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Subject: Annual Radiological Environmental Operating Report

Pursuant to Section 6.9.1.7 of the Technical Specifications, please find attached the 1995 Annual Radiological Environmental Operating Report for Fermi 2.

If you have any questions regarding this report, please contact Lynda Craine at (313) 586-1388.

Sincerely,

Attachment

cc: T. G. Colburn
M. J. Jordan
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T. Vegel (w/enclosure)
Region III (w/enclosure)

# Fermi 2
# 1995 Annual Radiological Environmental Operating Report

January 1, 1995 to December 31, 1995

Prepared by:

Fermi 2
Radiological Health
Department

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# *Executive Summary*

# *1. Executive Summary*

This Annual Radiological Environmental Monitoring Report is a detailed report on the Radiological Environmental Monitoring Program (REMP) conducted at Detroit Edison's Fermi 2 nuclear power plant from January 1 through December 31, 1995.

Samples collected as part of the REMP program are analyzed by Teledyne/Brown Engineering Environmental Services. Radioactivity measurements for these samples are reported in terms of sample concentration. Standard units of measure for reporting radioactivity are the Curie (Ci) for the amount of activity, and the Roentgen (R) for the amount of radiation exposure in free air. The unit of radioactivity used in this report is the picocurie (pCi). A picocurie is one-one trillionth of a curie. The unit of direct radiation used in this report is milliroentgen (mR). A milliroentgen is one-one thousandth of a roentgen. All radioactivity measurements for samples found to contain radioactivity are reported with a 2 sigma counting error, a standard counting practice. This means that, at a 95% confidence level, the true concentration of the sample lies somewhere between the measured concentration and plus or minus the counting error.

The Radiological Environmental Monitoring Program is divided into four major parts. These four parts are direct radiation monitoring, atmospheric monitoring, terrestrial monitoring, and aquatic monitoring. In 1995, more than 900 environmental samples were collected and approximately 1200 laboratory analyses were performed for the REMP. The results showed that environmental radioactivity levels have not increased from background radioactivity levels detected prior to the operation of Fermi 2.

Direct radiation measurements were taken at 67 locations using thermoluminescent dosimeters (TLD). The average quarterly exposure was 15.7 mR/standard quarter for indicating locations. This average exposure is equivalent to the ambient radiation levels measured prior to the operation of Fermi 2.

Atmospheric monitoring results for 1995 showed only naturally occurring radioactivity and were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected in any atmospheric samples during 1995.

Terrestrial monitoring results for 1995 of milk, grass, and leafy garden vegetable samples, showed only naturally occurring radioactivity and radioactivity associated with fallout from past atmospheric nuclear weapons testing. The radioactivity levels detected were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected in any terrestrial samples during 1995.

Aquatic monitoring results for 1995 of water, sediment, and fish, showed only naturally occurring radioactivity and radioactivity associated with fallout from past atmospheric nuclear weapons testing and were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected in any aquatic samples during 1995.

The operation of Fermi 2 caused no measurable radioactivity in the environment and no adverse effect on the quality of the environment in 1995. Comparisons of 1995 environmental data, past operational data, and preoperational data, show no adverse long-term trends in environmental radiation levels attributable to Fermi 2. In conclusion, the operation of Fermi 2 continues to have no significant radiological impact upon the environment.

# *Introduction*

# 2. Introduction

Nuclear power plants produce electricity by the fissioning of uranium, not the burning of fossil fuels. So they do not pollute the air with sulfur dioxide, nitrogen oxide, dust or "greenhouse" gases like carbon dioxide. Making one million kilowatt-hours of electricity in a power plant fueled with natural gas produces 550 tons of carbon dioxide. Making the same amount of electricity in an oil-fired plant produces 850 tons of carbon dioxide; in a coal-fired plant, 1,100 tons. But making one million kilowatt-hours of electricity in a nuclear power plant produces no carbon dioxide.

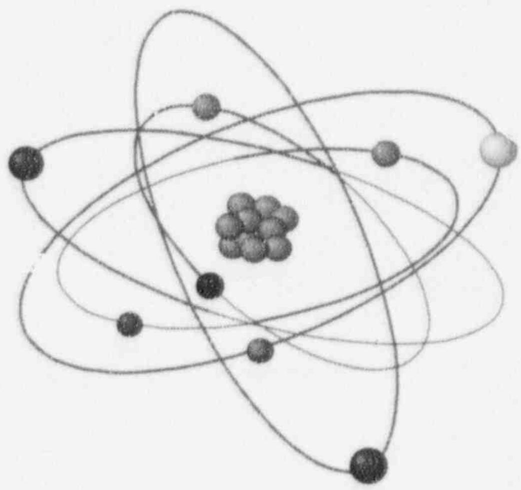
Without nuclear power plants, emissions of sulfur dioxide would be 4 million tons higher every year. To put this in perspective, the 1990 Clean Air Act amendments will reduce annual sulfur dioxide emissions from all sources by 10 million tons by the year 2000. (Sulfur dioxide may be one of the causes of acid rain.)

Nuclear power plants also eliminate 2 million tons of nitrogen oxide emissions each year. Nitrogen oxide contributes to the formation of urban smog as well as acid rain. The new Clean Air Act requires nitrogen oxide reductions of at least 2 million tons per year by the year 2000.

As the need for electricity grows, nuclear energy can help meet that demand without polluting the air. However, nuclear power plants do produce radioactive waste by-products, but these wastes pose no threat to the environment if properly handled. Nuclear waste is strictly managed and controlled, and carefully isolated from the environment at all times.

More than 400 nuclear power plants operate in 30 countries around the world including more than 100 in the United States. They supply about 17 % of the world's electricity and approximately 20% of this country's electricity. In order to more fully understand this unique source of energy, background information on basic radiation characteristics, risk assessment, and reactor operation is provided in this section.

## 2.1 The Atom



An atom is the smallest unit of matter that is recognizable as a chemical element. Atoms of different elements may also combine into systems called molecules, which are the smallest units of chemical compounds. In all these ordinary processes, atoms may be considered as the ancient Greeks imagined them to be: the ultimate building blocks of matter.

When strong forces are applied to atoms, however, the atoms may break up into smaller parts. Thus atoms are actually composites and not units, and have a complex inner structure of their own. By studying the processes in which atoms break up, scientists in the 20th century have come to understand many details of the inner structure of atoms.

Simply described, atoms are made up of positively and negatively charged particles and particles that have no charge. These particles are called protons, electrons, and neutrons, respectively. The relatively large protons and neutrons are packed tightly together in a cluster at the center of the atom called the nucleus. Orbiting around this nucleus are one or more smaller electrons. In an electrically neutral atom the negative charges of the electrons are balanced by the positive charges of the protons. Due to their dissimilar charges, the protons and electrons have a strong attraction for each other, which helps hold the atom together. Other attractive forces between the protons and neutrons keep the densely packed protons from repelling each other, preventing the nucleus from breaking apart.

## *2.2 Radiation*

Radiation is energy emitted in the form of waves or particles. The term is used in a variety of ways, and sometimes refers to light and radio waves. But most often it refers to "ionizing" radiation, which is radiation that can produce charged particles, called ions, in materials it hits. In the ionizing process, electrons break away from atoms, giving the atom an electrical charge.

When an atom breaks down - either naturally or in a controlled situation like a nuclear-power plant - and it releases waves or particles of energy, it is said to be radioactive.

Radioactive elements release five main types of energy:

**Alpha radiation:** positively charged particles that are barely able to penetrate the surface of the skin. It is the least-penetrating kind of radiation, and can be stopped completely by a single sheet of paper.

**Beta radiation:** More penetrating than alpha radiation, beta particles can be stopped by a thin sheet of aluminum.

**Gamma radiation:** A penetrating radiation that can pass through the human body, but can be stopped by dense materials such as lead or concrete.

**Neutron radiation:** Produced during the fission process in a nuclear-power plant. But does not occur when the reactor is shut down.

**X-ray radiation:** Widely used in medical applications, it accounts for the major part of the public's man-made radiation exposure and corresponds to about 20 percent of the average annual exposure to man.

## *2.3 Sources of Radiation*

Cosmic radiation from space covers the earth. Many rocks and minerals give off small amounts of radiation, including radon gas. Radioactive materials are in the air we breathe, and in the food and liquids we eat and drink. The materials we use to build our homes, schools and businesses also contain radioactive materials. Even our bodies are mildly radioactive. Lumped together, these things are called background radiation.

Radiation is invisible, but it can be measured with special instruments. The amount of radiation a person receives is calculated in millirems (mrem). One mrem is quite small. It's the equivalent of viewing color television one hour a day for one year, or spending five days high in the mountains.

**Typical Radiation Exposures**
Millirem annually per individual
average per activity

| | |
|---|---|
| **Nuclear Energy** | |
| Less than | 1.0 |
| **Consumer Products** | |
| Television | 1.0 |
| Others | 0.3 |
| **Social Activities** | |
| Mining and farming | 2.0 |
| Burning fuels | 2.0 |
| Water supply | 3.0 |
| Building materials | 7.0 |
| **Medical Procedures** | |
| Nuclear medicine | 14 |
| Diagnostic x-rays | 40 |
| **Natural Background** | |
| Food and water | 40 |
| Cosmic rays | 27 |
| Soil, rocks | 28 |
| Radon in the air | 200 |

On average, a person living in the U.S. receives about 300 to 360 mrem per year from all radiation sources. On the other hand, because of the low elevation and the absence of radioactive geologic formations, a person living within 10 miles of Fermi 2 receives an average of only about 125 mrem per year as measured by environmental TLDs.

Natural exposure might come from cosmic radiation, 25-30 mrem per year; food and water, 40 mrem; the earth, 28 mrem; the air, 200 mrem; and building materials, 7-10 mrem. Man-made radiation sources include chest x-rays, 40 mrem; a coast-to-coast airplane flight, 5 mrem; watching color television, 1-10 mrem; or living next to a nuclear power plant, less than 1 mrem.

## *2.4 Biological Effects of Radiation*

When living tissue is exposed to radiation, the tissue's molecular structure may be disrupted, triggering a chain of events that can destroy living cells, produce chromosomal damage or other injury. On the other hand, the human body evolved in the presence of radiation and possesses mechanisms to repair radiation damage. The amount of radiation absorbed per gram of body tissue is expressed in **rad** (radiation absorbed dose). The unit of measurement used to quantify the expected biological effect from radiation exposure in human soft tissue is **rem**, or roentgen equivalent man.

The effects of radiation on humans can be divided into two categories, somatic and genetic. Somatic effects are those which develop in exposed individuals, including a developing fetus. Genetic effects are those which may be observed in or passed on to offspring of the exposed individual.

Somatic effects can be divided further into acute and chronic effects. Acute effects are those that result from high radiation exposures in a short period of time. Chronic effects are those that result from radiation exposure over an extended period of time.

Much of our current knowledge of the biological effects of radiation comes from extensive laboratory animal experiments. Under laboratory conditions many crucial variables can be accurately controlled. These include, for example, the total dose, time interval and quality of radiation and characteristics such as age, sex and health status.

While laboratory animal experiments serve as valuable models for human studies, there are limitations in drawing conclusions from biological effects observed in irradiated animals to potential health effects in humans. Thus, the most relevant studies are the epidemiological surveys that have focused on human populations who received radiation exposure under a variety of conditions. Most of these epidemiological studies involved population groups ranging from several hundred to more than 100,000 individuals. The most important surveys have involved the following groups:

> <u>**Survivors of the Atomic Bomb and Nuclear Weapons Tests**</u> - The most intensely studied human populations are the Japanese survivors of the atomic bombs in Hiroshima and Nagasaki. These people were exposed to radiation from the bombs. Studies have also been made of natives of the Marshall Islands who were accidentally exposed to fallout from nuclear weapons testing in 1954.

**Medical Radiation** - Large doses of radiation were given to treat various health problems, such as ankylosing spondylitis (spinal impairment), thymus enlargement, ringworm of the scalp, postpartum mastitis (breast inflammation) and cancer of the cervix. Routine chest fluoroscopic examination of women being treated for tuberculosis resulted in significant doses to the breast. Children whose mothers were irradiated during pregnancy have also been studied.

**Radium Dial Painters** - Workers early in this century ingested radium-containing paint during the manufacture of luminous watches, clocks and aircraft instruments through a practice of "tipping" paint brushes with their lips.

**Uranium Miners** - Early in this century, certain large mines in Europe were worked for pitchblende, a uranium ore.

**Radiologists** - Pioneer medical scientists and physicians using x-rays, unaware of the potential hazards, accumulated large radiation doses principally to their hands.

These and other populations, many of whom continue to be studied to add to our current understanding, provide reliable data on health effects resulting from large doses of radiation. Among radiation scientists, there is strong agreement on the health effects and risks associated with large radiation doses (50 - 100 rads). What remains uncertain and controversial is the assessment of potential health effects that may result from small doses of radiation. Since we cannot, at the present time, detect health effects in human populations exposed to low doses of radiation, we must rely on information obtained from studies in cells, animals and other biological systems. Since some of these studies indicate that there may be some effect at very low doses, prudent radiation protection guidance is based on the assumption that health effects from low doses are proportionate to those that occur at high doses. Some radiation scientists believe that this assumption over-estimates the risks associated with low level radiation exposure. The effects predicted in this manner have never been actually observed in individuals exposed to low level radiation. Therefore, although no conclusive evidence exist indicating harmful effects due to low level doses of radiation, it is conservative and appropriate to assume risk can be extrapolated from high dose studies.

Acute effects require radiation doses some thousands of times greater than those received from natural sources. Generally, a dose of at least 100 rads to the whole body within a short time is required to cause even the mildest symptoms. These effects may appear within days or weeks of the exposure. An acute whole-body dose of more than 300 rads, in the absence of medical treatment, may be fatal in about half the individuals exposed. Thus, it follows that the small amount of radioactivity routinely released from Fermi 2 could not be high enough to cause such effects.

However, even such a large dose given in small amounts over a prolonged period of time allows the body's natural mechanisms to replace or repair damaged cells, as it would following many injuries.

Genetic changes in the sperm or egg cells can result in health effects appearing in future generations. The fertilized egg contains all the genetic information necessary to produce the organs and tissues of a new individual. This information is carried in the cell's nucleus in small chromosomes, of which equal numbers are contributed by both parents. The chromosomes transmit the genetic information from one generation to the next.

The genetic material contained in the cell nucleus can be altered by a large variety of toxic agents, including heat, chemicals, and both natural and man-made radiation. Genetic mutations occur randomly in all plant, animal and human populations and are considered to be the primary mechanism for evolutionary changes in all species. Epidemiological studies have shown that about five percent of all people are affected by a genetically transmitted or spontaneous disease at some time in their lives.

Although laboratory studies of mice exposed to large doses of radiation for many generations have shown genetic effects, studies of humans have not yet produced reliable evidence of effects on man. It is difficult to measure most mutations because they are difficult to observe and are randomly distributed within a population group. Of the 35,000 children born to parents irradiated at Hiroshima and Nagasaki, at an assumed average parental dose being 25,000 to 35,000 millirems (25 to 35 rems), there has been no observable increase in genetic defects. Using all the information available, scientists have estimated that about 100,000 millirems (100 rems) to each person in a large population would be required to double the genetic mutations occurring naturally in a non-irradiated population.

## *2.5 Benefits of Nuclear Power*

Nuclear power plays an important part in meeting today's electricity needs, and will continue to serve as an important source of electric energy well into the future. Nuclear power entered the 1980s as an alternative energy source and emerged from the decade as the second largest source of U.S. electricity, meeting almost 20 percent of national demand.

Nuclear power plants reduce U.S. dependence on foreign oil. Currently, the U.S. imports almost half of the oil it uses - at a cost of nearly $1 billion per week. However, nuclear power cuts the demand for foreign oil by more than 300 million barrels annually.

Studies show that U.S. economic growth has been fueled largely by electric power. There is a close and continuing connection between the growth of the economy and the supply of electricity. Nuclear energy is an important contributor to maintaining the U.S.'s economic and industrial strength.

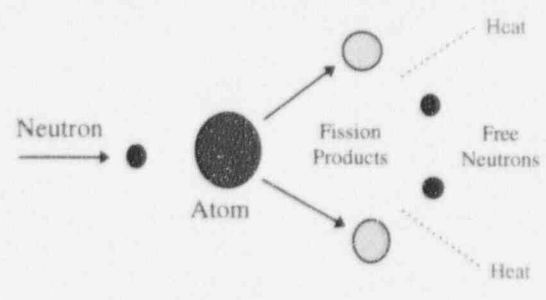
As the population grows, the demand for electricity increases. Since 1973, the U.S. population grew from 212 million to 250 million and electricity demand rose 61 percent. The U.S. Department of Energy (DOE) projects that our need for electricity will increase 24 percent between 1989 and the year 2000, and 51 percent by 2010. Nuclear power plants will be an important part of meeting that need.

Because nuclear power plants do not burn fuel, they do not emit combustion by-products. By substituting for other fuels in electricity production, nuclear power has significantly reduced U.S. and global emissions of carbon dioxide, the chief "greenhouse" gas. Since 1973, U.S. nuclear power plants have reduced the cumulative amount of carbon dioxide emissions by 1.6 billion metric tons. In 1993 alone, U.S. nuclear power plants prevented the discharge of 133 million metric tons of carbon into the atmosphere.

All methods of producing electricity affect the environment to some degree, but the impact of nuclear power is minimal. The following sections provide basic information on how electricity is produced by splitting or fissioning atoms.

## *2.6 Fission*

As discussed earlier, in the nucleus of an atom, attractive forces between the protons and neutrons keep the protons from repelling each other which prevents the nucleus from breaking apart. These attractive forces are known as the **binding energy**. If the binding energy is weak enough, the nucleus can be split when bombarded by a free neutron. When the nucleus splits or fissions, two or more smaller atoms, called **fission products**, form along with the release of more neutrons and energy in the form of heat. The neutrons that are released during the first fission are then available to fission other atoms producing a **chain reaction**. The first sustained nuclear chain reaction occurred on December 2,1942 by Enrico Fermi. He and 42 other scientists constructed an "atomic pile" or nuclear reactor beneath the University of Chicago athletic stadium.




*Fission Reaction*

## *2.7 Nuclear Reactor*

A nuclear reactor is a device in which a controlled nuclear fission chain reaction takes place. The fission reaction is initiated by the absorption of a neutron in a heavy nucleus such as uranium-235. The process produces additional neutrons that can be used to induce further fissions, thereby propagating the chain reaction. When the reactor components are appropriately adjusted, it is possible for the chain reaction to be self-sustaining. Such a reactor is called "critical." If there are insufficient neutrons being produced to sustain the process, then the reactor is "subcritical."

Nuclear reactors are most commonly used to produce electric energy, although they are occasionally used as sources of thermal energy for heating. They are also designed as sources of neutrons used in research or for the production of radiopharmaceuticals.

The typical U.S. power reactor is termed a light-water reactor (LWR) because it uses water in the form of $H_20$ as a moderator and coolant. Another type of power reactor uses a type of water in which the hydrogen has been replaced by deuterium -$D_20$- as a moderator; it is called a heavy-water reactor.

The design characteristics stem from a set of physical, engineering, and economic constraints. The physical aspects of the design seek to provide the nuclear fuel and other constituents so that a safe and controllable reactor can operate at the desired power level for an extended period of time. The engineering aspects of the design seek to convert the fission energy into a useful form of heat, usually high-pressure steam, to drive a turbine which is connected to an electric generator. The economic aspects of the design seek to optimize the physical and engineering design so as to minimize the cost of energy from the plant

The core of a reactor is the region that contains the nuclear fuel. Neutrons from the fission process are released with relatively high energy. However, the probability of a neutron causing a fission in the fuel nuclei is much larger for low energy neutrons than for high energy neutrons. In order to slow neutrons down, it is common to surround the fuel with a moderator. Neutrons can interact with nuclei much like collisions between hard spheres. The neutron will lose energy most efficiently, i.e., in fewest collisions, if the moderator nuclei are close to the mass of the neutron. Thus, moderators are made from light materials such as hydrogen in water, deuterium in heavy water, or carbon in graphite. The physical arrangement of the fuel and moderator is a major element of reactor physics.

The LWR uses $H_2O$ as the moderator and uranium dioxide, $UO_2$, as the fuel. The fissionable isotope of uranium is U-235, which makes up only 0.7% of natural uranium. It is not possible to design an LWR that uses natural uranium. In order to increase neutron production, the U-235 concentration in the fuel is increased. Such fuel is called "enriched."

Fuel for an LWR has a relatively simple structure. Uranium is pressed into small cylindrical pellets that are stacked in zirconium alloy tubes, referred to as "cladding", that are about 3.05 m (10 ft) in length. The tubes are arranged in a square array called a "fuel assembly". A modern light-water reactor has hundreds of fuel assemblies in its core.

Reactor control is achieved by carefully balancing the neutron production rate by fission with the neutron loss rate. The common process for obtaining control is to adjust the amount of neutron absorber in the core. Control materials are placed in rods with the same dimensions as fuel rods and the set of control rods are inserted in the middle of a fuel assembly. The control rods are attached to a drive mechanism that moves the control rods into or out of the core region. A typical set of control rods contains materials that are highly absorbent to neutrons such as silver, indium, boron carbide, and cadmium. The control rods are inserted into the core when reactor shutdown is desired. The rods are also inserted automatically in the event that unexpected conditions are detected.

The core, including fuel assemblies, control rods, and moderator, is a very large system. The entire assemblage fits into a thick-walled steel pressure vessel, designed to withstand very high pressures, up to 2,500 psi. For LWRs, water is both the moderator and the coolant, that is, the agent used to remove fission energy from the core and transfer it to the electric generating segment of the system.

In the U.S. there are two types of light-water reactors used for the generation of electric energy. The most common type of reactor in use is the pressurized water reactor (PWR). In a PWR plant, the coolant is heated by fission under pressure and then sent via the primary loop to a steam generator. In the steam generator, the hot water from the reactor transfers its heat to the secondary loop. The secondary loop is under low pressure and the water is transformed into steam, which in turn is fed to turbines to drive a generator. The second most common reactor is a boiling water reactor (BWR). In this type of reactor the coolant is permitted to boil within the reactor core. The steam emerging from the core is sent directly to a turbine rather than through a steam generator. Fermi 2 is a boiling water reactor.

Fermi 2 is a General Electric class 4 BWR with a pressure suppression Mark I containment. Fermi 2 has a generating capacity of approximately 1,100 megawatts at 22,000 volts of electricity. The reactor contains 185 control rods and 764 fuel assemblies. In the Fermi 2 BWR system, water is boiled within the reactor pressure vessel, producing saturated steam that passes through internal steam separators and dryers before continuing directly to the turbine. As the steam strikes the turbine blades, it spins both the turbine shaft and the generator rotor. As the rotor turns, it passes through a magnetic field which transforms the mechanical energy into electrical energy. The steam is then transformed back into water in the condenser and pumped back to the reactor vessel to start the heating process all over again. The cooling water has a separate cycle of its own. It is pumped from a 30-million gallon water reservoir to the condenser. The cool water passes through the condenser which removes the heat from the steam and is then pumped to the cooling towers.

The cooling towers use natural convection to return the water to its original temperature. The water is then pumped into the reservoir to repeat the cycle. Since the cooling water does not come in direct contact with the steam from the reactor, the water in the reservoir and cooling towers is not radioactive. Figure 2-1 illustrates the basic plant schematic for Fermi 2.

### *2.8 Reactor Safety Equipment*

As the reactor operates, a large inventory of radioactive isotopes accumulates in plant systems and represents a potential hazard. Any accident releasing a sizable portion of these materials would be very serious--as demonstrated by the Chernobyl accident. A fundamental objective of nuclear reactor design is to prevent accidents that could allow the escape of radioactivity. In order for fission products to reach the environment several barriers must be overcome. For an LWR, the first barrier is the fuel cladding that contains the fuel as well as the fission fragments. The cladding material is a high-strength alloy of zirconium capable of withstanding high pressures and high temperatures, well beyond normal reactor conditions. The second barrier is the pressure vessel, which is exceedingly strong. The third barrier is the containment building, which is a large, reinforced concrete building designed to withstand substantial pressure.

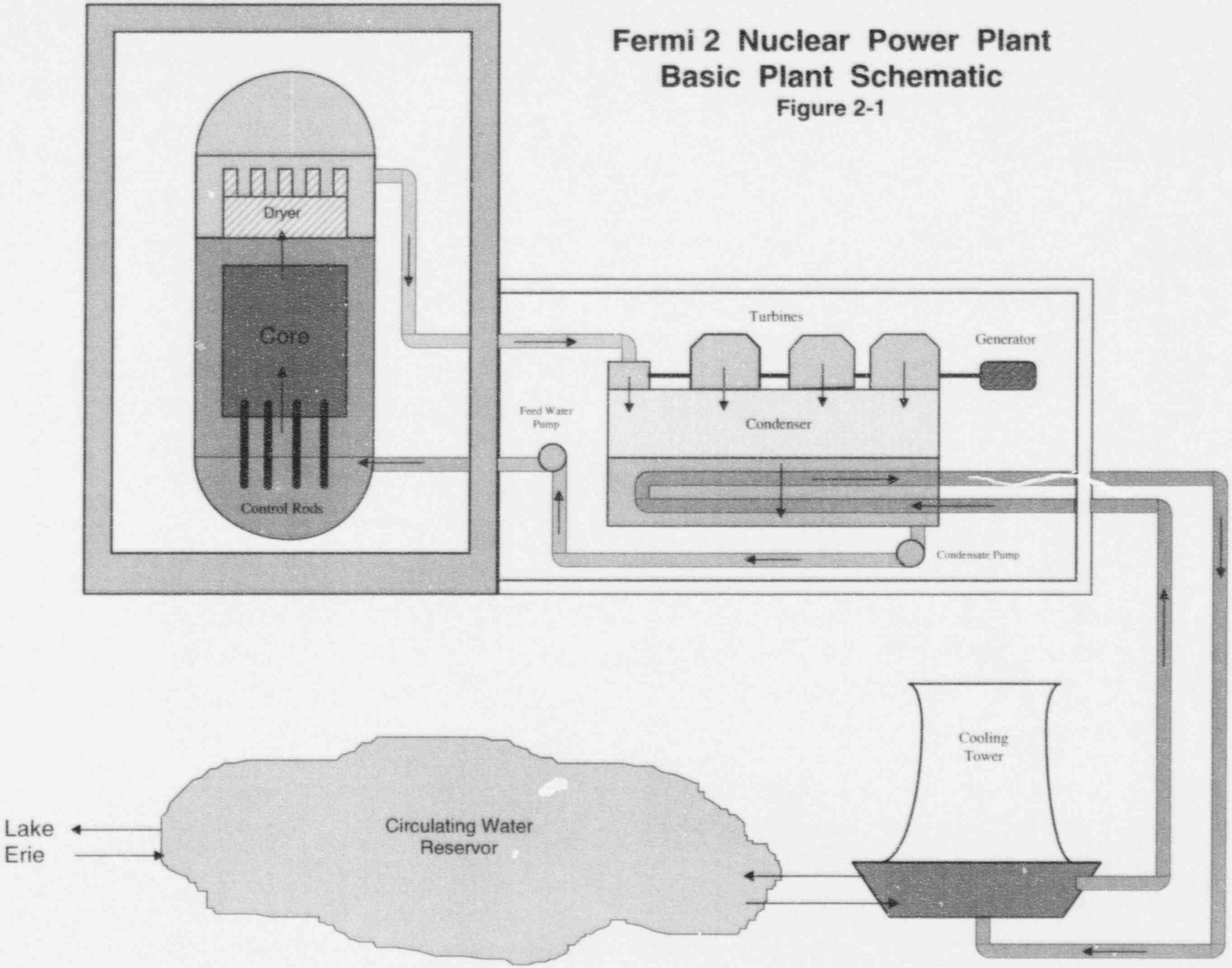
In order for any barrier to be breached, the system must first become overheated. There are two possible ways for this to occur. The first is for the fission rate to grow too rapidly for the coolant to remove all of the energy being created. The second is for the coolant system to fail and lose the ability to cool the fuel. Excessive fission energy production is monitored by numerous sensors throughout the core region; if they detect a rapid rate of increase in the fission process, the control rods are automatically inserted into the core to absorb the neutrons and this shuts down the reactor.

There is another important design element that protects against the possibility of an uncontrolled chain reaction. The heating up of a local region of the reactor would cause the nearby cooling water to boil, thereby reducing the water density through the creation of bubbles, or voids. It is a safety requirement of U.S. reactors that creation of coolant voids must, by itself, reduce the fission rate. The water space that surrounds a fuel rod is carefully designed so that a void reduces neutron moderation and hence reduces the fission rate. This property is not required in the Soviet Union and is a fundamental reason for the Chernobyl accident. The basic design of LWRs makes them safe against an uncontrolled chain reaction. Reactor design inherently limits positive reactivity, but an excursion is possible if multiple failures occur.

The design of safety systems begins by hypothesizing a number of different failures and then developing systems to mitigate the consequences of these failures. Such failures are known as design basis accidents. In order to obtain a license, a plant must show it is protected against the class of design basis accidents. The broad areas of concern include accidents within the plant as well as accidents involving the handling of radioactive spent fuel. Initiating events must include hardware failures, operator failures, and external events such as tornadoes.

One of the more important design basis accidents is the loss of coolant accident, or LOCA. The fission process itself ceases if a reactor loses its cooling water because the reactor goes subcritical. However, the fuel continues to heat up due to the stored thermal energy as well as from the decay heat of radioactive fission products. Without any coolant the cladding heats up and ultimately melts. Multiple safety systems have been designed and installed in all U.S. plants to prevent the clad from overheating by providing emergency cooling water. Such systems are collectively known as emergency core cooling systems, or ECCS. All such systems have multiple pathways for introducing water into the vessel under high-pressure or low-pressure conditions.

## Fermi 2 Nuclear Power Plant
## Basic Plant Schematic
**Figure 2-1**



# *Radiological Environmental Monitoring Program*

### 3. *Radiological Environmental Monitoring Program*

The purpose of the Radiological Environmental Monitoring Program (REMP) is to assess the environmental impact of operating Fermi 2 and is designed to measure radiation exposure to the public. This program also provides the verification of the effluent monitoring program results during routine operation of the plant and serves as an in-place sampling network in the event of an accidental release. Monitoring stations are placed at pre-determined locations which measure the radiological impact of operating the plant.

Exposure to the public can occur through direct pathways such as inhalation or immersion, or indirectly through the food chain. These exposure pathways are monitored by the use of thermoluminescent dosimeters (TLDs), and by the collection of air, milk, grass, garden produce, water, fish, and sediment samples. Figure 3-1 illustrates these exposure pathways.

Direct exposure by inhalation or immersion is measured both by TLDs and by collection of air samples. TLDs continuously monitor the environment and provide a direct measurement of ambient gamma radiation levels. The locations of both the TLD and air sampling sites were chosen with respect to the meteorology and population distribution around Fermi 2. Air samples are collected through a particulate filter and an activated charcoal filter using continuous air samplers. The particulate filters are analyzed individually for gross beta activity and composited for gamma spectrum analysis. The charcoal filters are analyzed for iodine-131.

Indirect exposure can result due to radionuclides entering the food chain through atmospheric or liquid discharges from the plant. Radionuclides released to the atmosphere, such as I-131, may be deposited on agricultural land and then ingested by dairy cows or goats, and potentially concentrating in the animals' milk. Radionuclides may also become incorporated in garden produce such as green leafy vegetables.

Monitoring for radionuclides due to liquid discharges includes collection of surface and drinking water, fish, and sediment samples. These samples are collected upstream of the plant discharge, as a control location, and at the discharge and downstream of the discharge, as an indicator location.

Fish are sampled semiannually and the species collected correspond to those that may be consumed by the local population. Fish are good indicators because, high in the food chain, they tend to concentrate radionuclides by ingestion and provide an effective mechanism for integrating the variable concentrations of radionuclides in the water over extended periods.

Sediment samples are also collected semiannually. Sediment, in the vicinity of the liquid radwaste discharge, represents the most likely site for accumulation of radionuclides in the aquatic environment and, with long-lived radionuclides, a gradual increase in radioactivity concentration is expected over time, if discharges occur. Sediments provide a long-term indication of change which is useful, even though it is not part of the food chain resulting in dose to humans.

### *3.1 Preoperational Program*

All nuclear power plants are required by the Nuclear Regulatory Commission (NRC) to conduct radiological environmental monitoring before construction of a facility. This preoperational program at Fermi 2 was aimed at collecting data needed to identify critical pathways, and determine the preexisting levels of radiation and radioactive products occurring naturally and from man-made sources in the vicinity of the plant.

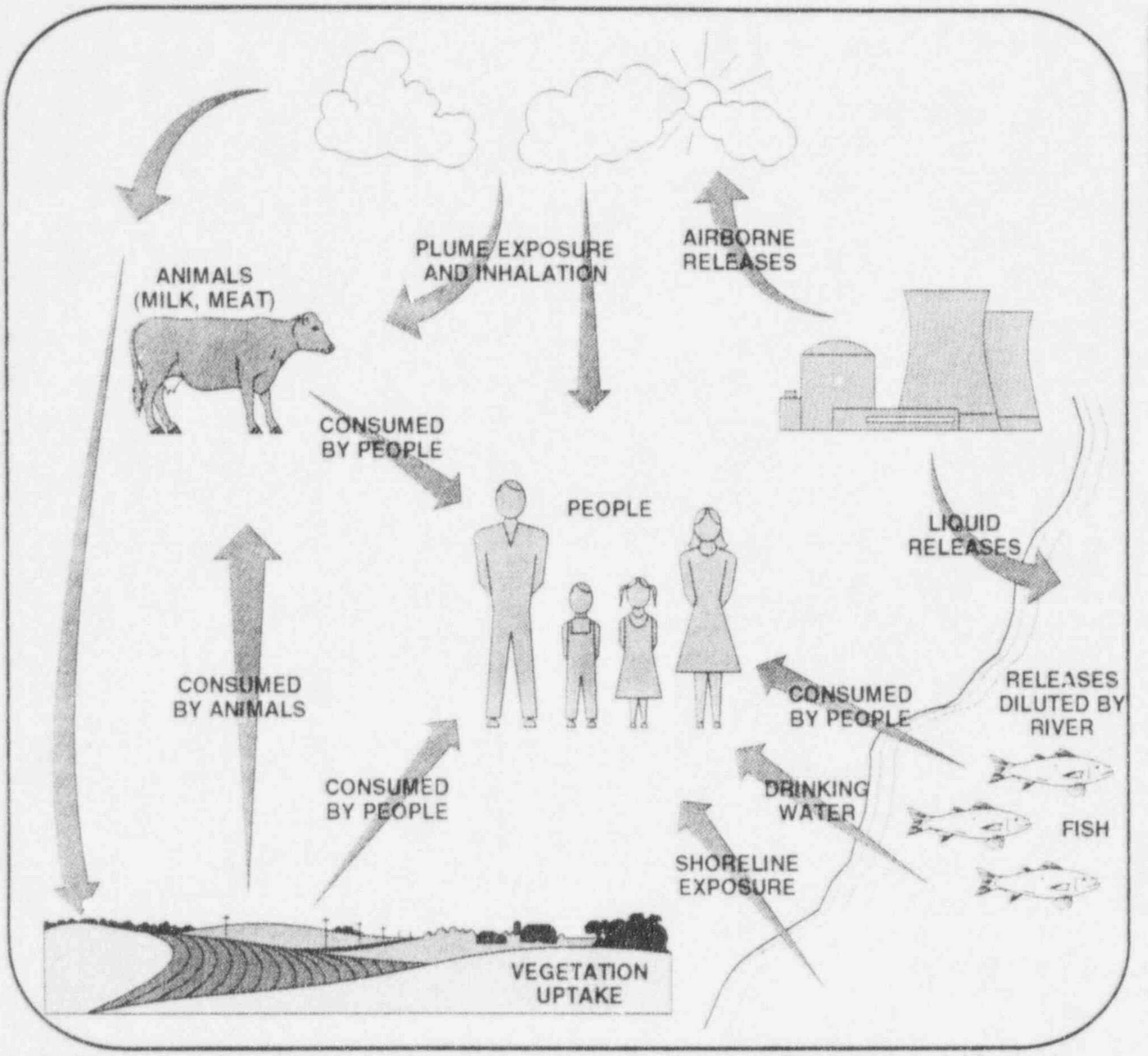
Fermi 2 began its preoperational program seven years (1978) before the reactor began operating in 1985. The data accumulated during those years established a baseline with which to compare operational data. The program consisted of monitoring air, drinking water, surface water, lake sediments, milk, vegetables, fish, and direct radiation in the environment in the vicinity of Fermi 2. The elements that made up the preoperational monitoring program are still in effect today in the operational program.

### *3.2 Operational Program*

The preoperational program became the operational program in June of 1985 when initial criticality was achieved for the Fermi 2 reactor. The sampling and analysis program in the operational phase monitors direct radiation, radioactivity in the air, lake water and sediments, drinking water, groundwater, cow and goat milk, and local garden vegetables.

## *Exposure Pathways to Man*

Figure 3-1




The exposure pathways monitored through the Radiological Environmental Monitoring Program (REMP) are:

**(1) Inhalation**

**(2) Ingestion**

**(3) Immersion**

# *Direct Radiation Monitoring*

## *4. Direct Radiation Monitoring*

Radiation is a normal component of the environment resulting primarily from natural sources, such as cosmic radiation and naturally occurring radionuclides; and to a lesser extent, from manmade sources such as fallout from past nuclear weapons testing. The earth is constantly bombarded by cosmic radiation in the form of high energy gamma rays and particulates. The earth's crust also contains natural radioactivity material, such as uranium and potassium-40, which contributes to the background radiation. Direct radiation monitoring primarily measures ionizing radiation from cosmic and terrestrial sources.

