (LLD) for each radionuclide. The operation of Clinton Power Station had no measurable contribution to the radioactive concentration of the terrestrial environment.

Milk

There is no known commercial production of milk for human consumption within a five (5) mile radius of the Clinton Power Station. However, milk samples are collected from a dairy located approximately 14 miles west-southwest of the station (twice a month during May through October and once a month during November through April to coincide with the grazing seasons). These samples are analyzed for I^{131} and gamma isotopic activities.

The results from the analyses showed only naturally occurring K^{40} and there was no I^{131} detected in any of the milk samples collected.

Grass

In addition to milk samples, grass samples are also collected at three (3) Indicator Locations and at one (1) Control Location. These samples are collected twice a month during May through October and once a month during November through April (when available). Grass samples are analyzed for gamma isotopic activity including I^{131}.

The results from the analyses showed only naturally occurring Be^7 and K^{40} in these samples. There was no I^{131} detected in any of the grass samples collected.

Vegetables

The Clinton Power Station obtains broadleaf vegetable samples from three (3) Indicator Locations and at one (1) Control Location. The Indicator Locations are located in the meteorological sectors with the highest potential for surface deposition and the Control Location is in a meteorological sector and distance – approximately 13 miles upwind - which is considered to be unaffected by station operations. Samples are collected once a month during the growing season (June through September) and then are analyzed for gross beta and gamma isotopic activities including I^{131}.

The results from the analyses identified only naturally occurring Be^7 and K^{40} from these samples. There was no I^{131} detected in any of the vegetable samples collected.

F. Water Monitoring

Water monitoring provides for the collection of drinking water, surface water, and ground water (well water) samples to detect the presence of any radioisotopes relative to station operations at the Clinton Power Station.

The only identified user of water from Clinton Lake for domestic purposes is the Clinton Power Station. Samples taken are analyzed for naturally occurring and man-made radioactive isotopes. Average gross beta concentrations in surface, drinking and well water[s] are presented within Table 7 at the end of this section.

Water monitoring results show no measurable effects resulting from the operation of the Clinton Power Station.

Drinking Water

A composite water sampler is located at the Station Service Building that collects a small - fixed volume - sample at hourly intervals. The sampler discharges each sample into a common sample collection bottle. Therefore, the monthly sample analyzed by our independent laboratory service represents a composite of the individual samples that are collected throughout the month. This monthly composite sample is then analyzed for gross beta and gamma isotopic activities. A portion of each of these monthly samples is further mixed with the other monthly samples collected during each calendar quarter. This quarterly composite sample is then analyzed for H^3 [Tritium].

Gross beta activity ranged from 0.9 to 2.6 pCi/l. These levels are attributed to very fine particles of sediment containing K^{40} that are not removed during the chlorination and filtration process.

The results from the H^3 and gamma-emitting radioisotope analysis were all less than the Lower Limit of Detection (LLD).

Surface Water

Composite Water Samplers are installed at three (3) locations sampling surface water from Clinton Lake. These Composite Water Samplers collect a small volume of surface water at regular intervals and discharge the sample into a large sample collection bottle. Monthly, this water is then collected.

Two (2) of the Composite Water Samplers are located upstream from Clinton Power Station and are therefore unaffected by any plant liquid releases occurring downstream. The third Composite Water Sampler is positioned to sample water being released from the plant at the start of the plant discharge flume. Grab samples are also collected from one (1) Indicator Location on Clinton Lake.

Surface water samples are analyzed for gamma isotopic and H^3 [Tritium] activities. Additional analyses for I^{131} activity are performed on water samples taken from the discharge flume. Tritium analyses are performed quarterly from all of the monthly composites from all Water Composite Sample locations.

These results are attributed to naturally occurring K^{40} suspended as fine sediment particles in the water. Other types of samples – such as Shoreline Sediments - have further validated the presence of K^{40} in Clinton Lake

All samples analyzed for H^3 [Tritium] were all less than the Minimum Detectable Activity (MDA). Pre-Operational H^3 [Tritium] concentrations ranged from 220 to 330 pCi/l. As noted in Reference E187, previous nuclear weapons testing have increased the pre-1960 levels of Tritium (6 - 24 pCi/l) by a factor of approximately 50 to 300 - 1,200 pCi/l.

nuclear weapons testing have increased the pre-1960 levels of Tritium (6 - 24 pCi/l) by a factor of approximately 50 to 300 - 1,200 pCi/l.

Gamma-emitting radioisotopes were all below the Lower Limits of Detection (LLD) and there was no I^{131} detected in any of the surface water samples that were collected.

Well Water

Every quarter - both treated and untreated well water samples - are collected from the well serving the Village of DeWitt and from a well serving the Illinois Department of Conservation at the Mascoutin State Recreational Area. Samples are analyzed for H^3 [Tritium] and gamma isotopic activities as required.

Gamma-emitting radioisotopes were all below the lower limits of detection (LLD) and there was no H^3 detected in any of the well water samples that were collected.

TABLE 7

AVERAGE GROSS BETA CONCENTRATIONS IN DRINKING, SURFACE AND WELL WATER

Average $\pm 2\sigma$ (pCi/l)

STATION	DESCRIPTION	2002	2003
	Drinking Water		
CL-14	Station Service Building	1.2 ± 0.7	1.4 ± 1.0

Fluctuations observed in the gross beta activity over the year can be attributed to changes in the environment, specifically during seasonal changes.

G. Quality Assurance Program

To establish confidence and credibility that both the data collected and reported are accurate and precise, REMP activities are incorporated into the Quality Assurance (QA) program, which includes assessments, audits, and surveillances. The Quality Assurance program requires the following:

- Participation in inter-comparison programs, such as the Environmental Resource Associates (ERA) crosscheck program.
- Audits of analysis laboratory functions and their facilities.
- Periodic review of the Clinton Power Station procedures specifying sampling techniques.
- Duplicate analysis of all samples received (excluding TLDs). This requirement is to validate laboratory precision.
- The routine counting of quality control samples.

The analytical results provided by the laboratory were reviewed monthly to ensure the required minimum sensitivities have been achieved and the proper analyses have been performed.

The station's Vendor - Environmental Inc., Mid-West Laboratory - has participated in interlaboratory comparison (crosscheck) programs since the formulation of their quality control program in December 1971. These programs are operated by agencies that supply environmental type samples – such as milk and water - containing concentrations of radionuclides that are only known by the issuing agency and not the participating laboratory. The purpose of such a program is to provide an independent check on the laboratory's analytical procedures and alert them to any possible problems.

Results from the 2003 Environmental Inc., Mid-West Laboratory cross-check program are shown in Appendix A of this report. CPS personnel have reviewed the 2003 results concluding the interlaboratory program utilized by Environmental Inc. effectively supports the 2003 REMP Program at CPS.

H. Changes to the REMP During 2003

Periodic revisions to the Radiological Environmental Monitoring Program [REMP] are necessary so as to maintain the monitoring of the environmental exposure pathways at the highest level of quality. Revisions may result from items identified during the performance of the Annual Land Use Census, incorporation of any revised or new regulatory requirement[s] or from Quality Assurance Audits.

During the course of 2003, there were no changes made to the REMP program as delineated within the Off-Site Dose Calculation Manual.

2003 ANNUAL LAND USE CENSUS

IV. 2003 ANNUAL LAND USE CENSUS

Each year an Annual Land Use Census is conducted to ensure that changes in the use of areas - at and beyond the site boundary - are identified and that any necessary modifications to the Radiological Environmental Monitoring Program [REMP] are made. The information gathered during the Annual Land Use Census is used for Radioactive Effluent Technical Specifications [RETS] dose assessments that feeds into the REMP ensuring that these programs accurately reflect the environment surrounding CPS.

The Annual Land Use Census is conducted during the growing season satisfying the CPS Offsite Dose Calculation Manual (ODCM) requirements. The Annual Land Use Census is conducted to identify the *nearest* milk animals, the *nearest* residence and the *nearest* garden of greater than 538 square feet that produce broadleaf vegetation – all within a distance of five (5) miles - in each of the sixteen (16) meteorological sectors.

The Annual Land Use Census shall also identify - within a distance of three (3) miles - the location in each of the 16 meteorological sectors *all* milk animals and *all* gardens of greater than 538 square feet that produce broadleaf vegetation. A detailed summary of the Annual Land Use Census results is provided in a separate document that is permanently archived at CPS.

In order to assemble as much information as possible, the location of area residences, their critical age groups, milking animals, the size and vegetable content of gardens and along with livestock, were all recorded from each sector within five (5) miles, as stated above.

These land use parameters are then used in the assessment of potential radiological doses to individuals for the stated sectors. This information provides the most restrictive parameters used for dose assessments that will result in the highest calculated dose within each sector. Additional information regarding dose assessments to members of the public is provided within the 2003 CPS Annual Radioactive Effluent Release Report.

Area residents were surveyed who reside within a five (5) mile radius of the station by either direct contact, via a mail-in questionnaire, a telephone interview or direct observation within the 16 geographical sectors surrounding CPS. The information provided within this section of the report is a summary of the 2003 results from that census. The nearest residence, garden, and milk animal for each meteorological sector - out to a distance of five (5) miles - are illustrated in Table 8.

Data from the 2003 Annual Land Use Census was obtained using the following procedure:

- When mail-in response[s] were unresponsive, door-to-door canvassing of residences / land owners identified from the 2002 Annual Land Use Census was performed with a DeWitt County plat book available if needed.

- Telephone solicitations of persons who were unavailable during the 'door-to-door' survey or who did not mail back their questionnaire.

- By direct observation of land when the aforementioned methods proved to be unsuccessful. If an individual was unable to be contacted, data from the previous year was used.

- State and local agencies were solicited for information.

TABLE 8

ANNUAL LAND USE CENSUS SUMMARY RESULTS

Sector	Nearest Residence [miles]	Nearest Garden [miles]	Nearest Milk Animal [miles] - (See Note)
N	0.9	0.9	0.9
NNE	1.0	2.9	2.3
NE	1.3	2.1	3.4
ENE	1.8	2.6	4.1
E	1.0	1.0	1.0
ESE	3.2	3.3	N/A
SE	2.8	4.4	4.4
SSE	2.4	2.8	N/A
S	3.0	4.1	N/A
SSW	2.9	N/A	3.4
SW	0.7	N/A	3.6
WSW	1.6	2.2	3.4
W	1.6	2.0	2.1
WNW	1.6	2.0	N/A
NW	1.6	3.7	2.4
NNW	1.7	2.3	1.3

N/A None identified within five (5) miles of CPS within this meteorological sector.

Note – Not used for human consumption

The Annual Land Use Census results were validated to ensure that the REMP will provide representative measurements of radiation and radioactive materials from exposure pathways and for radionuclides that lead to the highest potential radiation exposure to the general public resulting from station operations.

After carefully reviewing the Annual Land Use Census results - coupled with station effluent release data provided by the CPS Chemistry Department - an evaluation is conducted to ensure current ODCM sampling location requirements are adequate. As a result of that evaluation, no changes in REMP sampling locations were required.

Summary of Changes Identified in 2003 Annual Land Use Census

Nearest Residence

There were no changes in census locations for the nearest resident[s] identified within the sixteen (16) geographical sectors and is indicated below:

2002 Census Location	2003 Census Location
No Changes	No Changes

There were no changes or additions to the REMP as a result of the Nearest Resident Census.

Garden Census

Changes in census locations for the nearest garden were identified in seven (7) of the sixteen (16) geographical sectors and are indicated below:

2002 Census Location	2003 Census Location
1.8 miles ENE	2.6 miles ENE
2.7 miles SSE	2.8 miles SSE
2.3 miles WSW	2.2 miles WSW
2.1 miles W	2.0 miles W
1.6 miles WNW	2.0 miles WNW
> 5.0 miles NW	3.7 miles NW
1.3 miles NNW	2.3 miles NNW

There were no changes or additions to the REMP garden sampling locations as a result of the Garden Census.

Milk Animal Census

Milk animals within five (5) miles were identified in the sixteen (16) geographical sectors surrounding CPS. Ten (10) locations were identified within this five (5) mile radius. Only milk animals were specifically identified for this report. Of the livestock identified, milk animals were being raised primarily for nursing [nursing of their calves] and were being used for meat production [for both their own use and sold commercially]. There were no residents that milked their animals for any human consumption. Other livestock raised in the area were identified, but will not be addressed within this report.

Changes in the census locations for the nearest livestock / dairy were identified in three (3) of the sixteen (16) geographical sectors and are indicated below:

2002 Census Location	2003 Census Location
1.3 miles NNE	2.3 miles ENE
> 5 miles ENE	4.1 miles ENE
> 5 miles NW	2.4 miles NW

No changes or additions to REMP milk sampling locations were made as a result of the Milk Animal Census.

LIST OF REFERENCES

V. LIST OF REFERENCES

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APPENDICES

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2003 through December, 2003

Appendix A

Interlaboratory Comparison Program Results

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

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

Results in Table A-1 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of internal laboratory testing is also listed.

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

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

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

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

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

Attachment A lists acceptance criteria for "spiked" samples.

Out-of-limit results are explained directly below the result.

<u>Attachment A</u>

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES[a]

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

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

[b] Laboratory limit.

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-973	02/17/03	Sr-89	17.0 ± 0.5	15.9 ± 5.0	7.2 - 24.6
STW-973	02/17/03	Sr-90	8.9 ± 0.3	9.0 ± 5.0	0.4 - 17.7
STW-974	02/17/03	Ba-133	14.5 ± 0.9	19.5 ± 5.0	10.8 - 28.2
STW-974	02/17/03	Co-60	37.5 ± 0.9	37.4 ± 5.0	28.7 - 46.1
STW-974	02/17/03	Cs-134	18.2 ± 0.6	17.8 ± 5.0	9.1 - 26.5
STW-974	02/17/03	Cs-137	42.7 ± 1.0	44.2 ± 5.0	35.5 - 52.9
STW-974	02/17/03	Zn-65	56.8 ± 2.2	60.3 ± 6.0	49.9 - 70.7
STW-975[d]	02/17/03	Gr. Alpha	18.4 ± 0.3	37.6 ± 9.4	21.3 - 53.9
STW-975	02/17/03	Gr. Beta	11.7 ± 0.5	8.6 ± 5.0	0.0 - 17.2
STW-976	02/17/03	Ra-226	4.1 ± 0.1	4.7 ± 0.7	3.5 - 6.0
STW-976	02/17/03	Ra-228	7.6 ± 0.5	6.5 ± 1.6	3.7 - 9.3
STW-976	02/17/03	Uranium	52.9 ± 1.9	53.7 ± 5.4	44.4 - 63.0
STW-983	05/19/03	H-3	1290.0 ± 25.0	1250.0 ± 331.0	678.0 - 1820.0
STW-984	05/19/03	I-131	19.7 ± 1.3	20.8 ± 3.0	15.6 - 26.0
STW-985	05/19/03	Gr. Alpha	54.4 ± 3.0	70.3 ± 17.6	39.9 - 101.0
STW-985	05/19/03	Ra-226	14.9 ± 0.2	16.5 ± 2.5	12.2 - 20.8
STW-985	05/19/03	Ra-228	13.1 ± 0.6	10.3 ± 2.6	5.8 - 14.8
STW-985	05/19/03	Uranium	14.5 ± 0.4	15.1 ± 3.0	9.9 - 20.3
STW-986	05/19/03	Co-60	56.9 ± 8.6	63.8 ± 5.0	55.1 - 72.5
STW-986[e]	05/19/03	Cs-134	61.6 ± 6.6	75.7 ± 5.0	67.0 - 84.4
STW-986	05/19/03	Cs-137	143.0 ± 1.2	150.0 ± 7.5	137.0 - 163.0
STW-986	05/19/03	Gr. Beta	309.0 ± 2.7	363.0 ± 54.5	269.0 - 457.0
STW-986	05/19/03	Sr-89	33.1 ± 0.2	31.3 ± 5.0	22.6 - 40.0
STW-986	05/19/03	Sr-90	28.8 ± 1.3	27.4 ± 5.0	18.7 - 36.1
STW-988	08/18/03	Ra-226	13.3 ± 1.1	13.4 ± 2.0	9.9 - 16.9
STW-988	08/18/03	Ra-228	11.5 ± 1.0	12.5 ± 3.1	7.1 - 17.9
STW-988	08/18/03	Uranium	12.3 ± 0.4	11.4 ± 3.0	6.2 - 16.6
STW-989	08/18/03	Ba-133	18.1 ± 1.9	20.7 ± 5.0	12.0 - 29.4
STW-989	08/18/03	Co-60	35.9 ± 1.3	37.4 ± 5.0	28.7 - 46.1
STW-989	08/18/03	Cs-134	32.6 ± 1.8	32.6 ± 5.0	23.9 - 41.3
STW-989	08/18/03	Cs-137	48.3 ± 0.6	44.3 ± 5.0	35.6 - 53.0
STW-989	08/18/03	Zn-65	58.9 ± 2.1	60.2 ± 6.0	49.8 - 70.6
STW-990	08/18/03	Gr. Alpha	41.8 ± 3.4	56.2 ± 16.3	36.9 - 93.3
STW-990[f]	08/18/03	Gr. Beta	51.3 ± 3.0	31.6 ± 5.0	22.9 - 40.3
STW-991	08/18/03	Sr-89	57.2 ± 4.3	58.8 ± 5.0	50.1 - 67.5
STW-991	08/18/03	Sr-90	21.2 ± 0.9	20.6 ± 5.0	11.9 - 29.3

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-997	11/18/03	Gr. Alpha	37.0 ± 2.0	29.5 ± 7.4	16.7 - 42.3
STW-997	11/18/03	Gr. Beta	26.5 ± 0.8	26.3 ± 5.0	17.6 - 35.0
STW-998	11/18/03	I-131	14.8 ± 0.3	16.5 ± 3.0	11.3 - 21.7
STW-999	11/18/03	Ra-226	17.2 ± 1.1	17.8 ± 2.7	13.2 - 22.4
STW-999	11/18/03	Ra-228	6.6 ± 0.3	6.8 ± 1.7	3.8 - 9.7
STW-999	11/18/03	Uranium	11.7 ± 0.3	11.7 ± 3.0	6.5 - 16.9
STW-1000	11/18/03	H-3	15900.0 ± 174.0	14300.0 ± 1430.0	11800.0 - 16800.0
STW-1001	11/18/03	Gr. Alpha	32.9 ± 0.3	54.2 ± 3.0	30.7 - 77.7
STW-1001	11/18/03	Ra-226	16.5 ± 0.9	16.1 ± 2.4	11.9 - 20.3
STW-1001	11/18/03	Ra-228	6.2 ± 0.5	5.5 ± 1.4	3.1 - 7.9
STW-1001	11/18/03	Uranium	9.7 ± 1.5	9.3 ± 13.6	4.1 - 14.5
STW-1002	11/18/03	Co-60	27.7 ± 1.9	27.7 ± 5.0	19.0 - 36.4
STW-1002	11/18/03	Cs-134	21.5 ± 1.1	23.4 ± 5.0	17.6 - 29.2
STW-1002	11/18/03	Cs-137	66.3 ± 2.8	64.2 ± 5.0	55.5 - 72.9
STW-1002	11/18/03	Gr. Beta	159.0 ± 2.5	168.0 ± 5.0	124.0 - 212.0
STW-1002	11/18/03	Sr-89	48.5 ± 0.4	50.4 ± 5.0	41.7 - 59.1
STW-1002	11/18/03	Sr-90	10.1 ± 3.0	10.2 ± 25.2	1.5 - 18.9

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

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

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

[d] Recount of the original sample still low. The ERA blank was spiked in the lab; known value of 20.1 pCi/L, measured 21.5 ± 1.1 pCi/L. No explanation for ERA test failure.

[e] Lower bias observed for gamma spectroscopic analysis. The undiluted sample was reanalyzed; Results of reanalysis, Co-60: 62.3 pCi/L., Cs-134: 69.2 pCi/L., Cs-137: 152.3 pCi/L.

[f] Reason for deviation unknown. A recount of the original planchets averaged 43.4 pCi/L. Cs-137activity by gamma spectroscopy; 28.3 pCi/L. Result of reanalysis; 29.3 pCi/L.

TABLE A-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLDs).