Detroit Edison uses thermoluminescent dosimeters (TLDs) to measure direct gamma radiation in the environs of Fermi 2. Environmental TLDs supplied by Teledyne/Brown Engineering are presently being used to measure direct radiation. These TLDs are 25% by weight Calcium Sulfate encased in Teflon. The TLDs are thoroughly tested to comply with NRC Regulatory Guide 4.13 and American National Standards Institute's (ANSI) publication N545-1975, which assure accurate measurements under varying environmental conditions before being placed in the field. Indicator TLDs are located within an approximate ten mile radius of the plant and control TLDs are generally located greater than ten miles. While in the field, these TLDs are exposed to background radiation and, if measurable, gaseous effluents and direct radiation from Fermi 2. Environmental TLDs are exchanged and processed on a quarterly basis. The TLDs' data are reported in terms of milliroentgen per standard quarter (mR/std qtr), a standard quarter being 91.3 days. Regardless of the duration of TLD exposure in the field, the data have been normalized to a standard quarter to allow convenient intercomparisons with the net value.

The average exposure for indicator and control TLDs during the preoperational program was 17.3 mR/std qtr and 17.6 mR/std qtr, respectively. The annual average exposure for indicator TLDs ranged from 13.6 mR/std qtr to 21.0 mR/std qtr. The annual average exposure for control TLDs ranged from 15.5 mR/std qtr to 21.9 mR/std qtr.

From 1985 to 1994, the average exposure for indicator and control TLDs was 15.6 mR/std qtr and 16.1 mR/std qtr, respectively. The annual average exposure for indicator TLDs ranged from 13.6 mR/std qtr to 20.3 mR/std qtr. The annual average exposure for control TLDs ranged from 13.4 mR/std qtr to 22.2 mR/std qtr. As Figure 4-1 and Figure 4-2 illustrate, the operational period from 1985 to 1994 was consistent with the preoperational program

In 1995, the TLD monitoring program included sixty-seven (67) TLDs. The indicator TLDs had an average exposure of 15.7 mR/std qtr and ranged from 7.7 to 28.7 mR/std qtr. The control TLDs had an average exposure of 15.2 mR/std qtr and ranged from 13.9 to 17.7 mR/std qtr. Figure 4-1 shows a graphical comparison of preoperational, prior operational, and 1995 TLD exposure. The broader range for 1995 is due to seasonal variations, while the ranges for the preoperational and prior operational data are based on annual averages. As Figure 4-1 and Figure 4-2 illustrate, the average exposure for indicator and control TLDs is consistent with previous years, including preoperational years and show no impact from direct radiation on the environment.

Table 4-1 shows the average 1995 TLD exposure for each meteorological sector at specified distances from the Fermi 2 reactor. The blank cells in Table 4-1 represent areas that are over Lake Erie, or areas that are least likely to be affected by the operation of the plant based on meteorological data.

**1995 Average TLD Exposure by Meteorological Sector and Distance From Fermi 2 Reactor (mR/std qtr)**

**Table 4-1**

| Sector | < 2 mi. | 2 to 5 mi. | 5 to 10 mi. | > 10 mi. |
|---|---|---|---|---|
| N | 13.2 | 16.7 | 15.0 | |
| NNE | 15.5 | | 14.6 | |
| NE | 17.4 | | | |
| ENE | 14.9 | | | |
| E | 14.8 | | | |
| ESE | 17.4 | | | |
| SE | 18.8 | | | |
| SSE | 19.2 | | | |
| S | 15.4 | | | |
| SSW | 15.8 | | | |
| SW | 13.8 | | 15.7 | 14.9 |
| WSW | 17.8 | 15.7 | 14.4 | 15.8 |
| W | 17.0 | 16.2 | | 15.1 |
| WNW | 15.2 | 15.9 | | 15.3 |
| NW | 15.1 | 14.8 | 14.7 | |
| NNW | 15.3 | 16.4 | 13.8 | |
| Average | 15.9 | 15.9 | 14.8 | 15.2 |

For 1995, direct radiation measurements were taken at 67 locations using thermo-luminescent dosimeters (TLD). The average quarterly exposure was 15.7 mR/standard quarter for indicating locations. This average exposure is equivalent to the ambient radiation levels measured prior to the operation of Fermi 2. In conclusion, the TLD data is consistent with preoperational and prior operational data and shows no adverse long-term trends in ambient radiation levels attributable to Fermi 2.

***Fermi 2 TLD Gamma Exposure***
***Historical Averages and Ranges***

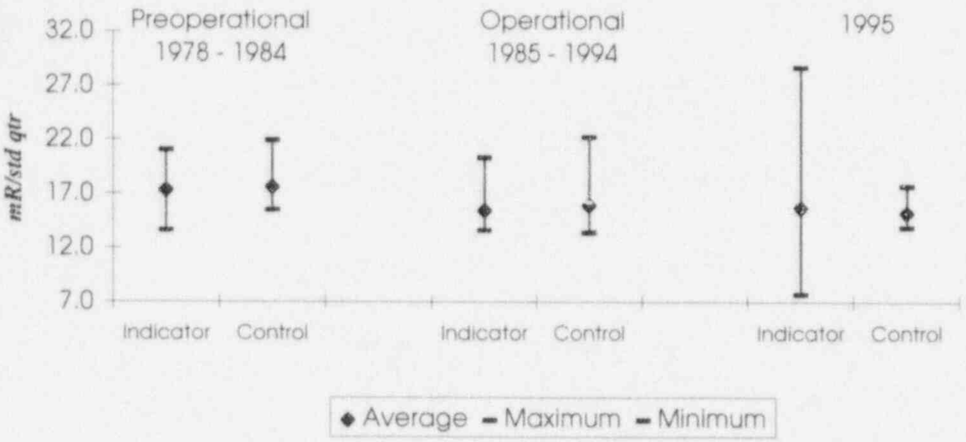



**Figure 4-1**

***Fermi 2 Annual Average TLD Gamma Exposure***

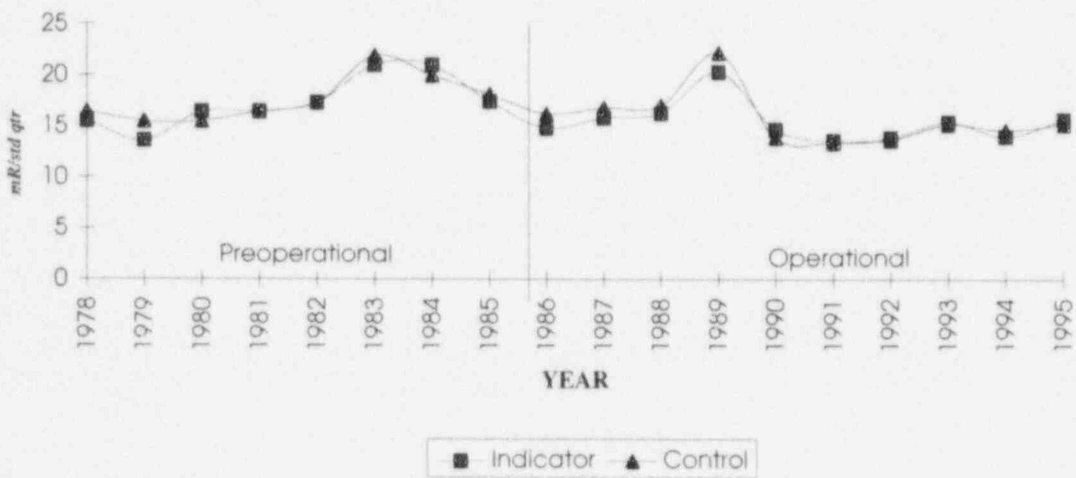



**Figure 4-2**

# *Atmospheric Monitoring*

## 5. Atmospheric Monitoring

A potential exposure pathway to humans is inhalation of airborne radioactive materials. Detroit Edison continuously samples the ambient air surrounding Fermi 2 for radioactivity. Air sampling began in 1979, during the preoperational program. At each sampling location, a mechanical air sampler is used to draw a continuous volume of air through two filters designed to collect particulates and radioiodines. Air samples are collected weekly and analyzed for gross beta and iodine-131 activities. The particulate filters for each sampling location are combined on a quarterly basis to form a "composite sample" and are analyzed for strontium-89/90 and gamma emitting isotopes. There are four indicator sampling locations which were selected based on an evaluation of the predominant wind directions. A fifth sampling location is approximately 14 miles west of the plant and is considered to be a control location unaffected by the operation of the plant.

### 5.1 Air Sampling

During the preoperational program, excluding the year 1981, the average gross beta for indicator air samples was 2.62E-2 pCi/cubic meter and ranged from 2.00E-2 to 4.00E-2 pCi/cubic meter. The average gross beta for the control samples was 2.50E-2 pCi/cubic meter and ranged from 1.90E-2 to 3.50E-2 pCi/cubic meter.

In late 1980, the Peoples Republic of China conducted an atmospheric nuclear weapon test. The fallout from this test was detected in Fermi 2 environmental air samples in 1981 (see Figure 5-2). The average gross beta for 1981 was 1.60E-1 pCi/cubic meter for indicator samples and 2.40E-1 pCi/cubic meter for control samples. Gamma spectroscopic analyses of the particulate filters indicated cesium-137, cerium-141, cerium-144, ruthenium-103, ruthenium-106, zirconium-95, niobium-95, manganese-54, and antimony-125 in the atmosphere as a result of this test.

From 1985 to 1994 the average gross beta for indicator samples was 2.24E-2 pCi/cubic meter and ranged from 2.00E-2 pCi/cubic meter to 2.50E-2 pCi/cubic meter. The average gross beta for the control samples was 2.22E-2 pCi/cubic meter and ranged from 2.00E-2 pCi/cubic meter to 2.50E-2 pCi/cubic meter. In 1986, as shown in Figure 5-2, there was a slight increase in gross beta activity and a 2.70E-1 pCi/cubic meter "spike" in the iodine-131 activity. These elevated levels in 1986 are attributed to the nuclear accident at Chernobyl (USSR) on April 26, 1986. For all other years, the iodine-131 activity was below the LLD of 7.0E-2 pCi/cubic meter. For the operational period from 1985 to 1994, excluding 1986, the air sampling data is consistent with preoperational data. Figure 5-1 shows a graphical comparison between preoperational and operational gross beta activity.

During 1995, two hundred and fifty-nine (259) particulate air filters were collected and analyzed for gross beta activity and two hundred and fifty-nine (259) charcoal filters were collected and analyzed for iodine-131. The average gross beta for indicator samples was 2.59E-2 pCi/cubic meter and ranged from 1.40E-2 to 4.70E-2 pCi/cubic meter. The average gross beta for control samples was 2.61E-2 pCi/cubic meter and ranged from 1.50E-2 to 4.30E-2 pCi/cubic meter. The following table contains the annual average gross beta results of all five sample locations for 1995.

**1995 Average Gross Beta Concentrations in Air Particulates**
**($pCi/m^3$)**

| Station | Description (sector/distance) | Annual Average |
|---|---|---|
| API-1 (I) | Estral Beach (NE/1.4 mi.) | 2.52E-2 |
| API-2 (I) | Site Boundary (NNW/0.6 mi.) | 2.63E-2 |
| API-3 (I) | Site Boundary (NW/0.6 mi.) | 2.56E-2 |
| API-4 (C) | North Custer Rd. (W/14 mi.) | 2.61E-2 |
| API-5 (I) | Erie St. (S/1.2 mi.) | 2.65E-2 |

**Table 5-1**

(I) = Indicator Station (C) = Control Station

The air particulate gross beta activity for each sampling period is shown in Figure 5-3. As the graph indicates, gross beta activity varies throughout the year. This variation is a common yearly trend and is primarily an effect of seasonal precipitation. However, wind patterns, dust loading and pollen can affect the gross beta activity. None of the charcoal filters collected showed detectable levels of iodine-131. Twenty (20) quarterly particulate filter composites were prepared and analyzed for strontium-89/90 and gamma emitting isotopes. Only naturally occurring potassium-40 and beryllium-7 were detected in these samples. For 1995, the air sampling data is consistent with prior operational data and preoperational data. Figure 5-1 shows a graphical comparison of preoperational, prior operational, and 1995 average gross beta activity. The broader range for 1995 is due to seasonal variations, while the ranges for the preoperational and prior operational data are based on annual averages.

Atmospheric monitoring results for 1995 showed only naturally occurring radioactivity and were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected in any atmospheric samples during 1995. In conclusion, the atmospheric monitoring data is consistent with preoperational and prior operational data and shows no adverse long-term trends in the environment, as illustrated in Figures 5-1 and 5-2, attributable to Fermi 2.

***Air Particulate Gross Beta***
***Historical Averages and Ranges***

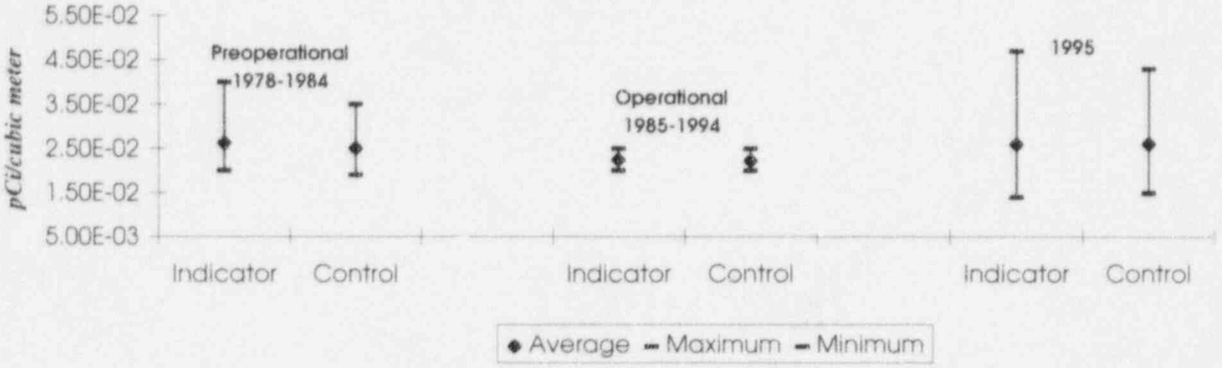



**Figure 5-1**

***Historical Gross Beta and I-131 Activity in Air Samples***

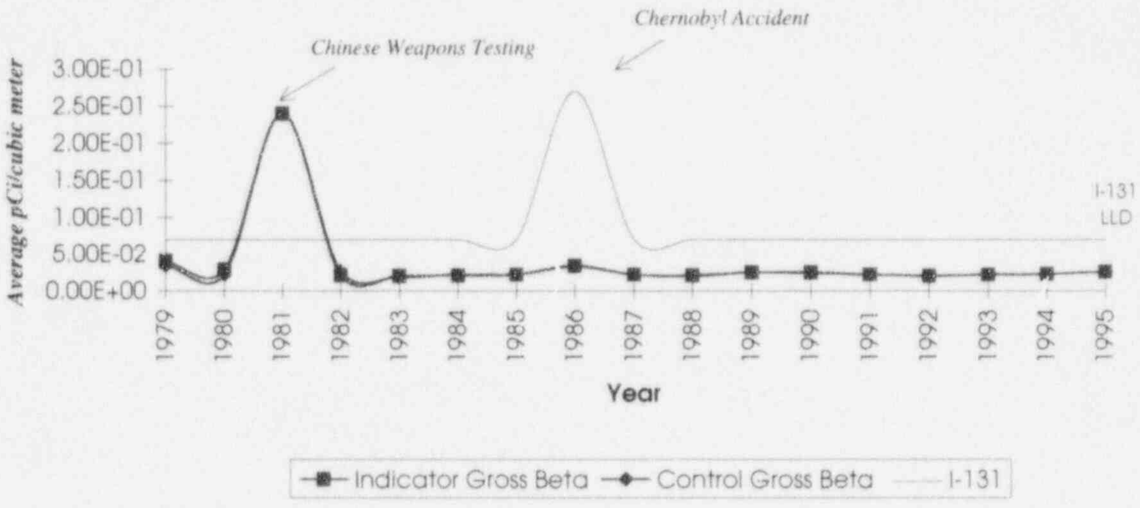



**Figure 5-2**

*Air Particulate Gross Beta for 1995*

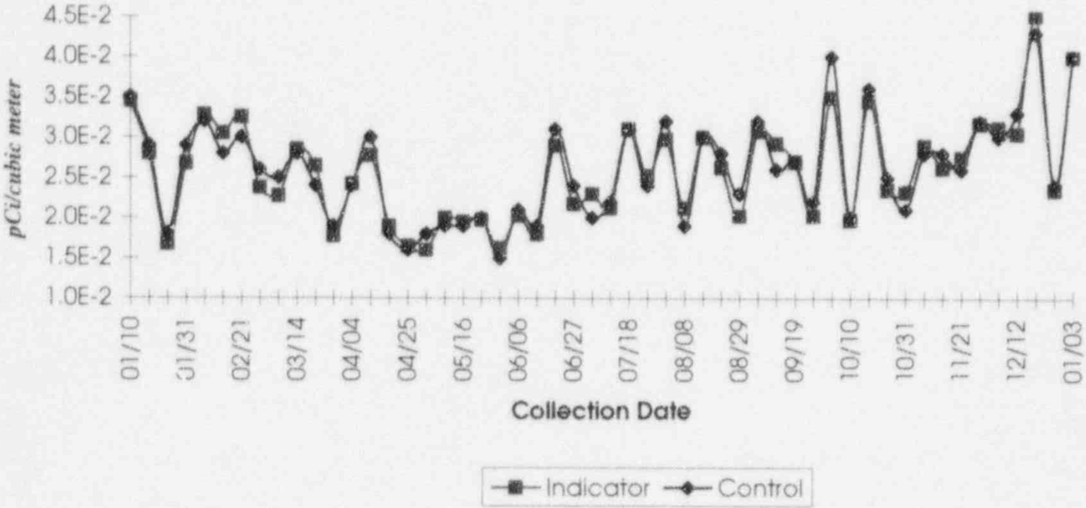



**Figure 5-3**

# *Terrestrail Monitoring*

# 6. Terrestrial Monitoring

Radionuclides released to the atmosphere may deposit on soil and vegetation, and therefore, may eventually be incorporated into the human food chain. To assess the impact of Fermi 2 operations to humans from the ingestion pathway, primary food product samples such as milk, grass and green leafy vegetables are collected and analyzed for radioactivity. The following sections discuss the type and frequency of terrestrial sampling, analyses performed, and a comparison of 1995 data to previous operational and preoperational data.

## 6.1 Milk Sampling

The milk sampling portion of the REMP is perhaps the most important aspect of the program. This is because a major radiation exposure pathway to the public can be the consumption of milk from local grazing animals (dairy cows or goats) due to biological concentration and the short turn around time in this pathway. Milk is collected from one indicator location and one control location semimonthly when animals are in the pasture, and monthly at other times. The milk is analyzed for iodine-131, gamma emitting isotopes, and strontium-89/90.

Milk sampling began in 1979 during the preoperational program. During this time period, milk samples were only analyzed for iodine-131 and gamma emitting isotopes. From 1979 to 1984, cesium-137 and naturally occurring potassium-40 were the only isotopes detected in milk samples. The cesium-137 concentration averaged 3.60E+0 pCi/liter and is due to past atmospheric nuclear weapons testing.

During the operational period between 1985 and 1987, milk samples were only analyzed for iodine-131 and gamma emitting isotopes. In 1986, after the nuclear accident at Chernobyl (USSR) iodine-131 and cesium 137 were detected in both indicator and control milk samples. The average concentration for iodine-131 was 3.70E+0 pCi/liter and 6.60E+0 pCi/liter for cesium-137 in 1986. The analysis for strontium-89/90 began in 1988, and strontium-90 is routinely detected in both indicator and control milk samples because of past atmospheric nuclear weapons testing. Since 1988, the average concentration for strontium-90 has been 2.16E+0 pCi/liter. Naturally occurring potassium-40 was also detected in milk samples during this operational period. For the operational period from 1985 to 1994, excluding 1986, the milk sample data is consistent with the preoperational data.

During the 1995, thirty six (36) cow milk samples and eleven (11) goat milk samples were collected and analyzed for iodine-131, gamma emitting isotopes, and strontium-89/90. No iodine-131 was detected in any of the samples. Strontium-90 was detected in both indicator and control milk samples and is due to fallout from past atmospheric weapons testing. The indicator samples had an average strontium-90 concentration of 1.56E+0 pCi/l and ranged from 8.90E-1 pCi/l to 3.20E+0 pCi/l. The control samples had an average strontium-90 concentration of 1.23E+0 pCi/l and ranged from 8.50E-1 pCi/l to 2.20E+0 pCi/l. Naturally occurring potassium-40 was detected in both indicator and control samples. For 1995, the milk sampling data is consistent with prior operational data and preoperational data.

In 1970, the concentration of strontium-90 in Monroe County milk was 6.00E+0 pCi/liter according to the Michigan Department of Health's "Milk Surveillance", Radiation Data and Reports, Vol. 11-15, 1970-1974. Figure 6-1 shows the calculated radiological decay curve for the 1970 concentration of strontium-90 and the average concentrations since 1988. Figure 6-1 illustrates that the inventory of strontium-90 in the local environment is decreasing with time and closely follows the calculated decay curve. This supports the rationale that the inventory of strontium-90 in the environment is due to fallout from past atmospheric nuclear weapons testing.

***Historical Strontium-90 Concentrations in Milk Samples***

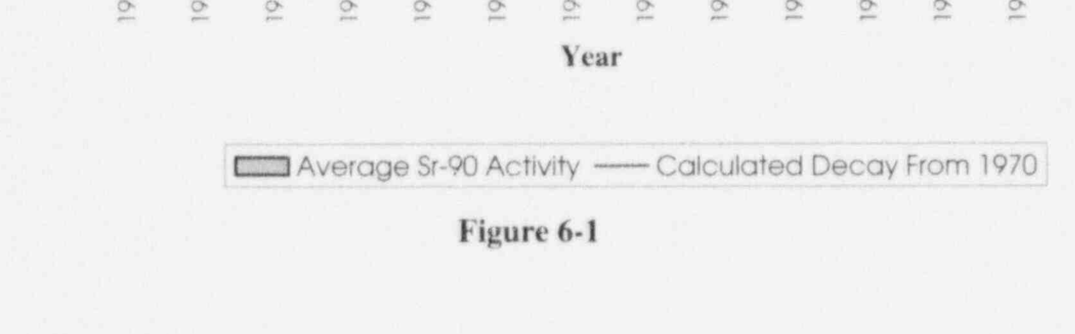



**Figure 6-1**

### *6.2 Grass Sampling*

At times when milk samples are not available, grass samples are collected at both the control milk sample location and the location where milk is not available. This has occurred in the past when the owners of a dairy animal have declined to participate in the REMP program or when an animal temporarily stops producing milk, as is the case for this year. Grass samples are analyzed for iodine-131 and gamma emitting isotopes.

Grass sampling began in 1985 in the operational program. In 1986, after the nuclear accident at Chernobyl (USSR), iodine-131, cesium-134, and cesium-137 were detected in both indicator and control grass samples. Also during the operational period between 1985 and 1991, naturally occurring potassium-40 and beryllium-7 was detected in both indicator and control samples. Cesium-137 was also detected in both indicator and control samples at an average concentration of 5.50E+0 pCi/kg during the operational program. This cesium activity is attributed to fallout from past atmospheric weapons testing and to the nuclear accident at Chernobyl.

During 1995, six (6) grass samples were collected and analyzed for iodine-131 and gamma emitting isotopes. Only naturally occurring potassium-40 and beryllium-7 were detected in these grass samples. For 1995, the grass sample data are consistent with previous years.

### *6.3 Garden Sampling*

Fermi 2 collects samples of broad leaf vegetables from indicator locations identified by the Annual Land Use Census. Samples are also collected at a control location that is at a distance and direction which is considered to be unaffected by plant operations. Samples are collected once a month during the growing season (June through September) and are analyzed for iodine-131 and gamma emitting isotopes.

Vegetable sampling started in 1982. During the preoperational program, only naturally occurring potassium-40 was detected in both indicator and control vegetable samples.

During the operational period from 1985 to 1990, only naturally occurring potassium-40 was detected in both indicator and control vegetable samples. However, in 1991, 1992, and 1993 cesium-137 was detected in one indicator sample each year and had an average concentration of 1.2E+1 pCi/kg. With the exception of the cesium-137 activity, the operational period from 1985 to 1993 was consistent the preoperational program.

Cesium-137 may become incorporated into plants by either uptake from the soil or direct deposition on foliar surfaces. Since cesium-137 has never been detected in any gaseous effluent sample from Fermi 2, and there has been no recent atmospheric weapons testing or nuclear accidents, the incorporation of cesium-137 by direct deposition is highly unlikely. The most probable source of cesium-137 in vegetable samples is the uptake of previously deposited cesium-137, which has leached into the soil. This cesium activity is attributed to fallout from past atmospheric weapons testing and to the nuclear accident at Chernobyl (USSR).

During 1995, thirteen (13) vegetable samples were collected and analyzed for iodine-131 and gamma emitting isotopes. No iodine-131 was detected in vegetable samples during 1995. Naturally occurring potassium-40 and beryllium-7 were detected in both indicator and control vegetable samples. One indicator sample showed detectable activity for naturally occurring thorium-228. For 1995, the vegetable sample data is consistent with prior operational data and preoperational data.

Terrestrial monitoring results for 1995 of milk, grass, and leafy garden vegetable samples, showed only naturally occurring radioactivity, and radioactivity associated with fallout from past atmospheric nuclear weapons testing. The radioactivity levels detected were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected in any terrestrial samples during 1995. In conclusion, the terrestrial monitoring data show no adverse long-term trends in the terrestrial environment.

# *Aquatic Monitoring*

# 7. Aquatic Monitoring

Lake Erie, on which Fermi 2 borders, is used as a source for drinking water, as well as for recreational activities such as fishing, swimming, sunbathing, and boating. For this reason, Lake Erie and its tributaries are extensively monitored for radioactivity.

The aquatic monitoring portion of the REMP consists of sampling raw municipal drinking water, surface water, groundwater, lake sediments, and fish for the presence of radioactivity due to the operation of Fermi 2. The following sections discuss the type and frequency of aquatic sampling, analyses performed, a comparison of 1995 data to previous operational and preoperational data, and the significance of these findings.

## 7.1 Drinking Water Sampling

Detroit Edison monitors drinking water at one control location and two indicator locations using automatic compositing samplers. Indicator water samples are obtained at the Monroe water intake located approximately 1.1 miles south of the plant and at the Fermi 1 potable water plant located approximately 0.3 miles south southeast of the plant. Detroit municipal water is used for the control samples and is obtained at the Allen Park water intake located approximately 18.6 miles north of the plant. The automatic samplers collect sample aliquots at time intervals that are very short (hourly) relative to the compositing period (monthly) in order to assure that a representative sample is obtained. Drinking water samples are collected on a monthly basis and analyzed for gross beta, strontium-89/90, and gamma emitting isotopes. The monthly samples for each location are combined on a quarterly basis to form a composite sample which is then analyzed for tritium activity.

Drinking water sampling was initiated in 1979, and samples were analyzed for gross beta, gamma emitting isotopes, and tritium as part of the preoperational program. The average annual gross beta for indicator drinking water samples, excluding 1981, was 3.40E+0 pCi/liter and ranged from 2.10E+0 to 4.30E+0 pCi/liter. The average annual gross beta for control drinking water samples during this time period was 3.47E+0 pCi/liter and ranged from 2.90E+0 to 4.50E+0 pCi/liter. In 1980 and 1983, cesium-137 was detected in drinking water samples at levels ranging from 5.40E+0 pCi/liter to 1.90E+1 pCi/liter. Tritium was also detected during the preoperational program and had an annual average of 3.25E+2 pCi/liter and ranged from 2.60E+2 to 4.50E+2 pCi/liter. The presence of cesium-137 and detectable levels of tritium in these water samples is due to fallout from past atmospheric nuclear weapons testing and naturally occurring tritium.

In 1981, as shown in Figure 7-2, the average gross beta was 9.80E+0 pCi/liter for indicator water samples. This anomalous gross beta activity is a direct result of an atmospheric nuclear weapon test conducted by the Peoples Republic of China in late 1980. Figure 7-2 also shows that, except for the Chinese weapons testing, the historic drinking water sample data is below the lower limit of detection (4 pCi/liter) required by US Environmental Protection Agency's National Interim Primary Drinking Water regulations. Even during the Chinese weapons testing, the drinking water samples did not exceed the USEPA's maximum allowable criteria of 5.00E+1 pCi/liter gross beta.

From 1985 to 1994, the average annual gross beta activity for indicator drinking water samples was 3.05E+0 pCi/liter and ranged from 2.40E+0 to 3.90E+0 pCi/liter. The average annual gross beta for control drinking water samples was 2.62E+0 pCi/liter and ranged from 1.90E+0 to 3.30E+0 pCi/liter. Figure 7-1 compares the average gross beta concentrations and ranges for the preoperational and operational programs.

The analysis for strontium-89/90 began in 1988 and strontium-90 has been detected in both indicator and control samples. The average annual strontium-90 activity for indicator samples was 7.30E-1 pCi/liter and ranged from 4.80E-1 to 1.20E+0 pCi/liter. The average annual strontium-90 activity for control samples was 7.60E-1 pCi/liter and ranged from 7.10E-1 to 8.00E-1 pCi/liter. Tritium was also detected in both indicator and control drinking water samples during this time period. The average annual tritium activity for indicator samples was 2.83E+2 pCi/liter and ranged from 2.20E+2 to 3.90E+2 pCi/liter. The average annual tritium activity for control samples was 3.00E+2 pCi/liter and ranged from 2.70E+2 to 3.40E+2 pCi/liter. The presence of strontium-90 and detectable levels of tritium in these water samples is due to fallout from past atmospheric nuclear weapons testing and naturally occurring tritium. For the operational period from 1985 to 1994, the drinking water sample data is consistent with the preoperational data.

In 1995, thirty-one (31) drinking water samples were collected and analyzed for gross beta, gamma emitting isotopes, strontium-89/90, and tritium. The average annual gross beta for indicator samples was 3.99E+0 and ranged from 2.00E+0 to 9.40E+0 pCi/liter. The average annual gross beta for control samples was 2.29E+0 pCi/liter and ranged from 1.80E+0 to 7.30E+0 pCi/liter. Figure 7-1 graphically compares the average gross beta concentrations and ranges for the preoperational, operational and 1995 data. The broader range for 1995 is due to seasonal variations, while the ranges for the preoperational and prior operational data are based on annual averages. No gamma emitting isotopes or strontium-89/90 activity was detected in drinking water samples during 1995. Ten (10) quarterly composite drinking water samples were prepared and analyzed for tritium. One indicator sample showed detectable activity for tritium at 2.30E+2 pCi/liter. For 1995, the drinking water sample data is consistent with prior operational data and preoperational data.

## *Drinking Water Gross Beta Concentrations*
## *Historical Averages and Ranges*

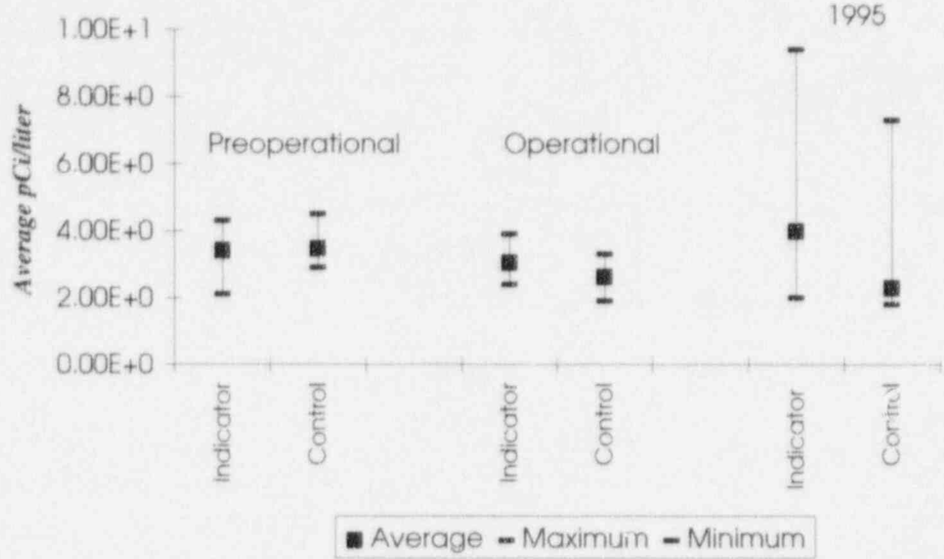



**Figure 7-1**

## *Historical Gross Beta Concentration*
## *in Drinking Water Samples*

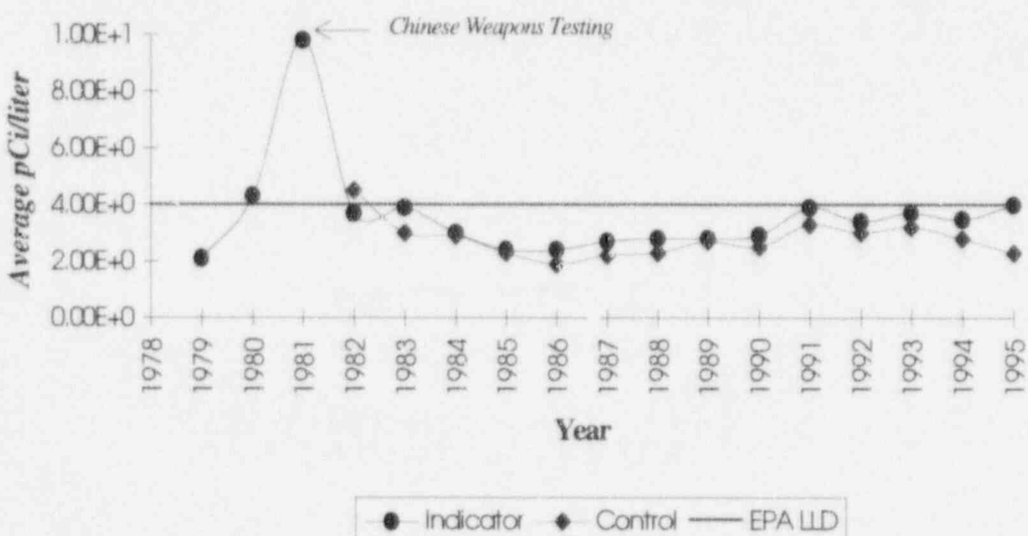



**Figure 7-2**

### *7.2 Surface Water Sampling*

Detroit Edison monitors surface water at two locations using automatic composite samplers. As with drinking water, surface water aliquots are collected at time intervals that are very short (hourly) relative to the compositing period (monthly) in order to assure obtaining a representative sample. Indicator surface water samples are obtained at the Fermi 2 General Service Water building, located approximately 0.3 miles south southeast from Fermi 2. The control surface water samples are obtained from Trenton Channel Power Plant's cooling water intake on the Detroit River which is approximately 11.7 miles north north east of Fermi 2. Surface water samples are collected on a monthly basis and analyzed for strontium-89/90 and gamma emitting isotopes. The monthly samples for each location are combined on a quarterly basis to form a quarterly composite sample and are analyzed for tritium.

Surface water sampling began in 1979 and the samples were analyzed for gamma emitting isotopes, and tritium. During this preoperational program no gamma emitting isotopes, except for naturally occurring potassium-40, were detected. Tritium was detected in both indicator and control samples during this time period and had an annual average of 3.15E+2 pCi/liter and ranged from 2.20E+2 to 4.10E+2 pCi/liter. This tritium activity represents the background concentration due to naturally occurring tritium and tritium produced during past thermonuclear weapons testing.

From 1985 to 1994, as part of the operational program, surface water samples were analyzed for gamma emitting isotopes and tritium. The analysis for strontium did not begin until 1988, and strontium-90 was detected in both indicator and control samples. The average strontium-90 concentration for this time period was 1.13E+0 pCi/liter and ranged from 5.30E-1 to 2.40E+0 pCi/liter. In 1990, two indicator samples showed detectable activity for cesium-137 at an average concentration of 1.20E+1 pCi/liter and ranged from 9.70E+0 to 1.50E+1 pCi/liter. The presence of cesium-137 and strontium-90 in these water samples is due to fallout from past atmospheric nuclear weapons testing. Tritium was also detected in surface water samples during this time period at a concentration of 2.33E+2 pCi/liter and ranged from 1.60E+2 to 3.10E+2 pCi/liter. This tritium activity is consistent with background levels measured during the preoperational program.

In 1995, thirty (30) surface water samples were collected and analyzed for gamma emitting isotopes and strontium-89/90. From the thirty monthly samples, eight (8) quarterly composite samples were prepared and analyzed for tritium. During 1995, no gamma emitting isotopes, except for naturally occurring potassium-40, were detected. Tritium was detected in one control sample at a concentration of 2.40E+2 pCi/liter. This tritium activity is consistent with background levels measured during the preoperational program. For 1995, the surface water sampling data is consistent with prior operational data and preoperational data.

### *7.3 Groundwater Sampling*

All municipal water supplies within 25 miles of Fermi 2 are from streams or lakes. In areas not served by municipal water systems, water supplies for domestic use are generally obtained from private wells. These wells penetrate aquifers composed of glacial drift deposits or soluble limestone and dolomite formations. The water is highly mineralized and contains significant amounts of sulfate and hydrogen sulfide. The network of private wells presently in use forms the source of water for domestic and livestock purposes in farms and homes west and north of the site. However, with the construction of new water plants and distribution systems, the water use trend in the area is from groundwater to surface water.

The subsurface hydrology of the local area is such that the groundwater gradient is to the east toward Lake Erie. To verify that a reversal of the groundwater gradient has not occurred, the water level of each well is measured once a month.

Groundwater is collected on a quarterly basis from four wells surrounding Fermi 2. The groundwater is analyzed for gamma emitting isotopes and tritium. Sampling location GW-4 which is located approximately 0.6 miles west north west is designated as the control location because it is up-gradient and is least likely to be affected by the operation of the plant. The other three sampling locations are down-gradient from Fermi 2 and designated as indicator locations.

Groundwater sampling began in 1987, during the operational period of the REMP program. From 1987 to 1989 no radioactivity was detected in groundwater samples. In 1990, one control sample had an activity of 7.71E+0 pCi/liter for cesium-137 and one indicator sample had a tritium activity of 9.90E+1 pCi/liter. The presence of cesium-137 in the 1990 control water sample is due to fallout from past atmospheric nuclear weapons testing leaching into the soil and becoming incorporated into the groundwater. The tritium activity in the 1990 indicator sample is consistent with background surface water levels measured during the surface water preoperational program.

Comparing past surface water sampling to groundwater samples is plausible, since surface water recharges groundwater. From 1991 to 1994, only naturally occurring potassium-40 was detected in groundwater samples.

In 1995, sixteen (16) groundwater samples were collected and analyzed for gamma emitting isotopes and tritium. Tritium was detected in one control sample at a concentration of 2.00E+2 pCi/liter. For 1995, the groundwater sample data is consistent with past operational data.

### *7.4 Sediment Sampling*

Sediments often act as a sink (temporary or permanent) for radionuclides, but they may also become a source, as when they are resuspended during periods of increased turbulence or are dredged and deposited elsewhere. Sediment, in the vicinity of the liquid discharge point, represents the most likely site for accumulation of radionuclides in the aquatic environment and, with long-lived radionuclides, a gradual increase in radioactivity concentration would be expected over time if discharges occur. Sediment, therefore, provides a long-term indication of change that may appear in other sample media (i.e., water and fish samples).

Lake Erie shoreline and bottom sediments from five locations are collected on a semiannual basis and are analyzed for gamma emitting isotopes and strontium-89/90. There is one control location and four indicator locations. The control sample is collected near the Trenton Channel Power Plant's cooling water intake. The indicator samples are collected at Estral Beach, near the Fermi 2 liquid discharge area, the shoreline at the end of Pointe Aux Peaux, and Indian Trails Community Beach.

During the preoperational program there was not a control location, and indicator samples were analyzed for gamma emitting isotopes. During the preoperational program, except for naturally occurring isotopes, only cesium-137 was detected in sediment samples. For this time period the average cesium-137 concentration was 3.27E+2 pCi/kg and ranged from 5.00E+1 to 6.60E+2 pCi/kg. The presence of cesium-137 in these sediment samples is due to fallout from past atmospheric nuclear weapons testing.

From 1985 to 1994, cesium-137, strontium-90, and naturally occurring isotopes were detected in sediment samples. The average cesium-137 concentration for indicator samples was 1.64E+2 pCi/kg and ranged from 2.60E+1 to 3.60E+2 pCi/kg. The control sample had an average cesium-137 concentration of 1.32E+2 pCi/kg for this time period and ranged from 1.00E+2 to 1.80E+2 pCi/kg.

The analysis for strontium-89/90 began in 1988, and strontium-90 has been routinely detected at similar concentrations in both indicator and control samples. The average strontium-90 activity for indicator samples was 8.42E+1 pCi/kg and ranged from 2.80E+1 to 1.59E+2 pCi/kg. The average strontium-90 activity for control samples was 1.98E+2 pCi/kg and ranged from 5.30E+1 to 3.08E+2 pCi/kg. The presence of cesium-137 and strontium-90 in these sediment samples is due to fallout from past atmospheric nuclear weapons testing.

In 1990 and 1991, the Spring samples taken at the Fermi 2 liquid discharge line (Location S-2) showed activity for plant related isotopes (manganese-54, cobalt-58, cobalt-60, and zinc-65) and was determined to be a result of liquid effluent from Fermi 2. The sample results were well below any regulatory reporting limits and were consistent with the activity released from the plant in liquid effluents and the dose impact was negligible.

In 1995, ten (10) sediment samples were collected and analyzed for gamma emitting isotopes and strontium 89/90. Strontium-90 was detected in two indicator sediment samples with an average concentration of 7.90E+1 pCi/kg. and ranged from 7.10E+1 to 8.70E+1 pCi/kg. Cesium-137 was detected in one control sample at a concentration of 1.10E+2 pCi/kg. The presence of cesium-137 and strontium-90 in sediment samples is due to fallout from past atmospheric nuclear weapons testing. Naturally occurring isotopes of potassium, radium, and thorium were also detected in both indicator and control sediment samples for this sampling period. For 1995, the sediment sample data is consistent with prior operational data and preoperational data.

***Historical Cesium-137 Concentrations in Sediment Samples***

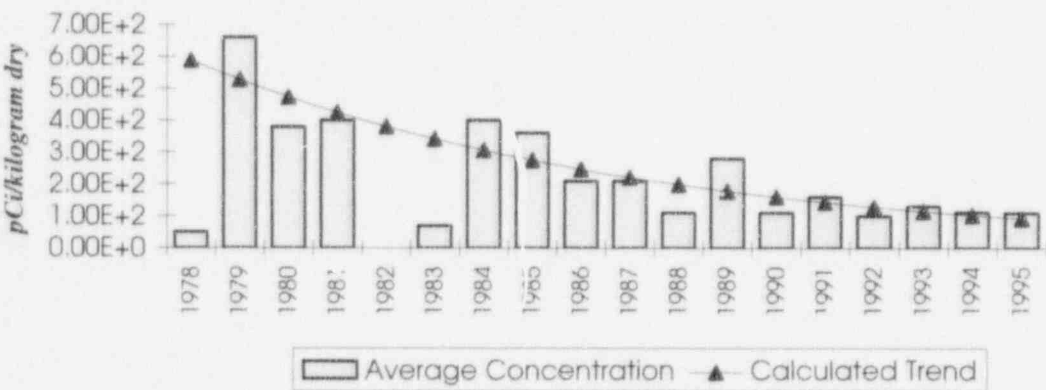



**Figure 7-3**

Figure 7-3 shows the historical concentration of cesium-137 in sediment samples from 1978 to 1995. Using the data from these years, and the statistical method of least squares, an exponential curve can be calculated that represents the cesium-137 concentration in sediment. This curve has a negative slope which indicates the overall concentration of cesium-137 in the environment is decreasing with time. This supports the rationale that the inventory of cesium-137 in the environment is due to fallout from past atmospheric nuclear weapons testing and not from the operation of Fermi 2.

### *7.5 Fish Sampling*

Samples of fish are collected from Lake Erie at three locations on a semiannual basis. There are two control locations and one indicator location. The two control locations are offshore of Celeron Island and Brest Bay. The indicator location is approximately 1200 feet offshore of the Fermi 2 liquid effluent discharge. Edible portions of the fish are analyzed for gamma emitting isotopes and strontium-89/90.

During the preoperational program fish samples were only analyzed for gamma emitting isotopes. Only cesium-137 and naturally occurring potassium-40 was detected during this time period. The average concentration of cesium-137 for indicator samples was 3.53E+1 pCi/kg and 4.20E+1 pCi/kg for control samples. The presence of cesium-137 in these fish samples is due to fallout from past atmospheric nuclear weapons testing.

From 1985 to 1994, cesium-137 and naturally occurring potassium-40 were detected in fish samples. The average cesium-137 concentration for indicator samples was 4.95E+1 pCi/kg and ranged from 2.00E+1 to 7.20E+1 pCi/kg. The average cesium-137 concentration for control samples was 5.13E+1 pCi/kg and ranged from 2.50E+1 to 9.70E+1 pCi/kg. Figure 7-4 shows a graphical representation of cesium-137 comparing preoperational and operational average concentrations and ranges.

The analysis for strontium-89/90 began in 1990, and strontium-90 has been routinely detected at similar concentrations in both indicator and control samples. The average strontium-90 concentration for indicator samples was 4.80E+1 pCi/kg and ranged from 1.71E+1 to 1.29E+2 pCi/kg. The average strontium-90 concentration for control samples was 4.02E+1 pCi/kg and ranged from 1.20E+1 to 7.70E+1 pCi/kg.

The presence of cesium-137 and strontium-90 in these fish samples is due to fallout from past atmospheric nuclear weapons testing. For this operational period, the fish sample data is consistent with prior preoperational data.

In 1995, twenty-three (23) fish samples were collected and analyzed for gamma emitting isotopes and strontium-89/90. Cesium-137, strontium-90 and naturally occurring potassium-40 was detected in fish samples. Four controls samples showed detectable activity for cesium-137 and had average concentration of 2.87E+1 pCi/kg and ranged from 2.29E+1 to 3.72E+1 pCi/kg. Figure 7-4 shows a graphical comparison of cesium-137 average concentrations and ranges between preoperational, operational, and 1995 data.

Strontium-90 was detected at similar concentrations in both indicator and control fish samples in 1995. The average concentration of strontium-90 for indicator samples was 2.63E+1 pCi/kg and ranged from 7.30E+0 to 6.50E+1 pCi/kg. The average concentration of strontium-90 for control samples was 3.31E+1 pCi/kg and ranged from 7.60E+0 to 5.00E+1 pCi/kg.

The presence of cesium-137 and strontium-90 in the 1995 fish samples is due to fallout from past atmospheric nuclear weapons testing. For 1995, the fish sample data is consistent with prior operational data and preoperational data.

***Cesium-137 Concentrations in Fish Samples***
***Historical Averages and Ranges***

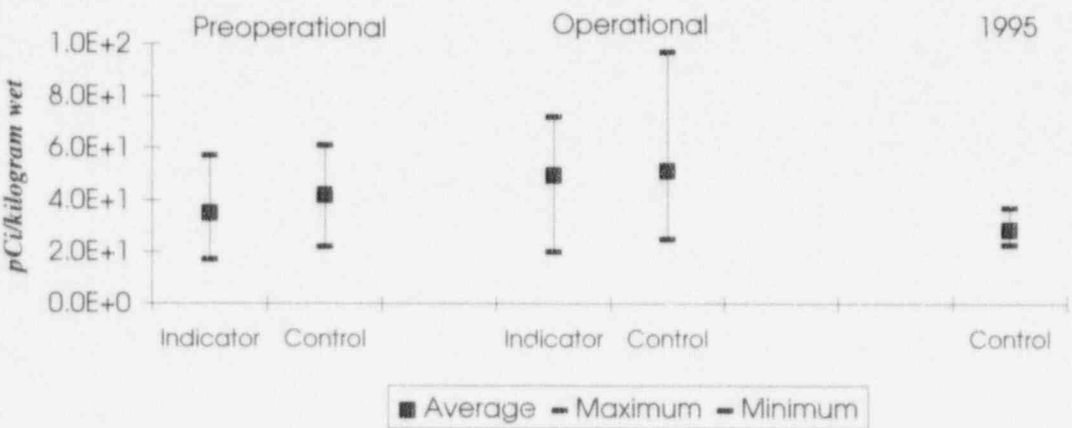



**Figure 7-4**

Aquatic monitoring results for 1995 of water, sediment, and fish, showed only naturally occurring radioactivity and radioactivity associated with fallout from past atmospheric nuclear weapons testing and were consistent with levels measured prior to the operation of Fermi 2. In conclusion, no radioactivity attributable to activities at Fermi 2 was detected in any aquatic samples during 1995 and no adverse long-term trends are shown in the aquatic monitoring data.

# *Land Use Census*

## *8. Land Use Census*

An annual Land Use Census is conducted in accordance with the Fermi 2 Offsite Dose Calculation Manual (ODCM), control 3.12.2, and satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. This census identifies changes in the use of unrestricted areas to permit modifications to monitoring programs for evaluating doses to individuals from principal pathways of exposure.

The annual Land Use Census is conducted during the growing season and is used to identify, within a radius of 5 miles, the location of the nearest residences, milk animals, meat animals, and gardens (greater than 50 square meters and containing broad leaf vegetation) in each of 16 meteorological sectors surrounding Fermi 2. Gardens greater than 50 square meters are the minimum size required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were made: (1) 20% of the garden is used for growing broad leaf vegetation (i.e., lettuce and cabbage); and (2) a vegetation yield of 2 kg/square meter.

### *8.1 1995 Land Use Census Results*

The 1995 Land Use Census was performed during the month of August. The 1995 data was compared to the 1994 data to determine any significant changes in the use of the land. No changes were found in the category of the nearest residences. One new milk animal (cows and goats) location was identified in the west north west sector. Eight new garden locations were identified during this census. The garden located at 6200 Langton (critical receptor) was not identified in the 1994 census due to a dry growing season. In the 1995 census, this garden was identified as the nearest garden and remains as the "critical receptor". The "critical receptor" is the individual living offsite who could receive the highest dose due to iodine-131, iodine-133, tritium and particulates with half lives greater than eight days in gaseous effluents.

If any identified changes are likely to change the identity of the critical receptor or to result in a potential dose via a particular pathway which is at least 20% greater than the current maximum dose for that pathway, then the potential dose for each location is calculated using Equation 7-14, of Section 7.8.1 of the ODCM. This evaluation is designed to qualify the "critical receptor" and not quantify the annual dose to the "critical receptor". Since there were no locations identified in the 1995 census that would change the location of the critical receptor no changes to the REMP were required. The information gathered during the 1995 Land Use Census is tabulated and presented in Tables 8-1 through 8-3.

## 1995 LAND USE CENSUS

Closest Residences

**Table 8-1**

| Year | Sector | Address | Distance (mi) | Change (mi) |
|---|---|---|---|---|
| 1994 | NE | 6760 Lakeshore | 1.13 | |
| 1995 | NE | 6760 Lakeshore | 1.13 | NC |
| 1994 | NNE | 6460 Brancheau | 1.07 | |
| 1995 | NNE | 6460 Brancheau | 1.07 | NC |
| 1994 | N | 6362 Brancheau | 1.09 | |
| 1995 | N | 6362 Brancheau | 1.09 | NC |
| 1994 | NNW | 5701 Post | 1.09 | |
| 1995 | NNW | 5701 Post | 1.09 | NC |
| 1994 | NW | 6577 Leroux | 1.04 | |
| 1995 | NW | 6577 Leroux | 1.04 | NC |
| 1994 | WNW | 6200 Langton | 0.66 | |
| 1995 # | WNW | 6200 Langton | 0.66 | NC |
| 1994 | W | 6001 Toll | 1.11 | |
| 1995 | W | 6001 Toll | 1.11 | NC |
| 1994 | WSW | 4981 Pte Aux Peaux | 1.39 | |
| 1995 | WSW | 4981 Pte Aux Peaux | 1.39 | NC |
| 1994 | SW | 5194 Pte Aux Peaux | 1.27 | |
| 1995 | SW | 5194 Pte Aux Peaux | 1.27 | NC |
| 1994 | SSW | 5820 Pte Aux Peaux | 1.12 | |
| 1995 | SSW | 5820 Pte Aux Peaux | 1.12 | NC |
| 1994 | S | 4834 Long | 1.03 | |
| 1995 | S | 4834 Long | 1.03 | NC |
| | ESE-SSE | Lake Erie | | |

NC = No Change
# = 1995 Critical Receptor

## 1995 LAND USE CENSUS

Closest Gardens

**Table 8-2**

| Year | Sector | Address | Distance (mi) | Change (mi) |
|---|---|---|---|---|
| 1994 | NE | 12197 Sovey | 2.31 | |
| 1995 | NE | 7531 Erie | 2.01 | -0.30 |
| 1994 | NNE | 7195 Lakeview | 1.91 | |
| 1995 | NNE | 6460 Brancheau | 1.07 | -0.84 |
| 1994* | NNE | 9501 U.S. Turnpike | 3.83 | |
| 1995* | NNE | 9501 U.S. Turnpike | 3.83 | NC |
| 1994 | N | 6080 Trombly | 1.64 | |
| 1995 | N | 6366 Trombly | 1.91 | +0.27 |
| 1994 | NNW | 7025 Melvina | 1.30 | |
| 1995 | NNW | 7025 Melvina | 1.30 | NC |
| 1994 | NW | 7175 Forest | 1.61 | |
| 1995 | NW | 7303 Swan Creek | 1.97 | +0.36 |
| 1994 | WNW | 6594 N.Dixie Hwy | 1.74 | |
| 1995* # | WNW | 6200 Langton | 0.66 | -1.08 |
| 1994 | W | 5681 Toll | 1.55 | |
| 1995 | W | 5681 Toll | 1.55 | NC |
| 1994 | WSW | 4611 Pte Aux Peaux | 1.77 | |
| 1995 | WSW | 5120 Spaulding | 2.34 | +0.57 |
| 1994 | SW | 4971 Elm | 1.46 | |
| 1995 | SW | 4666 Pte. Aux Peaux | 1.68 | +0.22 |
| 1994 | SSW | 4384 Ave C | 1.53 | |
| 1995 | SSW | 4345 Ave B | 1.56 | +0.03 |
| 1994 | S | 6139 Goddard | 1.19 | |
| 1995 | S | 6139 Goddard | 1.19 | NC |
| | ESE - SSE | Lake Erie | | |

NC = No Change
* = Participants in REMP program
# = 1995 Critical Receptor

## 1995 LAND USE CENSUS

Milk Locations

**Table 8-3**

| Year | Sector | Address | Distance (mi) | Findings |
|---|---|---|---|---|
| 1994 | NE | No Identified Locations | | |
| 1995 | NE | No Identified Locations | | |
| 1994 | NNE | No Identified Locations | | |
| 1995 | NNE | No Identified Locations | | |
| 1994* | N | 6658 Labo | 4.15 | Goats |
| 1995* | N | 6658 Labo | 4.15 | Goats |
| 1994 | NNW | No Identified Locations | | |
| 1995 | NNW | No Identified Locations | | |
| 1994 | NW | No Identified Locations | | |
| 1995 | NW | No Identified Locations | | |
| 1994* | NW | 2705 Labo | 5.41 | Cows |
| 1995* | NW | 2705 Labo | 5.41 | Cows |
| 1994 | WNW | No Identified Locations | | |
| 1995 | WNW | 4262 Post | 2.07 | Cows/Goats |
| 1994 | W | 6248 Williams | 2.70 | Goats |
| 1995 | W | 6248 Williams | 2.70 | Goats |
| 1994 | WSW | No Identified Locations | | |
| 1995 | WSW | No Identified Locations | | |
| 1994 | SW | No Identified Locations | | |
| 1995 | SW | No Identified Locations | | |
| 1994 | SSW | No Identified Locations | | |
| 1995 | SSW | No Identified Locations | | |
| 1994 | S | No Identified Locations | | |
| 1995 | S | No Identified Locations | | |
| | ESE - SSE | Lake Erie | | |

* = Participants in REMP sampling program

# *Sample Locations*

# 9. Sample Locations

## 9.1 Direct Radiation Sample Locations

**Table 9-1**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T1 | NE/38° | 1.3 mi. | Estral Beach, Pole on Lakeshore 23 Poles S of Lakeview (Special Area) | Q | I |
| T2 | NNE/22° | 1.2 mi. | East of termination of Brancheau St. on post (Special Area) | Q | I |
| T3 | N/9° | 1.1 mi. | Pole, NW corner of Swan Boat Club fence (Special Area) | Q | I |
| T4 | NNW/337° | 0.6 mi. | Site boundary and Toll Rd. on Site fence by API #2 | Q | I |
| T5 | NW/313° | 0.6 mi. | Site boundary and Toll Rd. on Site fence by API #3 | Q | I |
| T6 | WNW/293° | 0.6 mi. | Pole, NE corner of Bridge over Toll Rd. | Q | I |
| T7 | W/270° | 14.0 mi. | Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd. | Q | C |
| T8 | NW/305° | 1.9 mi. | Pole on Post Rd. near NE corner of Dixie Hwy. and Post Rd. | Q | I |
| T9 | NNW/334° | 1.5 mi. | Pole, NW corner of Trombley and Swan View Rd. | Q | I |
| T10 | N/6° | 2.1 mi. | Pole, S side of Massarant- 2 poles W of Chinavare. | Q | I |

*I = Indicator* *C = Control* *Q = Quarterly*

## *Direct Radiation Sample Locations (Table 9-1 continued)*

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T11 | NNE/23° | 6.2 mi. | Pole, NE corner of Milliman and Jefferson | Q | I |
| T12 | NNE/29° | 6.3 mi. | Pointe Mouille Game Area Field Office, Pole near tree, N area of parking lot | Q | I |
| T13 | N/356° | 4.1 mi. | Labo and Dixie Hwy. Pole on SW corner with light | Q | I |
| T14 | NNW/337° | 4.4 mi. | Labo and Brandon Pole on SE corner near RR | Q | I |
| T15 | NW/315° | 3.9 mi. | Pole, behind Newport Post Office. | Q | I |
| T16 | WNW/283° | 4.9 mi. | Pole, SE corner of War and Post Rd. | Q | I |
| T17 | W/271° | 4.9 mi. | Pole, NE corner of Nadeau and Laprad near mobile home park. | Q | I |
| T18 | WSW/247° | 4.8 mi. | Pole, NE corner of Mentel and Hurd Rd. | Q | I |
| T19 | SW/236° | 5.2 mi. | 1st pole E of Fermi siren on Waterworks Rd. NE corner of intersection - Sterling State Park Rd. Entrance Drive/Waterworks (in Sterling State Park) | Q | I |
| T20 | WSW/257° | 2.7 mi. | Pole, S side of Williams Rd, 8 poles W of Dixie Hwy. (Special Area) | Q | I |
| T21 | WSW/239° | 2.7 mi. | Pole, N side of Pearl at Parkview Woodland Beach (Special Area) | Q | I |

*I = Indicator* *C = Control* *Q = Quarterly*

### *Direct Radiation Sample Locations (Table 9-1 continued)*

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T22 | S/172° | 1.2 mi. | Pole, N side of Pointe Aux Peaux 2 poles W of Long - Site Boundary | Q | I |
| T23 | SSW/195° | 1.1 mi. | Pole, S side of Pointe Aux Peaux 1 pole W of Huron next to Vent Pipe - Site Boundary | Q | I |
| T24 | SW/225° | 1.2 mi. | Fermi Gate along Pointe Aux Peaux Rd. on fence wire W of gate Site Boundary | Q | I |
| T25 | WSW/251° | 1.5 mi. | Pole, Toll Rd. - 13 poles S of Fermi Drive | Q | I |
| T26 | WSW/259° | 1.1 mi. | Pole, Toll Rd. - 6 poles S of Fermi Drive | Q | I |
| T27 | SW/225° | 6.8 mi. | Pole, NE corner of McMillan and East Front St. (Special Area) | Q | I |
| T28 | SW/229° | 10.7 mi. | Pole, SE corner of Mortar Creek and LaPlaisance. | Q | C |
| T29 | WSW/237° | 10.3 mi. | Pole, E side of S Dixie, 1 pole S of Albain. | Q | C |
| T30 | WSW/247° | 7.8 mi. | Pole, St. Mary's Park corner of Elm and Monroe St., S side of parking lot next to river (Special Area) | Q | I |
| T31 | WSW/255° | 9.6 mi. | 1st pole W of entrance drive Milton "Pat" Munson Recreational Reserve on North Custer Rd. | Q | C |

*I = Indicator* *C = Control* *Q = Quarterly*

### Direct Radiation Sample Locations (Table 9-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T32 | WNW/295° | 10.3 mi. | Pole, corner of Stony Creek and Finzel Rd. | Q | I |
| T33 | NW/317° | 9.2 mi. | Pole, W side of Grafton Rd. 1 pole N of Ash and Grafton intersection. | Q | I |
| T34 | NNW/338° | 9.7 mi. | Pole, W side of Port Creek, 1 pole S of Will-Carleton Rd. | Q | I |
| T35 | N/359° | 6.9 mi. | Pole, S Side of S Huron River Dr. across from Race St. (Special Area) | Q | I |
| T36 | N/358° | 9.1 mi. | Pole, NE corner of Gibraltar and Cahill Rd. | Q | I |
| T37 | NNE/21° | 9.8 mi. | Pole, S corner of Adams and Gibraltar across from Humbug Marina. | Q | I |
| T38 | WNW/294° | 1.7 mi. | Residence - 6594 N. Dixie Hwy. | Q | I |
| T39 | S/176° | 0.3 mi. | SE corner of Protected Area Fence (PAF). | Q | I |
| T40 | S/170° | 0.3 mi. | Midway along OBA - (PAF) | Q | I |
| T41 | SSE/161° | 0.2 mi. | Midway between OBA and Shield Wall on PAF. | Q | I |
| T42 | SSE/149° | 0.2 mi. | Midway along Shield Wall on PAF. | Q | I |
| T43 | SE/131° | 0.1 mi. | Midway between Shield Wall and Aux Boilers on PAF. | Q | I |
| T44 | ESE/109° | 0.1 mi. | Opposite OSSF door on PAF. | Q | I |

*I = Indicator* *C = Control* *Q = Quarterly*

***Direct Radiation Sample Locations (Table 9-1 continued)***

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T45 | E/86° | 0.1 mi. | NE Corner of PAF. | Q | I |
| T46 | ENE/67° | 0.2 mi. | NE side of barge slip on fence. | Q | I |
| T47 | S/185° | 0.1 mi. | South of Turbine Bldg. rollup door on PAF. | Q | I |
| T48 | SW/235° | 0.2 mi. | 30 ft. from corner of AAP on PAF. | Q | I |
| T49 | WSW/251° | 1.1 mi. | Corner of Site Boundary fence north of NOC along Critical Path Rd. | Q | I |
| T50 | W/270° | 0.9 mi. | Site Boundary fence near main gate by the south Bullit Street sign. | Q | I |
| T51 | N/3° | 0.4 mi. | Site Boundary fence north of north Cooling Tower. | Q | I |
| T52 | NNE/20° | 0.4 mi. | Site Boundary fence at the corner of Arson and Tower. | Q | I |
| T53 | NE/55° | 0.2 mi. | Site Boundary fence east of South Cooling Tower. | Q | I |
| T54 | S/189° | 0.3 mi. | Pole next to Fermi 2 Visitors Center. | Q | I |
| T55 | WSW/251° | 3.3 mi. | Pole, north side of Nadeau Rd. across from Sodt Elementary School Marquee | Q | I |
| T56 | WSW/255° | 4.9 mi. | Pole, entrance to Jefferson Middle School on Stony Creek Rd. | Q | I |

*I = Indicator* *C = Control* *Q = Quarterly*

### *Direct Radiation Sample Locations (Table 9-1 continued)*

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| T57 | W/260° | 2.7 mi. | Pole, north side of Williams Rd. across from Jefferson High School entrance. | Q | I |
| T58 | WSW/249° | 4.9 mi. | Pole west of Hurd Elementary School Marquee | Q | I |
| T59 | NW/325° | 2.6 mi. | Pole north of St. Charles Church entrance on Dixie Hwy. | Q | I |
| T60 | NNW/341° | 2.5 mi. | 1st pole north of North Elementary School entrance on Dixie Hwy. | Q | I |
| T61 | W/268° | 10.1 mi. | Pole, SW corner of Stewart and Raisinville Rd. | Q | I |
| T62 | SW/232° | 9.7 mi. | Pole, NE corner of Albain and Hull Rd. | Q | I |
| T63 | WSW/245° | 9.6 mi. | Pole, NE corner of Dunbar and Telegraph Rd. | Q | I |
| T64 | WNW/286° | 0.2 mi. | West of switchgear yard on PAF | Q | I |
| T65 | NW/322° | 0.1 mi. | PAF switchgear yard area NW of RHR complex. | Q | I |
| T66 | NE/50° | 0.1 mi. | Behind Bldg. 42 on PAF | Q | I |
| T67 | NNW/338° | 0.2 mi. | Site Boundary fence West of South Cooling Tower. | Q | I |

*I = Indicator* *C = Control* *Q = Quarterly*

## *9.2 Air Particulate and Air Iodine Sample Locations*

**Table 9-2**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| API-1 | NE/39° | 1.4 mi. | Estral Beach Pole on Lakeshore, 18 Poles S of Lakeview (Nearest Community with highest X/Q) | W | I |
| API-2 | NNW/337° | 0.6 mi. | Site Boundary and Toll Road, on Site Fence by T-4 | W | I |
| API-3 | NW/313° | 0.6 mi. | Site Boundary and Toll Road, on Site Fence by T-5 | W | I |
| API-4 | W/270° | 14.0 mi. | Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd. | W | C |
| API-5 | S/191° | 1.2 mi. | One pole south of Pointe Aux Peaux Rd.on Erie St. | W | I |

*I = Indicator* *C = Control* *W = Weekly*

## *9.3 Milk Sample Locations*

**Table 9-3**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| M-2 | NW/319° | 5.4 mi. | Reaume Farm - 2705 E Labo | M-SM | I |
| M-8 | WNW/289° | 9.9 mi. | Calder Dairy - 9334 Finzel Rd | M-SM | C |
| M-9 | N/6° | 4.2 mi. | Bourasso Farm - 6658 Labo Rd. | M-SM | I |

*I = Indicator* *C = Control* *M = Monthly* *SM = Semimonthly*

## 9.4 Garden Sample Locations

**Table 9-4**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| FP-1 | NNE/21° | 3.8 mi. | 9501 Turnpike Highway | M | I |
| FP-3 | NNE/12° | 1.1 mi. | 6441 Brancheau | M | I |
| FP-7 | WNW/302° | 0.7 mi. | 6200 Langton | M | I |
| FP-9 | W/261° | 10.9 mi. | 4074 North Custer Road | M | C |

*I = Indicator* *C = Control* *M = Monthly (when available)*

## 9.5 Drinking Water Sample Locations

**Table 9-5**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| DW-1 | S/174° | 1.1 mi. | Monroe Water Station N Side of Pointe Aux Peaux 1/2 Block W of Long Rd | M | I |
| DW-2 | N/8° | 18.5 mi. | Detroit Water Station 14700 Moran Rd, Allen Park | M | C |
| DW-3 | SSE/160° | 0.3 mi. | Fermi 1 Raw Lake Water Intake Structure | M | I |

*I = Indicator* *C = Control* *M = Monthly*

## *9.6 Surface Water Sample Locations*

**Table 9-6**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| SW-2 | NNE/20° | 11.7 mi. | DECo's Trenton Channel Power Plant Intake Structure (Screenhouse #1) | M | C |
| SW-3 | SSE/160° | 0.2 mi. | DECO's Fermi 2 General Service Water Intake Structure | M | I |

*I = Indicator* *C = Control* *M = Monthly*

## *9.7 Groundwater Sample Locations*

**Table 9-7**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| GW-1 | S/175° | 0.4 mi. | Approx. 100 ft W of Lake Erie, EF-1 Parking lot near gas fired peakers | Q | I |
| GW-2 | SSW/208° | 1.0 mi. | 4 ft S of Pointe Aux Peaux (PAP) Rd. Fence 427 ft W of where PAP crosses over Stoney Point's Western Dike | Q | I |
| GW-3 | SW/226° | 1.0 mi. | 143 ft W of PAP Rd. Gate, 62 ft N of PAP Rd. Fence | Q | I |
| GW-4 | WNW/299° | 0.6 mi. | 42 ft S of Langton Rd, 8 ft E of Toll Rd. Fence | Q | C |

*I = Indicator* *C = Control* *Q = Quarterly*

## *9.8 Sediment Sample Locations*

**Table 9-8**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| S-1 | SSE/165° | 0.9 mi. | Pointe Aux Peaux, Shoreline to 500 ft offshore sighting directly to Land Base Water Tower | SA | I |
| S-2 | E/81° | 0.2 mi. | Fermi 2 Discharge, approx. 200 ft offshore | SA | I |
| S-3 | NE/39° | 1.1 mi. | Estral Beach, approx. 200 ft offshore, off North shoreline where Swan Creek and Lake Erie meet | SA | I |
| S-4 | WSW/241° | 3.0 mi. | Indian Trails Community Beach | SA | I |
| S-5 | NNE/20° | 11.7 mi. | DECo's Trenton Channel Power Plant intake area. | SA | C |

*I = Indicator* *C = Control* *SA = Semiannually*

## *9.9 Fish Sample Locations*

**Table 9-9**

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|---|---|---|---|---|---|
| F-1 | NNE/31° | 9.5 mi. | Celeron Island | SA | C |
| F-2 | E/86° | 0.4 mi. | Fermi 2 Discharge (approx. 1200 ft offshore) | SA | I |
| F-3 | WSW/238° | 4.8 mi. | Brest Bay Marina Area | SA | C |

*I = Indicator* *C = Control* *SA = Semiannually*

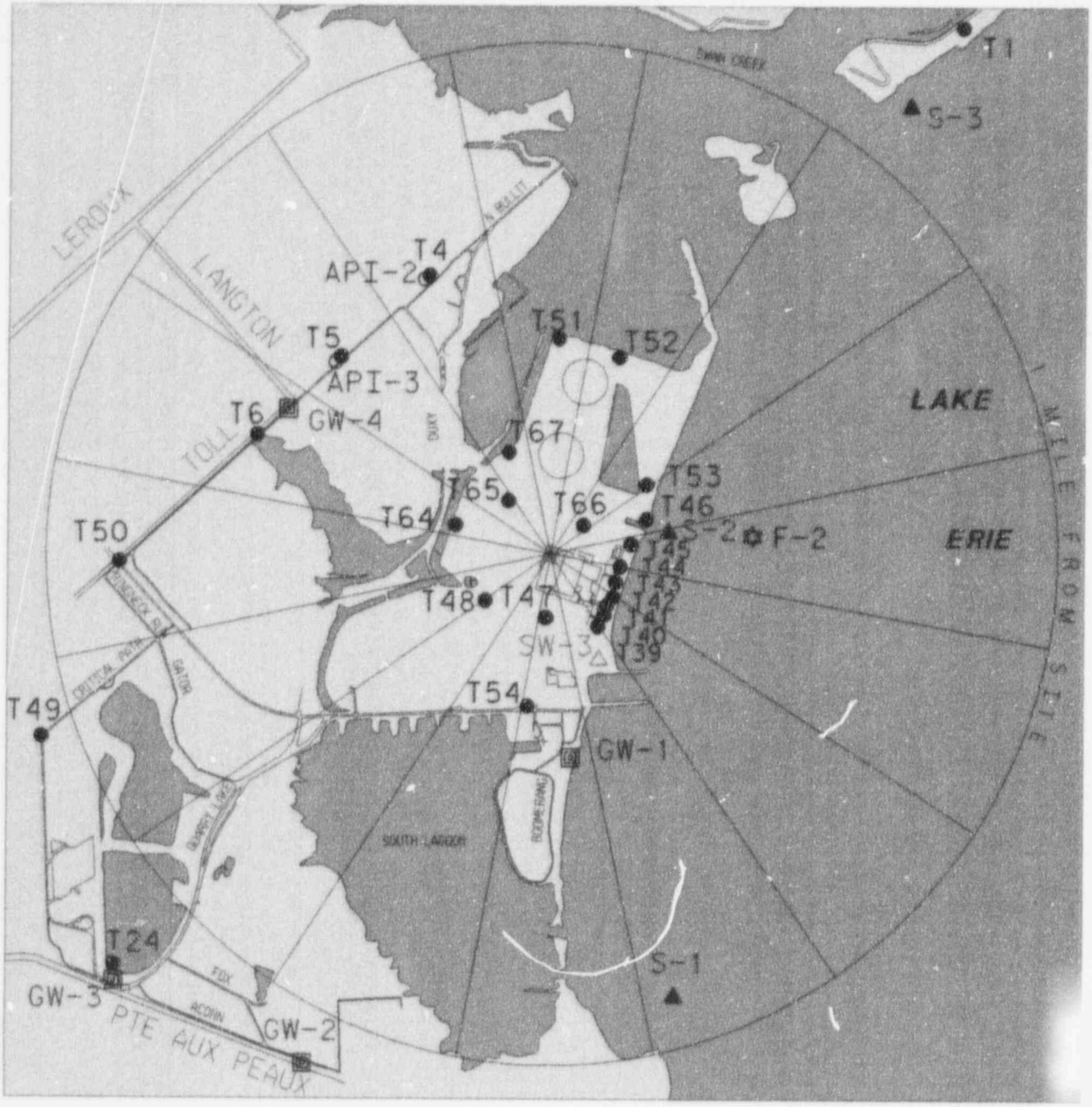



FIGURE 9-1
SAMPLING LOCATIONS
BY STATION NUMBER
WITHIN 1 MILE

N

LEGEND

- ● T- DIRECT RADIATION
- ○ API- AIR PARTICULATES/AIR IODINE
- ▲ S- SEDIMENTS
- △ DW/SW- DRINKING WATER/SURFACE WATER
- ▣ GW- GROUND WATER
- □ M- MILK
- ⊠ FP- FOOD PRODUCTS
- ✡ F- FISH