Lab Code	TLD Type	Date	mR Description	mR Known Value	mR Lab Result ± 2 sigma	mR Control Limits
Environmental, Inc.						
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 120	4.69	4.74 ± 0.54	3.28 - 6.10
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 150	3.00	3.02 ± 0.20	2.10 - 3.90
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 180	2.08	1.89 ± 0.45	1.46 - 2.70
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 180	2.08	2.11 ± 0.22	1.46 - 2.70
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 30	75.00	84.40 ± 4.87	52.50 - 97.50
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 60	18.75	19.11 ± 1.86	13.13 - 24.38
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 60	18.75	22.82 ± 5.41	13.13 - 24.38
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 90	8.33	9.05 ± 1.17	5.83 - 10.83
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 90	8.33	7.60 ± 1.08	5.83 - 10.83
Environmental, Inc.						
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 30	61.96	73.50 ± 2.58	43.37 - 80.55
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 60	15.49	19.70 ± 0.51	10.84 - 20.14
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 60	15.49	16.93 ± 1.37	10.84 - 20.14
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 90	6.88	8.06 ± 0.60	4.82 - 8.94
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 90	6.88	6.64 ± 0.58	4.82 - 8.94
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 120	3.87	4.39 ± 0.17	2.71 - 5.03
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 150	2.48	2.34 ± 0.18	1.74 - 3.22
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 150	2.48	2.51 ± 0.16	1.74 - 3.22
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 180	1.72	2.01 ± 0.13	1.20 - 2.24

TABLE A-3. In-House "Spike" Samples

Lab Code	Sample Type	Date	Analysis	Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
			Concentration (pCi/L)[a]			
SPW-356	water	1/2/2003	Sr-90	34.04 ± 1.57	30.93	24.74 - 37.12
W-10303	water	1/3/2003	Gr. Beta	63.24 ± 1.20	63.90	53.90 - 73.90
W-11303	water	1/13/2003	Gr. Beta	59.75 ± 1.10	63.90	53.90 - 73.90
W-12103	water	1/21/2003	Gr. Beta	61.56 ± 1.59	63.99	53.99 - 73.99
SPAP-446	Air Filter	1/31/2003	Gr. Beta	1.49 ± 0.02	1.52	-8.48 - 11.52
SPW-468	water	1/31/2003	H-3	95982.00 ± 865.00	89607.00	71685.60 - 107528.40
W-20703	water	2/7/2003	Fe-55	9095.00 ± 114.00	10587.00	8469.60 - 12704.40
SPU-1347	Urine	3/1/2003	H-3	1724.00 ± 412.00	1784.33	1101.27 - 2467.39
DW-30303	water	3/3/2003	Gr. Beta	65.44 ± 0.59	63.90	53.90 - 73.90
SPCH-964	Charcoal	3/8/2003	I-131(G)	73.37 ± 0.28	69.45	59.45 - 79.45
SPMI-1086	Milk	3/13/2003	Cs-137	57.18 ± 8.03	49.50	39.50 - 59.50
SPMI-1086	Milk	3/13/2003	I-131	75.13 ± 12.01	67.60	54.08 - 81.12
SPMI-1086	Milk	3/13/2003	I-131(G)	65.81 ± 1.06	67.56	57.56 - 77.56
SPW-1088	water	3/13/2003	Co-60	27.16 ± 4.79	28.20	18.20 - 38.20
SPW-1088	water	3/13/2003	Cs-137	51.74 ± 9.15	49.50	39.50 - 59.50
SPW-1088	water	3/13/2003	I-131(G)	68.14 ± 12.92	67.60	57.60 - 77.60
SPW-1088	water	3/13/2003	I-131	76.94 ± 1.13	67.56	54.05 - 81.07
SPVE-1110	Vegetation	3/14/2003	I-131(G)	122.80 ± 16.80	124.00	111.60 - 136.40
SPW-1194	water	3/21/2003	Co-60	31.09 ± 6.28	28.15	18.15 - 38.15
SPW-1194	water	3/21/2003	Cs-137	55.11 ± 0.13	49.50	39.50 - 59.50
SPW-1194	water	3/21/2003	I-131(G)	66.17 ± 9.15	67.60	57.60 - 77.60
W-32103	water	3/21/2003	C-14	5201.00 ± 16.60	4966.00	2979.60 - 6952.40
SPCH-1429	Charcoal	4/1/2003	I-131(G)	8.83 ± 0.11	9.18	-0.82 - 19.18
W-40103	water	4/1/2003	Gr. Beta	67.74 ± 0.52	63.39	53.39 - 73.39
SPF-1407	Fish	4/2/2003	Cs-134	0.58 ± 0.03	0.59	0.35 - 0.83
SPF-1407	Fish	4/2/2003	Cs-137	1.29 ± 0.06	1.32	0.79 - 1.85
SPAP-1409	Air Filter	4/2/2003	Gr. Beta	1.44 ± 0.02	1.51	-8.49 - 11.51
SPU-41203	Urine	4/12/2003	H-3	1798.50 ± 409.30	1784.33	1101.27 - 2467.39
SPU-41703	Urine	4/17/2003	H-3	1625.10 ± 401.30	1784.33	1101.27 - 2467.39
SPW-2022	water	4/25/2003	H-3	89007.00 ± 798.00	88463.00	70770.40 - 106155.60
SPW-2053	water	4/28/2003	Cs-137	45.70 ± 9.44	49.35	39.35 - 59.35
SPW-2053	water	4/28/2003	Sr-90	47.51 ± 1.87	44.47	35.58 - 53.36
SPMI-2055	Milk	4/28/2003	Cs-137	61.65 ± 7.17	65.80	55.80 - 75.80
SPMI-2055	Milk	4/28/2003	Sr-90	38.45 ± 1.59	44.74	35.79 - 53.69
W-50603	water	5/6/2003	Gr. Beta	70.95 ± 0.53	63.39	53.39 - 73.39
W-60303	water	6/3/2003	Gr. Beta	63.00 ± 0.51	65.73	55.73 - 75.73
SPW-3960	water	7/15/2003	H-3	88700.00 ± 822.00	87369.00	69895.20 - 104842.80
SPMI-4019	Milk	7/18/2003	Cs-137	47.17 ± 7.22	49.11	39.11 - 59.11
SPMI-4019	Milk	7/18/2003	Sr-89	40.95 ± 4.88	49.49	39.49 - 59.49
SPMI-4019	Milk	7/18/2003	Sr-90	45.30 ± 1.73	44.24	35.39 - 53.09
SPW-4023	water	7/18/2003	Cs-137	51.92 ± 6.24	49.11	39.11 - 59.11
SPW-4023	water	7/18/2003	Sr-89	42.49 ± 10.23	49.49	39.49 - 59.49
SPW-4023	water	7/18/2003	Sr-90	49.69 ± 3.04	44.24	35.39 - 53.09
SPW-4518	water	8/8/2003	Fe-55	8176.00 ± 107.00	9330.00	7464.00 - 11196.00

TABLE A-3. In-House "Spike" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L) Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPW-6197	water	10/16/2003	Tc-99	540.14 ± 54.00	539.73	377.81 - 701.65
SPAP-3958	Air Filter	10/28/2003	Gr. Beta	1.45 ± 0.02	1.50	-8.50 - 11.50
SPW-6401	water	10/28/2003	H-3	84867.00 ± 826.00	85984.00	68787.20 - 103180.80
SPAP-6403	Air Filter	10/28/2003	Gr. Beta	1.71 ± 0.02	1.49	-8.51 - 11.49
SPF-6418	Fish	10/28/2003	Cs-134	0.50 ± 0.02	0.49	0.29 - 0.69
SPF-6418	Fish	10/28/2003	Cs-137	1.37 ± 0.05	1.30	0.78 - 1.82
SPW-6421	water	10/28/2003	Fe-55	104.18 ± 1.26	88.18	68.18 - 108.18
SPMI-7459	Milk	12/12/2003	Cs-134	41.06 ± 2.45	41.88	31.88 - 51.88
SPMI-7459	Milk	12/12/2003	Cs-137	48.48 ± 4.99	48.64	38.64 - 58.64
SPMI-7459	Milk	12/12/2003	Sr-89	55.94 ± 4.12	65.80	52.64 - 78.96
SPMI-7459	Milk	12/12/2003	Sr-90	41.86 ± 1.57	43.80	35.04 - 52.56
SPW-7461	water	12/12/2003	Cs-134	44.07 ± 1.49	41.88	31.88 - 51.88
SPW-7461	water	12/12/2003	Cs-137	50.26 ± 2.67	48.64	38.64 - 58.64
SPW-7461	water	12/12/2003	Sr-89	56.41 ± 4.87	65.80	52.64 - 78.96
SPW-7461	water	12/12/2003	Sr-90	48.44 ± 1.84	43.80	35.04 - 52.56

[c] Control limits are based on Attachment A, Page A2 of this report.

NOTE: For fish, Jello is used for the Spike matrix. For Vegetation, cabbage is used for the Spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
SPW-357	water	1/2/2003	Sr-90	0.50	0.12 ± 0.25	1
W-10303	water	1/3/2003	Gr. Beta	0.12	0.022 ± 0.10	3.2
W-11303	water	1/13/2003	Gr. Beta	0.14	0.035 ± 0.10	3.2
W-12103	water	1/21/2003	Gr. Beta	0.12	0.029 ± 0.09	3.2
SPAP-447	Air Filter	1/31/2003	Gr. Beta	0.00	-0.0034 ± 0.00	3.2
SPW-469	water	1/31/2003	H-3	160.20	19.3 ± 80.30	200
W-20103	water	2/1/2003	Gr. Beta	0.17	0.0 ± 0.12	3.2
W-20703	water	2/7/2003	Fe-55	802.00	149 ± 498.00	1000
DW-30303		3/3/2003	Gr. Beta	0.15	0.007 ± 0.11	3.2
SPCH-965	Charcoal Cani	3/8/2003	I-131(G)	0.01		9.6
SPMI-1087	Milk	3/13/2003	Cs-134	7.49		10
SPMI-1087	Milk	3/13/2003	Cs-137	7.90		10
SPMI-1087	Milk	3/13/2003	I-131	0.33	-0.013 ± 0.18	0.5
SPMI-1087	Milk	3/13/2003	I-131(G)	7.76		20
SPW-1089	water	3/13/2003	Co-60	4.48		10
SPW-1089	water	3/13/2003	Cs-134	5.60		10
SPW-1089	water	3/13/2003	Cs-137	4.32		10
SPW-1089	water	3/13/2003	I-131	0.29	-0.050 ± 0.16	0.5
SPVE-1111	Vegetation	3/14/2003	I-131(G)	7.53		20
W-32103	water	3/21/2003	C-14	17.50	-0.4 ± 9.200	200
SPCH-1430	Charcoal Cani	4/1/2003	I-131(G)	0.01		9.6
W-40103	water	4/1/2003	Gr. Beta	0.14	-0.11 ± 0.100	3.2
SPF-1408	Fish	4/2/2003	Cs-134	0.01		100
SPF-1408	Fish	4/2/2003	Cs-137	0.01		100
SPAP-1410	Air Filter	4/2/2003	Gr. Beta	0.00	-0.0029 ± 0.002	3.2
SPU-41203	Urine	4/12/2003	H-3	653.99	542.28 ± 364.780	200
SPU-41703	Urine	4/17/2003	H-3	648.35	100.1 ± 344.800	200
SPW-2054	water	4/28/2003	Cs-137	3.16		10
SPW-2054	water	4/28/2003	Sr-89	0.55	0.45 ± 0.50	5
SPW-2054	water	4/28/2003	Sr-90	0.55	0.072 ± 0.260	1
SPMI-2056 [c]	Milk	4/28/2003	Sr-90	0.77	0.66 ± 0.430	1
SPMI-2056	Milk	4/28/2003	Cs-137	2.74		10
SPMI-2056	Milk	4/28/2003	I-131(G)	3.54		20
W-50603	water	5/6/2003	Gr. Beta	0.12	0 ± 0.090	3.2
W-60303	water	6/3/2003	Gr. Beta	0.14	-0.035 ± 0.095	3.2
SPW-3960	water	7/15/2003	H-3	156.60	53.4 ± 80.200	200
SPMI-4018	Milk	7/18/2003	Cs-137	4.10		10
SPMI-4018	Milk	7/18/2003	Sr-89	0.73	0.39 ± 0.880	5
SPMI-4018 [c]	Milk	7/18/2003	Sr-90	0.51	0.93 ± 0.340	1
SPW-4024	water	7/18/2003	Sr-89	0.83	0.21 ± 0.730	5
SPW-4024	water	7/18/2003	Sr-90	0.62	0.09 ± 0.300	1
SPW-4519	water	8/8/2003	Fe-55	527.00	87 ± 369.000	1000
SPW-6401	water	10/28/2003	H-3	163.80	-23.8 ± 85.000	200

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
SPAP-6404	Air Filter	10/28/2003	Gr. Beta	0.87	-0.99 ± 0.440	3.2
SPF-6419	Fish	10/28/2003	Cs-134	0.01		100
SPF-6419	Fish	10/28/2003	Cs-137	0.01		100
SPMI-7460	Milk	12/12/2003	Cs-134	4.52		10
SPMI-7460	Milk	12/12/2003	Cs-137	5.77		10
SPMI-7460[c]	Milk	12/12/2003	Sr-90	0.50	1.26 ± 0.370	1

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

[b] The activity reported is the net activity result.

[c] Low levels of Sr-90 are still detected in the environment. A concentration of (1-5 pCi/L) in milk is not unusual.

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-24, 25	1/2/2003	K-40	1362.00 ± 117.00	1377.00 ± 188.00	1369.50 ± 110.72
MI-24, 25	1/2/2003	Sr-90	1.45 ± 0.40	2.21 ± 0.50	1.83 ± 0.32
CF-47, 48	1/2/2003	Gr. Beta	2.72 ± 0.10	2.84 ± 0.10	2.78 ± 0.07
CF-47, 48	1/2/2003	K-40	2.61 ± 0.31	2.32 ± 0.12	2.47 ± 0.17
AP-8827, 8828	1/2/2003	Be-7	0.06 ± 0.01	0.05 ± 0.02	0.05 ± 0.01
AP-8869, 8870	1/2/2003	Be-7	0.04 ± 0.02	0.05 ± 0.02	0.05 ± 0.01
MI-119, 120	1/8/2003	K-40	1351.90 ± 116.10	1234.70 ± 108.70	1293.30 ± 79.52
MI-119, 120	1/8/2003	Sr-90	2.22 ± 0.43	1.88 ± 0.40	2.05 ± 0.30
MI-213, 214	1/14/2003	K-40	1372.30 ± 104.80	1303.80 ± 109.10	1338.05 ± 75.64
MI-213, 214	1/14/2003	Sr-90	1.81 ± 0.41	2.29 ± 0.45	2.05 ± 0.31
MI-262, 263	1/15/2003	K-40	1399.20 ± 200.70	1347.70 ± 126.40	1373.45 ± 118.59
S-696, 697	1/29/2003	Gr. Alpha	24.70 ± 4.89	23.23 ± 4.64	23.97 ± 3.37
S-696, 697	1/29/2003	Gr. Beta	22.89 ± 2.67	22.71 ± 2.73	22.80 ± 1.91
MI-448, 449	2/3/2003	K-40	1159.70 ± 157.90	1396.40 ± 106.20	1278.05 ± 95.15
SW-470, 471	2/3/2003	Gr. Beta	13.62 ± 1.23	15.21 ± 1.21	14.42 ± 0.86
SW-470, 471	2/3/2003	K-40 (ICP)	5.10 ± 0.51	5.20 ± 0.52	5.15 ± 0.36
SW-470, 471	2/3/2003	K-40	5.80 ± 0.51	5.90 ± 0.52	5.85 ± 0.36
MI-517, 518	2/4/2003	K-40	1437.70 ± 125.50	1357.70 ± 188.00	1397.70 ± 113.02
MI-541, 542	2/5/2003	K-40	1443.00 ± 194.80	1385.20 ± 190.10	1414.10 ± 136.09
MI-620, 621	2/11/2003	K-40	1294.70 ± 115.10	1234.10 ± 165.10	1264.40 ± 100.63
DW-922, 923	3/4/2003	I-131	0.67 ± 0.16	0.79 ± 0.16	0.73 ± 0.11
CF-1048, 1049 b	3/10/2003	K-40	3.09 ± 0.12	2.67 ± 0.07	2.88 ± 0.07
LW-1152, 1153	3/13/2003	H-3	1147.26 ± 122.56	1094.42 ± 120.92	1120.84 ± 86.09
F-1120, 1121	3/14/2003	Cs-137	0.04 ± 0.02	0.05 ± 0.01	0.05 ± 0.01
F-1120, 1121	3/14/2003	Gr. Beta	2.04 ± 0.06	2.11 ± 0.06	2.08 ± 0.04
F-1120, 1121	3/14/2003	K-40	1.93 ± 0.38	1.89 ± 0.25	1.91 ± 0.23
DW-1278, 1279	3/25/2003	I-131	0.37 ± 0.22	0.34 ± 0.29	0.36 ± 0.18
SO-1380, 1381	3/25/2003	Gr. Beta	18.60 ± 2.68	20.53 ± 2.83	19.57 ± 1.95
LW-1299, 1300	3/27/2003	Gr. Beta	2.35 ± 0.55	2.48 ± 0.56	2.42 ± 0.39
LW-1320, 1321	3/27/2003	H-3	487.12 ± 104.43	422.00 ± 102.00	454.56 ± 72.99
W-1403, 1404	3/31/2003	Sr-90	0.96 ± 0.32	1.10 ± 0.42	1.03 ± 0.26
AP-2019, 2020	3/31/2003	Be-7	0.07 ± 0.01	0.08 ± 0.01	0.07 ± 0.01
MI-1422, 1423	4/1/2003	K-40	1410.00 ± 176.00	1340.00 ± 114.00	1375.00 ± 104.85
MI-2170, 2171	4/1/2003	K-40	1452.30 ± 129.10	1472.50 ± 191.00	1462.40 ± 115.27
MI-1422, 1423	4/2/2003	Sr-90	1.84 ± 0.42	1.15 ± 0.39	1.50 ± 0.29
AP-1633, 1634	4/2/2003	Be-7	0.05 ± 0.01	0.06 ± 0.01	0.06 ± 0.01
AP-1871, 1872	4/2/2003	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-1974, 1975	4/2/2003	Be-7	0.08 ± 0.02	0.07 ± 0.02	0.08 ± 0.01
LW-1828, 1829	4/11/2003	Gr. Beta	2.49 ± 0.58	3.42 ± 0.63	2.96 ± 0.43
S-1544, 1545	4/15/2003	K-40	15.84 ± 2.36	15.41 ± 2.02	15.63 ± 1.55
DW-1913, 1914	4/15/2003	I-131	0.29 ± 0.21	0.42 ± 0.19	0.36 ± 0.14
MI-1996, 1997	4/21/2003	Sr-90	2.05 ± 0.74	3.25 ± 0.91	2.65 ± 0.58
MI-1996, 1997	4/22/2003	K-40	1580.20 ± 118.90	1602.10 ± 120.40	1591.15 ± 84.61

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]		
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result
LW-2063, 2064	4/28/2003	Gr. Beta	2.33 ± 0.66	2.68 ± 0.60	2.51 ± 0.45
SWU-2275, 2276	4/28/2003	Gr. Beta	3.62 ± 0.67	4.60 ± 0.71	4.11 ± 0.49
G-2149, 2150	4/30/2003	Be-7	0.71 ± 0.19	0.69 ± 0.20	0.70 ± 0.14
TD-2339, 2340	5/1/2003	H-3	221.00 ± 91.00	161.00 ± 88.00	191.00 ± 63.29
SO-2381, 2382	5/1/2003	Cs-137	0.11 ± 0.03	0.10 ± 0.02	0.10 ± 0.02
SO-2381, 2382	5/1/2003	Gr. Alpha	11.14 ± 5.15	10.39 ± 5.60	10.77 ± 3.80
SO-2381, 2382	5/1/2003	Gr. Beta	35.18 ± 4.69	39.66 ± 5.24	37.42 ± 3.52
SO-2381, 2382	5/1/2003	K-40	18.29 ± 0.84	17.83 ± 0.84	18.06 ± 0.59
SO-2381, 2382	5/1/2003	Sr-90	0.06 ± 0.02	0.10 ± 0.02	0.08 ± 0.01
DW-2317, 2318	5/6/2003	I-131	1.77 ± 0.27	1.47 ± 0.26	1.62 ± 0.19
BS-2595, 2596	5/6/2003	Cs-137	0.06 ± 0.02	0.06 ± 0.02	0.06 ± 0.02
BS-2595, 2596	5/6/2003	K-40	13.74 ± 0.62	14.10 ± 0.73	13.92 ± 0.48
U-2484, 2485	5/9/2003	H-3	512.00 ± 100.00	370.00 ± 95.00	441.00 ± 68.97
SO-2645, 2646	5/14/2003	Be-7	1.18 ± 0.42	1.21 ± 0.35	1.19 ± 0.27
SO-2645, 2646	5/14/2003	Cs-137	0.11 ± 0.04	0.09 ± 0.05	0.10 ± 0.03
SO-2645, 2646	5/14/2003	K-40	16.50 ± 1.13	15.33 ± 1.09	15.91 ± 0.79
MI-2696, 2697	5/19/2003	K-40	1320.40 ± 124.50	1394.10 ± 113.00	1357.25 ± 84.07
MI-2696, 2697	5/19/2003	Sr-90	1.49 ± 0.47	2.01 ± 0.45	1.75 ± 0.32
SO-2787, 2788	5/28/2003	Cs-137	0.27 ± 0.04	0.23 ± 0.04	0.25 ± 0.03
SO-2787, 2788	5/28/2003	Gr. Beta	19.62 ± 1.73	20.81 ± 1.72	20.21 ± 1.22
SO-2787, 2788	5/28/2003	K-40	14.77 ± 1.02	14.41 ± 1.00	14.59 ± 0.71
MI-2840, 2841	5/28/2003	K-40	1179.50 ± 167.80	1401.70 ± 120.20	1290.60 ± 103.20
SWU-2864, 2865	5/28/2003	Gr. Beta	3.39 ± 0.59	3.41 ± 0.64	3.40 ± 0.43
BS-2888, 2889	5/29/2003	Cs-137	0.05 ± 0.02	0.07 ± 0.04	0.06 ± 0.02
BS-2888, 2889	5/29/2003	K-40	9.70 ± 0.83	10.17 ± 0.87	9.93 ± 0.60
W-3230, 3231	5/30/2003	Gr. Beta	4.33 ± 1.00	3.28 ± 1.22	3.81 ± 0.79
TD-3036, 3037	6/2/2003	H-3	529.50 ± 100.00	585.50 ± 102.00	557.50 ± 71.42
SL-2909, 2910 b	6/3/2003	Gr. Beta	7.10 ± 0.15	7.60 ± 0.16	7.35 ± 0.11
SL-2909, 2910	6/3/2003	K-40	3.90 ± 0.67	3.49 ± 0.52	3.70 ± 0.42
SW-3080, 3081	6/10/2003	Gr. Alpha	4.63 ± 1.90	4.47 ± 1.71	4.55 ± 1.28
SW-3080, 3081	6/10/2003	Gr. Beta	9.07 ± 1.29	8.98 ± 1.28	9.02 ± 0.91
VE-3172, 3173	6/11/2003	K-40	2.62 ± 0.35	3.17 ± 0.58	2.90 ± 0.34
F-3742, 3743	6/11/2003	Gr. Beta	3.47 ± 0.13	3.71 ± 0.14	3.59 ± 0.10
F-3742, 3743	6/11/2003	K-40	2.94 ± 0.39	2.70 ± 0.40	2.82 ± 0.28
SO-3325, 3326	6/13/2003	Gr. Beta	20.95 ± 1.88	19.97 ± 2.01	20.46 ± 1.38
MI-3253, 3254	6/17/2003	K-40	1329.40 ± 121.80	1417.60 ± 130.90	1373.50 ± 89.40
MI-3297, 3298	6/17/2003	Sr-90	2.14 ± 0.57	2.27 ± 0.50	2.21 ± 0.38
WW-3380, 3381	6/23/2003	Gr. Beta	5.58 ± 0.69	5.03 ± 0.69	5.31 ± 0.49
SWT-3403, 3404	6/24/2003	Gr. Beta	2.80 ± 0.56	2.63 ± 0.55	2.72 ± 0.39
MI-3424, 3425	6/24/2003	K-40	1422.80 ± 185.40	1216.20 ± 170.10	1319.50 ± 125.80
SW-3862, 3863	6/24/2003	Gr. Beta	3.66 ± 1.18	3.70 ± 1.22	3.68 ± 0.85
G-3479, 3480	6/25/2003	Be-7	1.52 ± 0.25	1.43 ± 0.28	1.47 ± 0.19
G-3479, 3480	6/25/2003	K-40	5.02 ± 0.45	5.10 ± 0.48	5.06 ± 0.33
LW-3809, 3810	6/30/2003	Gr. Beta	2.12 ± 0.76	2.39 ± 0.72	2.25 ± 0.52