0 0.5
SCALE IN MILES

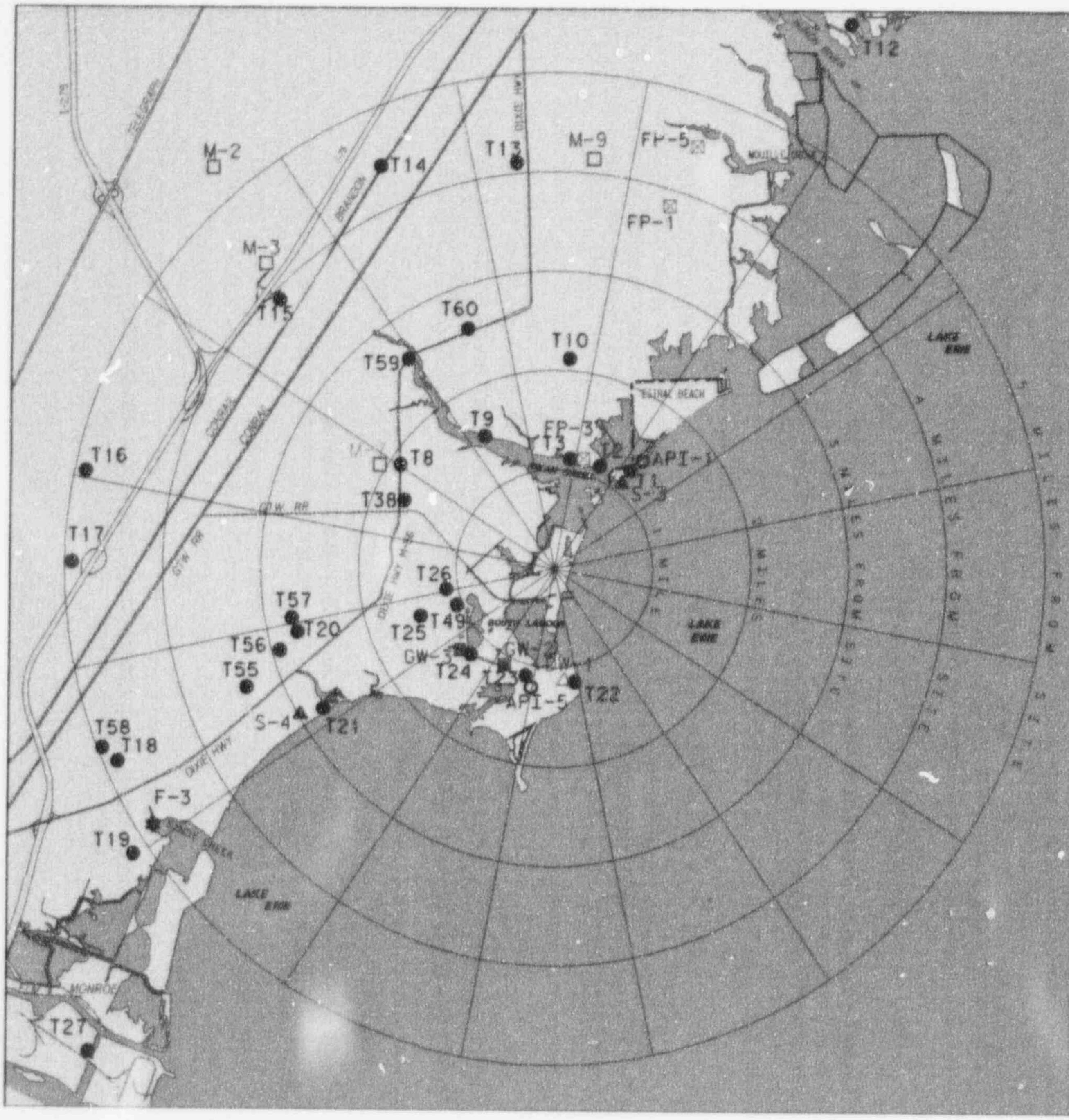



FIGURE 9-2
SAMPLING LOCATIONS
BY STATION NUMBER
(1 To 5 MILES)


LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES/AIR IODINE
- S- SEDIMENTS
- DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- FP- FOOD PRODUCTS
- F- FISH

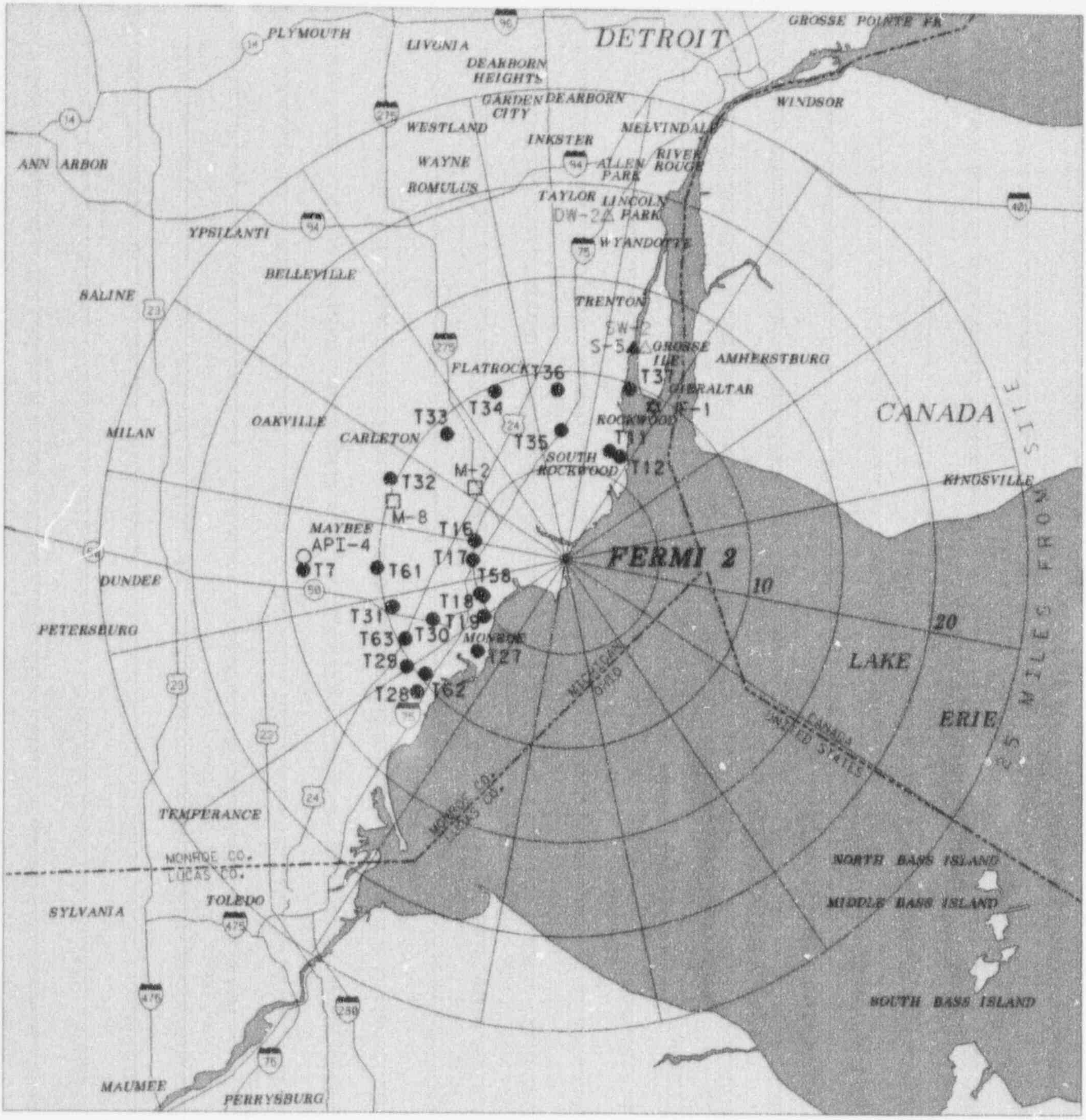



FIGURE 9-3
SAMPLING LOCATIONS
BY STATION NUMBER
(GREATER THAN 5 MILES)

LEGEND

- ● T- DIRECT RADIATION
- ○ API- AIR PARTICULATES OR AIR IODINE
- ▲ S- SEDIMENTS
- △ DW/SW- DRINKING WATER/SURFACE WATER
- ▩ GW- GROUND WATER
- □ M- MILK
- ⊠ FP- FOOD PRODUCTS
- ✡ F- FISH

N

5 0 5 10

SCALE IN MILES

# *Program Execution*

# *10. Program Execution*

In 1995, the major deviations from scheduled REMP activities were the loss of electrical power to air sampling and water sampling equipment and the freezing of surface water sample lines. The following sections list all deviations, changes and corrective actions from the normal sampling schedule for 1995. These deviations did not have a significant impact on the execution of the REMP.

## *10.1 Direct Radiation Monitoring*

All TLDs are placed in the field in inconspicuous locations to minimize the loss of TLDs due to vandalism. During 1995, two hundred sixty eight (268) TLDs were placed in the field for the REMP program and all TLDs were collected and processed.

## *10.2 Atmospheric Monitoring*

In the Atmospheric Monitoring program, two hundred and sixty (260) particulate and charcoal cartridges were scheduled to be collected in 1995. All samples were collected as scheduled, except one (1) sample was lost due to equipment malfunction. Section 10.2.1 lists all deviations and changes to the Atmospheric Monitoring program.

### *10.2.1 Air Sampling*

On May 9, air sampler API-1 was found not operating due to a short circuit in the electrical wiring. The sampler was immediately replaced with a spare sampler. For this reason the weekly sample was not collected and the second quarter composite sample is considered to be less than representative.

For the week of June 25th, all air samplers operated for six days due to the July 4th holiday.

For the week of July 2nd, all air samplers operated for eight days to reestablish the seven day sampling period.

On September 26, air sampler API-3 was found not operating due to equipment malfunction. The sampler was immediately replaced with a spare sampler. After an investigation, it was determined that the air sampler was down for approximately sixteen (16) hours. For this reason the weekly sample and the third quarter composite sample are considered to be less than representative.

### *10.3 Terrestrial Monitoring*

During 1995, fifty-four (54) milk samples were scheduled to be collected. Seven (7) samples were not collected due to the fact that one animal stopped producing milk. To compensate for the lack of milk, fourteen (14) grass samples were added to the schedule. However, due to seasonal availability, only six (6) grass samples were obtained. Sections 10.3.1 through 10.3.3 list all deviations and changes to the Terrestrial Monitoring program.

#### *10.3.1 Milk Sampling*

From January to the first half of June no milk samples were collected at location M-9 because the animal stopped producing milk.

Strontium 89 and 90 analysis was not performed on milk sample M-9 collected on June 22 due to low volume of sample.

#### *10.3.2 Grass Sampling*

From January to April on grass samples were not collected at M-9 and M-8 (control sample) due to seasonal availability.

#### *10.3.3 Garden Sampling*

In 1995, a new control garden location, designated as FP-9, was added to the program and is located at 4074 North Custer Road. At the beginning of the year, location FP-6 was dropped from the program at the owner's request. All scheduled garden samples were collected in 1995.

### *10.4 Aquatic Monitoring*

During 1995, thirty-one (31) drinking water, twenty-four (24) surface water, sixteen (16) groundwater, and ten (10) sediment samples were scheduled to be collected. In addition, twenty-two (22) fish samples were collected for the Aquatic Monitoring program. Due to loss of electrical power, two (2) grab samples were collected; one drinking water and one surface water sample. Five (5) grab samples were collected due to ice or sediment inside sample line. Sections 10.4.1 through 10.4.5 list all deviations to the Aquatic Monitoring program.

### *10.4.1 Drinking Water Sampling*

In July, drinking water sampler DW-3 (Fermi 1 potable water plant) was dropped from the program due to the shut down of the water plant.

On August 15, drinking water sampler DW-1 was found not operating due to loss of electrical power. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for August and the third quarter composite sample are considered less than representative.

### *10.4.2 Surface Water Sampling*

On January 9, surface water sampler SW-2 was found not operating due to ice inside the sample line. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for January and the first quarter composite sample are considered less than representative.

On February 6 and February 13, surface water sampler SW-2 was found not operating due to ice inside the sample line. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for February and the first quarter composite sample are considered less than representative.

On March 21, surface water sampler SW-3 was found not operating due to loss of electrical power. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for March and the first quarter composite sample are considered less than representative.

On June 13, surface water sampler SW-2 was found to have a low sample volume due to sediment inside the sample line. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for June and the second quarter composite sample are considered less than representative.

On December 12, surface water sampler SW-2 was found not operating due to ice inside the sample line. A grab sample was taken and the sampler was reset and put back into service. For this reason the monthly sample for December and the fourth quarter composite sample are considered less than representative.

### *10.4.3 Groundwater Sampling*

All scheduled groundwater samples were collected in 1995.

### *10.4.4 Sediment Sampling*

All scheduled sediment samples were collected in 1995.

### *10.4.5 Fish Sampling*

All scheduled fish samples were collected in 1995.

# Program Summary

Table 11-1 Radiological Environmental Monitoring Program Summary

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Gamma (TLD) Background (mR/std qtr) | Gamma Radiation 268 | 1.0 | 15.7 (252/252)<br>7.7 to 28.7 | T-66 (Indicator) | 23.6 (4/4)<br>15.5 to 28.7 | 15.2 (16/16)<br>13.9 to 17.7 | None |
| Airborne Particulates (pCi/cu.m.) | GB 259 | 1.00E-2 | 2.59E-2 (207/207)<br>1.40E-2 to 4.70E-2 | API-5 (Indicator) | 2.65E-2 (52/52)<br>1.50E-2 to 4.40E-2 | 2.61E-2 (52/52)<br>1.50E-2 to 4.30E-2 | None |
| | GS 20 | | | | | | |
| | BE-7 | N/A | 1.33E-1 (16/16)<br>9.81E-2 to 1.74E-1 | API-2 (Indicator) | 1.40E-1 (4/4)<br>1.16E-1 to 1.74E-1 | 1.20E-1 (4/4)<br>8.81E-2 to 1.39E-1 | None |
| | K-40 | N/A | 1.36E-2 ([illegible]/16)<br>[illegible].71E-3 to 5.3[illegible]E-2 | API-2 (Indicator) | 5.37E-2 (1/4)<br>5.37E-2 to 5.37E-2 | 1.08E-2 (3/4)<br>7.47E-3 to 1.61E-2 | None |
| | MN-54 | N/A | <MDA | | | <MDA | None |
| | CO-58 | N/A | <MDA | | | <MDA | None |
| | FE-59 | N/A | <MDA | | | <MDA | None |
| | CO-60 | N/A | <MDA | | | <MDA | None |
| | ZN-65 | N/A | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 5.00E-2 | <MDA | | | <MDA | None |
| | CS-137 | 6.00E-2 | <MDA | | | <MDA | None |
| | BA/LA-140 | N/A | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| | SR-89 20 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | <MDA | | | <MDA | None |
| Airborne Iodine (pCi/cu.m.) | I-131 259 | 7.00E-2 | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Milk (pCi/l) | I-131 47 | 1.00E+0 | <MDA | | | <MDA | None |
| | SR-89 46 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | 1.56E+0 (28/29) 8.90E-1 to 3.20E+0 | M-9 (Indicator) (goat milk) | 1.94E+0 (10/11) 1.40E+0 to 3.20E+0 | 1.23E+0 (18/18) 8.50E-1 to 2.20E+0 | None |
| | GS 47 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | 1.51E+3 (29/29) 1.22E+3 to 2.33E+3 | M-9 (Indicator) (goat milk) | 1.79E+3 (11/11) 1.46E+3 to 2.33E+3 | 1.37E+3 (18/18) 1.25E+3 to 1.48E+3 | None |
| | MN-54 | N/A | <MDA | | | <MDA | None |
| | CO-58 | N/A | <MDA | | | <MDA | None |
| | FE-59 | N/A | <MDA | | | <MDA | None |
| | CO-60 | N/A | <MDA | | | <MDA | None |
| | ZN-65 | N/A | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.50E+1 | <MDA | | | <MDA | None |
| | CS-137 | 1.80E+1 | <MDA | | | <MDA | None |
| | BA/LA-140 | 1.50E+1 | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| Grass (pCi/kg wet) | I-131 6 | 6.00E+1 | <MDA | | | <MDA | None |
| | GS 6 | | | | | | |
| | BE-7 | N/A | 7.17E+2 (2/3) 7.13E+2 to 7.21E+2 | M-9 (Indicator) | 7.17E+2 (2/3) 7.13E+2 to 7.21E+2 | 5.37E+2 (3/3) 2.11E+2 to 1.01E+3 | None |
| | K-40 | N/A | 5.09E+3 (3/3) 4.49E+3 to 5.41E+3 | M-9 (Indicator) | 5.09E+3 (3/3) 4.49E+3 to 5.41E+3 | 4.92E+3 (3/3) 3.93E+3 to 5.86E+3 | None |
| | MN-54 | N/A | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 | Docket No.: 50-341 | Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Grass (cont.) (pCi/kg wet) | CO-58 | N/A | <MDA | | | <MDA | None |
| | FE-59 | N/A | <MDA | | | <MDA | None |
| | CO-60 | N/A | <MDA | | | <MDA | None |
| | ZN-65 | N/A | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 6.00E+1 | <MDA | | | <MDA | None |
| | CS-137 | 8.00E+1 | <MDA | | | <MDA | None |
| | BA/LA-140 | N/A | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| Vegetables (pCi/kg wet) | I-131 13 | 6.00E+1 | <MDA | | | <MDA | None |
| | GS 13 | | | | | | None |
| | BE-7 | N/A | 3.74E+2 (5/9) 1.84E+2 to 7.09E+2 | FP-9 (Control) | 4.22E+2 (2/4) 2.30E+2 to 6.13E+2 | 4.22E+2 (2/4) 2.30E+2 to 6.13E+2 | None |
| | K-40 | N/A | 2.49E+3 (9/9) 1.68E+2 to 3.55E+3 | FP-9 (Control) | 3.18E+3 (4/4) 1.75E+3 to 5.23E+3 | 3.18E+3 (4/4) 1.75E+3 to 5.23E+3 | None |
| | MN-54 | N/A | <MDA | | | <MDA | None |
| | CO-58 | N/A | <MDA | | | <MDA | None |
| | FE-59 | N/A | <MDA | | | <MDA | None |
| | CO-60 | N/A | <MDA | | | <MDA | None |
| | ZN-65 | N/A | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 6.00E+1 | <MDA | | | <MDA | None |
| | CS-137 | 8.00E+1 | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean: Location | Location with Highest Annual Mean: Mean and Range | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| Vegetables (cont.) | BA/LA-140 | N/A | <MDA | | | <MDA | None |
| (pCi/kg wet) | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | 2.95E+1 (1/5) | FP-7 (Indicator) | 2.95E+1 (1/5) | <MDA | None |
| | | | 2.95E+1 to 2.95E+1 | | 2.95E+1 to 2.95E+1 | | |
| Drinking Water | GB 31 | 4.00E+0 | 3.99E+0 (19/19) | DW-1 (Indicator) | 4.00E+0 (13/13) | 2.29E+0 (12/12) | None |
| (pCi/l) | | | 2.00E+0 to 9.40E+0 | | 2.00E+0 to 9.40E+0 | 1.80E+0 to 7.30E+0 | None |
| | GS 31 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | <MDA | | | <MDA | None |
| | CR-51 | N/A | <MDA | | | <MDA | None |
| | MN-54 | 1.50E+1 | <MDA | | | <MDA | None |
| | CO-58 | 1.50E+1 | <MDA | | | <MDA | None |
| | FE-59 | 3.00E+1 | <MDA | | | <MDA | None |
| | CO-60 | 1.50E+1 | <MDA | | | <MDA | None |
| | ZN-65 | 3.00E+1 | <MDA | | | <MDA | None |
| | ZR/NB-95 | 1.50E+1 | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.50E+1 | <MDA | | | <MDA | None |
| | CS-137 | 1.80E+1 | <MDA | | | <MDA | None |
| | BA/LA-140 | 1.50E+1 | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| | H-3 10 | 2.00E+3 | 2.30E+2 (1/6) | DW-1 (Indicator) | 2.30E+2 (1/4) | <MDA | None |
| | | | 2.30E+2 to 2.30E+2 | | 2.30E+2 to 2.30E+2 | | |
| | SR-89 31 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Surface Water (pCi/l) | GS 30 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | <MDA | SW-2 (Control) | 3.52E+1 (1/17) 3.52E+1 to 3.52E+1 | 3.52E+1 (1/17) 3.52E+1 to 3.52E+1 | None |
| | CR-51 | N/A | <MDA | | | <MDA | None |
| | MN-54 | 1.50E+1 | <MDA | | | <MDA | None |
| | CO-58 | 1.50E+1 | <MDA | | | <MDA | None |
| | FE-59 | 3.00E+1 | <MDA | | | <MDA | None |
| | CO-60 | 1.50E+1 | <MDA | | | <MDA | None |
| | ZN-65 | 3.00E+1 | <MDA | | | <MDA | None |
| | ZR/NB-95 | 1.50E+1 | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.50E+1 | <MDA | | | <MDA | None |
| | CS-137 | 1.80E+1 | <MDA | | | <MDA | None |
| | BA/LA-140 | 1.50E+1 | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| | H-3 8 | 2.00E+3 | <MDA | SW-2 (Control) | 2.40E+2 (1/4) 2.40E+2 to 2.40E+2 | 2.40E+2 (1/4) 2.40E+2 to 2.40E+2 | None |
| | SR-89 30 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | <MDA | | | <MDA | None |
| Groundwater (pCi/l) | GS 16 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | <MDA | | | <MDA | None |
| | CR-51 | N/A | <MDA | | | <MDA | None |
| | MN-54 | 1.50E+1 | <MDA | | | <MDA | None |
| | CO-58 | 1.50E+1 | <MDA | | | <MDA | None |
| | FE-59 | 3.00E+1 | <MDA | | | <MDA | None |
| | CO-60 | 1.50E+1 | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Groundwater (cont.) (pCi/l) | ZN-65 | 3.00E+1 | <MDA | | | <MDA | None |
| | ZR/NB-95 | 1.50E+1 | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.50E+1 | <MDA | | | <MDA | None |
| | CS-137 | 1.80E+1 | <MDA | | | <MDA | None |
| | BA/LA-140 | 1.50E+1 | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| | H-3 16 | 2.00E+3 | <MDA | GW-4 (Control) | 2.00E+2 (1/4)<br>2.00E+2 to 2.00E+2 | 2.00E+2 (1/4)<br>2.00E+2 to 2.00E+2 | None |
| Sediment (pCi/kg dry) | GS 10 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | 1.07E+4 (8/8)<br>9.01E+3 to 1.26E+4 | S-3 (Indicator) | 1.18E+4 (2/2)<br>1.15E+4 to 1.20E+4 | 1.16E+4 (2/2)<br>1.03E+4 to 1.29E+4 | None |
| | MN-54 | N/A | <MDA | | | <MDA | None |
| | CO-58 | N/A | <MDA | | | <MDA | None |
| | FE-59 | N/A | <MDA | | | <MDA | None |
| | CO-60 | N/A | <MDA | | | <MDA | None |
| | ZN-65 | N/A | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.50E+2 | <MDA | | | <MDA | None |
| | CS-137 | 1.80E+2 | <MDA | S-5 (Control) | 1.10E+2 (1/2)<br>1.10E+2 to 1.10E+2 | 1.10E+2 (1/2)<br>1.10E+2 to 1.10E+2 | None |
| | BA/LA-140 | N/A | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|---|---|---|---|---|---|---|
| | | | | Location | Mean and Range | | |
| Sediment (cont.)<br>(pCi/kg dry) | RA-226 | N/A | 7.46E+2 (6/8)<br>5.20E+2 to 1.06E+3 | S-4 (Indicator) | 1.06E+3 (1/2)<br>1.06E+3 to 1.06E+3 | 9.66E+2 (2/2)<br>9.21E+2 to 1.01E+3 | None |
| | TH-228 | N/A | 2.52E+2 (8/8)<br>1.94E+2 to 3.48E+2 | S-5 (Control) | 4.68E+2 (2/2)<br>4.36E+2 to 5.00E+2 | 4.68E+2 (2/2)<br>4.36E+2 to 5.00E+2 | None |
| | SR-89 10 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | 7.90E+1 (2/8)<br>7.10E+1 to 8.70E+1 | S-2 (Indicator) | 8.70E+1 (1/2)<br>8.70E+1 to 8.70E+1 | <MDA | None |
| Fish<br>(pCi/kg wet) | GS 23 | | | | | | |
| | BE-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | 2.89E+3 (7/7)<br>2.18E+3 to 4.21E+3 | F-3 (Control) | 3.28E+3 (9/9)<br>2.32E+3 to 4.40E+3 | 3.23E+3 (16/16)<br>2.32E+3 to 4.40E+3 | None |
| | MN-54 | 1.30E+2 | <MDA | | | <MDA | None |
| | CO-58 | 1.30E+2 | <MDA | | | <MDA | None |
| | FE-59 | 2.60E+2 | <MDA | | | <MDA | None |
| | CO-60 | 1.30E+2 | <MDA | | | <MDA | None |
| | ZN-65 | 2.60E+2 | <MDA | | | <MDA | None |
| | ZR/NB-95 | N/A | <MDA | | | <MDA | None |
| | RU-103 | N/A | <MDA | | | <MDA | None |
| | RU-106 | N/A | <MDA | | | <MDA | None |
| | CS-134 | 1.30E+2 | <MDA | | | <MDA | None |
| | CS-137 | 1.50E+2 | <MDA | F-1 (Control) | 2.98E+1 (3/7)<br>2.29E+1 to 3.72E+1 | 2.87E+1 (4/16)<br>2.29E+1 to 3.72E+1 | None |
| | BA/LA-140 | N/A | <MDA | | | <MDA | None |
| | CE-141 | N/A | <MDA | | | <MDA | None |
| | CE-144 | N/A | <MDA | | | <MDA | None |
| | RA-226 | N/A | <MDA | | | <MDA | None |
| | TH-228 | N/A | <MDA | | | <MDA | None |
| | SR-89 23 | N/A | <MDA | | | <MDA | None |
| | SR-90 | N/A | 2.63E+1 (4/7)<br>7.30E+0 to 6.50E+1 | F-3 (Control) | 4.17E+1 (3/9)<br>3.10E+1 to 4.70E+1 | 3.31E+1 (9/16)<br>7.60E+0 to 5.00E+1 | None |

Table 11-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1995
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

GB = gross beta; GS = gamma scan
LLD = Fermi 2 Technical Specifications LLD: nominal lower limit of detection based on 4.66 sigma error for background sample.
<MDA = Less than the lab's minimum detectable activity which is less than the LLD.
Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).
Locations are specified by Fermi 2 code and are described in section 8.0 Sampling Locations.
Non-routine results are those which are reportable according to Fermi 2 Technical Specifications.

Note: Other nuclides were considered in analysis results, but only those identifiable were reported in addition to Tech Spec listed nuclides.

## *12. Quality Assurance*

An important part of the environmental monitoring program at Fermi 2 is Quality Assurance (QA). QA is a program that provides a method to check the adequacy and validity of the monitoring program. The QA program accomplishes this by independent annual audits by qualified personnel, strict adherence to written procedures, and good record keeping practices. The QA program is designed to identify possible deficiencies in the REMP so that corrective actions can be initiated promptly.

The QA program at Fermi 2 is conducted in accordance with the guidelines specified in NRC Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs". At Fermi 2 the QA program contains three data comparison programs; (1) EPA Interlaboratory Comparison Program, (2) NRC TLD comparison program, and (3) Independent blind spiked cross check program. The following sections describe and present the 1995 results of these programs.

# *Quality Assurance*

### *12.1 US EPA Interlaboratory Comparison Program for 1995*

Starting in 1991, Detroit Edison contracted Teledyne/Brown Engineering Environmental Services to provide analytical results of REMP environmental samples. Teledyne/Brown Engineering participates in the Environmental Protection Agency's (EPA) Interlaboratory Comparison program.

In the EPA Interlaboratory Comparison program, participant laboratories receive from the EPA environmental sample, of known activity concentration for analysis. After the samples have been analyzed by the laboratory, the EPA reports the known activity concentration of the samples to the laboratory. The laboratory compares its results to the EPA reported concentrations to determine any significant deviations, investigates such deviations if found, and initiates corrective action if necessary. Participation in this program provides assurance that the contract laboratory is capable of meeting accepted criteria for radioactivity analysis.

In 1995, Teledyne/Brown Engineering performed forty-three (43) analyses of environmental samples for the EPA Interlaboratory Comparison program. All of the samples results were within ± 3 sigma control limits. The results are shown in the following tables and all deviations, investigations and corrective actions taken by Teledyne/Brown Engineering are described in the foot notes.

# EPA INTERLABORATORY COMPARISON PROGRAM 1995

| Collection Date | Media | Nuclide | EPA Result(a) | Teledyne Brown Engineering Result(b) | Deviation(c) | |
|---|---|---|---|---|---|---|
| 01/13/95 | Water | Sr-89 | 20.0 ± 5.0 | 19.00 ± 2.65 | -0.35 | |
| | | Sr-90 | 15.0 ± 5.0 | 14.00 ± 0.00 | -0.35 | |
| 01/27/95 | Water | Gr-Alpha | 5.0 ± 5.0 | 5.00 ± 1.00 | 0.00 | |
| | | Gr-Beta | 5.0 ± 5.0 | 6.00 ± 1.00 | 0.35 | |
| 02/03/95 | Water | I-131 | 100.0 ± 10.0 | 88.33 ± 2.31 | -2.02 | (d) |
| 02/10/95 | Water | Ra-226 | 19.1 ± 2.9 | 20.67 ± 0.58 | 0.94 | |
| | | Ra-228 | 20.0 ± 5.0 | 18.67 ± 0.58 | -0.46 | |
| 03/10/95 | Water | H-3 | 7435.0 ± 744.0 | 7066.67 ± 115.47 | -0.86 | |
| 04/18/95 | Water | Gr-Beta | 86.6 ± 10.0 | 80.33 ± 2.52 | -1.09 | |
| | | Sr-89 | 20.0 ± 5.0 | 20.67 ± 1.15 | 0.23 | |
| | | Sr-90 | 15.0 ± 5.0 | 14.67 ± 0.58 | -0.12 | |
| | | Co-60 | 29.0 ± 5.0 | 31.67 ± 2.08 | 0.92 | |
| | | Cs-134 | 20.0 ± 5.0 | 19.67 ± 1.73 | -0.12 | |
| | | Cs-137 | 11.0 ± 5.0 | 11.67 ± 1.53 | 0.23 | |
| | | Gr-Alpha | 47.5 ± 11.9 | 39.67 ± 2.52 | -1.14 | |
| | | Ra-226 | 14.9 ± 2.2 | 15.67 ± 0.58 | 0.60 | |
| | | Ra-228 | 15.8 ± 4.0 | 13.00 ± 1.73 | -1.21 | |
| 06/09/95 | Water | Co-60 | 40.0 ± 5.0 | 42.33 ± 2.52 | 0.81 | |
| | | Zn-65 | 76.0 ± 8.0 | 82.33 ± 3.51 | 1.37 | |
| | | Cs-134 | 50.0 ± 5.0 | 46.67 ± 2.08 | -1.15 | |
| | | Cs-137 | 35.0 ± 5.0 | 37.67 ± 1.15 | 0.92 | |
| | | Ba-133 | 79.0 ± 8.0 | 74.33 ± 2.08 | -1.01 | |
| 06/16/95 | Water | Ra-226 | 14.8 ± 2.2 | 15.00 ± 0.00 | 0.16 | |
| | | Ra-228 | 15.0 ± 3.8 | 14.00 ± 0.00 | -0.46 | |
| 07/14/95 | Water | Sr-89 | 20.0 ± 5.0 | 18.33 ± 1.53 | -0.58 | |
| | | Sr-90 | 8.0 ± 5.0 | 8.00 ± 0.00 | 0.00 | |
| 07/21/95 | Water | Gr-Alpha | 27.5 ± 6.9 | 18.33 ± 1.53 | -2.30 | (e) |
| | | Gr-Beta | 19.4 ± 5.0 | 19.33 ± 1.53 | -0.02 | |
| 08/04/95 | Water | H-3 | 4872.0 ± 487.0 | 4866.67 ± 152.75 | -0.02 | |
| 08/25/95 | Air Filter | Gr-Alpha | 25.0 ± 6.3 | 23.67 ± 1.53 | -0.37 | |
| | | Gr-Beta | 86.6 ± 10.0 | 84.67 ± 1.53 | -0.33 | |
| | | Sr-90 | 30.0 ± 5.0 | 25.33 ± 0.58 | -1.62 | |
| | | Cs-137 | 25.0 ± 5.0 | 27.00 ± 1.00 | 0.69 | |

# EPA INTERLABORATORY COMPARISON PROGRAM 1995

| Collection Date | Media | Nuclide | EPA Result(a) | Teledyne Brown Engineering Result(b) | Deviation(c) |
|---|---|---|---|---|---|
| 09/15/95 | Water | Ra-226 | 24.8 ± 3.7 | 27.33 ± 1.15 | 1.19 |
| | | Ra-228 | 20.0 ± 5.0 | 14.67 ± 0.58 | -1.85 |
| 09/29/95 | Milk | Sr-89 | 20.0 ± 5.0 | 23.33 ± 3.06 | 1.15 |
| | | Sr-90 | 15.00 ± 5.0 | 16.33 ± 0.58 | 0.46 |
| | | I-131 | 99.0 ± 10.0 | 103.33 ± 5.77 | 0.75 |
| | | Cs-137 | 50.0 ± 5.0 | 54.67 ± 2.52 | 1.62 |
| | | Total K | 1654.0 ± 83.0 | 1683.33 ± 136.50 | 0.61 |
| 10/06/95 | Water | I-131 | 148.0 ± 15.0 | 150.00 ± 0.00 | 0.23 |
| 10/27/95 | Water | Gr-Alpha | 51.2 ± 12.8 | 37.00 ± 3.00 | -1.92 |
| | | Gr-Beta | 24.8 ± 5.0 | 25.33 ± 1.53 | 0.18 |

Footnotes:

(a) EPA Results-Expected laboratory precision (1 sigma). Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.

(b) Teledyne Results - Average ± one sigma. Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.

(c) Normalized deviation from the known.

(d) The normalized deviation marginally exceeded the warning level and an apparent trend in the results appeared. The cause was a probable high bias in the beta counting efficiency. Check source control charts did not indicate any changes in the counting equipment, so the I-131 calibration was suspected. New I-131 calibrations were performed July 3 through 6, 1995 after receiving a new standard from the EPA. The intercomparison sample data sheets were recalculated with the new efficiencies and the average result was in excellent agreement with the EPA (96 pCi/1 versus the EPA value of 100 pCi/1). The discrepancy in the I-131 efficiency between the current calibration and the previous one (aside from the uncertainty in the standard) appears to be an abnormally low yield in the preparation of the standard for the older calibration which created a high bias in the counter efficiencies. The bias was less than ten percent, therefore further corrective action or revision of previously reported data is deemed not necessary.

(e) The mineral salt content of the water used by the EPA to prepare the samples has been shown to vary substantially throughout the year. Absorption curves to account for mount weight may vary from the true absorption characteristics of a specific sample. Previous results do not indicate a trend toward "out of control" for gross alpha/beta analysis and the normalized deviation from the grand average is only -0.36. The normalized deviation from the known for TBE-ES does not exceed three standard deviations and internal spikes have been in control. No corrective action is planned at this time.

## *12.2 Fermi 2 and NRC TLD Intercomparison*

The U.S. Nuclear Regulatory Commission (NRC) Direct Radiation Monitoring Network is operated in cooperation with the State of Michigan's Division of Radiological Health. This program was established in August 1979 by the NRC Office of Inspection and Enforcement (IE) to measure ambient radiant radiation levels around NRC licensed facilities and to provide the NRC staff with prompt, independent data in emergency response and assessments. As part of Fermi 2's REMP Quality Control program, TLDs that are co-located with the NRC TLDs are compared with each other to determine if there is any significant difference between the two direct radiation monitor programs.

The NRC maintains 41 TLD locations around Fermi 2, and 21 are co-located with Detroit Edison TLDs. The TLDs are collected by State of Michigan representatives and are analyzed independently of the Fermi 2 TLDs. The results from the NRC monitoring program are published quarterly in NUREG 0837 titled ***NRC TLD Direct Radiation Monitoring Network.***

The data for 1995 is tabulated in the tables below. Only the first, second and third quarters of NRC data was available for comparison. The standard deviation for all data ranged from 0.1 to 2.0, which indicates a good correlation between the two programs.

**First Quarter (mR/std Qtr)**

| Station Numbers | | Fermi 2 | NRC | Std. Dev. |
|---|---|---|---|---|
| T1 | NRC1 | 13.4 | 11.7 | 0.8 |
| T4 | NRC36 | 15.7 | 13.2 | 1.3 |
| T5 | NRC37 | 15.1 | 15.5 | 0.2 |
| T6 | NRC38 | 15.9 | 17.8 | 0.9 |
| T12 | NRC25 | 13.8 | 13.7 | 0.0 |
| T13 | NRC23 | 17.2 | 18.4 | 0.6 |
| T14 | NRC22 | 16.7 | 17.7 | 0.5 |
| T15 | NRC21 | 15.5 | 15.9 | 0.2 |
| T19 | NRC16 | 16.7 | 18.1 | 0.7 |
| T20 | NRC14 | 18.8 | 19.1 | 0.1 |
| T21 | NRC15 | 15.4 | 15.2 | 0.1 |
| T22 | NRC13 | 15.3 | 16.2 | 0.5 |
| T23 | NRC11 | 16.0 | 15.9 | 0.1 |
| T24 | NRC9 | 15.3 | 13.5 | 0.9 |
| T27 | NRC17 | 14.2 | 14.0 | 0.1 |
| T28 | NRC32 | 14.2 | 15.1 | 0.5 |
| T30 | NRC18 | 13.4 | 14.2 | 0.4 |
| T32 | NRC29 | 14.7 | 15.5 | 0.4 |
| T33 | NRC28 | 14.4 | 14.8 | 0.2 |
| T35 | NRC26 | 14.2 | 14.5 | 0.2 |
| T36 | NRC40 | 15.8 | 16.4 | 0.3 |

**Second Quarter (mR/std Qtr)**

| Station Numbers | | Fermi 2 | NRC | Std. Dev. |
|---|---|---|---|---|
| T1 | NRC1 | 13.9 | 10.8 | 1.5 |
| T4 | NRC36 | 14.2 | 12.5 | 0.8 |
| T5 | NRC37 | 14.6 | 14.9 | 0.2 |
| T6 | NRC38 | 14.3 | 13.7 | 0.3 |
| T12 | NRC25 | 12.9 | 11.2 | 0.8 |
| T13 | NRC23 | 16.3 | 16.2 | 0.0 |
| T14 | NRC22 | 15.7 | 17.1 | 0.7 |
| T15 | NRC21 | 15.0 | 16.0 | 0.5 |
| T19 | NRC16 | 16.2 | 17.3 | 0.6 |
| T20 | NRC14 | 17.4 | 18.8 | 0.7 |
| T21 | NRC15 | 14.2 | 14.3 | 0.0 |
| T22 | NRC13 | 14.2 | 16.0 | 0.9 |
| T23 | NRC11 | 15.1 | 15.9 | 0.4 |
| T24 | NRC9 | 14.4 | 14.9 | 0.3 |
| T27 | NRC17 | 12.8 | 12.1 | 0.4 |
| T28 | NRC32 | 14.3 | N/D | -- |
| T30 | NRC18 | 13.0 | 12.7 | 0.1 |
| T32 | NRC29 | 14.7 | 14.7 | 0.0 |
| T33 | NRC28 | 14.5 | 13.6 | 0.4 |
| T35 | NRC26 | 13.6 | 13.4 | 0.1 |
| T36 | NRC40 | 16.0 | 18.9 | 1.4 |

**Third Quarter (mR/std Qtr)**

| Station Numbers | | Fermi 2 | NRC | Std. Dev. |
|---|---|---|---|---|
| T1 | NRC1 | 13.0 | 11.2 | 0.9 |
| T4 | NRC36 | 14.1 | 13.8 | 0.2 |
| T5 | NRC37 | 15.0 | 15.2 | 0.1 |
| T6 | NRC38 | 13.7 | 16.4 | 1.4 |
| T12 | NRC25 | 13.2 | 14.7 | 0.7 |
| T13 | NRC23 | 15.4 | 19.3 | 2.0 |
| T14 | NRC22 | 15.6 | 18.4 | 1.4 |
| T15 | NRC21 | 14.6 | 15.7 | 0.6 |
| T19 | NRC16 | 16.5 | 18.3 | 0.9 |
| T20 | NRC14 | 17.0 | N/D | -- |
| T21 | NRC15 | 13.9 | 14.8 | 0.4 |
| T22 | NRC13 | 13.9 | 15.9 | 1.0 |
| T23 | NRC11 | 15.5 | 15.9 | 0.2 |
| T24 | NRC9 | 14.5 | 13.4 | 0.6 |
| T27 | NRC17 | 13.1 | 14.4 | 0.7 |
| T28 | NRC32 | 15.1 | 16.2 | 0.6 |
| T30 | NRC18 | 12.7 | 12.5 | 0.1 |
| T32 | NRC29 | 15.1 | 15.5 | 0.2 |
| T33 | NRC28 | 14.8 | 15.9 | 0.5 |
| T35 | NRC26 | 13.7 | 15.0 | 0.6 |
| T36 | NRC40 | 15.1 | 16.5 | 0.7 |

### *12.3 Independent Blind Spiked Cross Check Program*

Analytics, Inc. supplies Detroit Edison's environmental laboratory, Teledyne/Brown Engineering, with blind spiked samples containing strontium-89 (Sr-89), strontium-90 (Sr-90), and iron-55 (Fe-55) on a quarterly basis. As part of the environmental QA program, these samples are analyzed by the vendor laboratory and compared to the known values. To determine if the laboratory results are in agreement with Analytics' known value, a ratio is calculated using the following formula:

Teledyne value / Analytics value = Ratio

The closer the ratio is to (1.0) one, the better the agreement between the two values. To determine if the ratio falls within acceptable limits, upper and lower limits are established using the sample resolution (supplied by Analytics) and the criteria in following table.

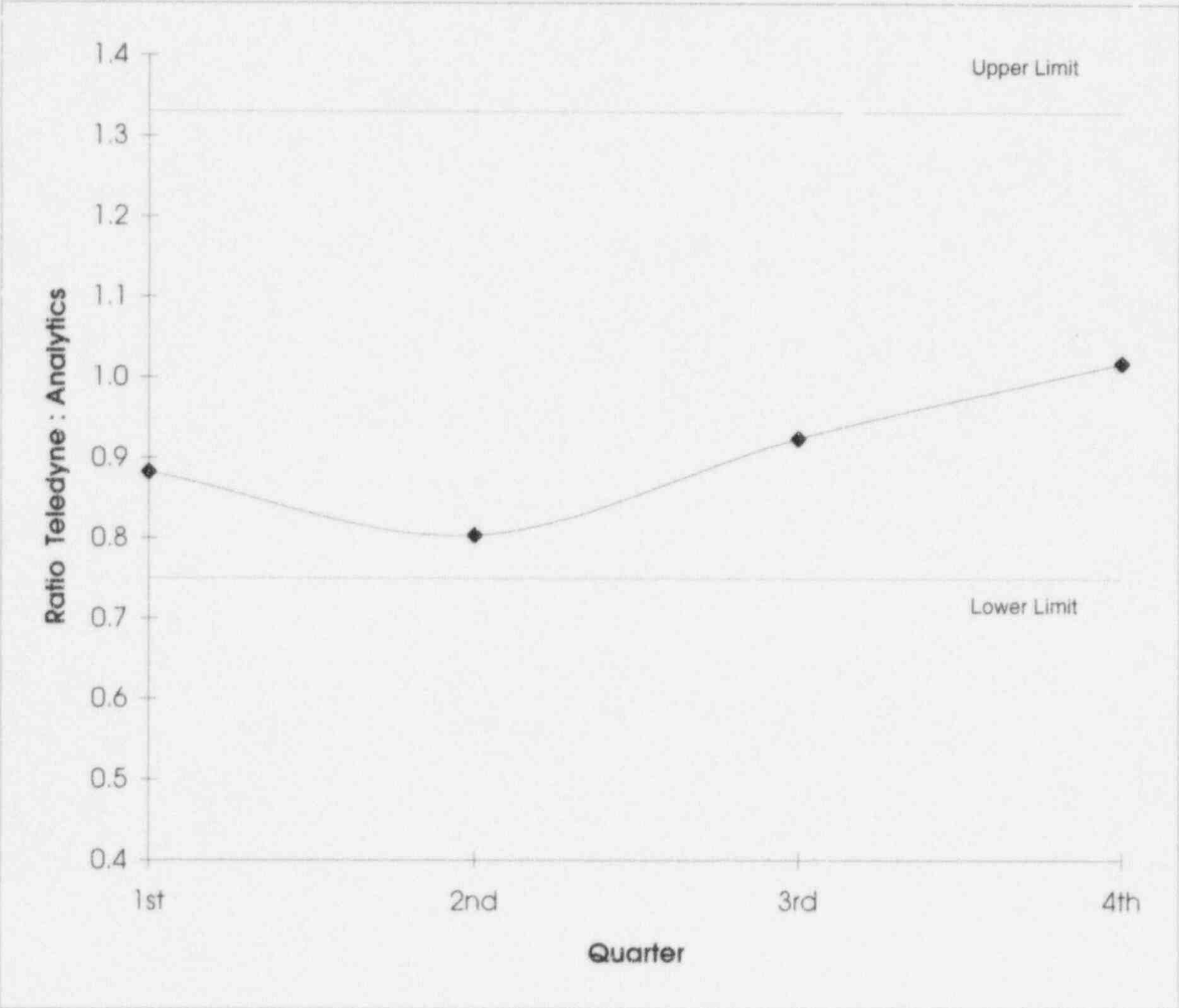
| Resolution | Agreement Criteria |
|---|---|
| less than 4 | N/A |
| 4 - 7 | 0.5 - 2.0 |
| 8 - 15 | 0.6 - 1.66 |
| 16 - 50 | 0.75 - 1.33 |
| 51 - 200 | 0.80 - 1.25 |
| greater than 200 | 0.85 - 1.18 |

For 1995, all spiked samples analyzed by Teledyne/Brown Engineering were in agreement with Analytics' known values. The results of the Independent Blind Spiked Cross Check Program are shown in the following tables and control charts.

# Fermi 2 1995
# Environmental Laboratory Cross Check Program
# Sr-89 Spiked Samples

| Quarter | Teledyne Value (uCi/cc) | Analytics Value (uCi/cc) | Ratio |
|---|---|---|---|
| 1st | 7.00E-03 | 7.93E-03 | 0.88 |
| 2nd | 1.80E-03 | 2.24E-03 | 0.80 |
| 3rd | 2.20E-03 | 2.38E-03 | 0.92 |
| 4th | 1.10E-03 | 1.08E-03 | 1.02 |

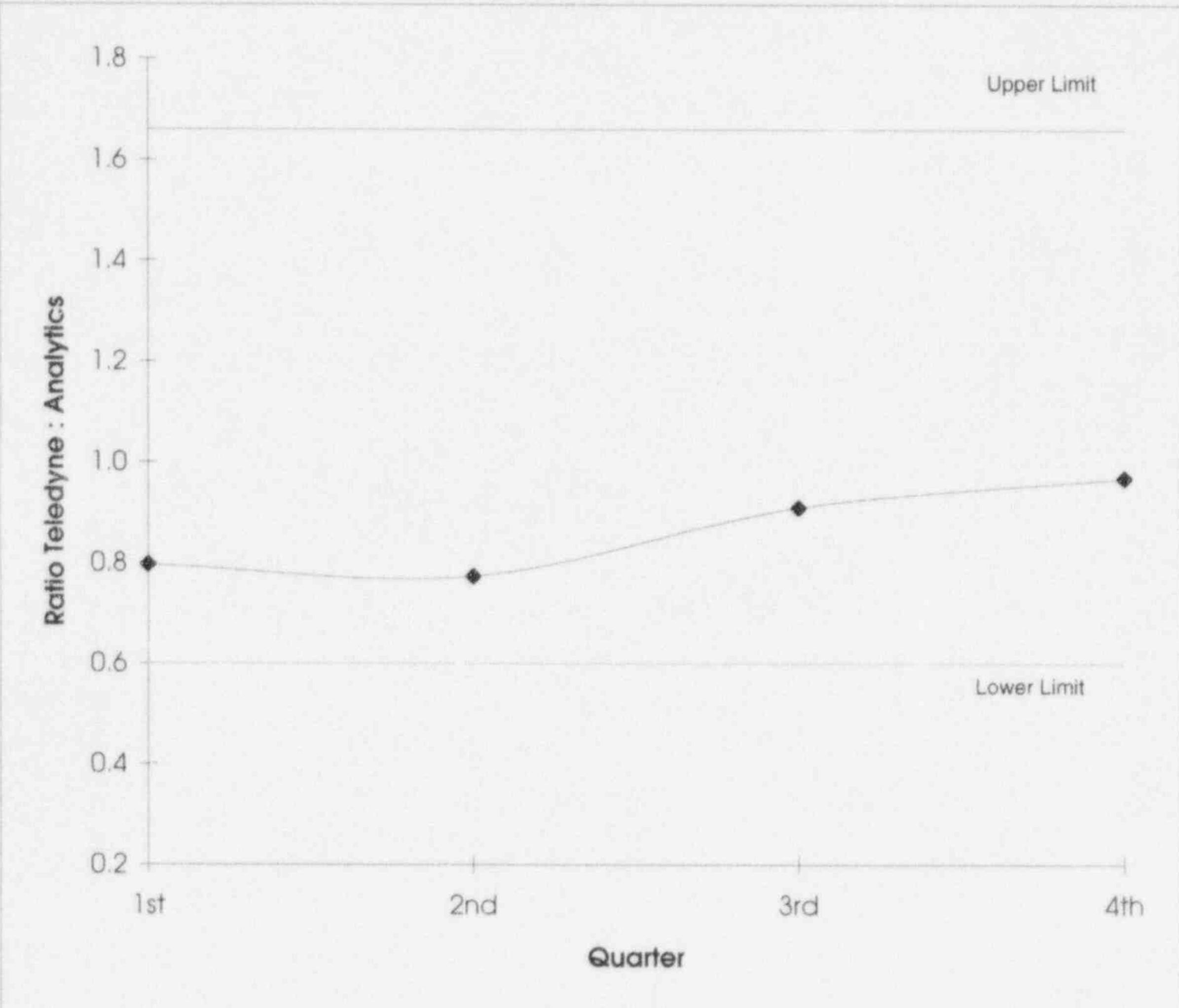
Resolution = 17
Agreement Criteria = 0.75 >= Ratio <= 1.33



# Fermi 2 1995
# Environmental Laboratory Cross Check Program
# Sr-90 Spiked Samples

| Quarter | Teledyne Value (uCi/cc) | Analytics Value (uCi/cc) | Ratio |
|---|---|---|---|
| 1st | 3.60E-04 | 4.52E-04 | 0.80 |
| 2nd | 1.70E-04 | 2.20E-04 | 0.77 |
| 3rd | 2.00E-04 | 2.20E-04 | 0.91 |
| 4th | 6.90E-05 | 7.13E-05 | 0.97 |

Resolution = 12.5
Agreement Criteria = 0.6 >= Ratio <=1.66

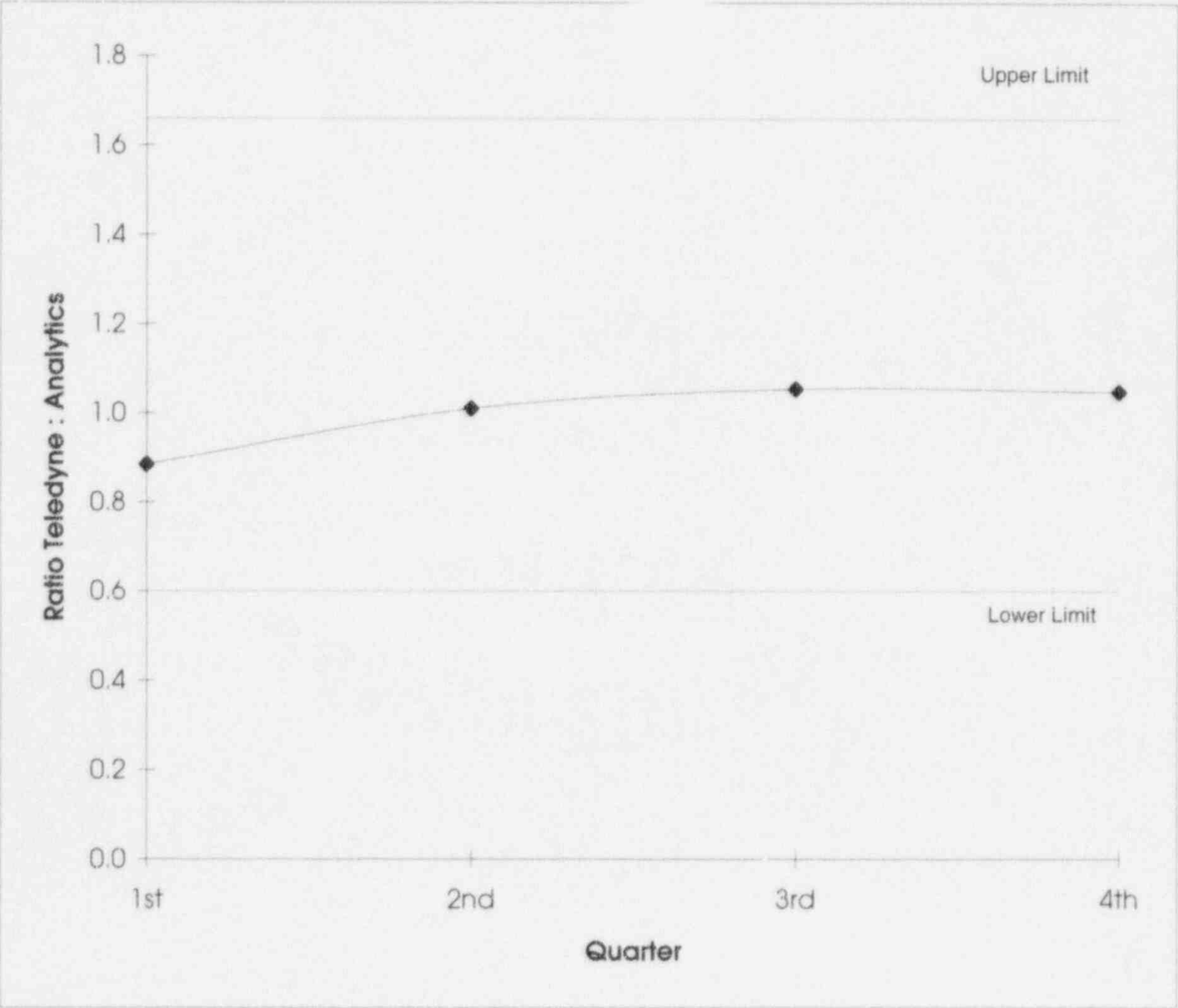


# Fermi 2
## Environmental Laboratory Cross Check Program
## Fe-55 Spiked Samples

| Quarter | Teledyne Value (uCi/cc) | Ananlytics Value (uCi/cc) | Ratio |
|---|---|---|---|
| 1st | 9.90E-05 | 1.12E-04 | 0.88 |
| 2nd | 4.20E-04 | 4.16E-04 | 1.01 |
| 3rd | 5.10E-04 | 4.84E-04 | 1.05 |
| 4th | 1.10E-04 | 1.05E-04 | 1.05 |

Resolution = 12.5

Agreement Criteria = 0.6>= Ratio <= 1.66



# *Data Tables*

# FERMI 2
# TLD ANALYSIS
(mR/Std Qtr)

| STATION NUMBER | FIRST QUARTER | SECOND QUARTER | THIRD QUARTER | FOURTH QUARTER |
|---|---|---|---|---|
| T-1 | 13.4 ± 0.3 | 13.9 ± 0.3 | 13.0 ± 0.5 | 14.6 ± 1.3 |
| T-2 | 16.9 ± 0.3 | 15.8 ± 0.3 | 15.4 ± 0.6 | 19.1 ± 1.1 |
| T-3 | 14.8 ± 2.6 | 12.7 ± 0.2 | 11.9 ± 0.4 | 14.4 ± 0.3 |
| T-4 | 15.7 ± 0.7 | 14.2 ± 0.2 | 14.1 ± 0.3 | 15.9 ± 0.3 |
| T-5 | 15.1 ± 0.3 | 14.6 ± 0.4 | 15.0 ± 0.5 | 18.0 ± 2.7 |
| T-6 | 15.9 ± 1.6 | 14.3 ± 0.4 | 13.7 ± 0.6 | 16.2 ± 0.5 |
| T-7 | 15.0 ± 0.8 | 13.9 ± 0.2 | 14.1 ± 0.3 | 16.6 ± 0.3 |
| T-8 | 15.9 ± 0.4 | 14.3 ± 0.4 | 15.6 ± 1.4 | 16.1 ± 0.1 |
| T-9 | 17.3 ± 2.5 | 14.4 ± 0.5 | 14.6 ± 0.9 | 15.0 ± 1.2 |
| T-10 | 18.9 ± 2.6 | 15.3 ± 0.5 | 15.8 ± 0.4 | 16.4 ± 0.4 |
| T-11 | 16.5 ± 2.1 | 13.8 ± 0.2 | 13.5 ± 0.4 | 15.4 ± 0.3 |
| T-12 | 13.8 ± 0.3 | 12.9 ± 0.5 | 13.2 ± 0.4 | 15.3 ± 0.2 |
| T-13 | 17.2 ± 1.1 | 16.3 ± 0.4 | 15.4 ± 0.4 | 17.9 ± 1.4 |
| T-14 | 16.7 ± 0.6 | 15.7 ± 0.3 | 15.6 ± 0.3 | 18.6 ± 1.6 |
| T-15 | 15.5 ± 0.3 | 15.0 ± 0.8 | 14.6 ± 0.6 | 14.9 ± 0.4 |
| T-16 | 16.4 ± 1.0 | 15.6 ± 0.1 | 14.6 ± 0.7 | 16.9 ± 0.3 |
| T-17 | 15.5 ± 0.4 | 14.1 ± 0.2 | 13.6 ± 0.3 | 15.5 ± 1.2 |
| T-18 | 16.0 ± 0.7 | 14.9 ± 0.5 | 13.9 ± 0.5 | 16.3 ± 0.4 |
| T-19 | 16.7 ± 0.4 | 16.2 ± 0.9 | 16.5 ± 1.1 | 17.7 ± 0.3 |
| T-20 | 18.8 ± 0.9 | 17.4 ± 0.3 | 17.0 ± 0.4 | 18.4 ± 0.2 |
| T-21 | 15.4 ± 0.4 | 14.2 ± 0.3 | 13.9 ± 0.6 | 15.8 ± 0.7 |
| T-22 | 15.3 ± 0.1 | 14.2 ± 0.6 | 13.9 ± 0.2 | 15.7 ± 1.5 |
| T-23 | 16.0 ± 0.3 | 15.1 ± 0.3 | 15.5 ± 0.6 | 16.4 ± 1.5 |
| T-24 | 15.3 ± 0.3 | 14.4 ± 0.1 | 14.5 ± 0.3 | 15.0 ± 0.2 |
| T-25 | 18.6 ± 0.4 | 17.4 ± 0.2 | 18.1 ± 0.3 | 19.8 ± 0.4 |
| T-26 | 17.6 ± 0.3 | 17.8 ± 0.5 | 17.5 ± 0.2 | 19.6 ± 0.3 |
| T-27 | 14.2 ± 1.3 | 12.8 ± 0.1 | 13.1 ± 0.4 | 13.9 ± 0.3 |
| T-28 | 14.2 ± 0.2 | 14.3 ± 0.2 | 15.1 ± 0.6 | 15.9 ± 0.3 |
| T-29 | 15.1 ± 0.3 | 15.3 ± 0.4 | 15.0 ± 0.4 | 17.7 ± 1.5 |
| T-30 | 13.4 ± 0.1 | 13.0 ± 0.7 | 12.7 ± 0.2 | 13.4 ± 0.2 |
| T-31 | 15.7 ± 1.2 | 14.9 ± 0.2 | 14.9 ± 0.7 | 16.1 ± 0.5 |
| T-32 | 14.7 ± 0.3 | 14.7 ± 0.3 | 15.1 ± 0.2 | 16.5 ± 0.5 |
| T-33 | 14.4 ± 0.3 | 14.5 ± 0.6 | 14.8 ± 0.9 | 15.2 ± 0.5 |
| T-34 | 13.4 ± 0.1 | 13.5 ± 0.3 | 14.0 ± 0.3 | 14.3 ± 0.2 |
| T-35 | 14.2 ± 0.3 | 13.6 ± 0.6 | 13.7 ± 0.6 | 15.6 ± 1.2 |
| T-36 | 15.8 ± 0.5 | 16.0 ± 1.1 | 15.1 ± 0.6 | 16.1 ± 0.7 |
| T-37 | 15.6 ± 0.4 | 15.4 ± 0.8 | 14.6 ± 0.4 | 15.7 ± 0.4 |
| T-38 | 16.5 ± 0.3 | 16.1 ± 0.3 | 15.7 ± 0.5 | 18.3 ± 1.7 |
| T-39 | 13.4 ± 0.7 | 14.8 ± 0.2 | 15.9 ± 0.5 | 18.1 ± 1.1 |
| T-40 | 13.7 ± 1.2 | 13.3 ± 0.4 | 14.9 ± 0.8 | 16.8 ± 1.1 |
| T-41 | 14.3 ± 0.4 | 16.8 ± 0.1 | 20.2 ± 1.0 | 22.5 ± 0.8 |
| T-42 | 16.5 ± 0.4 | 18.9 ± 0.3 | 22.2 ± 0.7 | 22.4 ± 0.3 |
| T-43 | 14.6 ± 1.9 | 16.7 ± 0.2 | 20.4 ± 0.8 | 23.4 ± 1.1 |
| T-44 | 13.1 ± 0.4 | 16.4 ± 0.6 | 19.4 ± 0.3 | 20.8 ± 0.4 |
| T-45 | 12.5 ± 0.3 | 14.3 ± 0.2 | 15.7 ± 0.6 | 16.8 ± 1.2 |
| T-46 | 14.0 ± 0.7 | 13.6 ± 0.3 | 15.2 ± 0.5 | 16.6 ± 1.2 |
| T-47 | 14.4 ± 0.3 | 16.4 ± 0.6 | 19.8 ± 1.1 | 22.2 ± 0.7 |

**FERMI 2**
**TLD ANALYSIS (CONT.)**
(mR/Std Qtr)

| STATION NUMBER | FIRST QUARTER | SECOND QUARTER | THIRD QUARTER | FOURTH QUARTER |
|---|---|---|---|---|
| T-48 | 13.1 ± 0.2 | 14.5 ± 0.2 | 15.7 ± 0.5 | 7.7 ± 0.2 |
| T-49 | 18.9 ± 0.3 | 18.9 ± 0.2 | 19.9 ± 0.4 | 9.5 ± 0.3 |
| T-50 | 17.6 ± 1.7 | 16.4 ± 0.7 | 15.9 ± 0.5 | 17.9 ± 0.6 |
| T-51 | 13.3 ± 0.5 | 12.4 ± 0.4 | 11.9 ± 0.2 | 14.3 ± 1.4 |
| T-52 | 14.2 ± 0.4 | 13.3 ± 0.3 | 13.6 ± 0.6 | 15.8 ± 0.7 |
| T-53 | 15.3 ± 1.5 | 13.6 ± 0.7 | 14.7 ± 0.5 | 16.4 ± 0.8 |
| T-54 | 15.1 ± 1.5 | 13.5 ± 0.2 | 12.8 ± 0.2 | 14.2 ± 0.6 |
| T-55 | 16.5 ± 0.6 | 15.6 ± 0.2 | 15.4 ± 0.2 | 16.6 ± 0.5 |
| T-56 | 16.2 ± 1.2 | 15.9 ± 0.8 | 15.1 ± 0.2 | 16.4 ± 0.4 |
| T-57 | 17.7 ± 0.2 | 17.6 ± 0.5 | 17.2 ± 0.1 | 18.0 ± 0.2 |
| T-58 | 15.0 ± 0.5 | 14.2 ± 0.2 | 13.5 ± 0.3 | 15.5 ± 1.1 |
| T-59 | 15.8 ± 0.3 | 13.9 ± 0.0 | 14.2 ± 0.5 | 14.9 ± 0.5 |
| T-60 | 16.7 ± 0.6 | 16.0 ± 0.3 | 15.2 ± 0.4 | 16.8 ± 0.5 |
| T-61 | 14.8 ± 0.4 | 15.2 ± 0.3 | 15.2 ± 0.2 | 15.8 ± 1.5 |
| T-62 | 16.7 ± 0.3 | 16.3 ± 0.4 | 16.2 ± 0.4 | 17.8 ± 1.0 |
| T-63 | 15.5 ± 1.0 | 14.5 ± 0.6 | 13.9 ± 0.8 | 15.0 ± 0.2 |
| T-64 | 13.5 ± 0.3 | 12.9 ± 1.1 | 14.0 ± 0.3 | 14.7 ± 0.3 |
| T-65 | 13.9 ± 0.2 | 13.9 ± 0.2 | 14.0 ± 0.1 | 14.4 ± 0.3 |
| T-66 | 15.5 ± 0.2 | 21.4 ± 0.3 | 28.7 ± 1.0 | 28.7 ± 1.3 |
| T-67 | 15.3 ± 0.2 | 15.0 ± 1.3 | 14.5 ± 0.3 | 17.3 ± 1.6 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-1 FIRST QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 03-Jan-95 | 10-Jan-95 | 3.50E-02 | +/- | 3.00E-03 |
| 10-Jan-95 | 17-Jan-95 | 2.90E-02 | +/- | 3.00E-03 |
| 17-Jan-95 | 24-Jan-95 | 1.60E-02 | +/- | 3.00E-03 |
| 24-Jan-95 | 31-Jan-95 | 2.50E-02 | +/- | 3.00E-03 |
| 31-Jan-95 | 07-Feb-95 | 3.20E-02 | +/- | 3.00E-03 |
| 07-Feb-95 | 14-Feb-95 | 2.90E-02 | +/- | 3.00E-03 |
| 14-Feb-95 | 21-Feb-95 | 3.20E-02 | +/- | 3.00E-03 |
| 21-Feb-95 | 28-Feb-95 | 2.30E-02 | +/- | 3.00E-03 |
| 28-Feb-95 | 07-Mar-95 | 2.10E-02 | +/- | 3.00E-03 |
| 07-Mar-95 | 14-Mar-95 | 2.70E-02 | +/- | 3.00E-03 |
| 14-Mar-95 | 21-Mar-95 | 2.50E-02 | +/- | 3.00E-03 |
| 21-Mar-95 | 28-Mar-95 | 1.80E-02 | +/- | 3.00E-03 |
| 28-Mar-95 | 04-Apr-95 | 2.40E-02 | +/- | 3.00E-03 |

## API-1 SECOND QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | 2.60E-02 | +/- | 3.00E-03 |
| 11-Apr-95 | 18-Apr-95 | 1.90E-02 | +/- | 3.00E-03 |
| 18-Apr-95 | 25-Apr-95 | 1.70E-02 | +/- | 3.00E-03 |
| 25-Apr-95 | 2-May-95 | 1.80E-02 | +/- | 3.00E-03 |
| 2-May-95 | 9-May-95 | (a) | | |
| 9-May-95 | 16-May-95 | 2.00E-02 | +/- | 3.00E-03 |
| 16-May-95 | 23-May-95 | 2.10E-02 | +/- | 3.00E-03 |
| 23-May-95 | 30-May-95 | 1.50E-02 | +/- | 3.00E-03 |
| 30-May-95 | 6-Jun-95 | 1.90E-02 | +/- | 3.00E-03 |
| 6-Jun-95 | 13-Jun-95 | 1.70E-02 | +/- | 3.00E-03 |
| 13-Jun-95 | 20-Jun-95 | 2.80E-02 | +/- | 3.00E-03 |
| 20-Jun-95 | 27-Jun-95 | 2.10E-02 | +/- | 3.00E-03 |
| 27-Jun-95 | 3-Jul-95 | 2.20E-02 | +/- | 3.00E-03 |

(a) sample not collected (see section 10.2.1)

# FERMI 2
## AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

### API-1 THIRD QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | 1.80E-02 | +/- | 3.00E-03 |
| 11-Jul-95 | 18-Jul-95 | 2.70E-02 | +/- | 3.00E-03 |
| 18-Jul-95 | 25-Jul-95 | 2.50E-02 | +/- | 3.00E-03 |
| 25-Jul-95 | 1-Aug-95 | 2.80E-02 | +/- | 3.00E-03 |
| 1-Aug-95 | 8-Aug-95 | 1.90E-02 | +/- | 3.00E-03 |
| 8-Aug-95 | 15-Aug-95 | 2.90E-02 | +/- | 3.00E-03 |
| 15-Aug-95 | 22-Aug-95 | 2.90E-02 | +/- | 3.00E-03 |
| 22-Aug-95 | 29-Aug-95 | 2.10E-02 | +/- | 3.00E-03 |
| 29-Aug-95 | 5-Sep-95 | 2.90E-02 | +/- | 3.00E-03 |
| 5-Sep-95 | 12-Sep-95 | 2.40E-02 | +/- | 3.00E-03 |
| 12-Sep-95 | 19-Sep-95 | 2.50E-02 | +/- | 3.00E-03 |
| 19-Sep-95 | 26-Sep-95 | 1.90E-02 | +/- | 3.00E-03 |
| 26-Sep-95 | 3-Oct-95 | 3.60E-02 | +/- | 4.00E-03 |

### API-1 FOURTH QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | 2.00E-02 | +/- | 3.00E-03 |
| 10-Oct-95 | 17-Oct-95 | 3.30E-02 | +/- | 3.00E-03 |
| 17-Oct-95 | 24-Oct-95 | 2.50E-02 | +/- | 3.00E-03 |
| 24-Oct-95 | 31-Oct-95 | 2.10E-02 | +/- | 3.00E-03 |
| 31-Oct-95 | 7-Nov-95 | 2.70E-02 | +/- | 3.00E-03 |
| 7-Nov-95 | 14-Nov-95 | 2.60E-02 | +/- | 3.00E-03 |
| 14-Nov-95 | 21-Nov-95 | 2.80E-02 | +/- | 3.00E-03 |
| 21-Nov-95 | 28-Nov-95 | 3.00E-02 | +/- | 3.00E-03 |
| 28-Nov-95 | 5-Dec-95 | 3.00E-02 | +/- | 3.00E-03 |
| 5-Dec-95 | 12-Dec-95 | 3.10E-02 | +/- | 4.00E-03 |
| 12-Dec-95 | 19-Dec-95 | 4.40E-02 | +/- | 4.00E-03 |
| 19-Dec-95 | 27-Dec-95 | 2.00E-02 | +/- | 3.00E-03 |
| 27-Dec-95 | 3-Jan-96 | 4.30E-02 | +/- | 4.00E-03 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-2 FIRST QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | 3.60E-02 | +/- | 4.00E-03 |
| 10-Jan-95 | 17-Jan-95 | 2.60E-02 | +/- | 3.00E-03 |
| 17-Jan-95 | 24-Jan-95 | 1.80E-02 | +/- | 3.00E-03 |
| 24-Jan-95 | 31-Jan-95 | 2.70E-02 | +/- | 3.00E-03 |
| 31-Jan-95 | 7-Feb-95 | 3.70E-02 | +/- | 4.00E-03 |
| 7-Feb-95 | 14-Feb-95 | 3.30E-02 | +/- | 4.00E-03 |
| 14-Feb-95 | 21-Feb-95 | 3.00E-02 | +/- | 3.00E-03 |
| 21-Feb-95 | 28-Feb-95 | 2.50E-02 | +/- | 3.00E-03 |
| 28-Feb-95 | 7-Mar-95 | 2.30E-02 | +/- | 3.00E-03 |
| 7-Mar-95 | 14-Mar-95 | 2.90E-02 | +/- | 3.00E-03 |
| 14-Mar-95 | 21-Mar-95 | 2.60E-02 | +/- | 3.00E-03 |
| 21-Mar-95 | 28-Mar-95 | 1.70E-02 | +/- | 3.00E-03 |
| 28-Mar-95 | 4-Apr-95 | 2.40E-02 | +/- | 3.00E-03 |

## API-2 SECOND QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | 3.00E-02 | +/- | 3.00E-03 |
| 11-Apr-95 | 18-Apr-95 | 2.20E-02 | +/- | 3.00E-03 |
| 18-Apr-95 | 25-Apr-95 | 1.60E-02 | +/- | 3.00E-03 |
| 25-Apr-95 | 2-May-95 | 1.70E-02 | +/- | 3.00E-03 |
| 2-May-95 | 9-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 9-May-95 | 16-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 16-May-95 | 23-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 23-May-95 | 30-May-95 | 1.70E-02 | +/- | 3.00E-03 |
| 30-May-95 | 6-Jun-95 | 2.10E-02 | +/- | 3.00E-03 |
| 6-Jun-95 | 13-Jun-95 | 2.10E-02 | +/- | 3.00E-03 |
| 13-Jun-95 | 20-Jun-95 | 3.10E-02 | +/- | 3.00E-03 |
| 20-Jun-95 | 27-Jun-95 | 2.20E-02 | +/- | 3.00E-03 |
| 27-Jun-95 | 3-Jul-95 | 2.20E-02 | +/- | 3.00E-03 |

# FERMI 2
## AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

### API-2 THIRD QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | 2.10E-02 | +/- | 3.00E-03 |
| 11-Jul-95 | 18-Jul-95 | 3.30E-02 | +/- | 3.00E-03 |
| 18-Jul-95 | 25-Jul-95 | 2.70E-02 | +/- | 3.00E-03 |
| 25-Jul-95 | 1-Aug-95 | 2.90E-02 | +/- | 3.00E-03 |
| 1-Aug-95 | 8-Aug-95 | 2.10E-02 | +/- | 3.00E-03 |
| 8-Aug-95 | 15-Aug-95 | 3.20E-02 | +/- | 3.00E-03 |
| 15-Aug-95 | 22-Aug-95 | 2.40E-02 | +/- | 3.00E-03 |
| 22-Aug-95 | 29-Aug-95 | 2.00E-02 | +/- | 3.00E-03 |
| 29-Aug-95 | 5-Sep-95 | 3.20E-02 | +/- | 4.00E-03 |
| 5-Sep-95 | 12-Sep-95 | 3.10E-02 | +/- | 3.00E-03 |
| 12-Sep-95 | 19-Sep-95 | 2.90E-02 | +/- | 3.00E-03 |
| 19-Sep-95 | 26-Sep-95 | 1.80E-02 | +/- | 3.00E-03 |
| 26-Sep-95 | 3-Oct-95 | 3.60E-02 | +/- | 4.00E-03 |