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]		
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result
LW-3809, 3810	6/30/2003	H-3	2814.09 ± 167.99	2812.17 ± 167.94	2813.13 ± 118.77
AP-4105, 4106	6/30/2003	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
G-3572, 3573	7/1/2003	Be-7	0.91 ± 0.24	0.81 ± 0.28	0.86 ± 0.18
G-3572, 3573	7/1/2003	Gr. Beta	6.35 ± 0.15	6.35 ± 0.15	6.35 ± 0.11
G-3572, 3573	7/1/2003	K-40	5.44 ± 0.55	5.68 ± 0.28	5.56 ± 0.31
G-3572, 3573	7/1/2003	Sr-90	0.01 ± 0.00	0.02 ± 0.00	0.01 ± 0.00
MI-3601, 3602	7/1/2003	K-40	1318.60 ± 117.40	1435.10 ± 117.80	1376.85 ± 83.16
MI-3601, 3602	7/1/2003	Sr-90	0.86 ± 0.51	1.74 ± 0.60	1.30 ± 0.39
AP-3933, 3934	7/1/2003	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-4061, 4062	7/2/2003	Be-7	0.07 ± 0.01	0.08 ± 0.01	0.08 ± 0.01
AP-4147, 4148	7/2/2003	Be-7	0.08 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-4084, 4085	7/3/2003	Be-7	0.09 ± 0.02	0.08 ± 0.02	0.08 ± 0.01
LW-3786, 3787	7/9/2003	Gr. Beta	2.13 ± 0.56	2.93 ± 0.62	2.53 ± 0.42
WW-4168, 4169	7/11/2003	Gr. Beta	3.79 ± 1.87	4.48 ± 1.98	4.14 ± 1.36
CF-3975, 3976	7/14/2003	Be-7	1.64 ± 0.81	1.66 ± 0.57	1.65 ± 0.50
CF-3975, 3976	7/14/2003	K-40	6.54 ± 0.75	6.19 ± 0.50	6.36 ± 0.45
MI-4020, 4021	7/16/2003	K-40	1350.90 ± 174.90	1199.80 ± 153.20	1275.35 ± 116.25
DW-4272, 4273	7/29/2003	Gr. Beta	2.35 ± 0.92	2.29 ± 0.89	2.32 ± 0.64
SWU-4461, 4462	7/30/2003	Gr. Beta	2.28 ± 0.44	1.93 ± 0.43	2.10 ± 0.31
SL-4398, 4399	8/4/2003	Be-7	4.55 ± 1.05	4.50 ± 1.10	4.53 ± 0.76
SL-4398, 4399 b	8/4/2003	Gr. Beta	3.41 ± 0.12	3.12 ± 0.11	3.27 ± 0.08
SL-4398, 4399	8/4/2003	K-40	2.47 ± 0.67	2.44 ± 0.87	2.46 ± 0.55
G-4419, 4420	8/4/2003	Be-7	3.98 ± 0.63	3.93 ± 0.57	3.96 ± 0.42
G-4419, 4420	8/4/2003	Gr. Beta	5.38 ± 0.14	5.35 ± 0.16	5.37 ± 0.11
G-4419, 4420	8/4/2003	K-40	4.42 ± 0.66	4.32 ± 0.74	4.37 ± 0.50
TD-4550, 4551	8/4/2003	H-3	327.30 ± 95.10	390.20 ± 92.10	358.75 ± 66.19
MI-4482, 4483	8/6/2003	K-40	1301.40 ± 115.20	1370.30 ± 116.80	1335.85 ± 82.03
MI-4482, 4483	8/6/2003	Sr-90	0.81 ± 0.30	0.85 ± 0.31	0.83 ± 0.21
G-4526, 4527	8/6/2003	Be-7	1.47 ± 0.29	1.42 ± 0.28	1.45 ± 0.20
G-4526, 4527	8/6/2003	K-40	5.42 ± 0.56	5.21 ± 0.63	5.31 ± 0.42
SWU-4609, 4610	8/6/2003	Gr. Beta	3.22 ± 0.63	2.67 ± 0.64	2.95 ± 0.45
CW-4694, 4695	8/6/2003	Gr. Beta	1.48 ± 0.34	1.09 ± 0.34	1.29 ± 0.24
CW-4694, 4695	8/6/2003	H-3	22776.41 ± 428.73	21831.75 ± 420.10	22304.08 ± 300.12
LW-4673, 4674	8/13/2003	Gr. Beta	2.86 ± 0.65	3.75 ± 0.71	3.30 ± 0.48
MI-4735, 4736	8/19/2003	K-40	1396.30 ± 127.90	1410.10 ± 120.20	1403.20 ± 87.76
MI-4756, 4757	8/19/2003	Sr-90	1.66 ± 0.47	1.53 ± 0.44	1.60 ± 0.32
VE-4832, 4833	8/20/2003	K-40	1.96 ± 0.50	1.43 ± 0.47	1.70 ± 0.34
MI-4860, 4861	8/26/2003	K-40	1312.10 ± 191.80	1307.80 ± 109.30	1309.95 ± 110.38
SO-5082, 5083	8/28/2003	Cs-137	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
SO-5082, 5083	8/28/2003	Gr. Beta	20.02 ± 1.84	20.92 ± 2.03	20.47 ± 1.37
CW-5349, 5350	8/31/2003	Gr. Beta	1.45 ± 0.39	1.55 ± 0.45	1.50 ± 0.30
CW-5349, 5350	8/31/2003	H-3	24429.50 ± 444.42	24744.25 ± 447.18	24586.88 ± 315.23
ME-4968, 4969	9/2/2003	Gr. Beta	4.90 ± 0.23	5.18 ± 0.24	5.04 ± 0.17
ME-4968, 4969	9/2/2003	K-40	2.46 ± 0.41	2.68 ± 0.37	2.57 ± 0.28

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]		
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result
DW-4989, 4990	9/2/2003	Gr. Beta	2.20 ± 1.04	3.19 ± 1.14	2.70 ± 0.77
MI-5154, 5155	9/8/2003	K-40	1365.50 ± 116.70	1456.70 ± 119.10	1411.10 ± 83.37
MI-5154, 5155	9/8/2003	Sr-90	1.19 ± 0.39	1.39 ± 0.39	1.29 ± 0.28
AP-6177, 6178	9/29/2003	Be-7	0.07 ± 0.01	0.06 ± 0.01	0.06 ± 0.01
SWU-5773, 5774	9/30/2003	Gr. Beta	2.55 ± 0.63	2.83 ± 0.60	2.69 ± 0.44
AP-6102, 6103	9/30/2003	Be-7	0.07 ± 0.01	0.05 ± 0.01	0.06 ± 0.01
G-5631, 5632	10/1/2003	Be-7	1.88 ± 0.48	2.21 ± 0.40	2.05 ± 0.31
G-5631, 5632	10/1/2003	Gr. Beta	5.87 ± 0.09	5.85 ± 0.08	5.86 ± 0.06
G-5631, 5632	10/1/2003	K-40	5.24 ± 0.77	5.26 ± 0.58	5.25 ± 0.48
SO-5660, 5661	10/1/2003	Cs-137	0.15 ± 0.04	0.16 ± 0.05	0.16 ± 0.03
SO-5660, 5661	10/1/2003	Gr. Alpha	12.72 ± 3.72	14.86 ± 3.88	13.79 ± 2.69
SO-5660, 5661	10/1/2003	Gr. Beta	32.42 ± 3.09	33.60 ± 3.04	33.01 ± 2.17
SO-5660, 5661	10/1/2003	K-40	18.93 ± 0.87	18.25 ± 1.19	18.59 ± 0.74
SO-5660, 5661	10/1/2003	Sr-90	0.03 ± 0.01	0.03 ± 0.01	0.03 ± 0.01
AP-6334, 6335	10/1/2003	Be-7	0.06 ± 0.01	0.06 ± 0.01	0.06 ± 0.01
AP-6363, 6364	10/2/2003	Be-7	0.07 ± 0.02	0.07 ± 0.02	0.07 ± 0.01
MI-5794, 5795	10/6/2003	Sr-90	1.37 ± 0.37	1.02 ± 0.37	1.19 ± 0.26
MI-5838, 5839	10/8/2003	K-40	1364.30 ± 124.10	1414.40 ± 110.40	1389.35 ± 83.05
MI-5838, 5839	10/8/2003	Sr-90	0.76 ± 0.30	1.00 ± 0.34	0.88 ± 0.23
BS-5938, 5939	10/8/2003	Cs-137	0.18 ± 0.03	0.20 ± 0.05	0.19 ± 0.03
BS-5938, 5939	10/8/2003	K-40	15.59 ± 0.70	16.69 ± 0.80	16.14 ± 0.53
SS-5959, 5960	10/13/2003	K-40	7.49 ± 0.42	7.29 ± 0.63	7.39 ± 0.38
MI-6011, 6012	10/13/2003	K-40	1165.20 ± 118.70	1191.20 ± 99.50	1178.20 ± 77.44
MI-6034, 6035	10/14/2003	Sr-90	0.86 ± 0.33	0.90 ± 0.34	0.88 ± 0.24
VE-6055, 6056	10/15/2003	Gr. Beta	5.18 ± 0.18	5.33 ± 0.18	5.25 ± 0.13
VE-6055, 6056	10/15/2003	K-40	5.31 ± 0.57	4.52 ± 0.51	4.92 ± 0.38
MI-6291, 6292	10/21/2003	K-40	1935.60 ± 147.70	1936.10 ± 116.50	1935.85 ± 94.06
MI-6291, 6292	10/21/2003	Sr-90	1.22 ± 0.39	1.41 ± 0.37	1.31 ± 0.27
SS-6435, 6436	10/21/2003	Cs-137	0.05 ± 0.02	0.05 ± 0.03	0.05 ± 0.02
SS-6435, 6436	10/21/2003	K-40	14.08 ± 0.54	14.28 ± 0.80	14.18 ± 0.48
CF-6313, 6314	10/22/2003	K-40	14.56 ± 0.45	14.70 ± 0.95	14.63 ± 0.53
SO-6528, 6529	10/22/2003	Cs-137	0.15 ± 0.03	0.16 ± 0.05	0.16 ± 0.03
SO-6528, 6529	10/22/2003	K-40	17.46 ± 0.69	17.90 ± 1.05	17.68 ± 0.63
SO-6393, 6394	10/25/2003	Cs-137	0.09 ± 0.03	0.10 ± 0.04	0.10 ± 0.03
SO-6393, 6394	10/25/2003	Gr. Beta	23.21 ± 1.98	21.76 ± 1.91	22.48 ± 1.38
SO-6393, 6394	10/25/2003	K-40	13.98 ± 0.80	14.57 ± 0.86	14.27 ± 0.59
SWT-6507, 6508	10/28/2003	Gr. Beta	2.64 ± 0.52	2.63 ± 0.53	2.63 ± 0.37
DW-6647, 6648	10/31/2003	I-131	0.46 ± 0.27	0.61 ± 0.31	0.53 ± 0.21
BS-6603, 6604	11/3/2003	Cs-137	9.03 ± 0.82	8.60 ± 1.13	8.82 ± 0.70
BS-6603, 6604	11/3/2003	Gr. Beta	26.83 ± 1.94	27.18 ± 1.95	27.01 ± 1.38
SO-6670, 6671	11/5/2003	Cs-137	0.15 ± 0.04	0.13 ± 0.04	0.14 ± 0.03
SO-6670, 6671	11/5/2003	K-40	12.96 ± 0.66	12.95 ± 0.72	12.96 ± 0.49
S-7067, 7068	11/10/2003	Cs-137	0.21 ± 0.05	0.19 ± 0.08	0.20 ± 0.05
MI-6818, 6819	11/11/2003	K-40	1695.50 ± 129.80	1709.40 ± 143.00	1702.45 ± 96.56

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]		
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result
MI-6818, 6819	11/11/2003	Sr-90	2.01 ± 0.41	1.59 ± 0.39	1.80 ± 0.28
WL-6987, 6988	11/17/2003	Fe-55	603.49 ± 53.32	619.65 ± 53.97	611.57 ± 37.93
SO-7156, 7157	11/21/2003	Cs-137	0.74 ± 0.08	0.77 ± 0.07	0.76 ± 0.06
SO-7156, 7157	11/21/2003	Gr. Alpha	14.90 ± 4.24	19.25 ± 4.45	17.07 ± 3.07
SO-7156, 7157	11/21/2003	Gr. Beta	22.97 ± 3.12	25.51 ± 2.98	24.24 ± 2.16
SO-7156, 7157	11/21/2003	K-40	12.51 ± 1.06	12.94 ± 1.07	12.73 ± 0.75
S-7281, 7282	11/24/2003	Cs-137	0.82 ± 0.15	1.16 ± 0.20	0.99 ± 0.12
SWU-7198, 7199	11/25/2003	Gr. Beta	2.60 ± 0.53	2.54 ± 0.55	2.57 ± 0.38
DW-7221, 7222	11/25/2003	Gr. Beta	12.32 ± 1.40	12.38 ± 1.43	12.35 ± 1.00
SW-7133, 7134	12/1/2003	Gr. Beta	2.10 ± 0.23	2.46 ± 0.23	2.28 ± 0.16
SW-7133, 7134	12/1/2003	K-40	1.50 ± 0.15	1.40 ± 0.14	1.45 ± 0.10
W-7519, 7520	12/1/2003	Fe-55	3.03 ± 0.65	3.12 ± 0.64	3.08 ± 0.46
SW-7805, 7806	12/1/2003	Sr-90	0.59 ± 0.32	0.56 ± 0.33	0.58 ± 0.23
VE-7399, 7400	12/9/2003	Gr. Beta	4.99 ± 0.15	5.24 ± 0.15	5.11 ± 0.11
VE-7399, 7400	12/9/2003	K-40	5.04 ± 0.46	5.34 ± 0.74	5.19 ± 0.43
SW-7540, 7541	12/9/2003	Gr. Alpha	2.64 ± 1.36	2.10 ± 1.19	2.37 ± 0.91
SW-7540, 7541	12/9/2003	Gr. Beta	6.62 ± 1.22	5.89 ± 1.35	6.25 ± 0.91
LW-7736, 7737	12/26/2003	Gr. Beta	2.62 ± 0.54	2.83 ± 0.56	2.73 ± 0.39
AP-7868, 7869	12/30/2003	Be-7	0.05 ± 0.01	0.04 ± 0.01	0.04 ± 0.01
AP-7952, 7953	12/30/2003	Be-7	0.04 ± 0.01	0.04 ± 0.01	0.04 ± 0.01
AP-7994, 7995	12/31/2003	Be-7	0.05 ± 0.02	0.05 ± 0.01	0.05 ± 0.01

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).

[b] 200 minute count time or longer, resulting in lower error.

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)[a].

			Concentration[b]			
Lab Code	Type	Date	Analysis	Laboratory result	Known Activity	Control Limits[c]
STW-972	water	12/01/02	Am-241	0.56 ± 0.06	0.58 ± 0.09	0.40 - 0.75
STW-972	water	12/01/02	Co-57	57.10 ± 1.90	57.00 ± 5.70	39.90 - 74.10
STW-972	water	12/01/02	Co-60	38.30 ± 0.60	38.20 ± 3.82	26.74 - 49.66
STW-972	water	12/01/02	Cs-134	395.30 ± 10.10	421.00 ± 42.10	294.70 - 547.30
STW-972	water	12/01/02	Cs-137	316.40 ± 5.30	329.00 ± 32.90	230.30 - 427.70
STW-972	water	12/01/02	Fe-55	94.90 ± 24.50	96.00 ± 9.60	67.20 - 124.80
STW-972	water	12/01/02	Mn-54	33.40 ± 0.10	32.90 ± 3.29	23.03 - 42.77
STW-972	water	12/01/02	Ni-63	123.80 ± 5.50	136.50 ± 13.70	95.55 - 177.45
STW-972	water	12/01/02	Pu-238	0.66 ± 0.06	0.83 ± 0.08	0.58 - 1.08
STW-972	water	12/01/02	Pu-239/40	0.001 ± 0.001	0.000 ± 0.000	0.000 - 0.005
STW-972	water	12/01/02	Sr-90	13.80 ± 1.00	12.31 ± 1.23	8.62 - 16.00
STW-972	water	12/01/02	Tc-99	128.10 ± 3.80	132.00 ± 13.20	92.40 - 171.60
STW-972	water	12/01/02	U-233/4	1.60 ± 0.09	1.54 ± 0.15	1.08 - 2.00
STW-972	water	12/01/02	U-238	1.64 ± 0.09	1.60 ± 0.16	1.12 - 2.08
STW-972	water	12/01/02	Zn-65	540.40 ± 9.90	516.00 ± 51.60	361.20 - 670.80
STSO-987	soil	01/01/03	Co-57	534.36 ± 2.61	530.00 ± 53.00	371.00 - 689.00
STSO-987	soil	01/01/03	Co-60	442.16 ± 2.31	420.00 ± 42.00	294.00 - 546.00
STSO-987	soil	01/01/03	Cs-134	211.00 ± 2.30	238.00 ± 23.80	166.60 - 309.40
STSO-987	soil	01/01/03	Cs-137	849.50 ± 3.30	832.00 ± 83.20	582.40 - 1081.60
STSO-987	soil	01/01/03	K-40	716.50 ± 12.80	652.00 ± 65.20	456.40 - 847.60
STSO-987	soil	01/01/03	Mn-54	148.76 ± 2.84	137.00 ± 13.70	95.90 - 178.10
STSO-987	soil	01/01/03	Ni-63	597.10 ± 23.50	770.00 ± 77.00	539.00 - 1001.00
STSO-987	soil	01/01/03	Pu-238	67.05 ± 3.10	66.90 ± 6.70	46.83 - 86.97
STSO-987	soil	01/01/03	Pu-239/40	52.80 ± 3.60	52.70 ± 5.30	36.90 - 68.50
STSO-987	soil	01/01/03	Sr-90	609.50 ± 9.80	714.00 ± 71.40	499.80 - 928.20
STSO-987	soil	01/01/03	U-233/4	99.50 ± 7.60	89.00 ± 8.90	62.30 - 115.70
STSO-987	soil	01/01/03	U-238	508.60 ± 42.20	421.00 ± 42.10	294.70 - 547.30
STSO-987	soil	01/01/03	Zn-65	492.70 ± 28.10	490.00 ± 49.00	343.00 - 637.00

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

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

[c] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP.

TABLE A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)

Lab Code	Type	Date	Analysis	Concentration[a] Laboratory results	EML Result[b]	Control Limits[c]
STW-977	water	03/01/03	Gr. Alpha	304.30 ± 53.10	377.50	0.58 - 1.29
STW-977	water	03/01/03	Gr. Beta	615.80 ± 14.70	627.50	0.61 - 1.43
STW-978	water	03/01/03	Am-241	2.00 ± 0.10	2.13	0.79 - 1.41
STW-978	water	03/01/03	Co-60	221.30 ± 1.20	234.00	0.80 - 1.20
STW-978 [d]	water	03/01/03	Cs-134	23.30 ± 1.10	30.50	0.80 - 1.30
STW-978	water	03/01/03	Cs-137	61.40 ± 0.60	63.80	0.80 - 1.22
STW-978 [e]	water	03/01/03	H-3	341.90 ± 22.70	390.00	0.78 - 2.45
STW-978	water	03/01/03	Pu-238	3.70 ± 0.20	3.33	0.74 - 1.20
STW-978	water	03/01/03	Pu-239/40	4.40 ± 0.10	3.92	0.79 - 1.20
STW-978	water	03/01/03	Sr-90	4.60 ± 0.30	4.34	0.69 - 1.34
STW-978	water	03/01/03	Uranium	5.10 ± 0.60	4.29	0.75 - 1.33
STSO-979	soil	03/01/03	Ac-228	55.60 ± 2.50	57.60	0.80 - 1.38
STSO-979	soil	03/01/03	Am-241	12.42 ± 0.90	15.60	0.65 - 2.28
STSO-979	soil	03/01/03	Bi-212	57.70 ± 3.20	60.60	0.50 - 1.34
STSO-979	soil	03/01/03	Bi-214	60.40 ± 3.20	67.00	0.78 - 1.42
STSO-979	soil	03/01/03	Cs-137	1416.80 ± 70.00	1450.00	0.80 - 1.25
STSO-979	soil	03/01/03	K-40	653.80 ± 11.90	636.00	0.80 - 1.32
STSO-979	soil	03/01/03	Pb-212	51.10 ± 5.20	57.90	0.78 - 1.32
STSO-979	soil	03/01/03	Pb-214	64.70 ± 5.10	71.10	0.76 - 1.46
STSO-979	soil	03/01/03	Pu-239/40	24.40 ± 0.30	23.40	0.71 - 1.30
STSO-979	soil	03/01/03	Sr-90	54.50 ± 2.60	64.40	0.67 - 2.90
STSO-979	soil	03/01/03	Uranium	245.00 ± 1.50	249.00	0.71 - 1.32
STVE-980	Vegetation	03/01/03	Am-241	3.10 ± 0.20	3.51	0.73 - 2.02
STVE-980	Vegetation	03/01/03	Cm-244	1.40 ± 0.50	2.01	0.61 - 1.59
STVE-980	Vegetation	03/01/03	Co-60	12.60 ± 0.40	12.10	0.80 - 1.44
STVE-980	Vegetation	03/01/03	Cs-137	449.70 ± 6.20	444.00	0.80 - 1.31
STVE-980	Vegetation	03/01/03	K-40	1159.00 ± 38.60	1120.00	0.79 - 1.39
STVE-980	Vegetation	03/01/03	Pu-239/40	4.80 ± 0.40	5.17	0.69 - 1.31
STVE-980	Vegetation	03/01/03	Sr-90	659.70 ± 50.40	650.00	0.55 - 1.21
STAP-981	Air Filter	03/01/03	Am-241	0.27 ± 0.10	0.34	0.70 - 2.34
STAP-981	Air Filter	03/01/03	Co-60	30.20 ± 0.30	33.50	0.80 - 1.26
STAP-981	Air Filter	03/01/03	Cs-137	90.30 ± 1.30	99.70	0.80 - 1.32
STAP-981	Air Filter	03/01/03	Mn-54	41.80 ± 0.60	43.80	0.80 - 1.35
STAP-981	Air Filter	03/01/03	Pu-238	0.52 ± 0.10	0.52	0.67 - 1.33
STAP-981	Air Filter	03/01/03	Pu-239/40	0.35 ± 0.10	0.33	0.73 - 1.26
STAP-981	Air Filter	03/01/03	Sr-90	2.50 ± 0.10	2.80	0.53 - 1.84
STAP-981	Air Filter	03/01/03	Uranium	0.51 ± 0.10	0.50	0.79 - 2.10
STAP-982	Air Filter	03/01/03	Gr. Alpha	0.90 ± 0.10	1.17	0.73 - 1.43
STAP-982	Air Filter	03/01/03	Gr. Beta	1.50 ± 0.10	1.50	0.76 - 1.36

TABLE A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)

			Concentration[a]			
Lab Code	Type	Date	Analysis	Laboratory results	EML Result[b]	Control Limits[c]
STW-992	water	09/02/03	Am-241	9.78 ± 0.32	8.76	0.79 - 1.41
The September, 2003 results are preliminary. Control limits used were taken from the March, 2003 data. Control limits may vary slightly when the final study is published.						
STW-992	water	09/02/03	Co-60	468.30 ± 4.10	513.00	0.80 - 1.20
STW-992	water	09/02/03	Cs-134	53.90 ± 0.80	63.00	0.80 - 1.30
STW-992	water	09/02/03	Cs-137	76.10 ± 1.40	80.30	0.80 - 1.22
STW-992	water	09/02/03	H-3	355.20 ± 12.80	446.30	0.78 - 2.45
STW-992	water	09/02/03	Pu-238	1.71 ± 0.07	2.07	0.74 - 1.20
STW-992	water	09/02/03	Pu-239/40	4.24 ± 0.01	4.99	0.79 - 1.20
STW-992	water	09/02/03	Sr-90	6.70 ± 0.50	7.04	0.69 - 1.34
STW-992	water	09/02/03	Uranium	5.10 ± 0.60	5.69	0.75 - 1.33
STW-993	water	09/02/03	Gr. Alpha	688.00 ± 7.60	622.00	0.58 - 1.29
STW-993	water	09/02/03	Gr. Beta	1985.00 ± 111.00	1948.00	0.61 - 1.43
STSO-994	soil	09/02/03	Am-241	19.70 ± 1.50	18.40	0.65 - 2.28
STSO-994	soil	09/02/03	Cs-137	1928.00 ± 19.00	1973.00	0.80 - 1.25
STSO-994	soil	09/02/03	K-40	533.00 ± 79.00	488.00	0.80 - 1.32
STSO-994	soil	09/02/03	Pu-238	15.30 ± 0.80	14.60	0.59 - 2.88
STSO-994	soil	09/02/03	Pu-239/40	32.50 ± 2.30	30.40	0.71 - 1.30
STSO-994	soil	09/02/03	Sr-90	69.80 ± 2.30	80.30	0.67 - 2.90
STSO-994	soil	09/02/03	Uranium	228.30 ± 17.10	259.30	0.71 - 1.32
STAP-995	Air Filter	09/02/03	Am-241	0.64 ± 0.05	0.44	0.70 - 2.34
STAP-995	Air Filter	09/02/03	Co-60	48.50 ± 0.40	55.10	0.80 - 1.26
STAP-995	Air Filter	09/02/03	Cs-137	51.20 ± 1.10	54.80	0.80 - 1.32
STAP-995	Air Filter	09/02/03	Mn-54	53.70 ± 1.10	58.00	0.80 - 1.35
STAP-995	Air Filter	09/02/03	Pu-238	0.24 ± 0.05	0.23	0.67 - 1.33
STAP-995	Air Filter	09/02/03	Pu-239/40	0.41 ± 0.10	0.40	0.73 - 1.26
STAP-995	Air Filter	09/02/03	Sr-90	1.90 ± 0.10	2.06	0.53 - 1.84
STAP-995	Air Filter	09/02/03	Uranium	0.80 ± 0.06	0.82	0.79 - 2.10
STAP-996	Air Filter	09/02/03	Gr. Alpha	3.23 ± 0.07	3.11	0.73 - 1.43
STAP-996	Air Filter	09/02/03	Gr. Beta	4.18 ± 0.03	3.89	0.76 - 1.36

[a] Results are reported in Bq/L with the following exceptions: Air Filters (Bq/Filter), Soil and Vegetation (Bq/kg).