### API-2 FOURTH QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | 1.70E-02 | +/- | 3.00E-03 |
| 10-Oct-95 | 17-Oct-95 | 3.50E-02 | +/- | 3.00E-03 |
| 17-Oct-95 | 24-Oct-95 | 2.30E-02 | +/- | 3.00E-03 |
| 24-Oct-95 | 31-Oct-95 | 2.30E-02 | +/- | 3.00E-03 |
| 31-Oct-95 | 7-Nov-95 | 3.00E-02 | +/- | 3.00E-03 |
| 7-Nov-95 | 14-Nov-95 | 2.80E-02 | +/- | 3.00E-03 |
| 14-Nov-95 | 21-Nov-95 | 2.80E-02 | +/- | 3.00E-03 |
| 21-Nov-95 | 28-Nov-95 | 3.00E-02 | +/- | 3.00E-03 |
| 28-Nov-95 | 5-Dec-95 | 3.20E-02 | +/- | 4.00E-03 |
| 5-Dec-95 | 12-Dec-95 | 3.30E-02 | +/- | 4.00E-03 |
| 12-Dec-95 | 19-Dec-95 | 4.60E-02 | +/- | 4.00E-03 |
| 19-Dec-95 | 27-Dec-95 | 2.50E-02 | +/- | 3.00E-03 |
| 27-Dec-95 | 3-Jan-96 | 3.70E-02 | +/- | 4.00E-03 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-3 FIRST QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | 3.30E-02 | +/- | 3.00E-03 |
| 10-Jan-95 | 17-Jan-95 | 2.90E-02 | +/- | 3.00E-03 |
| 17-Jan-95 | 24-Jan-95 | 1.70E-02 | +/- | 3.00E-03 |
| 24-Jan-95 | 31-Jan-95 | 2.60E-02 | +/- | 3.00E-03 |
| 31-Jan-95 | 7-Feb-95 | 3.00E-02 | +/- | 3.00E-03 |
| 7-Feb-95 | 14-Feb-95 | 2.90E-02 | +/- | 3.00E-03 |
| 14-Feb-95 | 21-Feb-95 | 3.30E-02 | +/- | 3.00E-03 |
| 21-Feb-95 | 28-Feb-95 | 2.50E-02 | +/- | 3.00E-03 |
| 28-Feb-95 | 7-Mar-95 | 2.40E-02 | +/- | 3.00E-03 |
| 7-Mar-95 | 14-Mar-95 | 2.80E-02 | +/- | 3.00E-03 |
| 14-Mar-95 | 21-Mar-95 | 2.90E-02 | +/- | 3.00E-03 |
| 21-Mar-95 | 28-Mar-95 | 1.60E-02 | +/- | 3.00E-03 |
| 28-Mar-95 | 4-Apr-95 | 2.40E-02 | +/- | 3.00E-03 |

## API-3 SECOND QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | 2.80E-02 | +/- | 3.00E-03 |
| 11-Apr-95 | 18-Apr-95 | 1.60E-02 | +/- | 3.00E-03 |
| 18-Apr-95 | 25-Apr-95 | 1.60E-02 | +/- | 3.00E-03 |
| 25-Apr-95 | 2-May-95 | 1.40E-02 | +/- | 2.00E-03 |
| 2-May-95 | 9-May-95 | 2.00E-02 | +/- | 3.00E-03 |
| 9-May-95 | 16-May-95 | 1.70E-02 | +/- | 3.00E-03 |
| 16-May-95 | 23-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 23-May-95 | 30-May-95 | 1.70E-02 | +/- | 3.00E-03 |
| 30-May-95 | 6-Jun-95 | 2.00E-02 | +/- | 3.00E-03 |
| 6-Jun-95 | 13-Jun-95 | 1.70E-02 | +/- | 3.00E-03 |
| 13-Jun-95 | 20-Jun-95 | 2.70E-02 | +/- | 3.00E-03 |
| 20-Jun-95 | 27-Jun-95 | 2.00E-02 | +/- | 3.00E-03 |
| 27-Jun-95 | 3-Jul-95 | 2.50E-02 | +/- | 3.00E-03 |

# FERMI 2
## AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

### API-3 THIRD QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | 2.30E-02 | +/- | 3.00E-03 |
| 11-Jul-95 | 18-Jul-95 | 3.30E-02 | +/- | 3.00E-03 |
| 18-Jul-95 | 25-Jul-95 | 2.40E-02 | +/- | 3.00E-03 |
| 25-Jul-95 | 1-Aug-95 | 3.20E-02 | +/- | 4.00E-03 |
| 1-Aug-95 | 8-Aug-95 | 2.20E-02 | +/- | 3.00E-03 |
| 8-Aug-95 | 15-Aug-95 | 3.00E-02 | +/- | 3.00E-03 |
| 15-Aug-95 | 22-Aug-95 | 2.40E-02 | +/- | 3.00E-03 |
| 22-Aug-95 | 29-Aug-95 | 2.00E-02 | +/- | 3.00E-03 |
| 29-Aug-95 | 5-Sep-95 | 3.10E-02 | +/- | 3.00E-03 |
| 5-Sep-95 | 12-Sep-95 | 3.10E-02 | +/- | 3.00E-03 |
| 12-Sep-95 | 19-Sep-95 | 2.80E-02 | +/- | 3.00E-03 |
| 19-Sep-95 | 26-Sep-95 | 2.00E-02 | +/- | 3.00E-03 |
| 26-Sep-95 | 3-Oct-95 | (a)3.30E-02 | +/- | 4.00E-03 |

### API-3 FOURTH QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | 2.10E-02 | +/- | 3.00E-03 |
| 10-Oct-95 | 17-Oct-95 | 3.50E-02 | +/- | 3.00E-03 |
| 17-Oct-95 | 24-Oct-95 | 2.20E-02 | +/- | 3.00E-03 |
| 24-Oct-95 | 31-Oct-95 | 2.50E-02 | +/- | 3.00E-03 |
| 31-Oct-95 | 7-Nov-95 | 2.70E-02 | +/- | [illegible]-03 |
| 7-Nov-95 | 14-Nov-95 | 2.60E-02 | +/- | 3.00E-03 |
| 14-Nov-95 | 21-Nov-95 | 2.70E-02 | +/- | 3.00E-03 |
| 21-Nov-95 | 28-Nov-95 | 3.50E-02 | +/- | 4.00E-03 |
| 28-Nov-95 | 5-Dec-95 | 3.10E-02 | +/- | 4.00E-03 |
| 5-Dec-95 | 12-Dec-95 | 2.30E-02 | +/- | 3.00E-03 |
| 12-Dec-95 | 19-Dec-95 | 4.70E-02 | +/- | 4.00E-03 |
| 19-Dec-95 | 27-Dec-95 | 2.30E-02 | +/- | 3.00E-03 |
| 27-Dec-95 | 3-Jan-96 | 4.00E-02 | +/- | 4.00E-03 |

(a) sample less than representive (see section 10.2.1)

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-4 FIRST QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | 3.50E-02 | +/- | 4.00E-03 |
| 10-Jan-95 | 17-Jan-95 | 2.90E-02 | +/- | 3.00E-03 |
| 17-Jan-95 | 24-Jan-95 | 1.80E-02 | +/- | 3.00E-03 |
| 24-Jan-95 | 31-Jan-95 | 2.90E-02 | +/- | 3.00E-03 |
| 31-Jan-95 | 7-Feb-95 | 3.20E-02 | +/- | 3.00E-03 |
| 7-Feb-95 | 14-Feb-95 | 2.80E-02 | +/- | 3.00E-03 |
| 14-Feb-95 | 21-Feb-95 | 3.00E-02 | +/- | 3.00E-03 |
| 21-Feb-95 | 28-Feb-95 | 2.60E-02 | +/- | 3.00E-03 |
| 28-Feb-95 | 7-Mar-95 | 2.50E-02 | +/- | 3.00E-03 |
| 7-Mar-95 | 14-Mar-95 | 2.80E-02 | +/- | 3.00E-03 |
| 14-Mar-95 | 21-Mar-95 | 2.40E-02 | +/- | 3.00E-03 |
| 21-Mar-95 | 28-Mar-95 | 1.90E-02 | +/- | 3.00E-03 |
| 28-Mar-95 | 4-Apr-95 | 2.40E-02 | +/- | 3.00E-03 |

## API-4 SECOND QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | 3.00E-02 | +/- | 3.00E-03 |
| 11-Apr-95 | 18-Apr-95 | 1.80E-02 | +/- | 3.00E-03 |
| 18-Apr-95 | 25-Apr-95 | 1.60E-02 | +/- | 3.00E-03 |
| 25-Apr-95 | 2-May-95 | 1.80E-02 | +/- | 3.00E-03 |
| 2-May-95 | 9-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 9-May-95 | 16-May-95 | 1.90E-02 | +/- | 3.00E-03 |
| 16-May-95 | 23-May-95 | 2.00E-02 | +/- | 3.00E-03 |
| 23-May-95 | 30-May-95 | 1.50E-02 | +/- | 2.00E-03 |
| 30-May-95 | 6-Jun-95 | 2.10E-02 | +/- | 3.00E-03 |
| 6-Jun-95 | 13-Jun-95 | 1.90E-02 | +/- | 3.00E-03 |
| 13-Jun-95 | 20-Jun-95 | 3.10E-02 | +/- | 3.00E-03 |
| 20-Jun-95 | 27-Jun-95 | 2.40E-02 | +/- | 3.00E-03 |
| 27-Jun-95 | 3-Jul-95 | 2.00E-02 | +/- | 3.00E-03 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

### API-4 THIRD QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | 2.20E-02 | +/- | 3.00E-03 |
| 11-Jul-95 | 18-Jul-95 | 3.10E-02 | +/- | 3.00E-03 |
| 18-Jul-95 | 25-Jul-95 | 2.40E-02 | +/- | 3.00E-03 |
| 25-Jul-95 | 1-Aug-95 | 3.20E-02 | +/- | 3.00E-03 |
| 1-Aug-95 | 8-Aug-95 | 1.90E-02 | +/- | 3.00E-03 |
| 8-Aug-95 | 15-Aug-95 | 3.00E-02 | +/- | 3.00E-03 |
| 15-Aug-95 | 22-Aug-95 | 2.80E-02 | +/- | 3.00E-03 |
| 22-Aug-95 | 29-Aug-95 | 2.30E-02 | +/- | 3.00E-03 |
| 29-Aug-95 | 5-Sep-95 | 3.20E-02 | +/- | 3.00E-03 |
| 5-Sep-95 | 12-Sep-95 | 2.60E-02 | +/- | 3.00E-03 |
| 12-Sep-95 | 19-Sep-95 | 2.70E-02 | +/- | 3.00E-03 |
| 19-Sep-95 | 26-Sep-95 | 2.20E-02 | +/- | 3.00E-03 |
| 26-Sep-95 | 3-Oct-95 | 4.00E-02 | +/- | 4.00E-03 |

### API-4 FOURTH QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | 2.00E-02 | +/- | 3.00E-03 |
| 10-Oct-95 | 17-Oct-95 | 3.60E-02 | +/- | 3.00E-03 |
| 17-Oct-95 | 24-Oct-95 | 2.50E-02 | +/- | 3.00E-03 |
| 24-Oct-95 | 31-Oct-95 | 2.10E-02 | +/- | 3.00E-03 |
| 31-Oct-95 | 7-Nov-95 | 2.80E-02 | +/- | 3.00E-03 |
| 7-Nov-95 | 14-Nov-95 | 2.80E-02 | +/- | 3.00E-03 |
| 14-Nov-95 | 21-Nov-95 | 2.60E-02 | +/- | 3.00E-03 |
| 21-Nov-95 | 28-Nov-95 | 3.20E-02 | +/- | 3.00E-03 |
| 28-Nov-95 | 5-Dec-95 | 3.00E-02 | +/- | 4.00E-03 |
| 5-Dec-95 | 12-Dec-95 | 3.30E-02 | +/- | 4.00E-03 |
| 12-Dec-95 | 19-Dec-95 | 4.30E-02 | +/- | 4.00E-03 |
| 19-Dec-95 | 27-Dec-95 | 2.40E-02 | +/- | 3.00E-03 |
| 27-Dec-95 | 3-Jan-96 | 4.00E-02 | +/- | 4.00E-03 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-5 FIRST QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | 3.40E-02 | +/- | 3.00E-03 |
| 10-Jan-95 | 17-Jan-95 | 2.80E-02 | +/- | 3.00E-03 |
| 17-Jan-95 | 24-Jan-95 | 1.60E-02 | +/- | 3.00E-03 |
| 24-Jan-95 | 31-Jan-95 | 2.90E-02 | +/- | 3.00E-03 |
| 31-Jan-95 | 7-Feb-95 | 3.20E-02 | +/- | 4.00E-03 |
| 7-Feb-95 | 14-Feb-95 | 3.10E-02 | +/- | 3.00E-03 |
| 14-Feb-95 | 21-Feb-95 | 3.50E-02 | +/- | 4.00E-03 |
| 21-Feb-95 | 28-Feb-95 | 2.20E-02 | +/- | 3.00E-03 |
| 28-Feb-95 | 7-Mar-95 | 2.30E-02 | +/- | 3.00E-03 |
| 7-Mar-95 | 14-Mar-95 | 3.00E-02 | +/- | 3.00E-03 |
| 14-Mar-95 | 21-Mar-95 | 2.60E-02 | +/- | 3.00E-03 |
| 21-Mar-95 | 28-Mar-95 | 2.00E-02 | +/- | 3.00E-03 |
| 28-Mar-95 | 4-Apr-95 | 2.50E-02 | +/- | 3.00E-03 |

## API-5 SECOND QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | 2.70E-02 | +/- | 3.00E-03 |
| 11-Apr-95 | 18-Apr-95 | 1.90E-02 | +/- | 3.00E-03 |
| 18-Apr-95 | 25-Apr-95 | 1.70E-02 | +/- | 3.00E-03 |
| 25-Apr-95 | 2-May-95 | 1.50E-02 | +/- | 3.00E-03 |
| 2-May-95 | 9-May-95 | 2.10E-02 | +/- | 3.00E-03 |
| 9-May-95 | 16-May-95 | 2.20E-02 | +/- | 3.00E-03 |
| 16-May-95 | 23-May-95 | 2.00E-02 | +/- | 3.00E-03 |
| 23-May-95 | 30-May-95 | 1.60E-02 | +/- | 3.00E-03 |
| 30-May-95 | 6-Jun-95 | 2.10E-02 | +/- | 3.00E-03 |
| 6-Jun-95 | 13-Jun-95 | 1.70E-02 | +/- | 3.00E-03 |
| 13-Jun-95 | 20-Jun-95 | 3.00E-02 | +/- | 3.00E-03 |
| 20-Jun-95 | 27-Jun-95 | 2.40E-02 | +/- | 3.00E-03 |
| 27-Jun-95 | 3-Jul-95 | 2.30E-02 | +/- | 3.00E-03 |

# FERMI 2
# AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

## API-5 THIRD QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | 2.30E-02 | +/- | 3.00E-03 |
| 11-Jul-95 | 18-Jul-95 | 3.10E-02 | +/- | 3.00E-03 |
| 18-Jul-95 | 25-Jul-95 | 2.50E-02 | +/- | 3.00E-03 |
| 25-Jul-95 | 1-Aug-95 | 3.00F-02 | +/- | 4.00E-03 |
| 1-Aug-95 | 8-Aug-95 | 2.30E-02 | +/- | 3.00E-03 |
| 8-Aug-95 | 15-Aug-95 | 2.90E-02 | +/- | 3.00E-03 |
| 15-Aug-95 | 22-Aug-95 | 2.80E-02 | +/- | 3.00E-03 |
| 22-Aug-95 | 29-Aug-95 | 2.00E-02 | +/- | 3.00E-03 |
| 29-Aug-95 | 5-Sep-95 | 3.10E-02 | +/- | 3.00E-03 |
| 5-Sep-95 | 12-Sep-95 | 3.10E-02 | +/- | 3.00E-03 |
| 12-Sep-95 | 19-Sep-95 | 2.60E-02 | +/- | 3.00E-03 |
| 19-Sep-95 | 26-Sep-95 | 2.40E-02 | +/- | 3.00E-03 |
| 26-Sep-95 | 3-Oct-95 | 3.50E-02 | +/- | 4.00E-03 |

## API-5 FOURTH QUARTER

| Start Date | End Date | Activity | | |
|---|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | 2.10E-02 | +/- | 3.00E-03 |
| 10-Oct-95 | 17-Oct-95 | 3.50E-02 | +/- | 3.00E-03 |
| 17-Oct-95 | 24-Oct-95 | 2.40E-02 | +/- | 3.00E-03 |
| 24-Oct-95 | 31-Oct-95 | 2.40E-02 | +/- | 3.00E-03 |
| 31-Oct-95 | 7-Nov-95 | 3.20E-02 | +/- | 3.00E-03 |
| 7-Nov-95 | 14-Nov-95 | 2.50E-02 | +/- | 3.00E-03 |
| 14-Nov-95 | 21-Nov-95 | 2.70E-02 | +/- | 3.00E-03 |
| 21-Nov-95 | 28-Nov-95 | 3.20E-02 | +/- | 3.00E-03 |
| 28-Nov-95 | 5-Dec-95 | 3.20E-02 | +/- | 4.00E-03 |
| 5-Dec-95 | 12-Dec-95 | 3.50E-02 | +/- | 4.00E-03 |
| 12-Dec-95 | 19-Dec-95 | 4.40E-02 | +/- | 4.00E-03 |
| 19-Dec-95 | 27-Dec-95 | 2.60E-02 | +/- | 3.00E-03 |
| 27-Dec-95 | 3-Jan-96 | 4.00E-02 | +/- | 4.00E-03 |

# FERMI 2
# AIR IODINE - 131
(pCi/cubic meter)

## API-1 FIRST QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | < | 3.00E-02 |
| 10-Jan-95 | 17-Jan-95 | < | 2.00E-02 |
| 17-Jan-95 | 24-Jan-95 | < | 3.00E-02 |
| 24-Jan-95 | 31-Jan-95 | < | 3.00E-02 |
| 31-Jan-95 | 7-Feb-95 | < | 2.00E-02 |
| 7-Feb-95 | 14-Feb-95 | < | 2.00E-02 |
| 14-Feb-95 | 21-Feb-95 | < | 4.00E-02 |
| 21-Feb-95 | 28-Feb-95 | < | 4.00E-02 |
| 28-Feb-95 | 7-Mar-95 | < | 3.00E-02 |
| 7-Mar-95 | 14-Mar-95 | < | 2.00E-02 |
| 14-Mar-95 | 21-Mar-95 | < | 3.00E-02 |
| 21-Mar-95 | 28-Mar-95 | < | 3.00E-02 |
| 28-Mar-95 | 4-Apr-95 | < | 3.00E-02 |

## API-1 SECOND QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | < | 3.00E-02 |
| 11-Apr-95 | 18-Apr-95 | < | 2.00E-02 |
| 18-Apr-95 | 25-Apr-95 | < | 4.00E-02 |
| 25-Apr-95 | 2-May-95 | < | 3.00E-02 |
| 2-May-95 | 9-May-95 | (a) | |
| 9-May-95 | 16-May-95 | < | 4.00E-02 |
| 16-May-95 | 23-May-95 | < | 3.00E-02 |
| 23-May-95 | 30-May-95 | < | 3.00E-02 |
| 30-May-95 | 6-Jun-95 | < | 2.00E-02 |
| 6-Jun-95 | 13-Jun-95 | < | 2.00E-02 |
| 13-Jun-95 | 20-Jun-95 | < | 2.00E-02 |
| 20-Jun-95 | 27-Jun-95 | < | 2.00E-02 |
| 27-Jun-95 | 3-Jul-95 | < | 2.00E-02 |

(a) sample not collected (see section 10.2.1)

# FERMI 2
# AIR IODINE - 131
(pCi/cubic meter)

## API-1 THIRD QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | < | 2.00E-02 |
| 11-Jul-95 | 18-Jul-95 | < | 1.00E-02 |
| 18-Jul-95 | 25-Jul-95 | < | 3.00E-02 |
| 25-Jul-95 | 1-Aug-95 | < | 2.00E-02 |
| 1-Aug-95 | 8-Aug-95 | < | 2.00E-02 |
| 8-Aug-95 | 15-Aug-95 | < | 2.00E-02 |
| 15-Aug-95 | 22-Aug-95 | < | 2.00E-02 |
| 22-Aug-95 | 29-Aug-95 | < | 1.00E-02 |
| 29-Aug-95 | 5-Sep-95 | < | 2.00E-02 |
| 5-Sep-95 | 12-Sep-95 | < | 3.00E-02 |
| 12-Sep-95 | 19-Sep-95 | < | 2.00E-02 |
| 19-Sep-95 | 26-Sep-95 | < | 3.00E-02 |
| 26-Sep-95 | 3-Oct-95 | < | 2.00E-02 |

## API-1 FOURTH QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | < | 5.00E-02 |
| 10-Oct-95 | 17-Oct-95 | < | 5.00E-02 |
| 17-Oct-95 | 24-Oct-95 | < | 2.00E-02 |
| 24-Oct-95 | 31-Oct-95 | < | 2.00E-02 |
| 31-Oct-95 | 7-Nov-95 | < | 2.00E-02 |
| 7-Nov-95 | 14-Nov-95 | < | 3.00E-02 |
| 14-Nov-95 | 21-Nov-95 | < | 2.00E-02 |
| 21-Nov-95 | 28-Nov-95 | < | 3.00E-02 |
| 28-Nov-95 | 5-Dec-95 | < | 3.00E-02 |
| 5-Dec-95 | 12-Dec-95 | < | 2.00E-02 |
| 12-Dec-95 | 19-Dec-95 | < | 2.00E-02 |
| 19-Dec-95 | 27-Dec-95 | < | 2.00E-02 |
| 27-Dec-95 | 3-Jan-96 | < | 3.00E-02 |

# FERMI 2
# AIR IODINE - 131
(pCi/cubic meter)

## API-2 FIRST QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | < | 3.00E-02 |
| 10-Jan-95 | 17-Jan-95 | < | 2.00E-02 |
| 17-Jan-95 | 24-Jan-95 | < | 3.00E-02 |
| 24-Jan-95 | 31-Jan-95 | < | 3.00E-02 |
| 31-Jan-95 | 7-Feb-95 | < | 2.00E-02 |
| 7-Feb-95 | 14-Feb-95 | < | 2.00E-02 |
| 14-Feb-95 | 21-Feb-95 | < | 4.00E-02 |
| 21-Feb-95 | 28-Feb-95 | < | 4.00E-02 |
| 28-Feb-95 | 7-Mar-95 | < | 3.00E-02 |
| 7-Mar-95 | 14-Mar-95 | < | 2.00E-02 |
| 14-Mar-95 | 21-Mar-95 | < | 3.00E-02 |
| 21-Mar-95 | 28-Mar-95 | < | 3.00E-02 |
| 28-Mar-95 | 4-Apr-95 | < | 3.00E-02 |

## API-2 SECOND QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | < | 4.00E-02 |
| 11-Apr-95 | 18-Apr-95 | < | 2.00E-02 |
| 18-Apr-95 | 25-Apr-95 | < | 4.00E-02 |
| 25-Apr-95 | 2-May-95 | < | 3.00E-02 |
| 2-May-95 | 9-May-95 | < | 3.00E-02 |
| 9-May-95 | 16-May-95 | < | 4.00E-02 |
| 16-May-95 | 23-May-95 | < | 3.00E-02 |
| 23-May-95 | 30-May-95 | < | 3.00E-02 |
| 30-May-95 | 6-Jun-95 | < | 2.00E-02 |
| 6-Jun-95 | 13-Jun-95 | < | 2.00E-02 |
| 13-Jun-95 | 20-Jun-95 | < | 2.00E-02 |
| 20-Jun-95 | 27-Jun-95 | < | 2.00E-02 |
| 27-Jun-95 | 3-Jul-95 | < | 2.00E-02 |

# FERMI 2
# AIR IODINE - 131
(pCi/cubic meter)

### API-2 THIRD QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 3-Jul-95 | 11-Jul-95 | < 2.00E-02 |
| 11-Jul-95 | 18-Jul-95 | < 2.00E-02 |
| 18-Jul-95 | 25-Jul-95 | < 3.00E-02 |
| 25-Jul-95 | 1-Aug-95 | < 2.00E-02 |
| 1-Aug-95 | 8-Aug-95 | < 2.00E-02 |
| 8-Aug-95 | 15-Aug-95 | < 2.00E-02 |
| 15-Aug-95 | 22-Aug-95 | < 2.00E-02 |
| 22-Aug-95 | 29-Aug-95 | < 1.00E-02 |
| 29-Aug-95 | 5-Sep-95 | < 2.00E-02 |
| 5-Sep-95 | 12-Sep-95 | < 3.00E-02 |
| 12-Sep-95 | 19-Sep-95 | < 2.00E-02 |
| 19-Sep-95 | 26-Sep-95 | < 3.00E-02 |
| 26-Sep-95 | 3-Oct-95 | < 2.00E-02 |

### API-2 FOURTH QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 3-Oct-95 | 10-Oct-95 | < 5.00E-02 |
| 10-Oct-95 | 17-Oct-95 | < 5.00E-02 |
| 17-Oct-95 | 24-Oct-95 | < 2.00E-02 |
| 24-Oct-95 | 31-Oct-95 | < 2.00E-02 |
| 31-Oct-95 | 7-Nov-95 | < 3.00E-02 |
| 7-Nov-95 | 14-Nov-95 | < 3.00E-02 |
| 14-Nov-95 | 21-Nov-95 | < 3.00E-02 |
| 21-Nov-95 | 28-Nov-95 | < 3.00E-02 |
| 28-Nov-95 | 5-Dec-95 | < 3.00E-02 |
| 5-Dec-95 | 12-Dec-95 | < 2.00E-02 |
| 12-Dec-95 | 19-Dec-95 | < 2.00E-02 |
| 19-Dec-95 | 27-Dec-95 | < 2.00E-02 |
| 27-Dec-95 | 3-Jan-96 | < 3.00E-02 |

# FERMI 2
## AIR IODINE - 131
(pCi/cubic meter)

### API-3 FIRST QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 3-Jan-95 | 10-Jan-95 | < 3.00E-02 |
| 10-Jan-95 | 17-Jan-95 | < 2.00E-02 |
| 17-Jan-95 | 24-Jan-95 | < 3.00E-02 |
| 24-Jan-95 | 31-Jan-95 | < 3.00E-02 |
| 31-Jan-95 | 7-Feb-95 | < 2.00E-02 |
| 7-Feb-95 | 14-Feb-95 | < 2.00E-02 |
| 14-Feb-95 | 21-Feb-95 | < 3.00E-02 |
| 21-Feb-95 | 28-Feb-95 | < 4.00E-02 |
| 28-Feb-95 | 7-Mar-95 | < 3.00E-02 |
| 7-Mar-95 | 14-Mar-95 | < 2.00E-02 |
| 14-Mar-95 | 21-Mar-95 | < 3.00E-02 |
| 21-Mar-95 | 28-Mar-95 | < 2.00E-02 |
| 28-Mar-95 | 4-Apr-95 | < 3.00E-02 |

### API-3 SECOND QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 4-Apr-95 | 11-Apr-95 | < 3.00E-02 |
| 11-Apr-95 | 18-Apr-95 | < 2.00E-02 |
| 18-Apr-95 | 25-Apr-95 | < 4.00E-02 |
| 25-Apr-95 | 2-May-95 | < 3.00E-02 |
| 2-May-95 | 9-May-95 | < 3.00E-02 |
| 9-May-95 | 16-May-95 | < 4.00E-02 |
| 16-May-95 | 23-May-95 | < 3.00E-02 |
| 23-May-95 | 30-May-95 | < 2.00E-02 |
| 30-May-95 | 6-Jun-95 | < 2.00E-02 |
| 6-Jun-95 | 13-Jun-95 | < 2.00E-02 |
| 13-Jun-95 | 20-Jun-95 | < 2.00E-02 |
| 20-Jun-95 | 27-Jun-95 | < 2.00E-02 |
| 27-Jun-95 | 3-Jul-95 | < 2.00E-02 |

# FERMI 2
## AIR IODINE - 131
(pCi/cubic meter)

### API-3 THIRD QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 3-Jul-95 | 11-Jul-95 | < 2.00E-02 |
| 11-Jul-95 | 18-Jul-95 | < 1.00E-02 |
| 18-Jul-95 | 25-Jul-95 | < 3.00E-02 |
| 25-Jul-95 | 1-Aug-95 | < 2.00E-02 |
| 1-Aug-95 | 8-Aug-95 | < 2.00E-02 |
| 8-Aug-95 | 15-Aug-95 | < 2.00E-02 |
| 15-Aug-95 | 22-Aug-95 | < 2.00E-02 |
| 22-Aug-95 | 29-Aug-95 | < 1.00E-02 |
| 29-Aug-95 | 5-Sep-95 | < 2.00E-02 |
| 5-Sep-95 | 12-Sep-95 | < 3.00E-02 |
| 12-Sep-95 | 19-Sep-95 | < 2.00E-02 |
| 19-Sep-95 | 26-Sep-95 | < 3.00E-02 |
| 26-Sep-95 | 3-Oct-95 | (a)< 2.00E-02 |

### API-3 FOURTH QUARTER

| Start Date | End Date | Activity |
|---|---|---|
| 3-Oct-95 | 10-Oct-95 | < 5.00E-02 |
| 10-Oct-95 | 17-Oct-95 | < 5.00E-02 |
| 17-Oct-95 | 24-Oct-95 | < 2.00E-02 |
| 24-Oct-95 | 31-Oct-95 | < 2.00E-02 |
| 31-Oct-95 | 7-Nov-95 | < 3.00E-02 |
| 7-Nov-95 | 14-Nov-95 | < 3.00E-02 |
| 14-Nov-95 | 21-Nov-95 | < 3.00E-02 |
| 21-Nov-95 | 28-Nov-95 | < 3.00E-02 |
| 28-Nov-95 | 5-Dec-95 | < 3.00E-02 |
| 5-Dec-95 | 12-Dec-95 | < 2.00E-02 |
| 12-Dec-95 | 19-Dec-95 | < 2.00E-02 |
| 19-Dec-95 | 27-Dec-95 | < 2.00E-02 |
| 27-Dec-95 | 3-Jan-96 | < 3.00E-02 |

(a) sample less than representive (see section 10.2.1)

# FERMI 2
## AIR IODINE - 131
(pCi/cubic meter)

### API-4 FIRST QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | < | 3.00E-02 |
| 10-Jan-95 | 17-Jan-95 | < | 2.00E-02 |
| 17-Jan-95 | 24-Jan-95 | < | 3.00E-02 |
| 24-Jan-95 | 31-Jan-95 | < | 3.00E-02 |
| 31-Jan-95 | 7-Feb-95 | < | 2.00E-02 |
| 7-Feb-95 | 14-Feb-95 | < | 2.00E-02 |
| 14-Feb-95 | 21-Feb-95 | < | 3.00E-02 |
| 21-Feb-95 | 28-Feb-95 | < | 4.00E-02 |
| 28-Feb-95 | 7-Mar-95 | < | 3.00E-02 |
| 7-Mar-95 | 14-Mar-95 | < | 2.00E-02 |
| 14-Mar-95 | 21-Mar-95 | < | 3.00E-02 |
| 21-Mar-95 | 28-Mar-95 | < | 2.00E-02 |
| 28-Mar-95 | 4-Apr-95 | < | 3.00E-02 |

### API-4 SECOND QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | < | 3.00E-02 |
| 11-Apr-95 | 18-Apr-95 | < | 2.00E-02 |
| 18-Apr-95 | 25-Apr-95 | < | 4.00E-02 |
| 25-Apr-95 | 2-May-95 | < | 3.00E-02 |
| 2-May-95 | 9-May-95 | < | 3.00E-02 |
| 9-May-95 | 16-May-95 | < | 3.00E-02 |
| 16-May-95 | 23-May-95 | < | 3.00E-02 |
| 23-May-95 | 30-May-95 | < | 2.00E-02 |
| 30-May-95 | 6-Jun-95 | < | 2.00E-02 |
| 6-Jun-95 | 13-Jun-95 | < | 2.00E-02 |
| 13-Jun-95 | 20-Jun-95 | < | 2.00E-02 |
| 20-Jun-95 | 27-Jun-95 | < | 2.00E-02 |
| 27-Jun-95 | 3-Jul-95 | < | 2.00E-02 |

# FERMI 2
## AIR IODINE - 131
(pCi/cubic meter)

### API-4 THIRD QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | < | 2.00E-02 |
| 11-Jul-95 | 18-Jul-95 | < | 1.00E-02 |
| 18-Jul-95 | 25-Jul-95 | < | 3.00E-02 |
| 25-Jul-95 | 1-Aug-95 | < | 2.00E-02 |
| 1-Aug-95 | 8-Aug-95 | < | 2.00E-02 |
| 8-Aug-95 | 15-Aug-95 | < | 2.00E-02 |
| 15-Aug-95 | 22-Aug-95 | < | 2.00E-02 |
| 22-Aug-95 | 29-Aug-95 | < | 1.00E-02 |
| 29-Aug-95 | 5-Sep-95 | < | 2.00E-02 |
| 5-Sep-95 | 12-Sep-95 | < | 3.00E-02 |
| 12-Sep-95 | 19-Sep-95 | < | 2.00E-02 |
| 19-Sep-95 | 26-Sep-95 | < | 3.00E-02 |
| 26-Sep-95 | 3-Oct-95 | < | 2.00E-02 |

### API-4 FOURTH QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | < | 4.00E-02 |
| 10-Oct-95 | 17-Oct-95 | < | 5.00E-02 |
| 17-Oct-95 | 24-Oct-95 | < | 2.00E-02 |
| 24-Oct-95 | 31-Oct-95 | < | 2.00E-02 |
| 31-Oct-95 | 7-Nov-95 | < | 2.00E-02 |
| 7-Nov-95 | 14-Nov-95 | < | 3.00E-02 |
| 14-Nov-95 | 21-Nov-95 | < | 3.00E-02 |
| 21-Nov-95 | 28-Nov-95 | < | 3.00E-02 |
| 28-Nov-95 | 5-Dec-95 | < | 3.00E-02 |
| 5-Dec-95 | 12-Dec-95 | < | 2.00E-02 |
| 12-Dec-95 | 19-Dec-95 | < | 2.00E-02 |
| 19-Dec-95 | 27-Dec-95 | < | 2.00E-02 |
| 27-Dec-95 | 3-Jan-96 | < | 3.00E-02 |

# FERMI 2
# AIR IODINE - 131
(pCi/cubic meter)

### API-5 FIRST QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jan-95 | 10-Jan-95 | < | 1.00E-02 |
| 10-Jan-95 | 17-Jan-95 | < | 1.00E-02 |
| 17-Jan-95 | 24-Jan-95 | < | 2.00E-02 |
| 24-Jan-95 | 31-Jan-95 | < | 2.00E-02 |
| 31-Jan-95 | 7-Feb-95 | < | 1.00E-02 |
| 7-Feb-95 | 14-Feb-95 | < | 1.00E-02 |
| 14-Feb-95 | 21-Feb-95 | < | 2.00E-02 |
| 21-Feb-95 | 28-Feb-95 | < | 2.00E-02 |
| 28-Feb-95 | 7-Mar-95 | < | 2.00E-02 |
| 7-Mar-95 | 14-Mar-95 | < | 1.00E-02 |
| 14-Mar-95 | 21-Mar-95 | < | 2.00E-02 |
| 21-Mar-95 | 28-Mar-95 | < | 2.00E-02 |
| 28-Mar-95 | 4-Apr-95 | < | 1.00E-02 |

### API-5 SECOND QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 4-Apr-95 | 11-Apr-95 | < | 2.00E-02 |
| 11-Apr-95 | 18-Apr-95 | < | 1.00E-02 |
| 18-Apr-95 | 25-Apr-95 | < | 2.00E-02 |
| 25-Apr-95 | 2-May-95 | < | 2.00E-02 |
| 2-May-95 | 9-May-95 | < | 3.00E-02 |
| 9-May-95 | 16-May-95 | < | 2.00E-02 |
| 16-May-95 | 23-May-95 | < | 2.00E-02 |
| 23-May-95 | 30-May-95 | < | 2.00E-02 |
| 30-May-95 | 6-Jun-95 | < | 1.00E-02 |
| 6-Jun-95 | 13-Jun-95 | < | 1.00E-02 |
| 13-Jun-95 | 20-Jun-95 | < | 1.00E-02 |
| 20-Jun-95 | 27-Jun-95 | < | 1.00E-02 |
| 27-Jun-95 | 3-Jul-95 | < | 2.00E-02 |

# FERMI 2
## AIR IODINE - 131
(pCi/cubic meter)

### API-5 THIRD QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Jul-95 | 11-Jul-95 | < | 1.00E-02 |
| 11-Jul-95 | 18-Jul-95 | < | 1.00E-02 |
| 18-Jul-95 | 25-Jul-95 | < | 2.00E-02 |
| 25-Jul-95 | 1-Aug-95 | < | 1.00E-02 |
| 1-Aug-95 | 8-Aug-95 | < | 1.00E-02 |
| 8-Aug-95 | 15-Aug-95 | < | 1.00E-02 |
| 15-Aug-95 | 22-Aug-95 | < | 1.00E-02 |
| 22-Aug-95 | 29-Aug-95 | < | 1.00E-02 |
| 29-Aug-95 | 5-Sep-95 | < | 2.00E-02 |
| 5-Sep-95 | 12-Sep-95 | < | 2.00E-02 |
| 12-Sep-95 | 19-Sep-95 | < | 1.00E-02 |
| 19-Sep-95 | 26-Sep-95 | < | 2.00E-02 |
| 26-Sep-95 | 3-Oct-95 | < | 1.00E-02 |