[b] The EML result listed is the mean of replicate determinations for each nuclide ± the standard error of the mean.

[c] Control limits are reported by EML as the ratio of Reported Value / EML value.

[d] A low bias for Cs-134 activity has been observed in the past. No errors have been found in the library or efficiency. Additional spike analyses will be performed and a correction factored into the calculation.

[e] Reporting error.

APPENDIX B

REMP ANNUAL SUMMARY

TABLE B-1

SAMPLING AND ANALYSIS FREQUENCY SUMMARY

Sample Type	Number of Sampling Locations	Collection Frequency	Number of Samples Collected	Type of Analysis	Analysis Frequency	Number of Samples Analyzed*
Air Particulate	10	Weekly	515	Gross Beta Gamma Isotopic	Weekly Quarterly Composite	515 40
Air Iodine	10	Weekly	515	Iodine^{131}	Weekly	515
Direct Radiation (TLD)	54	Quarterly (continuous)	213	Gamma Exposure	Quarterly	213
Surface Water (Grab)	1	Monthly	12	Gamma Isotopic Tritium	Monthly Quarterly Composite	12 4
Surface Water (Effluent Composite)	1	Monthly	12	Gamma Isotopic Tritium Iodine^{131}	Monthly Quarterly Composite Monthly	12 4 12

* Number of samples analyzed does not include duplicate analysis, recounts, or reanalysis.

TABLE B-1 (continued)

Sample Type	Number of Sampling Locations	Collection Frequency	Number of Samples Collected	Type of Analysis	Analysis Frequency	Number of Samples Analyzed*
Surface Water (Upstream Composite)	2	Monthly	23	Gamma Isotopic	Monthly	23
				Tritium	Quarterly Composite	8
Well Water	2**	Quarterly	12	Gamma Isotopic	Quarterly	12
				Tritium	Quarterly	12
Drinking Water	1	Monthly	12	Gross Beta	Monthly	12
				Gamma Isotopic	Monthly	12
				Tritium	Quarterly Composite	4

* Number of samples analyzed does not include duplicate analysis, recounts, or reanalysis.

** Samples collected at CL-12 are taken prior to water treatment and after water treatment.

TABLE B-1 (continued)

Sample Type	Number of Sampling Locations	Collection Frequency	Number of Samples Collected	Type of Analysis	Analysis Frequency	Number of Samples Analyzed*
Shoreline Sediment	1	Semi-Annually	2	Gamma Isotopic	Semi-Annually	2
Grass	4	Monthly / Semi-Monthly[k]	56	Gamma Isotopic (including I^{131})	Monthly / Semi-Monthly	112
Vegetables	4	Monthly (during the growing season)	36	Gross Beta	Monthly	36
				Gamma Isotopic (including I^{131})	Monthly	72
Milk	1	Monthly / Semi-Monthly**	19	Gamma Isotopic	Monthly / Semi-Monthly	19
				$Iodine^{131}$	Monthly / Semi-Monthly	19

* Number of samples analyzed does not include duplicate analysis, recounts, or reanalysis.

** Samples are collected Monthly from November through April (as delineated within the Station ODCM) and Semi-Monthly during May through October.

TABLE B-2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility: Clinton Power Station **Docket No. 50-461**

Location of Facility: **DeWitt, Illinois** (county, state) Reporting Period: **01 January – 31 December 2003**

Medium or Pathway Sampled (Unit of Measurement)	Type of Analysis Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction Mean (f) - (Range)	Control Locations: Mean (f) (Range)	Number of Non-routine Reported Measurements
Direct Radiation (mRem/qtr)	Gamma dose 213	-	20.7 (197/197) (18.0 – 22.9)	CL-49 3.5 miles W 22.9 (4/4) (20.1 – 26.4)	20.7 (16/16) (20.1 – 21.8)	0
Air Particulates (pCi/m^3)	Gross Beta 514	-	0.026 (462/462) (.017 - .033)	CL-3 0.7 miles NE .027 (51/51) (.018 - .033)	0.027 (52/52) (0.020 – 0.033)	0
	Gamma Spec 40					
	Cs^{134}	0.05	<0.0012	-	LLD	0
	Cs^{137}	0.06	<0.0009	-	LLD	0
Air Iodine (pCi/m^3)	I^{131} 514	0.07	<MDA	-	LLD	0

Note: Column explanations are at the end of Table B-2.

TABLE B-2 (*continued*)

Medium or Pathway Sampled ------------ (Unit of Measurement)	Type of Analysis ------------ Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: ------------ Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction ------------ Mean (f) - (Range)	Control Locations: Mean (f) - ------------ (Range)	Number of Non-routine Reported Measurements
	Tritium 4	3,000	<162	-	NA	0
	Gamma Spec 12					
Surface Water Grab (pCi/l)	Mn^{54}	15.0	<3.9	-	NA	0
	Fe^{59}	30.0	<5.8	-	NA	0
	Co^{58}	15.0	<4.9	-	NA	0
	Co^{60}	15.0	<3.6	-	NA	0
	Zn^{65}	30.0	<4.8	-	NA	0
	Nb^{95}	15.0	<4.3	-	NA	0
	Zr^{95}	30.0	<11.2	-	NA	0
	Cs^{134}	15.0	<3.4	-	NA	0
	Cs^{137}	18.0	<4.7	-	NA	0
	Ba^{140}	60.0	<26.0	-	NA	0
	La^{140}	15.0	<6.7	-	NA	0
	Ce^{144}	-	<36.9	-	NA	0

Note: Column explanations are at the end of Table B-2.

TABLE B-2 (continued)

Medium or Pathway Sampled (Unit of Measurement)	Type of Analysis Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction Mean (f) - (Range)	Control Locations: Mean (f) - (Range)	Number of Non-routine Reported Measurements
Surface Water Composite (pCi/l)	Tritium 12	3,000	<162	-	NA	0
	I^{131} 12	1.0	<0.5	-	NA	0
	Gamma Spec 35					
	Mn^{54}	15.0	<5.5	-	NA	
	Fe^{59}	30.0	<12.7	-	NA	0
	Co^{58}	15.0	<5.3	-	NA	0
	Co^{60}	15.0	<6.5	-	NA	0
	Zn^{65}	30.0	<10.3	-	NA	0
	Nb^{95}	15.0	<6.9	-	NA	0
	Zr^{95}	30.0	<13.5	-	NA	0
	Cs^{134}	15.0	<7.0	-	NA	0
	Cs^{137}	18.0	<6.8	-	NA	0
	Ba^{140}	60.0	<37.0	-	NA	0
	La^{140}	15.0	<10.9	-	NA	0
	Ce^{144}	-	<53.8	-	NA	0

Note: Column explanations are at the end of Table B-2.

TABLE B-2 (continued)

Medium or Pathway Sampled --- (Unit of Measurement)	Type of Analysis --- Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: --- Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction --- Mean (f) - (Range)	Control Locations: Mean (f) - --- (Range)	Number of Non-routine Reported Measurements
Drinking Water (pCi/l)	Gross Beta 12	4	1.4 (0/12) (0.9 – 2.6)	CL-14 0 Miles --- 2.6 (0/12) (0.9 – 2.6)	NA	0
	Tritium 4	3,000	<162	-	NA	0
	Gamma Spec 12					
	Mn^{54}	15.0	<6.1	-	NA	
	Fe^{59}	30.0	<10.8	-	NA	0
	Co^{58}	15.0	<6.1	-	NA	0
	Co^{60}	15.0	<6.5	-	NA	0
	Zn^{65}	30.0	<9.4	-	NA	0
	Nb^{95}	15.0	<5.7	-	NA	0
	Zr^{95}	30.0	<11.6	-	NA	0
	Cs^{134}	15.0	<5.6	-	NA	0
	Cs^{137}	18.0	<5.5	-	NA	0
	Ba^{140}	60.0	<31.0	-	NA	0
	La^{140}	15.0	<7.3	-	NA	0
	Ce^{144}	-	<56.7	-	NA	0

Note: Column explanations are at the end of Table B-2.

TABLE B-2 (continued)

Medium or Pathway Sampled (Unit of Measurement)	Type of Analysis Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction Mean (f) - (Range)	Control Locations: Mean (f) - (Range)	Number of Non-routine Reported Measurements
Well Water (pCi/l)	Tritium 12	3,000	<162	-	NA	0
	Gamma Spec 12					
	Mn^{54}	15.0	<4.2	-	NA	0
	Fe^{59}	30.0	<8.2	-	NA	0
	Co^{58}	15.0	<3.9	-	NA	0
	Co^{60}	15.0	<4.8	-	NA	0
	Zn^{65}	30.0	<6.1	-	NA	0
	Nb^{95}	15.0	<5.2	-	NA	0
	Zr^{95}	30.0	<12.9	-	NA	0
	Cs^{134}	15.0	<4.5	-	NA	0
	Cs^{137}	18.0	<6.2	-	NA	0
	Ba^{140}	60.0	<23.5	-	NA	0
	La^{140}	15.0	<7.3	-	NA	0
	Ce^{144}	-	<48.4	-	NA	0

Milk (pCi/l)	I^{131} 19	1.0	<0.6	-	NA	0
	Gamma Spec 19					
	Cs^{134}	15.0	<8.6	-	NA	0
	Cs^{137}	18.0	<7.3	-	NA	0
	Ba^{140}	60.0	<30.8	-	NA	0
	La^{140}	15.0	<12.5	-	NA	0

(U) Untreated well water sample

Note: Column explanations at the end of Table B-2.

TABLE B-2 (continued)

Medium or Pathway Sampled (Unit of Measurement)	Type of Analysis / Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: Mean (f) (Range)	Location with Highest Annual Mean: Name, Distance – Direction / Mean (f) - (Range)	Control Locations: Mean (f) - (Range)	Number of Non-routine Reported Measurements
Vegetables (pCi/g wet)	Gamma Spec 40					
	I^{131}	.060	<0.046	-	<.035	0
	Cs^{134}	.060	<0.022	-	<.025	0
	Cs^{137}	.080	<0.022	-	<.019	0
Grass (pCi/g wet)	Gamma Spec 56					
	I^{131}	.060	0.058	-	NA	0
	Cs^{134}	.060	0.034	-	NA	0
	Cs^{137}	.080	0.033	-	NA	0
Fish (pCi/g wet)	Gamma Spec 16					
	Mn^{54}	0.130	<0.017	-	NA	0
	Fe^{59}	0.260	<0.058	-	NA	0
	Co^{58}	0.130	<0.019	-	NA	0
	Co^{60}	0.130	<0.016	-	NA	0
	Zn^{65}	0.260	<0.040	-	NA	0
	Cs^{134}	0.130	<0.015	-	NA	0
	Cs^{137}	0.150	<0.018	-	NA	0
Shoreline Sediments (pCi/g dry)	Gamma Spec 2					
	Cs^{134}	0.150	<0.016	-	NA	0
	Cs^{137}	0.180	<0.012	-	NA	0

Note: Column explanations at the end of Table B-2.

TABLE B-2 (continued)

Medium or Pathway Sampled ------------------ (Unit of Measurement)	Type of Analysis ------------- Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: ------------- Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction ------------- Mean (f) - (Range)	Control Locations: Mean (f) - ----------- (Range)	Number of Non-routine Reported Measurements
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7

TABLE EXPLANATIONS:

Column 1: The Unit of Measurement describes all the numerical values for LLD, Mean and Range reported for a particular sample medium. For example: the Gross Beta LLD in AIR PARTICULATES is 0.010 pCi/m^3. Abbreviations used are: pCi/m^3 = pico-curie per cubic meter of sampled air; mRem/quarter = exposure measured for calendar quarter period; pCi/l = pico-curie per liter of sample; pCi/g = pico-curie per gram of sample.

Column 2: The Types of Analyses are described as follows: Gamma Spec = measurement of each radioisotope in a sample using Gamma Spectroscopy; Gross Betas and Gross Alphas = measurement of the radioactivity in a sample by measurement of emitted betas and alphas - no determination of individual radioisotopes is possible; Tritium = measurement of tritium (H^3) in sample by liquid scintillation counting method; TLD = direct measurement of gamma exposure using thermoluminescent dosimeters. Total number of analyses does not include duplicate analyses, recounts, or reanalysis. Only ODCM required LLDs and detectable activity (excluding some naturally occurring activity such as Bi^{212}) results are reported in this table. All sample results can be found in Appendix E of this report.

Column 3: The ODCM required LLD is given when applicable. LLD reported is the highest of those reported for each of the analyses during the year; if all analyses reported positive values, no LLD is reported. It should be noted that - in most cases - the CPS REMP uses lower detection limits than required.

TABLE B-2 (continued)

Medium or Pathway Sampled ------------------ (Unit of Measurement)	Type of Analysis ------------- Total Number Performed	Lower Limit of Detection (LLD)	All Indicator Locations: ------------- Mean (f) (Range)	Location with Highest Annual Mean Name Distance – Direction --------------- Mean (f) - (Range)	Control Locations: Mean (f) - ------------- (Range)	Number of Non-routine Reported Measurements
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7

TABLE EXPLANATIONS (continued):

Column 4: Samples taken at Indicator Locations during an operational Radiological Environmental Monitoring Program (REMP) reliably measure the quantities of any radioisotopes cycling through the pathways to man from a nuclear station. The reported values are the mean or average for the year of all samples of that type which had values greater than the LLD. (f) is the fraction of all the samples taken at all indicator locations for the medium, which reported values greater than the LLD. Example: Seven (7) results greater than LLD out of fifteen (15) samples taken would be reported as 7/15. The Range is the values of the lowest to highest sample results greater than LLD reported at all the indictor locations for that medium.

Column 5: The Mean, f-fraction and Range along with the name of the location, distance from the CPS gaseous effluent stack in miles, and the letter name corresponding to the compass sector in the direction of the sample location from the CPS HVAC gaseous effluent stack. The location with the highest annual mean is compared to both Indicator and Control Locations of the medium samples.

Column 6: Control locations are sited in areas with low relative deposition and / or dispersion factors. Sample results are used as reference for the control location.

Column 7: NRC Regulations [Branch Technical Position, Revision. 1, November 1979] include a table of radioisotope concentrations that, if exceeded by confirmed sample measurements, indicate that a Non-routine Reported Measurement exists. Such measurements require further investigation to validate the source.

APPENDIX C

Glossary

Activation - the process in which stable atoms become radioactive atoms by absorbing neutrons.

ALARA - acronym for "As Low As Reasonably Achievable" which applies to many facets of nuclear power (i.e., radiation exposure for personnel kept low, minimizes number / activity of effluent releases).

Alpha particle - a charged particle emitted from the nucleus of an atom having a mass and charge equal in magnitude to a helium nucleus which has two protons and two neutrons.

Atom - the smallest component of an element having all the properties of that element. Comprised of protons, neutrons and electrons such that the number of protons determines the element.

Background radiation - source of radiation that mankind has no control over, such as cosmic (from the sun) and terrestrial (naturally occurring radioactive elements).

Beta particle - a charged particle equivalent to an electron if negative or a positron if positive, originating near the nucleus of an atom during radioactive decay or fission.

Control Location - a sample collection location considered to be far enough away from the Clinton Power Station so as not to be influenced by station operations.

Cosmic radiation - penetrating ionizing radiation originating from the sun and from outer space varying from altitude and latitude.

Curie (Ci) - the unit of radioactivity equal to 2.2 trillion disintegrations per minute.

Dead water - water that contains no tritium.

Dose - a quantity (total or accumulated) of ionizing radiation received.

Dose equivalent - a quantity used in radiation protection that expresses all radiations on a common scale for calculating the effective absorbed dose (the unit of dose equivalent is the rem).

Ecology - a branch of biology dealing with the relations between organisms and their environment.

Electromagnetic radiation - a traveling wave motion resulting from changing electric or magnetic fields. Familiar sources of electromagnetic radiation range from x-rays (and gamma rays) of short wavelength, through the ultraviolet, visible and infrared regions, to radar and radio waves of relatively long wavelength. All electromagnetic radiation travels in a vacuum at the speed of light.

Element - one of 103 known chemical substances that cannot be broken down further without changing its chemical properties.

Environment - the aggregate of surrounding things, conditions, or influences.

Exposure - a measure of the ionization produced in air by x-ray or gamma radiation. Acute exposure is generally accepted to be a large exposure received over a short period of time. Chronic exposure is exposure received over a long period of time.

Fission - process by which an atomic nucleus splits into two smaller nuclei and releases neutrons and energy.

Fission products - the nuclei formed as part of the fissioning of an atomic nucleus.

Gamma rays - high energy, short wavelength electromagnetic radiation emitted from the nucleus.

Half-life - the time required for half of a given amount of a radionuclide to decay.

Indicator Location - a sample collection strategically placed to monitor dose rate or radioactive material that may be the result of Clinton Power Station operations.

Ionization - the process by which a neutral atom or molecule acquires a positive or negative charge.

Irradiation - exposure to radiation.

Lower Limit of Detection (LLD) - the smallest amount of sample activity that will give a net count for which there is a confidence at a predetermined level that the activity is actually present.

Microcurie (μCi) - one millionth of a curie and represents 2.2 million decays per minute.

Neutron - one of the three basic parts of an atom, which has no charge and is normally, found in the nucleus (center) of an atom.

Nucleus - the center of an atom containing protons and neutrons; determines the atomic weight and contributes to the net positive charge of an atom. Nuclei (plural).

Nuclides - atoms which all have the same atomic number and mass number.

Periphyton - water plant life (i.e., algae).

Radiation - the process by which energy is emitted from a nucleus as particles (alpha, beta, and neutron) or waves (gamma).

Radionuclide - a radioactive species of an atom characterized by the constitution of its nucleus. The number of protons, number of neutrons, and energy content specify the nuclear constitution.

Rem - the unit of dose of any ionizing radiation that produces the same biological effects as a unit of absorbed dose of ordinary x-rays. Acronym for Roentgen Equivalent Man.

Roentgen - a measure of ionization produced in air by x-ray or gamma radiation.

Site boundary - the site boundary is the line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.

Statistics - the science that deals with the collection, classification, analysis and interpretation of numerical data by use of mathematical theories of probabilities.

Target tissue - any tissue or organ of the body in which radiation is absorbed.

Terrestrial radiation - source of radiation pertaining to the ground (Earth's crust).

X-rays - high energy, short wavelength electromagnetic radiation, emitted from the electron shells of an atom.

APPENDIX D

Exceptions to the REMP During 2003

Data from the radiological analysis of environmental samples are routinely reviewed and evaluated by the ODCM Program Owner at the Clinton Power Station (CPS). This data is checked for LLD compliance, anomalous values, quality control sample agreement, and any positive results which are inconsistent with expected results - or - which exceed any Offsite Dose Calculation Manual (ODCM) reporting levels. Reporting levels for radioactivity concentrations from environmental samples are required by the Station's ODCM and are listed in Table 3-A of this report.

If an inconsistent result occurs, an investigation is initiated which may consist of one, some, or all of the following actions:

- Examine the collection data sheets for any indication of collection or delivery errors, tampering, vandalism, equipment calibration or any malfunction[s] as a result of electrical power failure[s], weather conditions, blown fuses, etc.
- Perform statistical tests
- Examine previous data for trends
- Review other results from same sample media and different sample media
- Review control station data
- Review quality control or duplicate sample data
- Review CPS Radiological Effluent Release Reports
- If possible, recount and / or reanalyze the sample
- Collect additional follow-up samples as warranted

During 2003, no investigations were performed as a result of reaching any ODCM reporting levels. All sample analysis required by the ODCM achieved the LLDs specified by the Station's ODCM (refer to Table 3-B of this report). Sampling and analysis exceptions are listed in this appendix.

SAMPLING AND ANALYSIS EXCEPTIONS FOR 2003

The exceptions described below are those that are considered 'deviations' from the Radiological Environmental Monitoring Program as required by the Station's ODCM. By definition, 'deviations' are permitted as delineated within NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and within Radiological Assessment Brach Technical Position, Revision 1, November 1979 which states.... "Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons".... The below section addresses the reporting requirements found within Section 7.1 of the Station's ODCM.

08 January 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-03 was found not to be running. Subsequent maintenance revealed that the motor had become seized. This prevented the minimum collection criteria of 200 m^3 as only 188 m^3 was achieved. The air sampler was replaced at the time of discovery with a spare unit.

19 February 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-08 was found to be running, but there were no flow indications. Subsequent maintenance revealed that the motor shaft was rotating without any rotational vane movement creating zero flow. The air sampler was replaced at the time of discovery with a spare unit.

26 February 2003

- During the performance of the February Monthly Water Composite Collection Surveillance, CL-99 was found inoperable. Upon closer evaluation, the North Fork Creek had frozen due to extremely frigid weather conditions. When coupled with a lower than normal creek level, the CL-99 Compositor was unable to obtain the February Monthly Composite Sample. As a result of early spring thawing conditions, the March Monthly Water Composite Collection Sample resumed.

19 March 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-08 was found not to be running. Subsequent maintenance revealed that the motor had become seized. This prevented the minimum collection criteria of 200 m^3 being collected. The air sampler was replaced at the time of discovery with a spare unit.

SAMPLING AND ANALYSIS EXCEPTIONS FOR 2003 (continued)

26 March 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-01 – a non-ODCM required air sample - was found to be running, but there were no flow indications. Subsequent maintenance revealed that the motor shaft was rotating without any rotational vane movement creating zero flow. The air sampler was replaced at the time of discovery with a spare unit.

14 May 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-94 – a non-ODCM required air sampler - was found not to be running. Subsequent maintenance revealed that the motor had become seized. This prevented the minimum collection criteria of 200 m^3 from being collected. The air sampler was replaced at the time of discovery with a spare unit.

18 June 2003

- During the performance of the Weekly Air Sample Collection Surveillance, the air sampler at CL-6 – a non-ODCM required air sampler - was found not to be running. Subsequent maintenance revealed that the motor had become seized. This prevented the minimum collection criteria of 200 m^3 from being collected. The air sampler was replaced at the time of discovery with a spare unit.

27 June 2003

- During the performance of the Second Quarter Environmental TLD Changeout, REMP TLDs CL-74 and CL-37 were found to be missing from their respective TLD Sample Holders. A subsequent investigation concluded that unauthorized personnel who frequent public access areas most likely removed these REMP TLDs from their Sample Holders.

27 August 2003

- During the performance of the August Monthly Vegetation Collection Surveillance, CL-114 was able to produce two (2) of the three (3) broadleaf vegetables, CL-115 was able to produce one (1) of the three (3) broadleaf vegetables and CL-118 was able to produce one (1) of the three (3) broadleaf vegetables. A subsequent investigation revealed that due to wildlife consumption, rotting and weed growth, the collection of the remaining broadleaf vegetables did not meet the minimum weight criteria.