### API-5 FOURTH QUARTER

| Start Date | End Date | Activity | |
|---|---|---|---|
| 3-Oct-95 | 10-Oct-95 | < | 3.00E-02 |
| 10-Oct-95 | 17-Oct-95 | < | 2.00E-02 |
| 17-Oct-95 | 24-Oct-95 | < | 2.00E-02 |
| 24-Oct-95 | 31-Oct-95 | < | 1.00E-02 |
| 31-Oct-95 | 7-Nov-95 | < | 1.00E-02 |
| 7-Nov-95 | 14-Nov-95 | < | 1.00E-02 |
| 14-Nov-95 | 21-Nov-95 | < | 2.00E-02 |
| 21-Nov-95 | 28-Nov-95 | < | 2.00E-02 |
| 28-Nov-95 | 5-Dec-95 | < | 2.00E-02 |
| 5-Dec-95 | 12-Dec-95 | < | 2.00E-02 |
| 12-Dec-95 | 19-Dec-95 | < | 1.00E-02 |
| 19-Dec-95 | 27-Dec-95 | < | 1.00E-02 |
| 27-Dec-95 | 3-Jan-96 | < | 1.00E-02 |

# FERMI 2
# AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

**API-1 (indicator)**
(pCi/cubic meter)

| Nuclide | First Quarter | | | | Second Quarter (a) | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.42E-01 | +/- | 1.40E-02 | | 1.68E-01 | +/- | 1.70E-02 |
| K-40 | | 9.11E-03 | +/- | 4.35E-03 | | 7.57E-03 | +/- | 4.33E-03 |
| Mn-54 | < | 5.00E-04 | | | < | 5.00E-04 | | |
| Co-58 | < | 8.00E-04 | | | < | 6.00E-04 | | |
| Fe-59 | < | 3.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 6.00E-04 | | | < | 5.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 8.00E-04 | | | < | 8.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Ru-106 | < | 5.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 4.00E-04 | | | < | 4.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 4.00E-03 | | | < | 3.00E-03 | | |
| Ra-226 | < | 1.00E-02 | | | < | 8.00E-03 | | |
| Th-228 | < | 9.00E-04 | | | < | 8.00E-04 | | |
| Sr-89 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Sr-90 | < | 5.00E-04 | | | < | 4.00E-04 | | |

**API-1 (indicator)**
(pCi/cubic meter)

| Nuclide | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.27E-01 | +/- | 1.30E-02 | | 1.08E-01 | +/- | 1.10E-02 |
| K-40 | < | 8.00E-03 | | | | 1.09E-02 | +/- | 4.50E-03 |
| Mn-54 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Co-58 | < | 6.00E-04 | | | < | 7.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 4.00E-04 | | | < | 4.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 7.00E-04 | | | < | 7.00E-04 | | |
| Ru-103 | < | 8.00E-04 | | | < | 1.00E-03 | | |
| Ru-106 | < | 3.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 4.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 3.00E-03 | | |
| Ra-226 | < | 6.00E-03 | | | < | 8.00E-03 | | |
| Th-228 | < | 6.00E-04 | | | < | 7.00E-04 | | |
| Sr-89 | < | 9.00E-04 | | | < | 3.00E-03 | | |
| Sr-90 | < | 1.00E-04 | | | < | 4.00E-04 | | |

(a) sample less than representive (see section 10.2.1)

# FERMI 2
# AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

**API-2 (indicator)**
(pCi/cubic meter)

| Nuclide | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.27E-01 | +/- | 1.30E-02 | | 1.74E-01 | +/- | 1.70E-02 |
| K-40 | | 5.37E-02 | +/- | 7.80E-03 | < | 1.00E-02 | | |
| Mn-54 | < | 7.00E-04 | | | < | 5.00E-04 | | |
| Co-58 | < | 1.00E-03 | | | < | 7.00E-04 | | |
| Fe-59 | < | 3.00E-03 | | | < | 3.00E-03 | | |
| Co-60 | < | 7.00E-04 | | | < | 6.00E-04 | | |
| Zn-65 | < | 2.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 1.00E-03 | | | < | 9.00E-04 | | |
| Ru-103 | < | 2.00E-03 | | | < | 1.00E-03 | | |
| Ru-106 | < | 6.00E-03 | | | < | 5.00E-03 | | |
| Cs-134 | < | 7.00E-04 | | | < | 6.00E-04 | | |
| Cs-137 | < | 7.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 2.00E-03 | | | < | 3.00E-03 | | |
| Ce-144 | < | 3.00E-03 | | | < | 5.00E-03 | | |
| Ra-226 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Th-228 | < | 9.00E-04 | | | < | 1.00E-03 | | |
| Sr-89 | < | 3.00E-03 | | | < | 2.00E-03 | | |
| Sr-90 | < | 5.00E-04 | | | < | 4.00E-04 | | |

**API-2 (indicator)**
(pCi/cubic meter)

| Nuclide | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.41E-01 | +/- | 1.40E-02 | | 1.16E-01 | +/- | 1.30E-02 |
| K-40 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Mn-54 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Co-58 | < | 8.00E-04 | | | < | 9.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 8.00E-04 | | | < | 9.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Ru-106 | < | 4.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 5.00E-04 | | |
| Cs-137 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 2.00E-02 | | |
| Ce-141 | < | 1.00E-03 | | | < | 3.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 5.00E-03 | | |
| Ra-226 | < | 6.00E-03 | | | < | 1.00E-02 | | |
| Th-228 | < | 6.00E-04 | | | < | 1.00E-03 | | |
| Sr-89 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Sr-90 | < | 3.00E-04 | | | < | 2.00E-04 | | |

# FERMI 2
# AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

**API-3 (indicator)**
(pCi/cubic meter)

| Nuclide | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.54E-01 | +/- | 1.50E-02 | | 1.41E-01 | +/- | 1.40E-02 |
| K-40 | | 8.51E-03 | +/- | 4.09E-03 | | 8.26E-03 | +/- | 4.60E-03 |
| Mn-54 | < | 6.00E-04 | | | < | 6.00E-04 | | |
| Co-58 | < | 9.00E-04 | | | < | 8.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 7.00E-04 | | | < | 5.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 7.00E-04 | | | < | 8.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Ru-106 | < | 5.00E-03 | | | < | 5.00E-03 | | |
| Cs-134 | < | 6.00E-04 | | | < | 6.00E-04 | | |
| Cs-137 | < | 6.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 2.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 3.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 4.00E-03 | | | < | 2.00E-03 | | |
| Ra-226 | < | 1.00E-02 | | | < | 8.00E-03 | | |
| Th-228 | < | 1.00E-03 | | | < | 8.00E-04 | | |
| Sr-89 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Sr-90 | < | 3.00E-04 | | | < | 5.00E-04 | | |

**API-3 (indicator)**
(pCi/cubic meter)

| Nuclide | Third Quarter (a) | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.24E-01 | +/- | 1.20E-02 | | 9.81E-02 | +/- | 9.80E-03 |
| K-40 | | 6.71E-03 | +/- | 3.52E-03 | < | 2.00E-02 | | |
| Mn-54 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Co-58 | < | 7.00E-04 | | | < | 8.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 3.00E-03 | | |
| Co-60 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Zr/Nd-95 | < | 8.00E-04 | | | < | 1.00E-03 | | |
| Ru-103 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Ru-106 | < | 5.00E-03 | | | < | 5.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Cs-137 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ra-226 | < | 6.00E-03 | | | < | 8.00E-03 | | |
| Th-228 | < | 6.00E-04 | | | < | 7.00E-04 | | |
| Sr-89 | < | 6.00E-04 | | | < | 6.00E-04 | | |
| Sr-90 | < | 1.00E-04 | | | < | 1.00E-04 | | |

(a) sample less than representive (see section 10.2.1)

# FERMI 2
# AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

**API-4 (control)**
(pCi/cubic meter)

| Nuclide | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.15E-01 | +/- | 1.20E-02 | | 1.39E-01 | +/- | 1.40E-02 |
| K-40 | < | 8.00E-03 | | | | 8.81E-03 | +/- | 3.56E-03 |
| Mn-54 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Co-58 | < | 7.00E-04 | | | < | 6.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 6.00E-04 | | | < | 5.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 9.00E-04 | | |
| Zr/Nd-95 | < | 8.00E-04 | | | < | 7.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Ru-106 | < | 4.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 5.00E-04 | | | < | 6.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 3.00E-03 | | | < | 3.00E-03 | | |
| Ra-226 | < | 8.00E-03 | | | < | 7.00E-03 | | |
| Th-228 | < | 9.00E-04 | | | < | 8.00E-04 | | |
| Sr-89 | < | 3.00E-03 | | | < | 2.00E-03 | | |
| Sr-90 | < | 5.00E-04 | | | < | 4.00E-04 | | |

**API-4 (control)**
(pCi/cubic meter)

| Nuclide | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.39E-01 | +/- | 1.40E-02 | | 8.81E-02 | +/- | 9.10E-03 |
| K-40 | | 1.61E-02 | +/- | 3.60E-03 | | 7.47E-03 | +/- | 3.58E-03 |
| Mn-54 | < | 4.00E-04 | | | < | 4.00E-04 | | |
| Co-58 | < | 6.00E-04 | | | < | 6.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 7.00E-04 | | | < | 8.00E-04 | | |
| Ru-103 | < | 9.00E-04 | | | < | 1.00E-03 | | |
| Ru-106 | < | 4.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 4.00E-04 | | | < | 6.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 3.00E-03 | | |
| Ra-226 | < | 6.00E-03 | | | < | 7.00E-03 | | |
| Th-228 | < | 6.00E-04 | | | < | 8.00E-04 | | |
| Sr-89 | < | 8.00E-04 | | | < | 1.00E-03 | | |
| Sr-90 | < | 2.00E-04 | | | < | 2.00E-04 | | |

# FERMI 2
# AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

**API-5 (Indicator)**
(pCi/cubic meter)

| Nuclide | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.22E-01 | +/- | 1.20E-02 | | 1.37E-01 | +/- | 1.40E-02 |
| K-40 | | 8.11E-03 | +/- | 4.38E-03 | | 9.71E-03 | +/- | 3.67E-03 |
| Mn-54 | < | 5.00E-04 | | | < | 3.00E-04 | | |
| Co-58 | < | 7.00E-04 | | | < | 7.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 7.00E-04 | | | < | 6.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 9.00E-04 | | |
| Ru-106 | < | 4.00E-03 | | | < | 4.00E-03 | | |
| Cs-134 | < | 5.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 4.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 8.00E-03 | | |
| Ce-141 | < | 1.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ra-226 | < | 6.00E-03 | | | < | 7.00E-03 | | |
| Th-228 | < | 6.00E-04 | | | < | 6.00E-04 | | |
| Sr-89 | < | 4.00E-03 | | | < | 2.00E-03 | | |
| Sr-90 | < | 9.00E-04 | | | < | 3.00E-04 | | |

**API-5 (Indicator)**
(pCi/cubic meter)

| Nuclide | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.47E-01 | +/- | 1.50E-02 | | 9.90E-02 | +/- | 9.90E-03 |
| K-40 | < | 1.00E-02 | | | < | 8.00E-03 | | |
| Mn-54 | < | 6.00E-04 | | | < | 4.00E-04 | | |
| Co-58 | < | 1.00E-03 | | | < | 6.00E-04 | | |
| Fe-59 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Co-60 | < | 6.00E-04 | | | < | 4.00E-04 | | |
| Zn-65 | < | 1.00E-03 | | | < | 1.00E-03 | | |
| Zr/Nd-95 | < | 1.00E-03 | | | < | 7.00E-04 | | |
| Ru-103 | < | 1.00E-03 | | | < | 9.00E-04 | | |
| Ru-106 | < | 5.00E-03 | | | < | 3.00E-03 | | |
| Cs-134 | < | 6.00E-04 | | | < | 4.00E-04 | | |
| Cs-137 | < | 6.00E-04 | | | < | 5.00E-04 | | |
| Ba/La-140 | < | 1.00E-02 | | | < | 1.00E-02 | | |
| Ce-141 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ce-144 | < | 2.00E-03 | | | < | 2.00E-03 | | |
| Ra-226 | < | 8.00E-03 | | | < | 6.00E-03 | | |
| Th-228 | < | 8.00E-04 | | | < | 6.00E-04 | | |
| Sr-89 | < | 9.00E-04 | | | < | 2.00E-03 | | |
| Sr-90 | < | 1.00E-04 | | | < | 3.00E-04 | | |

# FERMI 2
# MILK ANALYSIS

**M-2 (Indicator)**
(pCi/liter)

| Nuclide | 12-JAN | | | | 16-FEB | | | | 16-MAR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 4.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.40E+03 | +/- | 1.40E+02 | | 1.36E+03 | +/- | 1.40E+02 | | 1.34E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Co-58 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Fe-59 | < | 9.00E+00 | | | < | 9.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 |
| Co-60 | < | 4.00E+00 | | | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Zn-65 | < | 1.00E+01 | | | < | 8.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-106 | < | 4.00E+01 | | | < | 4.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Cs-134 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 5.00E+00 | | | < | 6.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 |
| Ce-141 | < | 6.00E+00 | | | < | 8.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Ce-144 | < | 2.00E+01 | | | < | 3.00E+01 | | 0.00E+00 | < | 2.00E+01 | | 0.00E+00 |
| Ra-226 | < | 7.00E+01 | | | < | 9.00E+01 | | 0.00E+00 | < | 7.00E+01 | | 0.00E+00 |
| Th-228 | < | 7.00E+00 | | | < | 8.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 |
| Sr-90 | | 1.30E+00 | +/- | 2.00E-01 | | 1.70E+00 | +/- | 2.00E-01 | | 1.20E+00 | +/- | 1.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 3.00E-01 | | 0.00E+00 | < | 2.00E-01 | | 0.00E+00 |

| Nuclide | 13-APR | | | | 11-MAY | | | | 25-MAY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 5.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.33E+03 | +/- | 1.30E+02 | | 1.39E+03 | +/- | 1.40E+02 | | 1.32E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Co-58 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Fe-59 | < | 1.00E+01 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 |
| Co-60 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 |
| Zn-65 | < | 1.00E+01 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 1.00E+01 | | 0.00E+00 |
| Zr/Nd-95 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-103 | < | 6.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-106 | < | 5.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 4.00E+01 | | 0.00E+00 |
| Cs-134 | < | 6.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Cs-137 | < | 6.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 5.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 |
| Ce-141 | < | 1.00E+01 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 |
| Ce-144 | < | 4.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Ra-226 | < | 1.00E+02 | | 0.00E+00 | < | 9.00E+01 | | 0.00E+00 | < | 9.00E+01 | | 0.00E+00 |
| Th-228 | < | 1.00E+01 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Sr-89 | < | 2.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 | < | 1.00E+00 | | 0.00E+00 |
| Sr-90 | | 1.20E+00 | +/- | 2.00E-01 | | 2.10E+00 | +/- | 2.00E-01 | | 1.40E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | 0.00E+00 | < | 2.00E-01 | | 0.00E+00 | < | 3.00E-01 | | 0.00E+00 |

# FERMI 2
# MILK ANALYSIS

**M-2 (Indicator)**
(pCi/liter)

| Nuclide | 8-JUN | | | | 22-JUN | | | | 13-JUL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.39E+03 | +/- | 1.40E+02 | | 1.29E+03 | +/- | 1.30E+02 | | 1.50E+03 | +/- | 1.50E+02 |
| Mn-54 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Co-58 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Fe-59 | < | 6.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 1.00E+01 | | 0.00E+00 |
| Co-60 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Zn-65 | < | 7.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 |
| Zr/Nd-95 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-103 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 |
| Ru-106 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 4.00E+01 | | 0.00E+00 |
| Cs-134 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Cs-137 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 4.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Ce-141 | < | 6.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Ce-144 | < | 2.00E+01 | | 0.00E+00 | < | 4.00E+01 | | 0.00E+00 | < | 2.00E+01 | | 0.00E+00 |
| Ra-226 | < | 6.00E+01 | | 0.00E+00 | < | 1.00E+02 | | 0.00E+00 | < | 7.00E+01 | | 0.00E+00 |
| Th-228 | < | 6.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Sr-89 | < | 2.00E+00 | | 0.00E+00 | < | 8.00E-01 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 |
| Sr-90 | | 1.30E+00 | +/- | 2.00E-01 | | 1.10E+00 | +/- | 2.00E-01 | | 1.40E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | 0.00E+00 | < | 2.00E-01 | | 0.00E+00 | < | 3.00E-01 | | 0.00E+00 |

| Nuclide | 27-JUL | | | | 10-AUG | | | | 24-AUG | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 4.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.26E+03 | +/- | 1.30E+02 | | 1.35E+03 | +/- | 1.40E+02 | | 1.38E+03 | +/- | 1.40E+02 |
| Mn-54 | < | 5.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Co-58 | < | 5.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Fe-59 | < | 1.00E+01 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 |
| Co-60 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Zn-65 | < | 1.00E+01 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 | < | 9.00E+00 | | 0.00E+00 |
| Zr/Nd-95 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Ru-103 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-106 | < | 4.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Cs-134 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Cs-137 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 6.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 |
| Ce-141 | < | 1.00E+01 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Ce-144 | < | 4.00E+01 | | 0.00E+00 | < | 2.00E+01 | | 0.00E+00 | < | 2.00E+01 | | 0.00E+00 |
| Ra-226 | < | 1.00E+02 | | 0.00E+00 | < | 6.00E+01 | | 0.00E+00 | < | 7.00E+01 | | 0.00E+00 |
| Th-228 | < | 1.00E+01 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Sr-89 | < | 2.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 |
| Sr-90 | | 8.90E-01 | +/- | 1.30E-01 | | 1.20E+00 | +/- | 2.00E-01 | | 1.70E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | 0.00E+00 | < | 3.00E-01 | | 0.00E+00 | < | 4.00E-01 | | 0.00E+00 |

# FERMI 2
# MILK ANALYSIS

**M-2 (Indicator)**
(pCi/liter)

| Nuclide | 7-SEP | | | | 21-SEP | | | | 12-OCT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.38E+03 | +/- | 1.40E+02 | | 1.29E+03 | +/- | 1.30E+02 | | 1.22E+03 | +/- | 1.20E+02 |
| Mn-54 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Co-58 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Fe-59 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 |
| Co-60 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Zn-65 | < | 9.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-103 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ru-106 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Cs-134 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Cs-137 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 5.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ce-141 | < | 7.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Ce-144 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Ra-226 | < | 9.00E+01 | | 0.00E+00 | < | 9.00E+01 | | 0.00E+00 | < | 9.00E+01 | | 0.00E+00 |
| Th-228 | < | 7.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Sr-89 | < | 3.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 |
| Sr-90 | | 1.10E+00 | +/- | 2.00E-01 | | 1.20E+00 | +/- | 2.00E-01 | | 1.40E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | 0.00E+00 | < | 2.00E-01 | | 0.00E+00 | < | 2.00E-01 | | 0.00E+00 |

| Nuclide | 26-OCT | | | | 16-NOV | | | | 14-DEC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| K-40 | | 1.27E+03 | +/- | 1.30E+02 | | 1.30E+03 | +/- | 1.30E+02 | | 1.35E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Co-58 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Fe-59 | < | 9.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 |
| Co-60 | < | 5.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Zn-65 | < | 9.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 | < | 8.00E+00 | | 0.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Ru-103 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Ru-106 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Cs-134 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 3.00E+00 | | 0.00E+00 |
| Cs-137 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ba/La-140 | < | 5.00E+00 | | 0.00E+00 | < | 5.00E+00 | | 0.00E+00 | < | 4.00E+00 | | 0.00E+00 |
| Ce-141 | < | 9.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Ce-144 | < | 4.00E+01 | | 0.00E+00 | < | 2.00E+01 | | 0.00E+00 | < | 3.00E+01 | | 0.00E+00 |
| Ra-226 | < | 1.00E+02 | | 0.00E+00 | < | 7.00E+01 | | 0.00E+00 | < | 7.00E+01 | | 0.00E+00 |
| Th-228 | < | 9.00E+00 | | 0.00E+00 | < | 7.00E+00 | | 0.00E+00 | < | 6.00E+00 | | 0.00E+00 |
| Sr-89 | < | 3.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 | < | 2.00E+00 | | 0.00E+00 |
| Sr-90 | | 1.40E+00 | +/- | 2.00E-01 | | 1.30E+00 | +/- | 1.00E-01 | | 1.30E+00 | +/- | 2.00E-01 |
| I-131 | < | 1.00E-01 | | 0.00E+00 | < | 3.00E-01 | | 0.00E+00 | < | 3.00E-01 | | 0.00E+00 |

# FERMI 2
# MILK ANALYSIS

**M-8 (Control)**
(pCi/liter)

| Nuclide | 12-JAN | | | | 16-FEB | | | | 16-MAR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.48E+03 | +/- | 1.50E+02 | | 1.37E+03 | +/- | 1.40E+02 | | 1.32E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 7.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 1.00E+01 | | | < | 7.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 1.00E+02 | | | < | 8.00E+01 | | |
| Th-228 | < | 6.00E+00 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Sr-89 | < | 3.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | | 8.50E-01 | +/- | 2.20E-01 | | 2.20E+00 | +/- | 2.00E-01 | | 1.00E+00 | +/- | 1.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 3.00E-01 | | | < | 2.00E-01 | | |

| Nuclide | 13-APR | | | | 11-MAY | | | | 25-MAY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 4.00E+01 | | |
| K-40 | | 1.48E+03 | +/- | 1.50E+02 | | 1.32E+03 | +/- | 1.30E+02 | | 1.32E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 2.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 2.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 5.00E+00 | | | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Co-60 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ru-106 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ba/La-140 | < | 3.00E+00 | | | < | 5.00E+00 | | | < | 6.00E+00 | | |
| Ce-141 | < | 4.00E+00 | | | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Ce-144 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Ra-226 | < | 5.00E+01 | | | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Th-228 | < | 4.00E+00 | | | < | 9.00E+00 | | | < | 9.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | | 1.20E+00 | +/- | 2.00E-01 | | 1.80E+00 | +/- | 2.00E-01 | | 1.20E+00 | +/- | 3.00E-01 |
| I-131 | < | 3.00E-01 | | | < | 2.00E-01 | | | < | 3.00E-01 | | |

# FERMI 2
# MILK ANALYSIS

**M-8 (Control)**
(pCi/liter)

| Nuclide | 8-JUN | | | | 22-JUN | | | | 13-JUL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.37E+03 | +/- | 1.40E+02 | | 1.47E+03 | +/- | 1.50E+02 | | 1.43E+03 | +/- | 1.40E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 1.00E+01 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 1.00E+01 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 6.00E+00 | | | < | 4.00E+00 | | |
| Ce-141 | < | 9.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 7.00E+01 | | | < | 6.00E+01 | | |
| Th-228 | < | 9.00E+00 | | | < | 7.00E+00 | | | < | 5.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 1.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | | 1.10E+00 | +/- | 2.00E-01 | | 9.90E-01 | +/- | 1.80E-01 | | 1.80E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 2.00E-01 | | | < | 3.00E-01 | | |

| Nuclide | 27-JUL | | | | 10-AUG | | | | 24-AUG | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.25E+03 | +/- | 1.30E+02 | | 1.40E+03 | +/- | 1.40E+02 | | 1.43E+03 | +/- | 1.40E+02 |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 8.00E+00 | | | < | 7.00E+00 | | | < | 9.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 8.00E+00 | | | < | 8.00E+00 | | | < | 9.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 6.00E+00 | | |
| Ce-141 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 7.00E+01 | | | < | 7.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Sr-89 | < | 1.00E+00 | | | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | | 8.80E-01 | +/- | 1.30E-01 | | 1.10E+00 | +/- | 2.00E-01 | | 1.10E+00 | +/- | 3.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 3.00E-01 | | | < | 3.00E-01 | | |

# FERMI 2
# MILK ANALYSIS

**M-8 (Control)**
(pCi/liter)

| Nuclide | | 7-SEP | | | | 21-SEP | | | | 12-OCT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.29E+03 | +/- | 1.30E+02 | | 1.33E+03 | +/- | 1.30E+02 | | 1.34E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 9.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 7.00E+00 | | | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 7.00E+00 | | | < | 8.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | | < | 8.00E+01 | | | < | 1.00E+02 | | |
| Th-228 | < | 5.00E+00 | | | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | | 9.80E-01 | +/- | 5.80E-01 | | 1.30E+00 | +/- | 1.00E-01 | | 1.20E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 2.00E-01 | | | < | 2.00E-01 | | |

| Nuclide | | 26-OCT | | | | 16-NOV | | | | 14-DEC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.47E+03 | +/- | 1.50E+02 | | 1.31E+03 | +/- | 1.30E+02 | | 1.31E+03 | +/- | 1.30E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 9.00E+00 | | | < | 8.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 1.00E+01 | | | < | 9.00E+00 | | | < | 9.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 8.00E+00 | | | < | 7.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 1.00E+02 | | | < | 8.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | | 1.10E+00 | +/- | 2.00E-01 | | 1.30E+00 | +/- | 1.00E-01 | | 1.10E+00 | +/- | 2.00E-01 |
| I-131 | < | 2.00E-01 | | | < | 3.00E-01 | | | < | 3.00E-01 | | |

# FERMI 2
# MILK ANALYSIS

**M-9 (Indicator)**
(pCi/liter)

| Nuclide | 22-JUN | | | | 13-JUL | | | | 27-JUL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.51E+03 | +/- | 1.50E+02 | | 2.33E+03 | +/- | 2.30E+02 | | 1.94E+03 | +/- | 1.90E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Co-60 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Zn-65 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 7.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 8.00E+01 | | | < | 1.00E+02 | | | < | 9.00E+01 | | |
| Th-228 | < | 8.00E+00 | | | < | 9.00E+00 | | | < | 8.00E+00 | | |
| Sr-89 | (a) | | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | (a) | | | | | 3.20E+00 | +/- | 2.00E-01 | | 1.50E+00 | +/- | 2.00E-01 |
| I-131 | < | 3.00E-01 | | | < | 3.00E-01 | | | < | 3.00E-01 | | |

| Nuclide | 11-AUG | | | | 24-AUG | | | | 7-SEP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.94E+03 | +/- | 1.90E+02 | | 1.88E+03 | +/- | 1.90E+02 | | 1.77E+03 | +/- | 1.80E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Co-60 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 7.00E+01 | | | < | 8.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | | 2.30E+00 | +/- | 2.00E-01 | | 1.40E+00 | +/- | 2.00E-01 | | 1.40E+00 | +/- | 2.00E-01 |
| I-131 | < | 4.00E-01 | | | < | 5.00E-01 | | | < | 2.00E-01 | | |

(a) analysis not performed (see section 10.3.1)

# FERMI 2
# MILK ANALYSIS

**M-9 (Indicator)**
(pCi/liter)

| Nuclide | 25-SEP | | | | 12-OCT | | | | 30-OCT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 1.46E+03 | +/- | 1.50E+02 | | 1.78E+03 | +/- | 1.80E+02 | | 1.57E+03 | +/- | 1.60E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 1.00E+01 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Co-60 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 8.00E+00 | | |
| Zr/Nd-95 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 3.00E+00 | | |
| Ce-141 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 9.00E+01 | | | < | 7.00E+01 | | | < | 6.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Sr-89 | < | 3.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | | 1.60E+00 | +/- | 2.00E-01 | | 1.80E+00 | +/- | 2.00E-01 | | 2.40E+00 | +/- | 2.00E-01 |
| I-131 | < | 1.00E-01 | | | < | 3.00E-01 | | | < | 2.00E-01 | | |

| Nuclide | 16-NOV | | | | 14-DEC | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 4.00E+01 | | |
| K-40 | | 1.94E+03 | +/- | 1.90E+02 | | 1.54E+03 | +/- | 1.50E+02 |
| Mn-54 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Co-58 | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Co-60 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Zn-65 | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 1.00E+02 | | |
| Th-228 | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | | 1.60E+00 | +/- | 2.00E-01 | | 2.20E+00 | +/- | 3.00E-01 |
| I-131 | < | 3.00E-01 | | | < | 4.00E-01 | | |

# FERMI 2
# GRASS ANALYSIS

**M-8 (Control)**
(pCi/kg wet)

| Nuclide | 11-MAY | | | | 25-MAY | | | | 8-JUN | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.01E+03 | +/- | 1.80E+02 | | 2.11E+02 | +/- | 9.40E+01 | | 3.89E+02 | +/- | 1.32E+02 |
| K-40 | | 5.86E+03 | +/- | 5.90E+02 | | 3.93E+03 | +/- | 3.90E+02 | | 4.98E+03 | +/- | 5.00E+02 |
| Mn-54 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 5.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 5.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ru-106 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ce-141 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 8.00E+01 | | | < | 1.00E+02 | | |
| Ra-226 | < | 5.00E+02 | | | < | 2.00E+02 | | | < | 4.00E+02 | | |
| Th-228 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| I-131 | < | 6.00E+00 | | | < | 5.00E+00 | | | < | 9.00E+00 | | |

**M-9 (Indicator)**
(pCi/kg wet)

| Nuclide | 11-MAY | | | | 25-MAY | | | | 8-J[illegible] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 1.00E+02 | | | | 7.13E+02 | +/- | 1.46E+02 | | 7.21E+02 | +/- | 1.59E+02 |
| K-40 | | 4.49E+03 | +/- | 4.50E+02 | | 5.41E+03 | +/- | 5.40E+02 | | 5.36E+03 | +/- | 5.40E+02 |
| Mn-54 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 3.00E+01 | | | < | 5.00E+01 | | | < | 5.00E+01 | | |
| Co-60 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 3.00E+01 | | | < | 5.00E+01 | | | < | 5.00E+01 | | |
| Zr/Nd-95 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Ce-141 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ce-144 | < | 9.00E+01 | | | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Ra-226 | < | 3.00E+02 | | | < | 4.00E+02 | | | < | 4.00E+02 | | |
| Th-228 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| I-131 | < | 4.00E+00 | | | < | 5.00E+00 | | | < | 1.00E+01 | | |

# FERMI 2
# VEGETABLE ANALYSIS

**FP-1 (Indicator)**
(pCi/kg wet)

| Nuclide | 27-JUL Cabbage | | | | 27-JUL Swiss Chard | | | | 27-JUL Broccoli | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 7.00E+01 | | | | 3.15E+02 | +/- | 6.30E+01 | < | 1.00E+02 | | |
| K-40 | | 2.10E+03 | +/- | 2.10E+02 | | 4.59E+03 | +/- | 4.60E+02 | | 3.64E+03 | +/- | 3.60E+02 |
| Mn-54 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 1.00E+01 | | |
| Co-58 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 1.00E+01 | | |
| Fe-59 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Co-60 | < | 8.00E+00 | | | < | 8.00E+00 | | | < | 2.00E+01 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Zr/Nd-95 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 1.00E+01 | | |
| Ru-103 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 2.00E+01 | | |
| Ru-106 | < | 6.00E+01 | | | < | 7.00E+01 | | | < | 1.00E+02 | | |
| Cs-134 | < | 8.00E+00 | | | < | 8.00E+00 | | | < | 2.00E+01 | | |
| Cs-137 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ce-141 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Ce-144 | < | 4.00E+01 | | | < | 6.00E+01 | | | < | 1.00E+02 | | |
| Ra-226 | < | 1.00E+02 | | | < | 2.00E+02 | | | < | 3.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| I-131 | < | 4.00E+00 | | | < | 6.00E+00 | | | < | 4.00E+00 | | |

**FP-1 (Indicator)**
(pCi/kg wet)

| Nuclide | 23-AUG Cabbage | | | | 23-AUG Swiss Chard | | | | 23-AUG Cauliflower | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.60E+02 | +/- | 5.40E+01 | | 2.64E+02 | +/- | 7.20E+01 | | 3.66E+02 | +/- | 5.60E+01 |
| K-40 | | 2.47E+03 | +/- | 2.50E+02 | | 4.96E+03 | +/- | 5.00E+02 | | 2.38E+03 | +/- | 2.40E+02 |
| Mn-54 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 7.00E+00 | | |
| Co-58 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 7.00E+00 | | |
| Fe-59 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-60 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 8.00E+00 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 7.00E+00 | | |
| Ru-103 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 7.00E+00 | | |
| Ru-106 | < | 6.00E+01 | | | < | 1.00E+02 | | | < | 6.00E+01 | | |
| Cs-134 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 8.00E+00 | | |
| Cs-137 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 8.00E+00 | | |
| Ba/La-140 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 8.00E+00 | | |
| Ce-141 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ce-144 | < | 5.00E+01 | | | < | 6.00E+01 | | | < | 5.00E+01 | | |
| Ra-226 | < | 2.00E+02 | | | < | 2.00E+02 | | | < | 1.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| I-131 | < | 8.00E+00 | | | < | 8.00E+00 | | | < | 8.00E+00 | | |

# FERMI 2
# VEGETABLE ANALYSIS

**FP-3 (Indicator)**
(pCi/kg wet)

| Nuclide | 27-JUL Cabbage | | | | 27-JUL Swiss Chard | | | | 23-AUG Cabbage | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 7.00E+01 | | | | 2.02E+02 | +/- | 7.90E+01 | < | 8.00E+01 | | |
| K-40 | | 1.92E+03 | +/- | 1.90E+02 | | 2.98E+03 | +/- | 3.00E+02 | | 1.75E+03 | +/- | 1.80E+02 |
| Mn-54 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Co-58 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Fe-59 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-60 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ru-103 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Ru-106 | < | 7.00E+01 | | | < | 9.00E+01 | | | < | 8.00E+01 | | |
| Cs-134 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Cs-137 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ba/La-140 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ce-141 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ce-144 | < | 5.00E+01 | | | < | 5.00E+01 | | | < | 5.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| I-131 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 9.00E+00 | | |

**FP-3 (Indicator)**
(pCi/kg wet)

| Nuclide | 23-AUG Swiss Chard | | | |
|---|---|---|---|---|
| Be-7 | | 4.51E+02 | +/- | 8.10E+01 |
| K-40 | | 3.01E+03 | +/- | 3.00E+02 |
| Mn-54 | < | 1.00E+01 | | |
| Co-58 | < | 9.00E+00 | | |
| Fe-59 | < | 2.00E+01 | | |
| Co-60 | < | 1.00E+01 | | |
| Zn-65 | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 9.00E+00 | | |
| Ru-103 | < | 1.00E+01 | | |
| Ru-106 | < | 8.00E+01 | | |
| Cs-134 | < | 9.00E+00 | | |
| Cs-137 | < | 1.00E+01 | | |
| Ba/La-140 | < | 1.00E+01 | | |
| Ce-141 | < | 2.00E+01 | | |
| Ce-144 | < | 8.00E+01 | | |
| Ra-226 | < | 2.00E+02 | | |
| Th-228 | < | 2.00E+01 | | |
| I-131 | < | 8.00E+00 | | |

# FERMI 2
# VEGETABLE ANALYSIS

**FP-7 (Indicator)**
(pCi/kg wet)

| Nuclide | 27-JUL Lettuce | | | | 27-JUL Cabbage | | | | 27-JUL Romaine Lettuce | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | | 1.84E+02 | +/- | 5.10E+01 | < | 9.00E+01 | | | | 3.25E+02 | +/- | 6.00E+01 |
| K-40 | | 1.68E+03 | +/- | 1.70E+02 | | 3.55E+03 | +/- | 3.50E+02 | | 1.97E+03 | +/- | 2.00E+02 |
| Mn-54 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Co-58 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Fe-59 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-60 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ru-103 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ru-106 | < | 7.00E+01 | | | < | 1.00E+02 | | | < | 9.00E+01 | | |
| Cs-134 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Cs-137 | < | 8.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ba/La-140 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ce-141 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ce-144 | < | 4.00E+01 | | | < | 6.00E+01 | | | < | 5.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | | | 2.95E+01 | +/- | 7.60E+00 |
| I-131 | < | 6.00E+00 | | | < | 6.00E+00 | | | < | 4.00E+00 | | |

**FP-7 (Indicator)**
(pCi/kg wet)

| Nuclide | 23-AUG Cabbage | | | | 23-AUG Lettuce | | | |
|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 8.00E+01 | | | | 7.09E+02 | +/- | 7.90E+01 |
| K-40 | | 2.22E+03 | +/- | 2.20E+02 | | 3.35E+03 | +/- | 3.40E+02 |
| Mn-54 | < | 8.00E+00 | | | < | 9.00E+00 | | |
| Co-58 | < | 9.00E+00 | | | < | 8.00E+00 | | |
| Fe-59 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-60 | < | 9.00E+00 | | | < | 9.00E+00 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 8.00E+00 | | | < | 1.00E+01 | | |
| Ru-103 | < | 9.00E+00 | | | < | 9.00E+00 | | |
| Ru-106 | < | 7.00E+01 | | | < | 9.00E+01 | | |
| Cs-134 | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Cs-137 | < | 9.00E+00 | | | < | 1.00E+01 | | |
| Ba/La-140 | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ce-141 | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ce-144 | < | 5.00E+01 | | | < | 6.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | |
| I-131 | < | 8.00E+00 | | | < | 8.00E+00 | | |