SAMPLING AND ANALYSIS EXCEPTIONS FOR 2003 (continued)

22 September 2003

- During the performance of the September Monthly Vegetation Collection Surveillance, CL-114 was able to produce two (2) of the three (3) broadleaf vegetables, CL-115 was able to produce one (1) of the three (3) broadleaf vegetables and CL-118 was able to produce two (2) of the three (3) broadleaf vegetables. A subsequent investigation revealed that due to wildlife consumption, rotting and weed growth, the collection of the remaining broadleaf vegetables did not meet the minimum weight criteria.

31 December 2003

- During the performance of the December Monthly Water Composite Collection Surveillance, CL-90 was found approximately one (1) gallon low of meeting the minimum two (2) gallon collection criteria. A grab sample was obtained to augment this minimum criterion for analysis. Upon a closer evaluation, the sampling hose had 'slipped' causing previously collected lake water to be siphoned back into the lake. After a field adjustment of the sampling hose and re-calibration of the Water Compositor, the sample collection resumed for the January Monthly Water Composite Collection.

27 January 2004

- Note that although this exception was not known until January 2004, this impacted the 2003 4th Quarter results and therefore appears as an exception in 2003. During the performance of the Fourth Quarter Environmental TLD Changeout, REMP TLD CL-3 – although installed with data collected throughout the 4th Quarter and routed to the Vendor for analysis – the Vendor reported back that TLD CL-3 was damaged and was otherwise unable to yield any results. A subsequent investigation concluded that this TLD was either damaged prior to receipt at Clinton Power Station or during the return flight back to the Vendor.

APPENDIX E

CPS Radiological Environmental Monitoring Results

During 2003

GROSS BETA ACTIVITY IN AIR PARTICULATES FOR 2003
(pCi/m^3)

DATE COLLECTED	CL-1	CL-2	CL-3	CL-4	CL-6
08-Jan-2003	0.027 ± 0.005	0.029 ± 0.005	0.028 ± 0.005	0.025 ± 0.004	0.026 ± 0.004
15-Jan-2003	0.027 ± 0.003	0.032 ± 0.004	0.029 ± 0.004	0.030 ± 0.004	0.028 ± 0.003
22-Jan-2003	0.030 ± 0.004	0.030 ± 0.004	0.035 ± 0.004	0.031 ± 0.004	0.031 ± 0.004
29-Jan-2003	0.031 ± 0.004	0.034 ± 0.004	0.036 ± 0.004	0.033 ± 0.004	0.033 ± 0.004
05-Feb-2003	0.032 ± 0.004	0.033 ± 0.004	0.034 ± 0.004	0.031 ± 0.004	0.034 ± 0.004
12-Feb-2003	0.023 ± 0.004	0.025 ± 0.004	0.033 ± 0.004	0.025 ± 0.004	0.029 ± 0.004
19-Feb-2003	0.016 ± 0.004	0.019 ± 0.004	0.019 ± 0.004	0.016 ± 0.004	0.017 ± 0.004
26-Feb-2003	0.024 ± 0.004	0.023 ± 0.004	0.026 ± 0.004	0.025 ± 0.004	0.025 ± 0.004
05-Mar-2003	0.035 ± 0.004	0.031 ± 0.004	0.038 ± 0.004	0.034 ± 0.004	0.042 ± 0.005
12-Mar-2003	0.033 ± 0.004	0.033 ± 0.004	0.036 ± 0.004	0.032 ± 0.004	0.033 ± 0.004
19-Mar-2003	0.025 ± 0.004	0.025 ± 0.004	0.024 ± 0.004	0.025 ± 0.004	0.022 ± 0.004
26-Mar-2003	▲	0.020 ± 0.003	0.018 ± 0.003	0.020 ± 0.003	0.019 ± 0.003
02-Apr-2003	0.018 ± 0.003	0.015 ± 0.003	0.017 ± 0.003	0.020 ± 0.003	0.020 ± 0.003
09-Apr-2003	0.012 ± 0.003	0.014 ± 0.003	0.015 ± 0.003	0.014 ± 0.003	0.013 ± 0.003
16-Apr-2003	0.023 ± 0.004	0.023 ± 0.004	0.022 ± 0.004	0.021 ± 0.004	0.022 ± 0.004
23-Apr-2003	0.017 ± 0.003	0.018 ± 0.004	0.021 ± 0.004	0.018 ± 0.004	0.017 ± 0.004
30-Apr-2003	0.020 ± 0.003	0.026 ± 0.004	0.023 ± 0.004	0.017 ± 0.003	0.022 ± 0.003
07-May-2003	0.024 ± 0.004	0.022 ± 0.004	0.025 ± 0.004	0.021 ± 0.004	0.027 ± 0.004
14-May-2003	0.017 ± 0.003	0.015 ± 0.003	0.018 ± 0.003	0.017 ± 0.003	0.019 ± 0.003
21-May-2003	0.015 ± 0.003	0.018 ± 0.004	0.018 ± 0.003	0.017 ± 0.003	0.018 ± 0.003
28-May-2003	0.013 ± 0.003	0.015 ± 0.003	0.012 ± 0.003	0.014 ± 0.003	0.012 ± 0.003
04-Jun-2003	0.031 ± 0.004	0.029 ± 0.004	0.031 ± 0.004	0.025 ± 0.004	0.022 ± 0.004
11-Jun-2003	0.018 ± 0.003	0.021 ± 0.003	0.022 ± 0.003	0.018 ± 0.003	0.021 ± 0.003
18-Jun-2003	0.025 ± 0.004	0.021 ± 0.004	0.025 ± 0.004	0.019 ± 0.003	▲
25-Jun-2003	0.019 ± 0.004	0.018 ± 0.004	0.022 ± 0.004	0.019 ± 0.004	0.019 ± 0.004
02-Jul-2003	0.025 ± 0.004	0.025 ± 0.004	0.024 ± 0.004	0.022 ± 0.004	0.023 ± 0.004
09-Jul-2003	0.028 ± 0.004	0.025 ± 0.004	0.024 ± 0.004	0.023 ± 0.004	0.022 ± 0.004
16-Jul-2003	0.024 ± 0.004	0.022 ± 0.004	0.022 ± 0.004	0.021 ± 0.004	0.017 ± 0.004
23-Jul-2003	0.018 ± 0.004	0.024 ± 0.004	0.024 ± 0.004	0.020 ± 0.004	0.019 ± 0.003
30-Jul-2003	0.021 ± 0.004	0.021 ± 0.004	0.024 ± 0.004	0.022 ± 0.004	0.023 ± 0.004
06-Aug-2003	0.025 ± 0.004	0.024 ± 0.004	0.027 ± 0.004	0.025 ± 0.003	0.025 ± 0.004
13-Aug-2003	0.022 ± 0.004	0.019 ± 0.004	0.022 ± 0.004	0.019 ± 0.004	0.020 ± 0.004
20-Aug-2003	0.031 ± 0.004	0.033 ± 0.004	0.038 ± 0.004	0.036 ± 0.004	0.033 ± 0.004
27-Aug-2003	0.039 ± 0.004	0.034 + 0.004	0.038 ± 0.004	0.039 ± 0.005	0.037 ± 0.004
03-Sep-2003	0.021 ± 0.003	0.018 ± 0.003	0.021 ± 0.003	0.016 ± 0.003	0.020 ± 0.003
10-Sep-2003	0.028 ± 0.003	0.031 + 0.004	0.037 ± 0.004	0.027 ± 0.004	0.032 ± 0.004
17-Sep-2003	0.034 ± 0.004	0.036 + 0.004	0.038 ± 0.004	0.038 ± 0.004	0.036 ± 0.004
24-Sep-2003	0.030 ± 0.004	0.032 ± 0.004	0.032 ± 0.004	0.025 ± 0.004	0.032 ± 0.004
01-Oct-2003	0.021 ± 0.004	0.020 ± 0.004	0.023 ± 0.004	0.022 ± 0.004	0.019 ± 0.004
08-Oct-2003	0.021 ± 0.004	0.025 ± 0.004	0.021 ± 0.004	0.024 ± 0.003	0.025 ± 0.004
15-Oct-2003	0.034 ± 0.004	0.033 ± 0.005	0.034 ± 0.004	0.029 ± 0.004	0.032 ± 0.004
22-Oct-2003	0.038 ± 0.004	0.036 ± 0.004	0.035 ± 0.004	0.038 ± 0.004	0.035 ± 0.004
29-Oct-2003	0.016 ± 0.003	0.017 + 0.004	0.018 ± 0.004	0.015 ± 0.004	0.017 ± 0.004
05-Nov-2003	0.034 ± 0.004	0.030 ± 0.004	0.028 ± 0.004	0.031 ± 0.004	0.031 ± 0.004
12-Nov-2003	0.040 ± 0.005	0.000 ± 0.005	0.038 ± 0.005	0.042 ± 0.005	0.039 ± 0.005
19-Nov-2003	0.023 ± 0.004	0.023 + 0.004	0.024 ± 0.004	0.022 ± 0.004	0.026 ± 0.004
25-Nov-2003	0.023 ± 0.004	0.023 + 0.004	0.022 ± 0.004	0.023 ± 0.003	0.025 ± 0.004
03-Dec-2003	0.032 ± 0.003	0.033 ± 0.003	0.033 ± 0.003	0.036 ± 0.003	0.032 ± 0.003
10-Dec-2003	0.027 ± 0.004	0.033 ± 0.004	0.031 ± 0.004	0.030 ± 0.004	0.032 ± 0.004
17-Dec-2003	0.033 ± 0.004	0.034 ± 0.004	0.028 ± 0.004	0.029 ± 0.004	0.032 ± 0.004
24-Dec-2003	0.033 ± 0.005	0.027 ± 0.005	0.025 ± 0.005	0.023 ± 0.005	0.019 ± 0.005
31-Dec-2003	0.033 ± 0.003	0.031 ± 0.003	0.030 ± 0.003	0.029 ± 0.003	0.027 ± 0.003

GROSS BETA ACTIVITY IN AIR PARTICULATES FOR 2003 (continued)

DATE COLLECTED	CL-7	CL-8	CL-11*	CL-15	CL-94
08-Jan-2003	0.032 ± 0.005	0.030 ± 0.005	0.028 ± 0.005	0.028 ± 0.005	0.029 ± 0.005
15-Jan-2003	0.030 ± 0.003	0.031 ± 0.004	0.030 ± 0.004	0.027 ± 0.003	0.027 ± 0.003
22-Jan-2003	0.034 ± 0.004	0.032 ± 0.004	0.033 ± 0.004	0.032 ± 0.004	0.032 ± 0.004
29-Jan-2003	0.030 ± 0.004	0.034 ± 0.004	0.038 ± 0.005	0.032 ± 0.004	0.033 ± 0.004
05-Feb-2003	0.033 ± 0.004	0.033 ± 0.004	0.031 ± 0.004	0.035 ± 0.004	0.031 ± 0.004
12-Feb-2003	0.024 ± 0.004	0.022 ± 0.004	0.024 ± 0.004	0.022 ± 0.004	0.024 ± 0.004
19-Feb-2003	0.016 ± 0.004	▲	0.018 ± 0.004	0.011 ± 0.003	0.016 ± 0.004
26-Feb-2003	0.025 ± 0.004	0.026 ± 0.004	0.025 ± 0.004	0.023 ± 0.004	0.029 ± 0.004
05-Mar-2003	0.034 ± 0.004	0.038 ± 0.004	0.035 ± 0.004	0.035 ± 0.004	0.035 ± 0.004
12-Mar-2003	0.031 ± 0.004	0.037 ± 0.004	0.035 ± 0.004	0.034 ± 0.004	0.038 ± 0.004
19-Mar-2003	0.027 ± 0.004	▲	0.028 ± 0.004	0.026 ± 0.004	0.032 ± 0.004
26-Mar-2003	0.019 ± 0.003	0.016 ± 0.003	0.020 ± 0.003	0.020 ± 0.003	0.020 ± 0.003
02-Apr-2003	0.019 ± 0.003	0.018 ± 0.003	0.018 ± 0.003	0.018 ± 0.003	0.019 ± 0.003
09-Apr-2003	0.014 ± 0.003	0.013 ± 0.003	0.013 ± 0.003	0.013 ± 0.003	0.011 ± 0.003
16-Apr-2003	0.026 ± 0.004	0.022 ± 0.004	0.024 ± 0.004	0.024 ± 0.004	0.021 ± 0.004
23-Apr-2003	0.020 ± 0.004	0.020 ± 0.004	0.019 ± 0.003	0.020 ± 0.004	0.019 ± 0.004
30-Apr-2003	0.023 ± 0.004	0.022 ± 0.004	0.022 ± 0.004	0.019 ± 0.003	0.023 ± 0.004
07-May-2003	0.024 ± 0.004	0.027 ± 0.004	0.028 ± 0.004	0.022 ± 0.004	0.025 ± 0.004
14-May-2003	0.018 ± 0.003	0.015 ± 0.003	0.018 ± 0.003	0.018 ± 0.003	▲
21-May-2003	0.015 ± 0.003	0.013 ± 0.003	0.016 ± 0.003	0.016 ± 0.003	0.019 ± 0.003
28-May-2003	0.016 ± 0.003	0.017 ± 0.003	0.017 ± 0.003	0.018 ± 0.003	0.016 ± 0.003
04-Jun-2003	0.024 ± 0.004	0.023 ± 0.004	0.028 ± 0.004	0.029 ± 0.004	0.024 ± 0.004
11-Jun-2003	0.021 ± 0.003	0.021 ± 0.004	0.022 ± 0.003	0.016 ± 0.003	0.018 ± 0.003
18-Jun-2003	0.020 ± 0.004	0.024 ± 0.004	0.027 ± 0.004	0.018 ± 0.003	0.022 ± 0.004
25-Jun-2003	0.017 ± 0.004	0.021 ± 0.004	0.019 ± 0.004	0.019 ± 0.004	0.022 ± 0.004
02-Jul-2003	0.022 ± 0.004	0.024 ± 0.004	0.023 ± 0.004	0.023 ± 0.004	0.026 ± 0.004
09-Jul-2003	0.026 ± 0.004	0.025 ± 0.004	0.029 ± 0.004	0.028 ± 0.004	0.033 ± 0.005
16-Jul-2003	0.017 ± 0.004	0.024 ± 0.004	0.030 ± 0.004	0.018 ± 0.004	0.017 ± 0.004
23-Jul-2003	0.020 ± 0.004	0.022 ± 0.004	0.025 ± 0.004	0.020 ± 0.004	0.024 ± 0.004
30-Jul-2003	0.022 ± 0.004	0.024 ± 0.004	0.022 ± 0.004	0.021 ± 0.004	0.025 ± 0.004
06-Aug-2003	0.023 ± 0.003	0.029 ± 0.004	0.026 ± 0.003	0.021 ± 0.003	0.026 ± 0.004
13-Aug-2003	0.019 ± 0.004	0.023 ± 0.004	0.019 ± 0.004	0.019 ± 0.004	0.018 ± 0.003
20-Aug-2003	0.032 ± 0.004	0.037 ± 0.004	0.033 ± 0.004	0.033 ± 0.004	0.035 ± 0.004
27-Aug-2003	0.035 ± 0.004	0.035 ± 0.004	0.039 ± 0.004	0.037 ± 0.004	0.042 ± 0.005
03-Sep-2003	0.019 ± 0.003	0.022 ± 0.003	0.020 ± 0.003	0.018 ± 0.003	0.019 ± 0.003
10-Sep-2003	0.032 ± 0.004	0.038 ± 0.004	0.032 ± 0.004	0.031 ± 0.004	0.031 ± 0.004
17-Sep-2003	0.032 ± 0.004	0.040 ± 0.004	0.039 ± 0.004	0.034 ± 0.004	0.040 ± 0.004
24-Sep-2003	0.030 ± 0.004	0.032 ± 0.004	0.032 ± 0.004	0.031 ± 0.004	0.029 ± 0.004
01-Oct-2003	0.021 ± 0.004	0.022 ± 0.004	0.021 ± 0.004	0.018 ± 0.004	0.021 ± 0.004
08-Oct-2003	0.023 ± 0.004	0.024 ± 0.004	0.028 ± 0.004	0.022 ± 0.003	0.025 ± 0.004
15-Oct-2003	0.029 ± 0.004	0.030 ± 0.004	0.032 ± 0.004	0.030 ± 0.004	0.031 ± 0.004
22-Oct-2003	0.038 ± 0.004	0.039 ± 0.004	0.037 ± 0.004	0.036 ± 0.004	0.034 ± 0.004
29-Oct-2003	0.019 ± 0.004	0.017 ± 0.004	0.019 ± 0.004	0.017 ± 0.004	0.017 ± 0.003
05-Nov-2003	0.033 ± 0.004	0.026 ± 0.004	0.035 ± 0.004	0.031 ± 0.004	0.027 ± 0.004
12-Nov-2003	0.041 ± 0.004	0.040 ± 0.005	0.043 ± 0.005	0.041 ± 0.005	0.045 ± 0.005
19-Nov-2003	0.020 ± 0.004	0.027 ± 0.004	0.026 ± 0.004	0.024 ± 0.004	0.026 ± 0.004
25-Nov-2003	0.024 ± 0.004	0.021 ± 0.004	0.025 ± 0.004	0.023 ± 0.004	0.021 ± 0.004
03-Dec-2003	0.034 ± 0.003	0.033 ± 0.003	0.034 ± 0.003	0.030 ± 0.003	0.033 ± 0.003
10-Dec-2003	0.027 ± 0.004	0.031 ± 0.004	0.030 ± 0.004	0.029 ± 0.004	0.028 ± 0.004
17-Dec-2003	0.035 ± 0.004	0.035 ± 0.004	0.030 ± 0.004	0.032 ± 0.004	0.029 ± 0.004
24-Dec-2003	0.029 ± 0.005	0.027 ± 0.005	0.024 ± 0.005	0.024 ± 0.005	0.029 ± 0.005
31-Dec-2003	0.026 ± 0.003	0.029 ± 0.003	0.029 ± 0.003	0.035 ± 0.004	0.026 ± 0.003

* Control Location, all other locations are Indicator Locations.
▲ No data due to a mechanical failure of the air sample pump.

GAMMA ISOTOPIC ACTIVITY IN AIR PARTICULATES FOR 2003*

(pCi/m^3)

SITE	ISOTOPE	1ST QTR	2ND QTR	3RD QTR	4TH QTR
CL-1	Be^7	0.059 ± 0.015	0.072 ± 0.016	0.074 ± 0.013	0.045 ± 0.012
	K^{40}	< 0.0230	< 0.0210	< 0.0240	< 0.0240
	Co^{60}	< 0.0011	< 0.0011	< 0.0007	< 0.0006
	Nb^{95}	< 0.0012	< 0.0012	< 0.0014	< 0.0006
	Zr^{95}	< 0.0014	< 0.0014	< 0.0015	< 0.0013
	Ru^{103}	< 0.0005	< 0.0010	< 0.0009	< 0.0006
	Ru^{106}	< 0.0106	< 0.0095	< 0.0044	< 0.0035
	Cs^{134}	< 0.0008	< 0.0007	< 0.0005	< 0.0008
	Cs^{137}	< 0.0004	< 0.0005	< 0.0008	< 0.0008
	Ce^{141}	< 0.0018	< 0.0019	< 0.0011	< 0.0018
	Ce^{144}	< 0.0042	< 0.0041	< 0.0037	< 0.0054
CL-2	Be^7	0.070 ± 0.012	0.068 ± 0.015	0.072 ± 0.021	0.050 ± 0.020
	K^{40}	< 0.0210	< 0.0220	< 0.0250	< 0.0240
	Co^{60}	< 0.0010	< 0.0010	< 0.0008	< 0.0006
	Nb^{95}	< 0.0012	< 0.0013	< 0.0011	< 0.0005
	Zr^{95}	< 0.0015	< 0.0015	< 0.0019	< 0.0012
	Ru^{103}	< 0.0004	< 0.0008	< 0.0006	< 0.0009
	Ru^{106}	< 0.0099	< 0.0088	< 0.0081	< 0.0064
	Cs^{134}	< 0.0007	< 0.0005	< 0.0006	< 0.0009
	Cs^{137}	< 0.0004	< 0.0006	< 0.0007	< 0.0005
	Ce^{141}	< 0.0019	< 0.0022	< 0.0012	< 0.0017
	Ce^{144}	< 0.0042	< 0.0051	< 0.0048	< 0.0048
CL-3	Be^7	0.064 ± 0.013	0.078 ± 0.016	0.065 ± 0.014	0.065 ± 0.013
	K^{40}	< 0.0250	< 0.0210	< 0.0250	< 0.0240
	Co^{60}	< 0.0011	< 0.0010	< 0.0007	< 0.0006
	Nb^{95}	< 0.0014	< 0.0013	< 0.0017	< 0.0006
	Zr^{95}	< 0.0012	< 0.0019	< 0.0013	< 0.0013
	Ru^{103}	< 0.0008	< 0.0003	< 0.0011	< 0.0007
	Ru^{106}	< 0.0071	< 0.0065	< 0.0053	< 0.0066
	Cs^{134}	< 0.0007	< 0.0007	< 0.0005	< 0.0010
	Cs^{137}	< 0.0004	< 0.0005	< 0.0008	< 0.0004
	Ce^{141}	< 0.0018	< 0.0015	< 0.0021	< 0.0009
	Ce^{144}	< 0.0042	< 0.0053	< 0.0045	< 0.0035

* All I^{131} results were < 0.07 pCi/m^3

GAMMA ISOTOPIC ACTIVITY IN AIR PARTICULATES FOR 2003* (continued)

SITE	ISOTOPE	1^{ST} QTR	2^{ND} QTR	3^{RD} QTR	4^{TH} QTR
CL-4	Be^{7}	0.068 ± 0.014	0.075 ± 0.022	0.069 ± 0.018	0.038 ± 0.013
	K^{40}	< 0.0210	< 0.0260	< 0.0240	< 0.0230
	Co^{60}	< 0.0010	< 0.0012	< 0.0007	< 0.0007
	Nb^{95}	< 0.0011	< 0.0012	< 0.0012	< 0.0009
	Zr^{95}	< 0.0013	< 0.0025	< 0.0009	< 0.0013
	Ru^{103}	< 0.0006	< 0.0010	< 0.0011	< 0.0010
	Ru^{106}	< 0.0073	< 0.0067	< 0.0046	< 0.0037
	Cs^{134}	< 0.0006	< 0.0005	< 0.0006	< 0.0008
	Cs^{137}	< 0.0009	< 0.0004	< 0.0006	< 0.0008
	Ce^{141}	< 0.0019	< 0.0015	< 0.0017	< 0.0015
	Ce^{144}	< 0.0058	< 0.0042	< 0.0051	< 0.0031
CL-6	Be^{7}	0.075 ± 0.016	0.083 ± 0.017	0.070 ± 0.020	0.054 ± 0.016
	K^{40}	< 0.0210	< 0.0230	< 0.0250	< 0.0240
	Co^{60}	< 0.0012	< 0.0012	< 0.0007	< 0.0007
	Nb^{95}	< 0.0011	< 0.0012	< 0.0012	< 0.0007
	Zr^{95}	< 0.0016	< 0.0014	< 0.0007	< 0.0009
	Ru^{103}	< 0.0004	< 0.0007	< 0.0008	< 0.0006
	Ru^{106}	< 0.0070	< 0.0079	< 0.0069	< 0.0057
	Cs^{134}	< 0.0008	< 0.0005	< 0.0008	< 0.0008
	Cs^{137}	< 0.0006	< 0.0004	< 0.0007	< 0.0008
	Ce^{141}	< 0.0019	< 0.0011	< 0.0011	< 0.0021
	Ce^{144}	< 0.0045	< 0.0048	< 0.0047	< 0.0027
CL-7	Be^{7}	0.055 ± 0.014	0.074 ± 0.015	0.052 ± 0.014	0.041 ± 0.013
	K^{40}	< 0.0210	< 0.0210	< 0.0260	< 0.0310
	Co^{60}	< 0.0010	< 0.0011	< 0.0007	< 0.0007
	Nb^{95}	< 0.0010	< 0.0012	< 0.0012	< 0.0004
	Zr^{95}	< 0.0013	< 0.0015	< 0.0013	< 0.0013
	Ru^{103}	< 0.0007	< 0.0008	< 0.0009	< 0.0012
	Ru^{106}	< 0.0077	< 0.0068	< 0.0052	< 0.0057
	Cs^{134}	< 0.0011	< 0.0006	< 0.0011	< 0.0009
	Cs^{137}	< 0.0005	< 0.0008	< 0.0006	< 0.0007
	Ce^{141}	< 0.0016	< 0.0011	< 0.0010	< 0.0017
	Ce^{144}	< 0.0055	< 0.0049	< 0.0045	< 0.0054
CL-8	Be^{7}	0.076 ± 0.013	0.074 ± 0.014	0.083 ± 0.017	0.047 ± 0.014
	K^{40}	< 0.0240	< 0.0220	< 0.0240	< 0.0240
	Co^{60}	< 0.0012	< 0.0012	< 0.0008	< 0.0006
	Nb^{95}	< 0.0013	< 0.0011	< 0.0011	< 0.0006
	Zr^{95}	< 0.0015	< 0.0012	< 0.0007	< 0.0013
	Ru^{103}	< 0.0006	< 0.0013	< 0.0010	< 0.0006
	Ru^{106}	< 0.0086	< 0.0081	< 0.0054	< 0.0035
	Cs^{134}	< 0.0007	< 0.0005	< 0.0005	< 0.0008
	Cs^{137}	< 0.0006	< 0.0004	< 0.0005	< 0.0006
	Ce^{141}	< 0.0015	< 0.0015	< 0.0009	< 0.0016
	Ce^{144}	< 0.0049	< 0.0038	< 0.0048	< 0.0051

* All I^{131} results were < 0.07 pCi/m^3

GAMMA ISOTOPIC ACTIVITY IN AIR PARTICULATES FOR 2003[■] (continued)

SITE	ISOTOPE	1ST QTR	2ND QTR	3RD QTR	4TH QTR
CL-11*	Be^{7}	0.075 ± 0.015	0.088 ± 0.017	0.070 ± 0.021	0.050 ± 0.013
	K^{40}	< 0.0210	< 0.0220	< 0.0240	< 0.0250
	Co^{60}	< 0.0010	< 0.0010	< 0.0007	< 0.0006
	Nb^{95}	< 0.0011	< 0.0012	< 0.0011	< 0.0010
	Zr^{95}	< 0.0017	< 0.0016	< 0.0015	< 0.0017
	Ru^{103}	< 0.0007	< 0.0011	< 0.0007	< 0.0008
	Ru^{106}	< 0.0070	< 0.0076	< 0.0059	< 0.0051
	Cs^{134}	< 0.0005	< 0.0005	< 0.0006	< 0.0012
	Cs^{137}	< 0.0004	< 0.0004	< 0.0007	< 0.0005
	Ce^{141}	< 0.0020	< 0.0021	< 0.0017	< 0.0017
	Ce^{144}	< 0.0027	< 0.0050	< 0.0046	< 0.0047
CL-15	Be^{7}	0.078 ± 0.015	0.067 ± 0.015	0.059 ± 0.015	0.070 ± 0.019
	K^{40}	< 0.0230	< 0.0210	< 0.0250	< 0.0230
	Co^{60}	< 0.0012	< 0.0012	< 0.0008	< 0.0008
	Nb^{95}	< 0.0011	< 0.0014	< 0.0012	< 0.0006
	Zr^{95}	< 0.0022	< 0.0013	< 0.0011	< 0.0010
	Ru^{103}	< 0.0008	< 0.0005	< 0.0006	< 0.0010
	Ru^{106}	< 0.0065	< 0.0073	< 0.0065	< 0.0063
	Cs^{134}	< 0.0006	< 0.0005	< 0.0006	< 0.0009
	Cs^{137}	< 0.0004	< 0.0004	< 0.0006	< 0.0006
	Ce^{141}	< 0.0021	< 0.0020	< 0.0016	< 0.0018
	Ce^{144}	< 0.0034	< 0.0024	< 0.0053	< 0.0059
CL-94	Be^{7}	0.065 ± 0.014	0.089 ± 0.022	0.047 ± 011	0.053 ± 0.015
	K^{40}	< 0.0210	< 0.0230	< 0.0240	< 0.0240
	Co^{60}	< 0.0010	< 0.0012	< 0.0008	< 0.0006
	Nb^{95}	< 0.0014	< 0.0013	< 0.0012	< 0.0004
	Zr^{95}	< 0.0013	< 0.0014	< 0.0013	< 0.0021
	Ru^{103}	< 0.0005	< 0.0013	< 0.0010	< 0.0005
	Ru^{106}	< 0.0072	< 0.0076	< 0.0062	< 0.0053
	Cs^{134}	< 0.0009	< 0.0005	< 0.0007	< 0.0008
	Cs^{137}	< 0.0007	< 0.0004	< 0.0005	< 0.0006
	Ce^{141}	< 0.0017	< 0.0021	< 0.0013	< 0.0019
	Ce^{144}	< 0.0047	< 0.0032	< 0.0059	< 0.0030

* Control Location, all other locations are Indicator Locations.

■ All I^{131} results were < 0.07 pCi/m^3

2003 QUARTERLY TLD RESULTS
(mRem / quarter net exposure)

Location	1ST QTR	2ND QTR	3RD QTR	4TH QTR
CL-1	22.1 ± 0.5	17.7 ± 0.9	20.4 ± 2.2	18.0 ± 2.1
CL-2	20.3 ± 0.7	20.3 ± 1.0	20.4 ± 0.5	17.2 ± 1.1
CL-3	19.8 ± 0.7	19.3 ± 0.6	21.8 ± 4.9	▲
CL-4	21.1 ± 1.3	18.6 ± 1.0	20.0 ± 1.1	19.3 ± 1.0
CL-5	23.6 ± 0.5	20.6 ± 1.4	21.0 ± 0.9	20.3 ± 1.4
CL-6	20.6 ± 0.4	18.4 ± 0.6	18.4 ± 1.8	17.4 ± 0.3
CL-7	20.2 ± 0.8	17.5 ± 1.2	18.8 ± 0.7	18.9 ± 0.9
CL-8	20.5 ± 1.3	21.8 ± 1.1	19.9 ± 0.4	19.3 ± 2.0
CL-11*	19.8 ± 1.6	18.9 ± 0.8	20.4 ± 0.4	22.5 ± 0.1
CL-15	19.4 ± 0.3	17.6 ± 0.9	17.0 ± 0.5	17.9 ± 0.9
CL-22	21.1 ± 0.2	20.7 ± 0.2	21.2 ± 0.5	20.6 ± 4.1
CL-23	20.4 ± 1.5	22.8 ± 2.3	20.0 ± 1.8	19.7 ± 2.4
CL-24	22.5 ± 1.6	21.0 ± 2.7	21.5 ± 0.7	20.2 ± 0.5
CL-33**	22.8 ± 1.7	22.8 ± 0.7	21.2 ± 1.6	20.2 ± 0.7
CL-34	22.2 ± 1.1	21.0 ± 2.1	21.4 ± 1.1	20.3 ± 1.3
CL-35	21.7 ± 0.9	18.3 ± 0.5	19.2 ± 1.1	18.4 ± 1.8
CL-36	21.6 ± 1.5	20.4 ± 0.8	20.6 ± 1.2	19.9 ± 1.5
CL-37	23.1 ± 2.2	▲▲	19.6 ± 0.3	19.2 ± 1.6
CL-41	22.4 ± 1.7	21.5 ± 2.8	20.9 ± 0.7	22.9 ± 3.8
CL-42	21.3 ± 1.6	19.7 ± 1.0	21.4 ± 1.4	19.2 ± 1.5
CL-43	24.0 ± 0.7	21.9 ± 1.2	21.8 ± 1.7	20.9 ± 2.8
CL-44	22.1 ± 1.1	20.7 ± 0.8	22.0 ± 1.5	19.4 ± 1.7
CL-45	22.7 ± 0.8	22.0 ± 0.8	21.6 ± 0.4	22.5 ± 2.8
CL-46	19.4 ± 1.2	19.4 ± 0.4	19.7 ± 1.6	20.4 ± 1.9
CL-47	22.1 ± 2.0	20.8 ± 1.0	21.0 ± 1.7	21.6 ± 0.9
CL-48	19.3 ± 1.1	23.6 ± 1.8	22.0 ± 2.2	19.6 ± 1.0
CL-49	22.4 ± 1.0	26.4 ± 3.0	22.5 ± 1.3	20.1 ± 2.9
CL-51	21.9 ± 1.2	21.8 ± 1.7	23.4 ▲▲▲	19.4 ± 0.5
CL-52	23.0 ± 1.1	24.1 ± 2.5	22.6 ± 2.4	21.3 ± 1.2
CL-53	20.2 ± 0.3	19.9 ± 1.3	20.8 ± 1.8	19.8 ± 2.1
CL-54	21.3 ± 1.7	22.1 ± 1.3	22.1 ± 1.2	19.5 ± 1.6
CL-55	21.8 ± 0.5	24.3 ± 0.2	20.5 ± 0.7	19.3 ± 0.6
CL-56	22.1 ± 2.1	21.6 ± 2.3	21.8 ± 2.5	25.0 ± 4.5
CL-57	21.8 ± 1.5	23.7 ± 2.0	20.4 ± 0.4	22.9 ± 2.7
CL-58	21.1 ± 0.9	21.8 ± 0.4	21.0 ± 0.9	22.2 ± 1.5
CL-60	21.6 ± 2.7	20.2 ± 1.5	21.8 ± 1.6	19.0 ± 1.1
CL-61	22.3 ± 0.6	21.2 ± 2.1	20.1 ± 2.0	22.9 ± 2.8
CL-63	21.0 ± 0.6	21.6 ± 0.8	21.7 ± 0.2	20.6 ± 3.3
CL-64	22.1 ± 0.7	20.3 ± 1.4	20.6 ± 0.8	19.9 ± 1.0
CL-65	21.7 ± 0.7	21.4 ± 1.0	21.7 ± 0.9	21.4 ± 1.2
CL-74	20.1 ± 0.8	▲▲	18.9 ± 1.7	17.8 ± 2.0
CL-75	21.8 ± 1.1	20.8 ± 0.8	19.9 ± 0.9	20.1 ± 1.1
CL-76	21.9 ± 1.9	20.6 ± 0.9	22.5 ± 0.7	19.0 ± 0.4
CL-77	21.2 ± 1.9	19.4 ± 0.9	19.7 ± 2.7	18.9 ± 2.7
CL-78	20.4 ± 0.4	22.1 ± 0.3	20.6 ± 1.1	20.6 ± 1.9

* ODCM Control Location
** Supplemental Control Locations
▲ No data to report from this location as the TLD was damaged.
▲▲ Although a TLD was placed into the environment, upon retrieval at the end of the Quarter, the TLD was missing due to unauthorized personnel who frequent public access areas removing these REMP TLDs from their Sample Holders.
▲▲▲ There was no standard deviation reported by the vendor as only one (1) element of the TLD was read. The other elements were damaged.

2003 QUARTERLY TLD RESULTS (continued)

(mRem / quarter net exposure

Location	1ST QTR	2ND QTR	3RD QTR	4TH QTR
CL-79	22.1 ± 1.8	20.9 ± 1.8	20.5 ± 0.9	22.3 ± 3.0
CL-80	22.2 ± 1.0	20.6 ± 1.6	19.1 ± 2.2	19.8 ± 0.9
CL-81	21.3 ± 1.3	20.9 ± 1.4	20.8 ± 0.6	18.6 ± 0.6
CL-84	22.6 ± 1.3	20.7 ± 1.1	19.7 ± 0.8	18.4 ± 1.3
CL-90	19.3 ± 1.4	20.2 ± 1.1	21.9 ± 2.2	15.7 ± 0.8
CL-91	20.9 ± 0.9	21.5 ± 0.5	23.8 ± 3.6	18.8 ± 5.0
CL-97**	21.5 ± 0.7	18.2 ± 1.0	24.4 ± 2.3	18.6 ± 1.8
CL-99	19.3 ± 0.6	17.6 ± 0.8	20.6 ± 1.2	16.7 ± 1.4
CL-114**	20.8 ± 1.1	19.8 ± 1.9	23.3 ± 4.9	16.6 ± 1.2

** Supplemental Control Locations

CL-13 SURFACE WATER ACTIVITY
(pCI/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	28 May 03	25 Jun 03
Be^{7}	< 24.8	< 23.9	< 26.3	< 22.0	< 28.5	< 21.1
K^{40}	< 77.3	< 76.8	< 57.7	< 57.2	< 54.1	< 58.7
Mn^{54}	< 3.1	< 1.7	< 1.4	< 3.1	< 2.3	< 2.0
Fe^{59}	< 3.4	< 5.5	< 4.0	< 5.0	< 2.6	< 2.7
Co^{58}	< 2.4	< 3.5	< 2.3	< 2.7	< 1.3	< 2.7
Co^{60}	< 2.5	< 4.2	< 1.5	< 1.8	< 2.3	< 2.3
Zn^{65}	< 6.4	< 3.3	< 3.8	< 2.0	< 3.2	< 2.5
Nb^{95}	< 2.6	< 5.1	< 2.3	< 2.9	< 1.7	< 1.6
Zr^{95}	< 5.5	< 4.6	< 3.9	< 4.0	< 6.1	< 2.2
Cs^{134}	< 4.0	< 3.5	< 2.2	< 2.8	< 2.6	< 1.9
Cs^{137}	< 4.1	< 5.3	< 2.7	< 3.1	< 3.1	< 2.3
Ba^{140}	< 12.6	< 24.5	< 12.8	< 18.4	< 10.0	< 12.8
La^{140}	< 2.6	< 5.7	< 2.8	< 1.7	< 1.9	< 2.7
Ce^{144}	< 24.7	< 30.5	< 31.5	< 31.4	< 24.4	< 28.0

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	29 Oct 03	25 Nov 03	31 Dec 03
Be^{7}	< 17.5	< 29.8	< 16.4	< 37.8	< 33.5	< 26.3
K^{40}	< 71.4	< 72.0	< 42.5	< 83.9	< 110.6	< 80.4
Mn^{54}	< 3.3	< 2.8	< 2.2	< 3.9	< 3.9	< 2.8
Fe^{59}	< 2.1	< 4.0	< 2.9	< 5.6	< 5.6	< 5.8
Co^{58}	< 1.4	< 2.4	< 1.9	< 2.5	< 4.9	< 2.6
Co^{60}	< 2.5	< 3.3	< 2.3	< 3.2	< 3.6	< 1.9
Zn^{65}	< 3.5	< 4.0	< 3.3	< 4.8	< 3.6	< 4.5
Nb^{95}	< 2.8	< 4.0	< 2.2	< 4.3	< 2.0	< 4.3
Zr^{95}	< 4.4	< 7.3	< 4.4	< 6.6	< 11.2	< 5.7
Cs^{134}	< 2.5	< 2.8	< 2.0	< 3.1	< 2.7	< 3.4
Cs^{137}	< 2.9	< 3.8	< 2.5	< 4.3	< 4.7	< 3.1
Ba^{140}	< 9.7	< 11.3	< 12.8	< 20.5	< 26.0	< 17.1
La^{140}	< 4.0	< 2.1	< 3.0	< 5.0	< 6.7	< 2.9
Ce^{144}	< 24.2	< 33.0	< 20.0	< 36.7	< 31.4	< 36.9

CL-90 SURFACE WATER ACTIVITY (pCi/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	28 May 03	25 Jun 03
I^{131}	< 0.3	< 0.3	< 0.3	< 0.3	< 0.5	< 0.3
Be^{7}	< 53.4	< 18.3	< 34.0	< 47.6	< 37.5	< 18.6
K^{40}	< 119.7	< 88.3	< 69.3	< 102.9	< 75.4	< 51.3
Mn^{54}	< 3.7	< 4.0	< 1.7	< 4.5	< 2.7	< 2.2
Fe^{59}	< 5.4	< 5.8	< 5.3	< 6.3	< 3.8	< 5.6
Co^{58}	< 4.1	< 2.3	< 2.8	< 3.5	< 2.8	< 2.4
Co^{60}	< 6.5	< 2.9	< 3.6	< 3.5	< 4.3	< 2.0
Zn^{65}	< 10.3	< 5.1	< 6.6	< 5.4	< 4.0	< 3.1
Nb^{95}	< 6.9	< 4.2	< 3.4	< 4.4	< 4.9	< 2.5
Zr^{95}	< 8.4	< 8.6	< 6.9	< 11.2	< 4.7	< 4.4
Cs^{134}	< 6.3	< 3.4	< 2.4	< 3.6	< 4.3	< 3.2
Cs^{137}	< 5.1	< 4.3	< 5.0	< 2.5	< 3.6	< 2.7
Ba^{140}	< 19.2	< 9.9	< 18.5	< 13.8	< 16.4	< 14.7
La^{140}	< 4.2	< 2.5	< 5.2	< 3.3	< 3.7	< 1.7
Ce^{144}	< 29.2	< 53.6	< 23.8	< 36.8	< 25.5	< 30.5

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	29 Oct 03	25 Nov 03	31 Dec 03
I^{131}	< 0.3	< 0.4	< 0.4	< 0.3	< 0.3	< 0.3
Be^{7}	< 20.3	< 16.2	< 49.5	< 32.8	< 32.7	< 26.2
K^{40}	< 58.4	< 52.2	< 105.8	< 117.8	< 73.9	< 118.0
Mn^{54}	< 2.5	< 2.0	< 3.6	< 3.5	< 1.8	< 3.8
Fe^{59}	< 3.3	< 2.3	< 5.4	< 5.6	< 4.0	< 7.1
Co^{58}	< 2.4	< 2.2	< 3.3	< 3.2	< 3.3	< 3.2
Co^{60}	< 1.7	< 1.5	< 3.8	< 3.4	< 2.5	< 4.4
Zn^{65}	< 3.0	< 2.0	< 4.5	< 3.2	< 3.1	< 3.5
Nb^{95}	< 2.3	< 2.1	< 3.3	< 3.8	< 2.6	< 5.2
Zr^{95}	< 4.8	< 3.1	< 10.6	< 5.3	< 4.7	< 11.1
Cs^{134}	< 2.6	< 2.3	< 6.0	< 4.9	< 3.7	< 4.7
Cs^{137}	< 2.8	< 2.6	< 4.8	< 3.5	< 2.1	< 5.0
Ba^{140}	< 12.0	< 13.3	< 37.0	< 21.3	< 11.0	< 24.0
La^{140}	< 3.6	< 2.0	< 7.7	< 8.0	< 3.4	< 6.8
Ce^{144}	< 16.0	< 22.2	< 34.7	< 45.4	< 27.5	< 51.6

CL-91 SURFACE WATER ACTIVITY
(pCI/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	28 May 03	25 Jun 03
Be^{7}	< 42.0	< 28.9	< 17.9	< 36.8	< 16.0	< 18.9
K^{40}	< 87.7	< 59.4	< 44.7	< 108.6	< 73.0	< 73.3
Mn^{54}	< 2.4	< 2.3	< 1.9	< 5.5	< 3.3	< 3.0
Fe^{59}	< 7.4	< 4.2	< 4.5	< 5.0	< 4.7	< 4.4
Co^{58}	< 2.5	< 2.8	< 1.6	< 2.6	< 2.1	< 2.8
Co^{60}	< 5.3	< 3.5	< 1.6	< 4.0	< 2.7	< 1.5
Zn^{65}	< 4.0	< 2.6	< 3.1	< 5.7	< 2.0	< 4.6
Nb^{95}	< 4.0	< 2.8	< 2.6	< 5.1	< 2.9	< 3.0
Zr^{95}	< 9.1	< 7.0	< 4.0	< 5.1	< 5.4	< 7.6
Cs^{134}	< 4.4	< 4.1	< 2.2	< 4.3	< 2.2	< 3.3
Cs^{137}	< 5.7	< 1.9	< 2.4	< 4.9	< 3.1	< 3.6
Ba^{140}	< 16.4	< 12.2	< 6.8	< 18.	< 8.9	< 13.4
La^{140}	< 3.2	< 3.5	< 3.8	< 7.6	< 2.6	< 2.8
Ce^{144}	< 21.9	< 26.3	< 20.8	< 40.6	< 22.9	< 20.2

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	29 Oct 03	25 Nov 03	31 Dec 03
Be^{7}	< 22.5	< 26.1	< 30.2	< 41.0	< 27.0	< 23.4
K^{40}	< 51.2	< 84.9	< 67.0	< 109.9	< 64.4	< 60.5
Mn^{54}	< 2.4	< 3.0	< 1.7	< 5.3	< 3.3	< 1.6
Fe^{59}	< 4.0	< 6.1	< 1.9	< 6.7	< 3.0	< 4.8
Co^{58}	< 2.8	< 3.2	< 2.8	< 5.3	< 2.9	< 2.8
Co^{60}	< 2.7	< 2.4	< 1.7	< 4.1	< 2.9	< 2.1
Zn^{65}	< 4.6	< 7.1	< 2.8	< 5.1	< 3.1	< 3.0
Nb^{95}	< 3.0	< 3.3	< 2.4	< 3.4	< 2.2	< 2.2
Zr^{95}	< 3.5	< 5.5	< 6.5	< 10.6	< 3.8	< 3.2
Cs^{134}	< 2.7	< 2.7	< 1.3	< 3.8	< 2.7	< 2.0
Cs^{137}	< 1.8	< 4.6	< 3.1	< 4.8	< 2.4	< 2.3
Ba^{140}	< 10.4	< 18.9	< 13.3	< 17.7	< 8.2	< 12.6
La^{140}	< 2.7	< 5.4	< 2.6	< 10.9	< 2.1	< 20.0
Ce^{144}	< 26.8	< 25.3	< 20.7	< 48.9	< 31.5	< 33.1

CL-99 SURFACE WATER ACTIVITY
(pCi/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	28 May 03	25 Jun 03
Be^{7}	< 40.4	-[a]-	< 50.4	< 30.2	< 38.6	< 43.2
K^{40}	< 82.0	-[a]-	< 110.4	< 101.2	< 64.8	< 82.6
Mn^{54}	< 3.0	-[a]-	< 4.6	< 5.0	< 2.1	< 3.1
Fe^{59}	< 4.6	-[a]-	< 11.6	< 12.7	< 3.5	< 5.8
Co^{58}	< 3.4	-[a]-	< 3.5	< 2.7	< 2.0	< 2.2
Co^{60}	< 5.7	-[a]-	< 5.3	< 3.3	< 2.1	< 5.6
Zn^{65}	< 5.9	-[a]-	< 7.2	< 5.3	< 3.0	< 4.0
Nb^{95}	< 3.6	-[a]-	< 4.9	< 3.0	< 2.9	< 2.7
Zr^{95}	< 8.5	-[a]-	< 13.2	< 13.5	< 6.1	< 5.3
Cs^{134}	< 3.6	-[a]-	< 3.5	< 3.4	< 2.3	< 2.4
Cs^{137}	< 5.0	-[a]-	< 4.2	< 5.5	< 2.6	< 1.7
Ba^{140}	< 19.9	-[a]-	< 31.2	< 15.1	< 12.8	< 18.4
La^{140}	< 4.5	-[a]-	< 7.9	< 3.7	< 2.6	< 4.0
Ce^{144}	< 21.7	-[a]-	< 50.4	< 49.0	< 23.0	< 27.2

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	29 Oct 03	25 Nov 03	31 Dec 03
Be^{7}	< 28.9	< 26.1	< 39.2	< 39.5	< 41.4	< 62.1
K^{40}	< 68.1	< 60.6	< 72.5	< 70.9	< 100.7	< 110.4
Mn^{54}	< 2.5	< 2.4	< 2.7	< 3.3	< 4.9	< 5.5
Fe^{59}	< 5.0	< 2.7	< 3.9	< 5.7	< 8.5	< 7.8
Co^{58}	< 3.1	< 2.5	< 3.4	< 2.5	< 2.7	< 3.7
Co^{60}	< 1.6	< 2.5	< 1.8	< 2.1	< 4.7	< 5.5
Zn^{65}	< 2.6	< 3.4	< 1.9	< 6.4	< 4.0	< 6.4
Nb^{95}	< 3.8	< 2.1	< 4.6	< 4.8	< 4.5	< 5.1
Zr^{95}	< 6.0	< 6.0	< 4.8	< 7.6	< 9.2	< 8.9
Cs^{134}	< 2.9	< 1.5	< 3.5	< 4.2	< 7.0	< 6.0
Cs^{137}	< 4.2	< 2.2	< 4.1	< 2.8	< 6.8	< 5.6
Ba^{140}	< 8.7	< 8.6	< 8.2	< 25.7	< 28.8	< 17.2
La^{140}	< 3.7	< 2.5	< 3.0	< 8.5	< 3.5	< 6.9
Ce^{144}	< 27.7	< 22.5	< 28.1	< 32.7	< 44.0	< 51.0

[a] Due to the frozen conditions found at the North Fork Creek, a composite water sample from CL-99 was unavailable for February.

SURFACE WATER and DRINKING WATER QUARTERLY TRITIUM COMPOSITE

(pCI/l)

Quarter	CI-13	CI-14	CI-90	CI-91	CI-99
1st	< 151	< 151	< 151	< 151	< 151
2nd	< 162	< 162	< 162	< 162	< 162
3rd	< 161	< 161	< 161	< 161	< 161
4th	< 161	< 161	< 161	< 161	< 161

CL-7D WELL WATER ACTIVITY

(pCI/l)

Date Collected	26 Mar 03	25 Jun 03	22 Sep 03	31 Dec 03
H^3	< 133	< 162	< 165	< 161
Be^7	< 37.2	< 36.7	< 19.4	< 25.7
K^{40}	< 69.3	< 119.2	< 70.8	< 63.3
Mn^{54}	< 3.2	< 4.1	< 2.3	< 2.7
Fe^{59}	< 3.5	< 8.2	< 6.7	< 5.6
Co^{58}	< 2.6	< 3.9	< 1.6	< 1.6
Co^{60}	< 3.5	< 4.8	< 2.6	< 1.8
Zn^{65}	< 5.1	< 4.9	< 1.8	< 3.3
Nb^{95}	< 3.1	< 3.9	< 3.0	< 2.3
Zr^{95}	< 6.0	< 5.7	< 10.4	< 4.1
Cs^{134}	< 3.9	< 4.5	< 3.9	< 3.1
Cs^{137}	< 3.5	< 6.2	< 2.7	< 2.8
Ba^{140}	< 20.2	< 13.2	< 18.8	< 15.9
La^{140}	< 5.8	< 7.3	< 2.5	< 3.8
Ce^{144}	< 32.4	< 35.5	< 31.0	< 27.3

CL-12 UNTREATED WELL WATER ACTIVITY
(pCI/l)

Date Collected	26 Mar 03	25 Jun 03	22 Sep 03	31 Dec 03
H^3	< 133	< 162	< 165	< 161
Be^7	< 20.4	< 29.4	< 21.3	< 36.9
K^{40}	< 58.2	< 89.4	< 60.5	< 79.1
Mn^{54}	< 2.0	< 2.3	< 2.2	< 3.3
Fe^{59}	< 4.4	< 3.8	< 3.0	< 4.6
Co^{58}	< 2.2	< 2.0	< 2.5	< 1.7
Co^{60}	< 2.7	< 1.4	< 2.4	< 1.8
Zn^{65}	< 4.1	< 3.7	< 2.3	< 5.5
Nb^{95}	< 4.5	< 3.5	< 2.6	< 2.6
Zr^{95}	< 9.0	< 3.3	< 5.5	< 7.2
Cs^{134}	< 2.5	< 3.1	< 2.5	< 2.5
Cs^{137}	< 4.0	< 3.4	< 1.7	< 2.9
Ba^{140}	< 11.4	< 16.5	< 23.5	< 17.9
La^{140}	< 3.9	< 2.5	< 3.1	< 2.2
Ce^{144}	< 22.6	< 38.5	< 25.4	< 33.4

CL-12 TREATED WELL WATER ACTIVITY
(pCI/l)

Date Collected	26 Mar 03	25 Jun 03	22 Sep 03	31 Dec 03
H^3	< 133	< 162	< 165	< 161
Be^7	< 41.3	< 31.2	< 34.3	< 23.4
K^{40}	< 87.1	< 102.3	< 76.6	< 60.6
Mn^{54}	< 4.0	< 4.2	< 2.9	< 2.3
Fe^{59}	< 2.3	< 7.4	< 2.6	< 5.0
Co^{58}	< 3.5	< 3.0	< 2.7	< 1.2
Co^{60}	< 3.9	< 2.9	< 2.3	< 1.9
Zn^{65}	< 4.8	< 6.1	< 3.5	< 1.8
Nb^{95}	< 4.5	< 5.2	< 2.2	< 2.9
Zr^{95}	< 11.0	< 12.9	< 6.1	< 2.8
Cs^{134}	< 4.1	< 4.5	< 3.9	< 2.5
Cs^{137}	< 2.8	< 4.8	< 2.	< 2.1
Ba^{140}	< 19.9	< 21.8	< 22.7	< 14.7
La^{140}	< 6.4	< 3.5	< 2.0	< 2.4
Ce^{144}	< 32.9	< 48.4	< 35.5	< 20.1

CL-14 DRINKING WATER ACTIVITY
(pCi/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	28 May 03	25 Jun 03
Gross Beta	1.0 ± 0.5	1.4 ± 0.5	< 0.9	1.4 ± 0.5	1.1 ± 0.5	1.4 ± 0.5
Be^7	< 48.8	< 44.5	< 46.5	< 44.7	< 35.0	< 36.6
K^{40}	< 99.1	< 83.8	< 118.1	< 85.7	< 75.4	< 78.1
Mn^{54}	< 4.6	< 2.1	< 5.0	< 4.2	< 3.6	< 2.3
Fe^{59}	< 3.2	< 4.6	< 4.3	< 4.3	< 3.8	< 4.6
Co^{58}	< 5.0	< 1.3	< 4.5	< 4.2	< 2.4	< 1.6
Co^{60}	< 3.1	< 2.2	< 3.9	< 3.6	< 3.8	< 2.6
Zn^{65}	< 9.2	< 7.3	< 6.9	< 9.4	< 6.5	< 2.1
Nb^{95}	< 3.7	< 3.5	< 4.1	< 3.2	< 2.7	< 3.1
Zr^{95}	< 8.2	< 8.6	< 10.1	< 7.6	< 7.4	< 7.4
Cs^{134}	< 5.0	< 4.1	< 5.6	< 3.5	< 1.7	< 4.1
Cs^{137}	< 5.2	< 3.9	< 4.9	< 3.4	< 4.0	< 3.9
Ba^{140}	< 25.1	< 13.0	< 27.8	< 22.6	< 15.7	< 15.2
La^{140}	< 4.5	< 1.7	< 6.7	< 2.9	< 3.8	< 3.2
Ce^{144}	< 45.5	< 37.2	< 44.0	< 38.5	< 29.9	< 21.6

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	29 Oct 03	25 Nov 03	31 Dec 03
Gross Beta	0.9 ± 0.5	1.2 ± 0.5	1.4 ± 0.5	1.1 ± 0.4	2.6 ± 0.5	2.1 ± 0.6
Be^7	< 37.8	< 29.5	< 31.9	< 51.3	< 43.3	< 32.9
K^{40}	< 77.4	< 75.6	< 111.4	< 106.5	< 110.3	< 112.3
Mn^{54}	< 2.3	< 3.2	< 6.1	< 4.0	< 3.8	< 5.8
Fe^{59}	< 2.3	< 4.2	< 7.3	< 4.4	< 10.8	< 6.5
Co^{58}	< 1.7	< 1.8	< 3.8	< 3.8	< 4.7	< 6.1
Co^{60}	< 1.7	< 3.0	< 4.1	< 3.8	< 4.0	< 6.5
Zn^{65}	< 1.9	< 2.5	< 6.3	< 4.9	< 7.4	< 9.0
Nb^{95}	< 2.1	< 3.2	< 5.7	< 4.9	< 5.5	< 4.5
Zr^{95}	< 7.2	< 4.2	< 7.7	< 6.7	< 11.6	< 8.9
Cs^{134}	< 3.5	< 3.2	< 4.5	< 5.3	< 5.3	< 4.3
Cs^{137}	< 1.8	< 1.8	< 4.3	< 5.5	< 4.3	< 4.1
Ba^{140}	< 10.4	< 11.1	< 31.0	< 16.1	< 19.3	< 30.4
La^{140}	< 2.5	< 1.4	< 3.6	< 6.9	< 6.4	< 7.3
Ce^{144}	< 21.3	< 35.0	< 45.2	< 45.9	< 56.7	< 43.0

CL-116 MILK ACTIVITY - (Control)
(pCi/l)

Date Collected	29 Jan 03	26 Feb 03	26 Mar 03	30 Apr 03	14 May 03
I^{131}	< 0.3	< 0.6	< 0.4	< 0.4	< 0.4
Be^{7}	< 17.9	< 26.6	< 34.7	< 32.5	< 38.6
K^{40}	1,331 ± 111	1,310 ± 106	1,217 ± 167	1,183 ± 151	1,109 ± 160
Mn^{54}	< 3.7	< 3.5	< 5.9	< 4.5	< 5.5
Fe^{59}	< 3.8	< 8.4	< 13.0	< 5.5	< 5.2
Co^{58}	< 2.3	< 1.9	< 5.1	< 3.7	< 3.3
Co^{60}	< 3.1	< 3.1	< 5.1	< 4.1	< 3.1
Zn^{65}	< 6.1	< 7.3	< 10.9	< 5.8	< 6.6
Nb^{95}	< 3.7	< 1.8	< 4.5	< 5.4	< 2.6
Zr^{95}	< 5.9	< 4.9	< 9.6	< 8.3	< 9.4
Cs^{134}	< 2.9	< 3.8	< 4.8	< 5.3	< 2.8
Cs^{137}	< 4.4	< 3.3	< 6.7	< 5.1	< 5.1
Ba^{140}	< 6.4	< 12.9	< 30.8	< 14.0	< 17.6
La^{140}	< 2.4	< 3.6	< 6.9	< 3.1	< 3.4
Ce^{144}	< 25.8	< 31.3	< 53.8	< 28.5	< 26.5

Date Collected	28 May 03	11 Jun 03	25 Jun 03	09 Jul 03	23 Jul 03
I^{131}	< 0.4	< 0.4	< 0.4	< 0.3	< 0.3
Be^{7}	< 23.0	< 63.1	< 48.7	< 39.9	< 52.2
K^{40}	1,210 ± 122	1,251 ± 167	1,332 ± 169	1,203 ± 165	1,559 ± 193
Mn^{54}	< 3.9	< 5.3	< 3.9	< 6.6	< 5.4
Fe^{59}	< 8.8	< 10.6	< 8.9	< 10.1	< 12.2
Co^{58}	< 3.4	< 2.6	< 3.6	< 5.5	< 4.7
Co^{60}	< 3.4	< 4.1	< 6.6	< 6.5	< 4.4
Zn^{65}	< 11.2	< 10.7	< 12.1	< 11.9	< 14.3
Nb^{95}	< 4.0	< 2.7	< 4.2	< 4.9	< 3.3
Zr^{95}	< 7.6	< 10.8	< 11.2	< 11.8	< 15.6
Cs^{134}	< 4.4	< 3.7	< 4.2	< 5.1	< 6.2
Cs^{137}	< 4.5	< 5.8	< 6.7	< 4.3	< 5.8
Ba^{140}	< 14.0	< 11.7	< 24.9	< 14.7	< 27.1
La^{140}	< 3.0	< 2.9	< 3.5	< 6.0	< 3.8
Ce^{144}	< 27.4	< 41.2	< 48.1	< 48.3	< 39.4

CL-116 MILK ACTIVITY – (Control) (continued)

Date Collected	06 Aug 03	20 Aug 03	03 Sep 03	17 Sep 03	01 Oct 03
I^{131}	< 0.3	< 0.5	< 0.2	< 0.3	< 0.4
Be^{7}	< 25.5	< 35.8	< 27.3	< 38.2	< 62.0
K^{40}	1,434 ± 124	1,434 ± 117	1,235 ± 111	1,155 ± 117	1,349 ± 178
Mn^{54}	< 2.0	< 4.1	< 2.9	< 3.6	< 6.8
Fe^{59}	< 4.1	< 8.1	< 8.0	< 8.7	< 10.4
Co^{58}	< 2.1	< 4.0	< 2.2	< 4.3	< 3.6
Co^{60}	< 4.3	< 3.2	< 3.8	< 1.3	< 5.8
Zn^{65}	< 5.7	< 5.1	< 9.4	< 6.0	< 14.1
Nb^{95}	< 3.5	< 4.9	< 3.7	< 3.0	< 4.9
Zr^{95}	< 4.8	< 7.4	< 6.7	< 5.6	< 8.4
Cs^{134}	< 2.5	< 2.2	< 3.6	< 4.6	< 8.2
Cs^{137}	< 2.7	< 3.0	< 3.2	< 3.7	< 4.2
Ba^{140}	< 11.0	< 12.4	< 14.6	< 12.4	< 28.0
La^{140}	< 1.4	< 4.3	< 12.5	< 2.0	< 7.1
Ce^{144}	< 36.0	< 33.9	< 25.0	< 32.0	< 43.5

Date Collected	15 Oct 03	29 Oct 03	25 Nov 03	31 Dec 03
I^{131}	< 0.3	< 0.2	< 0.5	< 0.3
Be^{7}	< 16.0	< 27.6	< 57.1	< 53.6
K^{40}	1,196 ± 104	1,282 ± 162	1,233 ± 166	1,220 ± 163
Mn^{54}	< 3.4	< 5.7	< 6.7	< 7.6
Fe^{59}	< 7.5	< 13.7	< 11.7	< 15.9
Co^{58}	< 2.0	< 3.4	< 4.8	< 4.4
Co^{60}	< 1.5	< 4.8	< 3.7	< 6.8
Zn^{65}	< 3.7	< 11.6	< 7.7	< 12.7
Nb^{95}	< 3.9	< 3.6	< 5.0	< 4.4
Zr^{95}	< 4.7	< 7.7	< 9.9	< 12.5
Cs^{134}	< 3.0	< 4.7	< 5.5	< 8.6
Cs^{137}	< 3.8	< 5.2	< 7.3	< 6.5
Ba^{140}	< 9.2	< 16.4	< 27.4	< 17.9
La^{140}	< 2.1	< 4.1	< 4.2	< 7.1
Ce^{144}	< 27.1	< 46.7	< 40.4	< 47.6

CL-1 GRASS ACTIVITY
(pCi/g wet)

Date Collected	30 Apr 03	14 May 03	28 May 03	11 Jun 03	25 Jun 03
Be^{7}	3.32 ± 0.38	1.30 ± 0.28	1.04 ± 0.30	0.87 ± 0.28	0.86 ± 0.17
K^{40}	2.78 ± 0.46	5.9 ± 0.53	14.24 ± 0.88	4.91 ± 0.64	< 6.76 ± 0.52
Mn^{54}	< .017	< .014	< .026	< .013	< .010
Fe^{59}	< .040	< .036	< .031	< .025	< .018
Co^{58}	< .014	< .015	< .019	< .015	< .016
Co^{60}	< .017	< .014	< .015	< .017	< .014
Zn^{65}	< .024	< .021	< .046	< .032	< .017
Nb^{95}	< .007	< .012	< .015	< .018	< .017
Zr^{95}	< .012	< .028	< .040	< .044	< .011
I^{131}	< .029	< .029	< .029	< .034	< .026
Cs^{134}	< .020	< .021	< .028	< .011	< .015
Cs^{137}	< .019	< .010	< .029	< .017	< .015
Ba^{140}	< .059	< .054	< .057	< .099	< .096
La^{140}	< .016	< .009	< .011	< .013	< .013
Ce^{144}	< .099	< .118	< .225	< .080	< .093

Date Collected	09 Jul 03	23 Jul 03	06 Aug 03	20 Aug 03	03 Sep 03
Be^{7}	0.84 ± 0.25	1.37 ± 0.35	1.45 ± 0.20	0.76 ± 0.18	0.69 ± 0.15
K^{40}	3.92 ± 0.67	5.42 ± 0.66	5.31 ± 0.42	4.88 ± 0.41	4.53 ± 0.39
Mn^{54}	< .021	< .017	< .021	< .010	< .010
Fe^{59}	< .048	< .064	< .045	< .032	< .029
Co^{58}	< .016	< .016	< .011	< .011	< .009
Co^{60}	< .019	< .020	< .013	< .014	< .008
Zn^{65}	< .033	< .044	< .026	< .021	< .017
Nb^{95}	< .014	< .014	< .015	< .012	< .013
Zr^{95}	< .023	< .036	< .030	< .031	< .021
I^{131}	< .031	< .041	< .032	< .015	< .020
Cs^{134}	< .023	< .027	< .015	< .014	< .013
Cs^{137}	< .027	< .022	< .019	< .017	< .013
Ba^{140}	< .085	< .127	< .056	< .054	< .048
La^{140}	< .027	< .026	< .011	< .006	< .007
Ce^{144}	< .190	< .153	< .095	< .090	< .078

CL-1 GRASS ACTIVITY (continued)

Date Collected	17 Sep 03	01 Oct 03	15 Oct 03	29 Oct 03
Be^{7}	0.57 ± 0.27	1.39 ± 0.26	2.03 ± 0.28	2.14 ± 0.27
K^{40}	5.41 ± 0.73	4.91 ± 0.44	3.98 ± 0.49	5.80 ± 0.52
Mn^{54}	< .012	< .012	< .013	< .019
Fe^{59}	< .032	< .034	< .031	< .024
Co^{58}	< .014	< .015	< .017	< .007
Co^{60}	< .021	< .014	< .009	< .015
Zn^{65}	< .058	< .029	< .040	< .028
Nb^{95}	< .019	< .017	< .014	< .015
Zr^{95}	< .036	< .025	< .032	< .041
I^{131}	< .029	< .027	< .024	< .026
Cs^{134}	< .014	< .016	< .015	< .014
Cs^{137}	< .017	< .016	< .016	< .016
Ba^{140}	< .110	< .063	< .087	< .084
La^{140}	< .016	< .007	< .013	< .008
Ce^{144}	< .103	< .118	< .121	< .149

CL-2 GRASS ACTIVITY
(pCI/g wet)

Date Collected	30 Apr 03	14 May 03	28 May 03	11 Jun 03	25 Jun 03
Be^{7}	0.70 ± 0.14	1.96 ± 0.40	0.48 ± 0.20	1.46 ± 0.23	1.27 ± 0.24
K^{40}	6.17 ± 0.38	8.07 ± 0.78	5.97 ± 0.66	6.61 ± 0.53	6.56 ± 0.54
Mn^{54}	< .013	< .026	< .015	< .014	< .013
Fe^{59}	< .025	< .059	< .020	< .018	< .037
Co^{58}	< .013	< .021	< .012	< .019	< .011
Co^{60}	< .008	< .030	< .015	< .015	< .015
Zn^{65}	< .032	< .030	< .042	< .033	< .022
Nb^{95}	< .010	< .029	< .012	< .018	< .015
Zr^{95}	< .020	< .037	< .035	< .039	< .022
I^{131}	< .031	< .033	< .024	< .025	< .019
Cs^{134}	< .016	< .030	< .026	< .014	< .022
Cs^{137}	< .017	< .031	< .020	< .013	< .011
Ba^{140}	< .059	< .120	< .077	< .061	< .074
La^{140}	< .006	< .012	< .018	< .009	< .008
Ce^{144}	< .091	< .176	< .111	< .134	< .103

Date Collected	09 Jul 03	23 Jul 03	06 Aug 03	20 Aug 03	03 Sep 03
Be^{7}	0.60 ± 0.24	2.58 ± 0.50	1.62 ± 0.22	0.53 ± 0.25	1.37 ± 0.30
K^{40}	4.38 ± 0.63	6.26 ± 0.81	8.49 ± 0.56	7.39 ± 0.54	4.69 ± 0.66
Mn^{54}	< .018	< .031	< .015	< .011	< .014
Fe^{59}	< .045	< .057	< .035	< .033	< .030
Co^{58}	< .021	< .022	< .009	< .015	< .013
Co^{60}	< .016	< .024	< .013	< .012	< .012
Zn^{65}	< .023	< .068	< .032	< .042	< .046
Nb^{95}	< .024	< .030	< .011	< .017	< .020
Zr^{95}	< .038	< .066	< .029	< .034	< .030
I^{131}	< .031	< .058	< .021	< .030	< .028
Cs^{134}	< .025	< .034	< .015	< .017	< .021
Cs^{137}	< .019	< .033	< .016	< .017	< .019
Ba^{140}	< .071	< .166	< .065	< .062	< .064
La^{140}	< .020	< .025	< .006	< .010	< .014
Ce^{144}	< .140	< .213	< .102	< .106	< .084

CL-2 GRASS ACTIVITY (continued)

Date Collected	17 Sep 03	01 Oct 03	15 Oct 03	29 Oct 03
Be^{7}	1.72 ± 0.25	0.51 ± 0.22	1.25 ± 0.26	2.52 ± 0.28
K^{40}	14.10 ± 0.71	4.99 ± 0.68	5.32 ± 0.50	5.86 ± 0.50
Mn^{54}	< .020	< .017	< .017	< .012
Fe^{59}	< .039	< .049	< .030	< .036
Co^{58}	< .015	< .013	< .017	< .010
Co^{60}	< .015	< .024	< .021	< .012
Zn^{65}	< .034	< .046	< .043	< .024
Nb^{95}	< .015	< .015	< .017	< .012
Zr^{95}	< .030	< .029	< .036	< .042
I^{131}	< .030	< .019	< .022	< .026
Cs^{134}	< .022	< .026	< .023	< .018
Cs^{137}	< .029	< .014	< .016	< .019
Ba^{140}	< .078	< .106	< .083	< .044
La^{140}	< .012	< .011	< .007	< .011
Ce^{144}	< .100	< .140	< .105	< .126

CL-8 GRASS ACTIVITY
(pCi/g wet)

Date Collected	30 Apr 03	14 May 03	28 May 03	11 Jun 03	25 Jun 03
Be^{7}	0.71 ± 0.30	1.43 ± 0.26	0.57 ± 0.17	0.68 ± 0.16	0.66 ± 0.22
K^{40}	6.20 ± 0.72	11.73 ± 0.68	5.94 ± 0.47	5.29 ± 0.49	7.23 ± 0.73
Mn^{54}	< .017	< .015	< .012	< .012	< .017
Fe^{59}	< .043	< .023	< .026	< .030	< .036
Co^{58}	< .025	< .015	< .009	< .014	< .014
Co^{60}	< .022	< .019	< .008	< .015	< .018
Zn^{65}	< .039	< .035	< .036	< .033	< .032
Nb^{95}	< .014	< .018	< .019	< .015	< .022
Zr^{95}	< .058	< .020	< .013	< .035	< .036
I^{131}	< .025	< .016	< .011	< .020	< .031
Cs^{134}	< .030	< .021	< .013	< .014	< .020
Cs^{137}	< .020	< .016	< .009	< .015	< .022
Ba^{140}	< .086	< .076	< .065	< .065	< .079
La^{140}	< .021	< .011	< .007	< .012	< .014
Ce^{144}	< .139	< .121	< .095	< .121	< .096

Date Collected	09 Jul 03	23 Jul 03	06 Aug 03	20 Aug 03	03 Sep 03
Be^{7}	1.33 ± 0.29	2.51 ± 0.48	1.84 ± 0.21	< 0.25	2.68 ± 0.38
K^{40}	5.00 ± 0.71	6.95 ± 0.84	7.11 ± 0.53	7.45 ± 0.68	6.27 ± 0.76
Mn^{54}	< .015	< .016	< .016	< .020	< .018
Fe^{59}	< .036	< .064	< .027	< .055	< .027
Co^{58}	< .012	< .026	< .011	< .018	< .028
Co^{60}	< .009	< .024	< .010	< .022	< .022
Zn^{65}	< .025	< .053	< .034	< .053	< .058
Nb^{95}	< .014	< .024	< .017	< .017	< .019
Zr^{95}	< .032	< .046	< .021	< .039	< .036
I^{131}	< .025	< .048	< .015	< .041	< .035
Cs^{134}	< .016	< .025	< .014	< .027	< .028
Cs^{137}	< .019	< .027	< .018	< .025	< .024
Ba^{140}	< .118	< .095	< .090	< .092	< .121
La^{140}	< .017	< .029	< .014	< .024	< .029
Ce^{144}	< .088	< .139	< .128	< .193	< .217

CL-8 GRASS ACTIVITY (continued)

Date Collected	17 Sep 03	01 Oct 03	15 Oct 03	29 Oct 03
Be^{7}	0.72 ± 0.26	1.17 ± 0.25	3.39 ± 0.41	0.57 ± 0.23
K^{40}	7.54 ± 0.76	6.00 ± 0.65	5.44 ± 0.70	4.75 ± 0.63
Mn^{54}	< .022	< .021	< .019	< .027
Fe^{59}	< .031	< .026	< .033	< .030
Co^{58}	< .019	< .017	< .017	< .017
Co^{60}	< .024	< .019	< .021	< .018
Zn^{65}	< .064	< .050	< .035	< .022
Nb^{95}	< .022	< .019	< .023	< .025
Zr^{95}	< .035	< .044	< .040	< .039
I^{131}	< .025	< .029	< .031	< .031
Cs^{134}	< .028	< .024	< .012	< .019
Cs^{137}	< .023	< .015	< .026	< .022
Ba^{140}	< .124	< .093	< .129	< .072
La^{140}	< .025	< .014	< .017	< .016
Ce^{144}	< .120	< .159	< .127	< .114

CL-116 GRASS ACTIVITY (Control)

(pCi/g wet)

Date Collected	30 Apr 03	14 May 03	28 May 03	11 Jun 03	25 Jun 03
Be^{7}	0.63 ± 0.16	0.75 ± 0.28	< 0 .27	0.97 ± 0.21	1.47 ± 0.19
K^{40}	5.5 0 ± 0.42	5.54 ± 0.67	4.79 ± 0.61	3.85 ± 0.48	5.06 ± 0.33
Mn^{54}	< .009	< .014	< .013	< .011	< .011
Fe^{59}	< .022	< .044	< .018	< .025	< .027
Co^{58}	< .009	< .016	< .017	< .013	< .005
Co^{60}	< .014	< .025	< .020	< .018	< .011
Zn^{65}	< .022	< .055	< .031	< .018	< .023
Nb^{95}	< .012	< .020	< .015	< .015	< .013
Zr^{95}	< .022	< .047	< .018	< .034	< .020
I^{131}	< .013	< .030	< .026	< .016	< .021
Cs^{134}	< .011	< .024	< .019	< .018	< .010
Cs^{137}	< .011	< .019	< .018	< .015	< .011
Ba^{140}	< .050	< .085	< .062	< .049	< .064
La^{140}	< .005	< .019	< .013	< .016	< .009
Ce^{144}	< .087	< .137	< .150	< .109	< .088

Date Collected	09 Jul 03	23 Jul 03	06 Aug 03	20 Aug 03	03 Sep 03
Be^{7}	< 0.20	4.67 ± 0.36	2.00 ± 0.29	0.63 ± 0.21	0.56 ± 0.19
K^{40}	3.37 ± 0.51	4.49 ± 0.45	5.09 ± 0.59	7.51 ± 0.59	4.81 ± 0.49
Mn^{54}	< .013	< .012	< .015	< .010	< .015
Fe^{59}	< .038	< .021	< .028	< .027	< .018
Co^{58}	< .010	< .009	< .007	< .010	< .009
Co^{60}	< .013	< .012	< .020	< .013	< .009
Zn^{65}	< .012	< .025	< .021	< .031	< .022
Nb^{95}	< .013	< .018	< .011	< .017	< .014
Zr^{95}	< .047	< .018	< .031	< .035	< .023
I^{131}	< .020	< .025	< .029	< .026	< .022
Cs^{134}	< .018	< .016	< .013	< .012	< .017
Cs^{137}	< .021	< .014	< .015	< .017	< .010
Ba^{140}	< .066	< .046	< .092	< .044	< .058
La^{140}	< .014	< .008	< .012	< .013	< .015
Ce^{144}	< .091	< .136	< .073	< .097	< .120

CL-116 GRASS ACTIVITY (Control) (continued)

Date Collected	17 Sep 03	01 Oct 03	15 Oct 03	29 Oct 03
Be^{7}	0.64 ± 0.32	1.16 ± 0.22	4.19 ± 0.36	3.57 ± 0.40
K^{40}	9.95 ± 0.87	6.30 ± 0.50	5.39 ± 0.55	5.28 ± 0.60
Mn^{54}	< .023	< .015	< .014	< .025
Fe^{59}	< .035	< .033	< .025	< .040
Co^{58}	< .020	< .011	< .012	< .017
Co^{60}	< .026	< .010	< .014	< .012
Zn^{65}	< .075	< .027	< .017	< .020
Nb^{95}	< .023	< .017	< .017	< .023
Zr^{95}	< .046	< .020	< .042	< .023
I^{131}	< .034	< .023	< .028	< .022
Cs^{134}	< .018	< .013	< .014	< .026
Cs^{137}	< .016	< .017	< .012	< .017
Ba^{140}	< .090	< .068	< .075	< .048
La^{140}	< .014	< .009	< .013	< .017
Ce^{144}	< .171	< .081	< .155	< .133

CL-114 GREEN LEAFY VEGETABLE ACTIVITY (Control)

(pCi/g wet)

Date Collected	25 Jun 03	25 Jun 03	25 Jun 03	30 Jul 03	30 Jul 03
Sample Type	Lettuce	Swiss Chard	Cabbage	Lettuce	Swiss Chard
Gross Beta	2.63 ± 0.08	7.18 ± 0.18	2.32 ± 0.07	6.16 ± 0.14	4.24 ± 0.10
Be^{7}	< .15	< .17	< .14	< .22	< .16
K^{40}	3.10 ± 0.46	7.57 ± 0.64	2.85 ± 0.45	5.08 ± 0.61	5.17 ± 0.46
Mn^{54}	< .010	< .016	< .010	< .016	< .013
Fe^{59}	< .033	< .024	< .024	< .017	< .032
Co^{58}	< .016	< .021	< .067	< .014	< .014
Co^{60}	< .009	< .014	< .009	< .012	< .008
Zn^{65}	< .038	< .036	< .028	< .045	< .036
Nb^{95}	< .011	< .017	< .014	< .019	< .019
Zr^{95}	< .033	< .039	< .027	< .047	< .022
I^{131}	< .021	< .035	< .020	< .032	< .022
Cs^{134}	< .015	< .013	< .016	< .025	< .016
Cs^{137}	< .011	< .018	< .010	< .019	< .010
Ba^{140}	< .080	< .089	< .074	< .095	< .083
La^{140}	< .014	< .012	< .018	< .011	< .011
Ce^{144}	< .058	< .131	< .098	< .132	< .087

Date Collected	30 Jul 03	27 Aug 03	27 Aug 03	22 Sep 03	22 Sep 03
Sample Type	Cabbage	Swiss Chard	Cabbage	Swiss Chard	Cabbage
Gross Beta	3.18 ± 0.07	2.89 ± 0.07	2.43+ ± 0.05	3.40 ± 0.07	3.63 ± 0.09
Be^{7}	< .11	< 0 .11	< 0.07	< .22	< .13
K^{40}	3.35 ± 0.42	3.95 ± 0.31	2.99 ± 0.23	3.73 ± 0.56	3.63 ± 0.41
Mn^{54}	< .012	< .009	< .005	< .020	< .012
Fe^{59}	< .021	< .021	< .007	< .023	< .030
Co^{58}	< .009	< .011	< .007	< .011	< .012
Co^{60}	< .008	< .010	< .006	< .016	< .009
Zn^{65}	< .020	< .021	< .009	< .031	< .020
Nb^{95}	< .016	< .010	< .006	< .014	< .012
Zr^{95}	< .023	< .011	< .009	< .023	< .030
I^{131}	< .015	< .016	< .007	< .020	< .028
Cs^{134}	< .008	< .006	< .004	< .013	< .015
Cs^{137}	< .012	< .008	< .006	< .016	< .015
Ba^{140}	< .058	< .032	< .024	< .077	< .099
La^{140}	< .009	< .010	< .006	< .019	< .010
Ce^{144}	< .046	< .050	< .047	< .117	< .063

CL-115 GREEN LEAFY VEGETABLE ACTIVITY

(pCi/g wet)

Date Collected Sample Type	25 Jun 03 Lettuce	25 Jun 03 Swiss Chard	25 Jun 03 Cabbage	30 Jul 03 Lettuce
Gross Beta	4.80 ± 0.14	8.37 ± 0.23	4.41 ± 0.14	4.54 ± 0.11
Be^{7}	< .14	< 0.22	< 0.10	0.40 ± 0.20
K^{40}	4.80 ± 0.46	6.97 ± 0.78	4.67 ± 0.41	3.29 ± 0.50
Mn^{54}	< .012	< .018	< .009	< .012
Fe^{59}	< .018	< .042	< .013	< .017
Co^{58}	< .009	< .019	< .006	< .012
Co^{60}	< .010	< .015	< .007	< .009
Zn^{65}	< .029	< .030	< .027	< .028
Nb^{95}	< .014	< .017	< .014	< .017
Zr^{95}	< .030	< .023	< .032	< .015
I^{131}	< .017	< .026	< .019	< .024
Cs^{134}	< .010	< .018	< .014	< .010
Cs^{137}	< .015	< .017	< .011	< .015
Ba^{140}	< .054	< .081	< .069	< .067
La^{140}	< .007	< .017	< .007	< .014
Ce^{144}	< .081	< .105	< .050	< .073

Date Collected Sample Type	30 Jul 03 Swiss Chard	30 Jul 03 Cabbage	27 Aug 03 Cabbage	22 Sep 03 Cabbage
Gross Beta	6.49 ± 0.14	2.41 ± 0.05	3.22 ± 0.07	3.45 ± 0.07
Be^{7}	0.51 ± 0.21	< 0.10	< 0.10	< 0.13
K^{40}	5.70 ± 0.66	1.85 ± 0.26	2.50 ± 0.33	3.48 ± 0.57
Mn^{54}	< .012	< .007	< .015	< .016
Fe^{59}	< .047	< .012	< .031	< .034
Co^{58}	< .008	< .006	< .012	< .016
Co^{60}	< .019	< .009	< .013	< .024
Zn^{65}	< .041	< .018	< .022	< .022
Nb^{95}	< .018	< .010	< .010	< .008
Zr^{95}	< .032	< .018	< .020	< .038
I^{131}	< .023	< .016	< .014	< .046
Cs^{134}	< .015	< .011	< .011	< .011
Cs^{137}	< .015	< .013	< .009	< .022
Ba^{140}	< .102	< .042	< .053	< .116
La^{140}	< .013	< .005	< .009	< .016
Ce^{144}	< .104	< .051	< .087	< .092

CL-117 GREEN LEAFY VEGETABLE ACTIVITY

(pCi/g wet)

Date Collected	25 Jun 03	25 Jun 03	25 Jun 03	30 Jul 03	30 Jul 03
Sample Type	Lettuce	Swiss Chard	Cabbage	Lettuce	Swiss Chard
Gross Beta	2.62 ± 0.07	8.23 ± 0.22	2.69 ± 0.07	6.16 ± 0.12	5.16 ± 0.10
Be^{7}	< 0.18	< 0.36	< 0.20	0.29 ± 0.14	< 0.22
K^{40}	2.72 ± 0.43	8.66 ± 0.61	2.08 ± 0.49	5.12 ± 0.48	5.53 ± 0.61
Mn^{54}	< .007	< .012	< .017	< .010	< .016
Fe^{59}	< .020	< .033	< .027	< .035	< .019
Co^{58}	< .015	< .012	< .010	< .008	< .016
Co^{60}	< .014	< .014	< .013	< .011	< .022
Zn^{65}	< .018	< .015	< .024	< .027	< .035
Nb^{95}	< .013	< .010	< .015	< .012	< .008
Zr^{95}	< .029	< .026	< .034	< .024	< .040
I^{131}	< .030	< .019	< .030	< .017	< .027
Cs^{134}	< .019	< .020	< .020	< .015	< .018
Cs^{137}	< .016	< .014	< .015	< .011	< .018
Ba^{140}	< .088	< .056	< .079	< .043	< .065
La^{140}	< .010	< .013	< .012	< .007	< .011
Ce^{144}	< .092	< .072	< .070	< .087	< .125

Date Collected	30 Jul 03	27 Aug 03	27 Aug 03	27 Aug 03
Sample Type	Cabbage	Swiss Chard	Lettuce	Cabbage
Gross Beta	2.37 ± 0.05	6.66 ± 0.14	11.58 ± 0.29	3.18 ± 0.06
Be^{7}	< 0.11	< 0.08	< 0.15	< 0.08
K^{40}	2.43 ± 0.32	5.93 ± 0.30	9.51 ± 0.42	2.77 ± 0.26
Mn^{54}	< .012	< .007	< .011	< .006
Fe^{59}	< .023	< .011	< .033	< .014
Co^{58}	< .010	< .006	< .011	< .005
Co^{60}	< .008	< .011	< .007	< .007
Zn^{65}	< .024	< .022	< .033	< .012
Nb^{95}	< .006	< .010	< .009	< .005
Zr^{95}	< .012	< .020	< .022	< .019
I^{131}	< .022	< .012	< .019	< .008
Cs^{134}	< .008	< .007	< .013	< .007
Cs^{137}	< .006	< .009	< .012	< .009
Ba^{140}	< .054	< .033	< .047	< .027
La^{140}	< .013	< .004	< .006	< .008
Ce^{144}	< .070	< .060	< .086	< .044

CL-118 GREEN LEAFY VEGETABLE ACTIVITY

(pCi/g wet)

Date Collected	25 Jun 03	25 Jun 03	25 Jun 03	30 Jul 03	30 Jul 03
Sample Type	Lettuce	Swiss Chard	Cabbage	Lettuce	Swiss Chard
Gross Beta	4.07 ± 0.12	6.90 ± 0.19	3.87 ± 0.11	5.73 ± 0.12	7.18 ± 0.16
Be^7	< 0.16	< 0 .15	< 0.18	0.38 ± 0.21	0.27 ± 0.11
K^{40}	4.40 ± 0.50	7.43 ± 0.53	3.65 ± 0.58	4.32 ± 0.59	6.65 ± 0.43
Mn^{54}	< .013	< .016	< .019	< .018	< .010
Fe^{59}	< .035	< .030	< .038	< .026	< .022
Co^{58}	< .007	< .010	< .011	< .017	< .005
Co^{60}	< .013	< .010	< .014	< .013	< .012
Zn^{65}	< .023	< .030	< .032	< .025	< .015
Nb^{95}	< .016	< .009	< .010	< .022	< .011
Zr^{95}	< .027	< .017	< .044	< .038	< .021
I^{131}	< .027	< .020	< .025	< .033	< .019
Cs^{134}	< .022	< .010	< .018	< .020	< .011
Cs^{137}	< .016	< .015	< .015	< .015	< .006
Ba^{140}	< .079	< .045	< .086	< .056	< .038
La^{140}	< .011	< .007	< .013	< .013	< .005
Ce^{144}	< .087	< .107	< .127	< .105	< .061

Date Collected	30 Jul 03	27 Aug 03	22 Sep 03	22 Sep 03
Sample Type	Cabbage	Cabbage	Swiss Chard	Cabbage
Gross Beta	3.35 ± 0.09	3.34 ± 0.07	5.93 ± 0.12	4.07 ± 0.09
Be^7	< 0.20	< 0.14	< 0.15	< 0.20
K^{40}	3.99 ± 0.58	3.03 ± 0.43	7.25 ± 0.71	4.11 ± 0.45
Mn^{54}	< .016	< .019	< .020	< .011
Fe^{59}	< .038	< .027	< .036	< .018
Co^{58}	< .009	< .014	< .008	< .009
Co^{60}	< .008	< .017	< .023	< .010
Zn^{65}	< .035	< .022	< .035	< .015
Nb^{95}	< .016	< .011	< .021	< .017
Zr^{95}	< .032	< .027	< .024	< .027
I^{131}	< .021	< .014	< .031	< .024
Cs^{134}	< .011	< .010	< .022	< .017
Cs^{137}	< .020	< .016	< .015	< .010
Ba^{140}	< .104	< .051	< .131	< .064
La^{140}	< .014	< .008	< .019	< .021
Ce^{144}	< .085	< .071	< .079	< .090

CL-19 FISH ACTIVITY
(pCi/g wet)

Date Collected	14 Apr 03	14 Apr 03	14 Apr 03	14 Apr 03
Type	Carp	Largemouth Bass	Bluegill	White Bass
Be^{7}	< 0.11	< 0.06	< 0.15	< 0.11
K^{40}	2.99 ± 0.44	3.20 ± 0.32	3.04 ± 0.41	3.18 ± 0.32
Mn^{54}	< .015	< .009	< .012	< .010
Fe^{59}	< .048	< .018	< .033	< .018
Co^{58}	< .012	< .005	< .016	< .004
Co^{60}	< .016	< .008	< .010	< .010
Zn^{65}	< .017	< .012	< .028	< .010
Nb^{95}	< .019	< .010	< .023	< .013
Zr^{95}	< .039	< .013	< .037	< .016
Cs^{134}	< .009	< .007	< .015	< .010
Cs^{137}	< .015	< .004	< .018	< .005
Ba^{140}	< .126	< .087	< .206	< .071
La^{140}	< .033	< .014	< .026	< .017
Ce^{144}	< .064	< .038	< .102	< .070

Date Collected	13 Oct 03	13 Oct 03	13 Oct 03	13 Oct 03
Type	Carp	Largemouth Bass	Bluegill	Black & White Crappie
Be^{7}	< 0.17	< 0.16	< 0.19	< 0.21
K^{40}	2.69 ± 0.34	3.06 ± 0.39	2.00 ± 0.39	3.05 ± 0.32
Mn^{54}	< .017	< .011	< .012	< .008
Fe^{59}	< .058	< .051	< .041	< .032
Co^{58}	< .015	< .016	< .019	< .009
Co^{60}	< .012	< .013	< .013	< .011
Zn^{65}	< .030	< .040	< .013	< .025
Nb^{95}	< .017	< .016	< .029	< .017
Zr^{95}	< .043	< .029	< .018	< .028
Cs^{134}	< .012	< .013	< .013	< .014
Cs^{137}	< .011	< .017	< .015	< .012
Ba^{140}	< .510	< .350	< .591	< .334
La^{140}	< .064	< .082	< .148	< .135
Ce^{144}	< .065	< .071	< .060	< .085

CL-105 FISH ACTIVITY (Control)

(pCi/g wet)

Date Collected	14 Apr 03	14 Apr 03	14 Apr 03	14 Apr 03
Type	Carp	Largemouth Bass	Bluegill	White Crappie
Be^{7}	< 0.05	< 0.11	< 0.18	< 0.10
K^{40}	2.99 ± 0.32	3.51 ± 0.47	2.08 ± 0.37	2.95 ± 0.36
Mn^{54}	< .009	< .013	< .007	< .016
Fe^{59}	< .016	< .050	< .033	< .021
Co^{58}	< .005	< .017	< .010	< .008
Co^{60}	< .010	< .014	< .011	< .015
Zn^{65}	< .006	< .016	< .012	< .013
Nb^{95}	< .011	< .012	< .010	< .016
Zr^{95}	< .021	< .032	< .034	< .027
Cs^{134}	< .005	< .017	< .014	< .007
Cs^{137}	< .006	< .011	< .011	< .012
Ba^{140}	< .087	< .159	< .157	< .130
La^{140}	< .014	< .023	< .034	< .020
Ce^{144}	< .029	< .079	< .062	< .044

Date Collected	13 Oct 03	13 Oct 03	13 Oct 03	13 Oct 03
Type	Carp	Largemouth & White Bass	Bluegill	Black & White Crappie
Be^{7}	< 0.12	< 0.18	< 0.18	< 0.13
K^{40}	2.75 ± 0.38	2.77 ± 0.37	2.39 ± 0.41	2.77 ± 0.35
Mn^{54}	< .015	< .017	< .015	< .013
Fe^{59}	< .039	< .023	< .043	< .049
Co^{58}	< .012	< .020	< .023	< .008
Co^{60}	< .009	< .009	< .014	< .012
Zn^{65}	< .021	< .015	< .028	< .021
Nb^{95}	< .019	< .023	< .020	< .023
Zr^{95}	< .033	< .048	< .044	< .026
Cs^{134}	< .015	< .015	< .015	< .010
Cs^{137}	< .016	< .013	< .019	< .011
Ba^{140}	< .394	< .457	< .576	< .253
La^{140}	< .063	< .057	< .148	< .126
Ce^{144}	< .066	< .121	< .090	< .051

CL-7B SHORELINE SEDIMENT ACTIVITY

(pCi/g dry)

Date Collected	14 Apr 03	13 Oct 03
Be^{7}	< 0.14	< 0.15
K^{40}	4.71 ± 0.48	7.39 ± 0.38
Mn^{54}	< .014	< .010
Fe^{59}	< .041	< .045
Co^{58}	< .015	< .016
Co^{60}	< .012	< .012
Zn^{65}	< .025	< .028
Nb^{95}	< .011	< .019
Zr^{95}	< .024	< .032
Cs^{134}	< .016	< .016
Cs^{137}	< .011	< .012
Ba^{140}	< .057	< .303
La^{140}	< .015	< .082
Ce^{144}	< .070	< .080