# FERMI 2
# VEGETABLE ANALYSIS

**FP-9 (Control)**
(pCi/kg wet)

| Nuclide | 27-JUL Cabbage | | | | 27-JUL Romaine Lettuce | | | | 23-AUG Cabbage | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 6.00E+01 | | | | 6.13E+02 | +/- | 1.05E+02 | < | 9.00E+01 | | |
| K-40 | | 1.75E+03 | +/- | 1.80E+02 | | 5.23E+03 | +/- | 5.20E+02 | | 2.32E+03 | +/- | 2.30E+02 |
| Mn-54 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Co-58 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Fe-59 | < | 1.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Co-60 | < | 6.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Zn-65 | < | 1.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 7.00E+00 | | | < | 1.00E+01 | | | < | 9.00E+00 | | |
| Ru-103 | < | 6.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Ru-106 | < | 6.00E+01 | | | < | 1.00E+02 | | | < | 8.00E+01 | | |
| Cs-134 | < | 7.00E+00 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Cs-137 | < | 7.00E+00 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ba/La-140 | < | 8.00E+00 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ce-141 | < | 9.00E+00 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ce-144 | < | 4.00E+01 | | | < | 8.00E+01 | | | < | 7.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 3.00E+02 | | | < | 2.00E+02 | | |
| Th-228 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| I-131 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 8.00E+00 | | |

**FP-9 (Control)**
(pCi/kg wet)

| Nuclide | 23-AUG Broccoli | | | |
|---|---|---|---|---|
| Be-7 | | 2.30E+02 | +/- | 7.20E+01 |
| K-40 | | 3.42E+03 | +/- | 3.40E+02 |
| Mn-54 | < | 8.00E+00 | | |
| Co-58 | < | 8.00E+00 | | |
| Fe-59 | < | 2.00E+01 | | |
| Co-60 | < | 1.00E+01 | | |
| Zn-65 | < | 2.00E+01 | | |
| Zr/Nd-95 | < | 9.00E+00 | | |
| Ru-103 | < | 9.00E+00 | | |
| Ru-106 | < | 7.00E+01 | | |
| Cs-134 | < | 9.00E+00 | | |
| Cs-137 | < | 9.00E+00 | | |
| Ba/La-140 | < | 1.00E+01 | | |
| Ce-141 | < | 1.00E+01 | | |
| Ce-144 | < | 5.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | |
| Th-228 | < | 1.00E+01 | | |
| I-131 | < | 7.00E+00 | | |

## FERMI 2
## DRINKING WATER ANALYSIS

**DW-1 (Indicator)**
(pCi/liter)

| Nuclide | 30-JAN | | | | 28-FEB | | | | 28-MAR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 5.00E+01 | | | < | 5.00E+01 | | | < | 8.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 5.00E+00 | | | < | 6.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 7.00E+00 | | | < | 5.00E+00 | | | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ce-141 | < | 7.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 9.00E+01 | | | < | 7.00E+01 | | | < | 6.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Gross Beta | | 2.90E+00 | +/- | 9.00E-01 | | 4.60E+00 | +/- | 1.20E+00 | | 3.80E+00 | +/- | 1.00E+00 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 4.00E-01 | | | < | 6.00E-01 | | | < | 6.00E-01 | | |

| Nuclide | 25-APR | | | | 30-MAY | | | | 27-JUN | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 4.00E+01 | | | < | 7.00E+01 | | | < | 5.00E+01 | | |
| Cr-51 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 2.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 5.00E+00 | | | < | 8.00E+00 | | | < | 6.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 5.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 2.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 7.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 5.00E+00 | | | < | 9.00E+00 | | | < | 7.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | | < | 1.00E+02 | | | < | 8.00E+01 | | |
| Th-228 | < | 5.00E+00 | | | < | 8.00E+00 | | | < | 6.00E+00 | | |
| Gross Beta | | 3.60E+00 | +/- | 1.10E+00 | | 3.80E+00 | +/- | 9.00E-01 | | 9.40E+00 | +/- | 1.30E+00 |
| Sr-89 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | < | 8.00E-01 | | | < | 6.00E-01 | | | < | 1.00E+00 | | |

# FERMI 2
# DRINKING WATER ANALYSIS

**DW-1 (Indicator)**
(pCi/liter)

| Nuclide | 25-JUL | | | | 14-AUG (a) | | | | 29-AUG (b) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 7.00E+01 | | | < | 9.00E+01 | | | < | 5.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | | < | 6.00E+01 | | | < | 7.00E+01 | | |
| Th-228 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 6.00E+00 | | |
| Gross Beta | | 3.90E+00 | +/- | 1.00E+00 | | 4.40E+00 | +/- | 1.00E+00 | | 3.30E+00 | +/- | 9.00E-01 |
| Sr-89 | < | 1.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 8.00E-01 | | | < | 7.00E-01 | | | < | 6.00E-01 | | |

| Nuclide | 26-SEP | | | | 31-OCT | | | | 28-NOV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| K-40 | < | 4.00E+01 | | | < | 5.00E+01 | | | < | 5.00E+01 | | |
| Cr-51 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Fe-59 | < | 5.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Co-60 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 5.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Cs-134 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ce-141 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | | < | 7.00E+01 | | | < | 7.00E+01 | | |
| Th-228 | < | 5.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Gross Beta | | 2.50E+00 | +/- | 9.00E-01 | | 2.00E+00 | +/- | 9.00E-01 | | 3.90E+00 | +/- | 1.00E+00 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 5.00E-01 | | | < | 7.00E-01 | | | < | 6.00E-01 | | |

## FERMI 2
## DRINKING WATER ANALYSIS

**DW-1 (Indicator)**
(pCi/liter)

| Nuclide | 27-DEC | | | |
|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | |
| K-40 | < | 5.00E+01 | | |
| Cr-51 | < | 2.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | |
| Fe-59 | < | 5.00E+00 | | |
| Co-60 | < | 3.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | |
| Ru-106 | < | 2.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | |
| Ce-141 | < | 5.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | |
| Th-228 | < | 5.00E+00 | | |
| Gross Beta | | 3.90E+00 | +/- | 1.00E+00 |
| Sr-89 | < | 2.00E+00 | | |
| Sr-90 | < | 6.00E-01 | | |

(a) Grab Sample (see section 10 4.1)
(b) sample less than representative (see section 10.4.1)

# FERMI 2
# DRINKING WATER ANALYSIS

**DW-2 (Control)**
(pCi/liter)

| Nuclide | 30-JAN | | | | 28-FEB | | | | 28-MAR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 7.00E+01 | | | < | 1.00E+02 | | | < | 9.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 8.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 8.00E+00 | | | < | 5.00E+00 | | | < | 6.00E+00 | | |
| Ce-144 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 7.00E+01 | | | < | 7.00E+01 | | |
| Th-228 | < | 9.00E+00 | | | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Gross Beta | | 1.80E+00 | +/- | 8.00E-01 | | 5.30E+00 | +/- | 1.10E+00 | | 2.20E+00 | +/- | 8.00E-01 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 1.00E-01 | | | < | 5.00E-01 | | | < | 6.00E-01 | | |

| Nuclide | 25-APR | | | | 30-MAY | | | | 27-JUN | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 4.00E+01 | | | < | 6.00E+01 | | | < | 6.00E+01 | | |
| Cr-51 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 4.00E+00 | | | < | 6.00E+00 | | | < | 7.00E+00 | | |
| Co-60 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 7.00E+00 | | |
| Zr/Nd-95 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 2.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 2.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 3.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 4.00E+00 | | | < | 6.00E+00 | | | < | 8.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 5.00E+01 | | | < | 7.00E+01 | | | < | 1.00E+02 | | |
| Th-228 | < | 4.00E+00 | | | < | 6.00E+00 | | | < | 8.00E+00 | | |
| Gross Beta | | 7.30E+00 | +/- | 1.20E+00 | | 2.70E+00 | +/- | 8.00E-01 | | 3.00E+00 | +/- | 9.00E-01 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | < | 9.00E-01 | | | < | 7.00E-01 | | | < | 9.00E-01 | | |

# FERMI 2
# DRINKING WATER ANALYSIS

**DW-2 (Control)**
(pCi/liter)

| Nuclide | 25-JUL | | | | 29-AUG | | | | 26-SEP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| K-40 | < | 4.00E+01 | | | < | 5.00E+01 | | | < | 4.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 8.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 7.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ce-141 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 6.00E+01 | | | < | 6.00E+01 | | | < | 5.00E+01 | | |
| Th-228 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Gross Beta | | 2.80E+00 | +/- | 8.00E-01 | | 2.90E+00 | +/- | 8.00E-01 | | 2.70E+00 | +/- | 9.00E-01 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 7.00E-01 | | | < | 8.00E-01 | | | < | 7.00E-01 | | |

| Nuclide | 31-OCT | | | | 28-NOV | | | | 27-DEC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| K-40 | < | 5.00E+01 | | | < | 1.00E+02 | | | < | 4.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 2.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 2.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 8.00E+00 | | | < | 5.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | | < | 8.00E+00 | | | < | 5.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 2.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 8.00E+01 | | | < | 7.00E+01 | | | < | 5.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 4.00E+00 | | |
| Gross Beta | | 2.10E+00 | +/- | 9.00E-01 | | 3.70E+00 | +/- | 9.00E-01 | | 3.00E+00 | +/- | 8.00E-01 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 5.00E-01 | | | < | 6.00E-01 | | | < | 6.00E-01 | | |

# FERMI 2
# DRINKING WATER ANALYSIS

**DW-3 (Indicator)**
(pCi/liter)

| Nuclide | 30-JAN | | | | 28-FEB | | | | 28-MAR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| K-40 | < | 1.00E+02 | | | < | 8.00E+01 | | | < | 1.00E+02 | | |
| Cr-51 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Mn-54 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 8.00E+00 | | | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Zr/Nd-95 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 7.00E+00 | | |
| Ce-144 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 6.00E+01 | | | < | 9.00E+01 | | |
| Th-228 | < | 6.00E+00 | | | < | 5.00E+00 | | | < | 7.00E+00 | | |
| Gross Beta | | 2.80E+00 | +/- | 9.00E-01 | | 4.70E+00 | +/- | 1.20E+00 | | 3.20E+00 | +/- | 1.00E+00 |
| Sr-89 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 1.00E+00 | | | < | 7.00E-01 | | | < | 8.00E-01 | | |

| Nuclide | 25-APR | | | | 30-MAY | | | | 27-JUN | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 5.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| K-40 | < | 1.00E+02 | | | < | 5.00E+01 | | | < | 1.00E+02 | | |
| Cr-51 | < | 5.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Mn-54 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Co-58 | < | 5.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 6.00E+00 | | | < | 9.00E+00 | | |
| Co-60 | < | 4.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 1.00E+01 | | | < | 5.00E+00 | | | < | 1.00E+01 | | |
| Zr/Nd-95 | < | 5.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 5.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Cs-134 | < | 5.00E+00 | | | < | 3.00E+00 | | | < | 5.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | | < | 7.00E+00 | | |
| Ce-141 | < | 1.00E+01 | | | < | 6.00E+00 | | | < | 8.00E+00 | | |
| Ce-144 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 6.00E+01 | | | < | 9.00E+01 | | |
| Th-228 | < | 9.00E+00 | | | < | 5.00E+00 | | | < | 8.00E+00 | | |
| Gross Beta | | 4.80E+00 | +/- | 1.20E+00 | | 4.50E+00 | +/- | 1.00E+00 | | 3.90E+00 | +/- | 1.00E+00 |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 3.00E+00 | | |
| Sr-90 | < | 1.00E+00 | | | < | 9.00E-01 | | | < | 8.00E-01 | | |

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-2 (Control)**
(pCi/liter)

| Nuclide | 9-JAN (a) | | 30-JAN(b) | | 6-FEB (a) | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| K-40 | < | 5.00E+01 | < | 5.00E+01 | < | 5.00E+01 |
| Cr-51 | < | 3.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Mn-54 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Co-58 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 7.00E+00 | < | 5.00E+00 | < | 5.00E+00 |
| Co-60 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Zn-65 | < | 8.00E+00 | < | 6.00E+00 | < | 6.00E+00 |
| Zr/Nd-95 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-103 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-106 | < | 3.00E+01 | < | 2.00E+01 | < | 2.00E+01 |
| Cs-134 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Cs-137 | < | 4.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Ba/La-140 | < | 4.00E+00 | < | 3.00E+00 | < | 5.00E+00 |
| Ce-141 | < | 6.00E+00 | < | 5.00E+00 | < | 6.00E+00 |
| Ce-144 | < | 2.00E+01 | < | 2.00E+01 | < | 2.00E+01 |
| Ra-226 | < | 7.00E+01 | < | 6.00E+01 | < | 7.00E+01 |
| Th-228 | < | 6.00E+00 | < | 5.00E+00 | < | 6.00E+00 |
| Sr-89 | < | 1.00E+00 | < | 2.00E+00 | < | 2.00E+00 |
| Sr-90 | < | 8.00E-01 | < | 1.00E+00 | < | 1.00E+00 |

| Nuclide | 13-FEB (a) | | 28-FEB (b) | | 28-MAR | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| K-40 | < | 1.00E+02 | < | 1.00E+02 | < | 8.00E+01 |
| Cr-51 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Mn-54 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Co-58 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 8.00E+00 | < | 7.00E+00 | < | 6.00E+00 |
| Co-60 | < | 4.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Zn-65 | < | 8.00E+00 | < | 8.00E+00 | < | 7.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-103 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ru-106 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Cs-134 | < | 4.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Cs-137 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ba/La-140 | < | 5.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ce-141 | < | 5.00E+00 | < | 5.00E+00 | < | 5.00E+00 |
| Ce-144 | < | 2.00E+01 | < | 2.00E+01 | < | 2.00E+01 |
| Ra-226 | < | 7.00E+01 | < | 7.00E+01 | < | 7.00E+01 |
| Th-228 | < | 6.00E+00 | < | 6.00E+00 | < | 6.00E+00 |
| Sr-89 | < | 2.00E+00 | < | 3.00E+00 | < | 1.00E+00 |
| Sr-90 | < | 6.00E-01 | < | 8.00E-01 | < | 7.00E-01 |

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-2 (Control)**
(pCi/liter)

| Nuclide | 25-APR | | | | 30-MAY | | | | 13-JUN (a) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 5.00E+01 | | | < | 6.00E+01 | | | < | 9.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 5.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 5.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 6.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 8.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 8.00E+01 | | | < | 6.00E+01 | | |
| Th-228 | < | 6.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 7.00E-01 | | | < | 7.00E-01 | | | < | 9.00E-01 | | |

| Nuclide | 27-JUN (b) | | | | 25-JUL | | | | 29-AUG | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | | 3.52E+01 | +/- | 1.98E+01 | < | 9.00E+01 | | | < | 5.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Fe-59 | < | 7.00E+00 | | | < | 7.00E+00 | | | < | 6.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | | < | 7.00E+00 | | | < | 7.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 4.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 6.00E+00 | | | < | 6.00E+00 | | | < | 4.00E+00 | | |
| Ce-141 | < | 8.00E+00 | | | < | 6.00E+00 | | | < | 7.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ra-226 | < | 8.00E+01 | | | < | 7.00E+01 | | | < | 9.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 6.00E+00 | | | < | 7.00E+00 | | |
| Sr-89 | < | 3.00E+00 | | | < | 2.00E+00 | | | < | 2.00E+00 | | |
| Sr-90 | < | 1.00E+00 | | | < | 2.00E+00 | | | < | 6.00E-01 | | |

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-2 (Control)**
(pCi/liter)

| Nuclide | 26-SEP | | | 31-OCT | | | 28-NOV | | |
|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+01 | | < | 3.00E+01 | | < | 3.00E+01 | |
| K-40 | < | 4.00E+01 | | < | 6.00E+01 | | < | 9.00E+01 | |
| Cr-51 | < | 3.00E+01 | | < | 3.00E+01 | | < | 2.00E+01 | |
| Mn-54 | < | 3.00E+00 | | < | 3.00E+00 | | < | 3.00E+00 | |
| Co-58 | < | 3.00E+00 | | < | 3.00E+00 | | < | 3.00E+00 | |
| Fe-59 | < | 5.00E+00 | | < | 7.00E+00 | | < | 6.00E+00 | |
| Co-60 | < | 3.00E+00 | | < | 3.00E+00 | | < | 3.00E+00 | |
| Zn-65 | < | 6.00E+00 | | < | 7.00E+00 | | < | 6.00E+00 | |
| Zr/Nd-95 | < | 3.00E+00 | | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-103 | < | 3.00E+00 | | < | 4.00E+00 | | < | 3.00E+00 | |
| Ru-106 | < | 3.00E+01 | | < | 3.00E+01 | | < | 3.00E+01 | |
| Cs-134 | < | 3.00E+00 | | < | 3.00E+00 | | < | 3.00E+00 | |
| Cs-137 | < | 3.00E+00 | | < | 4.00E+00 | | < | 3.00E+00 | |
| Ba/La-140 | < | 4.00E+00 | | < | 6.00E+00 | | < | 4.00E+00 | |
| Ce-141 | < | 6.00E+00 | | < | 7.00E+00 | | < | 5.00E+00 | |
| Ce-144 | < | 2.00E+01 | | < | 3.00E+01 | | < | 2.00E+01 | |
| Ra-226 | < | 7.00E+01 | | < | 8.00E+01 | | < | 6.00E+01 | |
| Th-228 | < | 6.00E+00 | | < | 7.00E+00 | | < | 5.00E+00 | |
| Sr-89 | < | 2.00E+00 | | < | 2.00E+00 | | < | 2.00E+00 | |
| Sr-90 | < | 6.00E-01 | | < | 5.00E-01 | | < | 6.00E-01 | |

| Nuclide | 12-DEC (a) | | | 27-DEC | | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | < | 3.00E+01 | |
| K-40 | < | 5.00E+01 | | < | 5.00E+01 | |
| Cr-51 | < | 2.00E+01 | | < | 3.00E+01 | |
| Mn-54 | < | 3.00E+00 | | < | 3.00E+00 | |
| Co-58 | < | 3.00E+00 | | < | 3.00E+00 | |
| Fe-59 | < | 5.00E+00 | | < | 6.00E+00 | |
| Co-60 | < | 3.00E+00 | | < | 3.00E+00 | |
| Zn-65 | < | 6.00E+00 | | < | 6.00E+00 | |
| Zr/Nd-95 | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-103 | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-106 | < | 3.00E+01 | | < | 3.00E+01 | |
| Cs-134 | < | 3.00E+00 | | < | 3.00E+00 | |
| Cs-137 | < | 4.00E+00 | | < | 3.00E+00 | |
| Ba/La-140 | < | 3.00E+00 | | < | 4.00E+00 | |
| Ce-141 | < | 5.00E+00 | | < | 6.00E+00 | |
| Ce-144 | < | 2.00E+01 | | < | 3.00E+01 | |
| Ra-226 | < | 7.00E+01 | | < | 8.00E+01 | |
| Th-228 | < | 6.00E+00 | | < | 6.00E+00 | |
| Sr-89 | < | 2.00E+00 | | < | 3.00E+00 | |
| Sr-90 | < | 8.00E-01 | | < | 7.00E-01 | |

(a) Grab Sample (see section 10.4.2)
(b) sample less than representative (see section 10.4.2)

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-3 (Indicator)**
(pCi/liter)

| Nuclide | 30-JAN | | 28-FEB | | 21-MAR (a) | |
|---|---|---|---|---|---|---|
| Be-7 | < | 4.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| K-40 | < | 1.00E+02 | < | 5.00E+01 | < | 6.00E+01 |
| Cr-51 | < | 4.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Mn-54 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Co-58 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 9.00E+00 | < | 5.00E+00 | < | 6.00E+00 |
| Co-60 | < | 5.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Zn-65 | < | 1.00E+01 | < | 6.00E+00 | < | 7.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-103 | < | 5.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-106 | < | 4.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Cs-134 | < | 5.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Cs-137 | < | 5.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ba/La-140 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ce-141 | < | 8.00E+00 | < | 5.00E+00 | < | 6.00E+00 |
| Ce-144 | < | 4.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Ra-226 | < | 1.00E+02 | < | 7.00E+01 | < | 8.00E+01 |
| Th-228 | < | 8.00E+00 | < | 6.00E+00 | < | 7.00E+00 |
| Sr-89 | < | 3.00E+00 | < | 2.00E+00 | < | 1.00E+00 |
| Sr-90 | < | 6.00E-01 | < | 7.00E-01 | < | 7.00E-01 |

| Nuclide | 28-MAR (b) | | 25-APR | | 30-MAY | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| K-40 | < | 6.00E+01 | < | 5.00E+01 | < | 6.00E+01 |
| Cr-51 | < | 3.00E+01 | < | 3.00E+01 | < | 4.00E+01 |
| Mn-54 | < | 4.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Co-58 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 7.00E+00 | < | 6.00E+00 | < | 8.00E+00 |
| Co-60 | < | 4.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Zn-65 | < | 9.00E+00 | < | 6.00E+00 | < | 6.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Ru-103 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ru-106 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Cs-134 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Cs-137 | < | 4.00E+00 | < | 4.00E+00 | < | 4.00E+00 |
| Ba/La-140 | < | 4.00E+00 | < | 4.00E+00 | < | 8.00E+00 |
| Ce-141 | < | 6.00E+00 | < | 7.00E+00 | < | 9.00E+00 |
| Ce-144 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Ra-226 | < | 8.00E+01 | < | 9.00E+01 | < | 1.00E+02 |
| Th-228 | < | 7.00E+00 | < | 7.00E+00 | < | 9.00E+00 |
| Sr-89 | < | 2.00E+00 | < | 2.00E+00 | < | 2.00E+00 |
| Sr-90 | < | 9.00E-01 | < | 9.00E-01 | < | 8.00E-01 |

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-3 (Indicator)**
(pCi/liter)

| Nuclide | 27-JUN | | 25-JUL | | 29-AUG | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| K-40 | < | 6.00E+01 | < | 4.00E+01 | < | 6.00E+01 |
| Cr-51 | < | 3.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Mn-54 | < | 4.00E+00 | < | 2.00E+00 | < | 3.00E+00 |
| Co-58 | < | 3.00E+00 | < | 2.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 7.00E+00 | < | 5.00E+00 | < | 7.00E+00 |
| Co-60 | < | 4.00E+00 | < | 2.00E+00 | < | 4.00E+00 |
| Zn-65 | < | 7.00E+00 | < | 5.00E+00 | < | 8.00E+00 |
| Zr/Nd-95 | < | 4.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-103 | < | 4.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Ru-106 | < | 3.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Cs-134 | < | 3.00E+00 | < | 2.00E+00 | < | 4.00E+00 |
| Cs-137 | < | 4.00E+00 | < | 3.00E+00 | < | 4.00E+00 |
| Ba/La-140 | < | 7.00E+00 | < | 4.00E+00 | < | 5.00E+00 |
| Ce-141 | < | 9.00E+00 | < | 5.00E+00 | < | 8.00E+00 |
| Ce-144 | < | 3.00E+01 | < | 2.00E+01 | < | 3.00E+01 |
| Ra-226 | < | 1.00E+02 | < | 5.00E+01 | < | 1.00E+02 |
| Th-228 | < | 8.00E+00 | < | 4.00E+00 | < | 8.00E+00 |
| Sr-89 | < | 4.00E+00 | < | 2.00E+00 | < | 2.00E+00 |
| Sr-90 | < | 1.00E+00 | < | 7.00E-0[illegible] | < | 6.00E-01 |

| Nuclide | 27-SEP | | 31-OCT | | 28-NOV | |
|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| K-40 | < | 5.00E+01 | < | 6.00E+01 | < | 7.00E+01 |
| Cr-51 | < | 3.00E+01 | < | 3.00E+01 | < | 2.00E+01 |
| Mn-54 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Co-58 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Fe-59 | < | 6.00E+00 | < | 6.00E+00 | < | 6.00E+00 |
| Co-60 | < | 3.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Zn-65 | < | 6.00E+00 | < | 6.00E+00 | < | 7.00E+00 |
| Zr/Nd-95 | < | 3.00E+00 | < | 3.00E+00 | < | 3.00E+00 |
| Ru-103 | < | 3.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Ru-106 | < | 3.00E+01 | < | 3.00E+01 | < | 3.00E+01 |
| Cs-134 | < | 3.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Cs-137 | < | 3.00E+00 | < | 4.00E+00 | < | 3.00E+00 |
| Ba/La-140 | < | 4.00E+00 | < | 5.00E+00 | < | 4.00E+00 |
| Ce-141 | < | 7.00E+00 | < | 8.00E+00 | < | 5.00E+00 |
| Ce-144 | < | 3.00E+01 | < | 3.00E+01 | < | 2.00E+01 |
| Ra-226 | < | 8.00E+01 | < | 9.00E+01 | < | 6.00E+01 |
| Th-228 | < | 7.00E+00 | < | 8.00E+00 | < | 5.00E+00 |
| Sr-89 | < | 2.00E+00 | < | 3.00E+00 | < | 2.00E+00 |
| Sr-90 | < | 7.00E-01 | < | 7.00E-01 | < | 9.00E-01 |

# FERMI 2
# SURFACE WATER ANALYSIS

**SW-3 (Indicator)**
(pCi/liter)

| Nuclide | 27-DEC | | | |
|---|---|---|---|---|
| Be-7 | < | 3.00E+01 | | |
| K-40 | < | 6.00E+01 | | |
| Cr-51 | < | 3.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | |
| Fe-59 | < | 6.00E+00 | | |
| Co-60 | < | 3.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | |
| Cs-134 | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | |
| Ba/La-140 | < | 3.00E+00 | | |
| Ce-141 | < | 7.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | |
| Ra-226 | < | 9.00E+01 | | |
| Th-228 | < | 7.00E+00 | | |
| Sr-89 | < | 2.00E+00 | | |
| Sr-90 | < | 7.00E-01 | | |

(a) Grab Sample (see section 10.4.2)
(b) sample less than representative (see section 10.4.2)

# FERMI 2
## DRINKING AND SURFACE WATER
## QUARTERLY COMPOSITE SAMPLES

**Tritium**
(pCi/liter)

| Station | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| DW-1 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| DW-2 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| DW-3 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| SW-2 | < | 2.00E+02 | (a) | | < | 2.00E+02 | (a) | |
| SW-3 | < | 2.00E+02 | (a) | | < | 2.00E+02 | | |

| Station | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| DW-1 | < | 2.00E+02 | (b) | | | 2.30E+02 | +/- | 1.00E+02 |
| DW-2 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| SW-2 | < | 2.00E+02 | | | (a) | 2.40E+02 | +/- | 1.10E+02 |
| SW-3 | < | 2.00E+02 | | | < | 2.00E+02 | | |

(a) sample less than representative (see section 10.4.2)
(b) sample less than representative (see section 10.4.1)

# FERMI 2
# GROUNDWATER ANALYSIS

**GW-1 (Indicator)**
(pCi/liter)

| Nuclide | First Quarter | | | Second Quarter | | |
|---|---|---|---|---|---|---|
| H-3 | < | 2.00E+02 | | < | 2.00E+02 | |
| Be-7 | < | 3.00E+01 | | < | 3.00E+01 | |
| K-40 | < | 6.00E+01 | | < | 5.00E+01 | |
| Cr-51 | < | 3.00E+01 | | < | 3.00E+01 | |
| Mn-54 | < | 3.00E+00 | | < | 3.00E+00 | |
| Co-58 | < | 3.00E+00 | | < | 3.00E+00 | |
| Fe-59 | < | 6.00E+00 | | < | 6.00E+00 | |
| Co-60 | < | 4.00E+00 | | < | 3.00E+00 | |
| Zn-65 | < | 6.00E+00 | | < | 6.00E+00 | |
| Zr/Nd-95 | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-103 | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-106 | < | 3.00E+01 | | < | 3.00E+01 | |
| Cs-134 | < | 4.00E+00 | | < | 3.00E+00 | |
| Cs-137 | < | 4.00E+00 | | < | 3.00E+00 | |
| Ba/La-140 | < | 4.00E+00 | | < | 4.00E+00 | |
| Ce-141 | < | 5.00E+00 | | < | 7.00E+00 | |
| Ce-144 | < | 2.00E+01 | | < | 3.00E+01 | |
| Ra-226 | < | 7.00E+01 | | < | 7.00E+01 | |
| Th-228 | < | 6.00E+00 | | < | 6.00E+00 | |

| Nuclide | Third Quarter | | | Fourth Quarter | | |
|---|---|---|---|---|---|---|
| H-3 | < | 3.00E+02 | | < | 2.00E+02 | |
| Be-7 | < | 3.00E+01 | | < | 3.00E+01 | |
| K-40 | < | 6.00E+01 | | < | 9.00E+01 | |
| Cr-51 | < | 3.00E+01 | | < | 3.00E+01 | |
| Mn-54 | < | 3.00E+00 | | < | 3.00E+00 | |
| Co-58 | < | 3.00E+00 | | < | 3.00E+00 | |
| Fe-59 | < | 6.00E+00 | | < | 7.00E+00 | |
| Co-60 | < | 3.00E+00 | | < | 3.00E+00 | |
| Zn-65 | < | 7.00E+00 | | < | 7.00E+00 | |
| Zr/Nd-95 | < | 3.00E+00 | | < | 3.00E+00 | |
| Ru-103 | < | 4.00E+00 | | < | 4.00E+00 | |
| Ru-106 | < | 3.00E+01 | | < | 3.00E+01 | |
| Cs-134 | < | 4.00E+00 | | < | 4.00E+00 | |
| Cs-137 | < | 4.00E+00 | | < | 4.00E+00 | |
| Ba/La-140 | < | 5.00E+00 | | < | 5.00E+00 | |
| Ce-141 | < | 6.00E+00 | | < | 6.00E+00 | |
| Ce-144 | < | 2.00E+01 | | < | 2.00E+01 | |
| Ra-226 | < | 7.00E+01 | | < | 7.00E+01 | |
| Th-228 | < | 6.00E+00 | | < | 6.00E+00 | |

# FERMI 2
# GROUNDWATER ANALYSIS

**GW-2 (Indicator)**
(pCi/liter)

| Nuclide | First Quarter | Second Quarter |
|---|---|---|
| H-3 | < 2.00E+02 | < 2.00E+02 |
| Be-7 | < 2.00E+01 | < 3.00E+01 |
| K-40 | < 5.00E+01 | < 5.00E+01 |
| Cr-51 | < 2.00E+01 | < 3.00E+01 |
| Mn-54 | < 3.00E+00 | < 3.00E+00 |
| Co-58 | < 3.00E+00 | < 3.00E+00 |
| Fe-59 | < 6.00E+00 | < 6.00E+00 |
| Co-60 | < 3.00E+00 | < 3.00E+00 |
| Zn-65 | < 6.00E+00 | < 6.00E+00 |
| Zr/Nd-95 | < 3.00E+00 | < 3.00E+00 |
| Ru-103 | < 3.00E+00 | < 3.00E+00 |
| Ru-106 | < 3.00E+01 | < 3.00E+01 |
| Cs-134 | < 3.00E+00 | < 3.00E+00 |
| Cs-137 | < 4.00E+00 | < 3.00E+00 |
| Ba/La-140 | < 4.00E+00 | < 6.00E+00 |
| Ce-141 | < 6.00E+00 | < 7.00E+00 |
| Ce-144 | < 2.00E+01 | < 3.00E+01 |
| Ra-226 | < 7.00E+01 | < 8.00E+01 |
| Th-228 | < 6.00E+00 | < 7.00E+00 |

| Nuclide | Third Quarter | Fourth Quarter |
|---|---|---|
| H-3 | < 2.00E+02 | < 2.00E+02 |
| Be-7 | < 3.00E+01 | < 3.00E+01 |
| K-40 | < 9.00E+01 | < 6.00E+01 |
| Cr-51 | < 3.00E+01 | < 4.00E+01 |
| Mn-54 | < 4.00E+00 | < 3.00E+00 |
| Co-58 | < 4.00E+00 | < 3.00E+00 |
| Fe-59 | < 7.00E+00 | < 7.00E+00 |
| Co-60 | < 4.00E+00 | < 3.00E+00 |
| Zn-65 | < 8.00E+00 | < 6.00E+00 |
| Zr/Nd-95 | < 4.00E+00 | < 4.00E+00 |
| Ru-103 | < 4.00E+00 | < 4.00E+00 |
| Ru-106 | < 3.00E+01 | < 3.00E+01 |
| Cs-134 | < 4.00E+00 | < 4.00E+00 |
| Cs-137 | < 4.00E+00 | < 4.00E+00 |
| Ba/La-140 | < 5.00E+00 | < 7.00E+00 |
| Ce-141 | < 6.00E+00 | < 9.00E+00 |
| Ce-144 | < 2.00E+01 | < 4.00E+01 |
| Ra-226 | < 7.00E+01 | < 1.00E+02 |
| Th-228 | < 6.00E+00 | < 8.00E+00 |

# FERMI 2
# GROUNDWATER ANALYSIS

**GW-3 (Indicator)**
(pCi/liter)

| Nuclide | First Quarter | Second Quarter |
|---|---|---|
| H-3 | < 2.00E+02 | < 2.00E+02 |
| Be-7 | < 3.00E+01 | < 3.00E+01 |
| K-40 | < 5.00E+01 | < 8.00E+01 |
| Cr-51 | < 2.00E+01 | < 3.00E+01 |
| Mn-54 | < 3.00E+00 | < 3.00E+00 |
| Co-58 | < 2.00E+00 | < 3.00E+00 |
| Fe-59 | < 5.00E+00 | < 7.00E+00 |
| Co-60 | < 3.00E+00 | < 3.00E+00 |
| Zn-65 | < 6.00E+00 | < 6.00E+00 |
| Zr/Nd-95 | < 3.00E+00 | < 3.00E+00 |
| Ru-103 | < 3.00E+00 | < 3.00E+00 |
| Ru-106 | < 2.00E+01 | < 3.00E+01 |
| Cs-134 | < 3.00E+00 | < 3.00E+00 |
| Cs-137 | < 4.00E+00 | < 3.00E+00 |
| Ba/La-140 | < 3.00E+00 | < 6.00E+00 |
| Ce-141 | < 5.00E+00 | < 5.00E+00 |
| Ce-144 | < 2.00E+01 | < 2.00E+01 |
| Ra-226 | < 6.00E+01 | < 6.00E+01 |
| Th-228 | < 6.00E+00 | < 5.00E+00 |

| Nuclide | Third Quarter | Fourth Quarter |
|---|---|---|
| H-3 | < 2.00E+02 | < 2.00E+02 |
| Be-7 | < 4.00E+01 | < 3.00E+01 |
| K-40 | < 1.00E+02 | < 7.00E+01 |
| Cr-51 | < 4.00E+01 | < 3.00E+01 |
| Mn-54 | < 4.00E+00 | < 3.00E+00 |
| Co-58 | < 4.00E+00 | < 3.00E+00 |
| Fe-59 | < 9.00E+00 | < 6.00E+00 |
| Co-60 | < 4.00E+00 | < 3.00E+00 |
| Zn-65 | < 1.00E+01 | < 7.00E+00 |
| Zr/Nd-95 | < 5.00E+00 | < 4.00E+00 |
| Ru-103 | < 5.00E+00 | < 4.00E+00 |
| Ru-106 | < 4.00E+01 | < 3.00E+01 |
| Cs-134 | < 5.00E+00 | < 4.00E+00 |
| Cs-137 | < 5.00E+00 | < 4.00E+00 |
| Ba/La-140 | < 6.00E+00 | < 5.00E+00 |
| Ce-141 | < 7.00E+00 | < 9.00E+00 |
| Ce-144 | < 3.00E+01 | < 3.00E+01 |
| Ra-226 | < 9.00E+01 | < 1.00E+02 |
| Th-228 | < 7.00E+00 | < 8.00E+00 |

# FERMI 2
# GROUNDWATER ANALYSIS

**GW-4 (Control)**
(pCi/liter)

| Nuclide | First Quarter | | | | Second Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| H-3 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Be-7 | < | 4.00E+01 | | | < | 2.00E+01 | | |
| K-40 | < | 1.00E+02 | | | < | 4.00E+01 | | |
| Cr-51 | < | 4.00E+01 | | | < | 2.00E+01 | | |
| Mn-54 | < | 5.00E+00 | | | < | 2.00E+00 | | |
| Co-58 | < | 5.00E+00 | | | < | 2.00E+00 | | |
| Fe-59 | < | 9.00E+00 | | | < | 5.00E+00 | | |
| Co-60 | < | 5.00E+00 | | | < | 3.00E+00 | | |
| Zn-65 | < | 1.00E+01 | | | < | 5.00E+00 | | |
| Zr/Nd-95 | < | 6.00E+00 | | | < | 3.00E+00 | | |
| Ru-103 | < | 5.00E+00 | | | < | 3.00E+00 | | |
| Ru-106 | < | 4.00E+01 | | | < | 2.00E+01 | | |
| Cs-134 | < | 5.00E+00 | | | < | 3.00E+00 | | |
| Cs-137 | < | 5.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 5.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 9.00E+00 | | | < | 5.00E+00 | | |
| Ce-144 | < | 4.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 1.00E+02 | | | < | 6.00E+01 | | |
| Th-228 | < | 1.00E+01 | | | < | 5.00E+00 | | |

| Nuclide | Third Quarter | | | | Fourth Quarter | | | |
|---|---|---|---|---|---|---|---|---|
| H-3 | < | 2.00E+02 | | | | 2.00E+02 | +/- | 1.20E+02 |
| Be-7 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| K-40 | < | 5.00E+01 | | | < | 1.00E+02 | | |
| Cr-51 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Mn-54 | < | 3.00E+00 | | | < | 3.00E+00 | | |
| Co-58 | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Fe-59 | < | 6.00E+00 | | | < | 8.00E+00 | | |
| Co-60 | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Zn-65 | < | 6.00E+00 | | | < | 8.00E+00 | | |
| Zr/Nd-95 | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-103 | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Ru-106 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-134 | < | 3.00E+00 | | | < | 4.00E+00 | | |
| Cs-137 | < | 4.00E+00 | | | < | 4.00E+00 | | |
| Ba/La-140 | < | 4.00E+00 | | | < | 5.00E+00 | | |
| Ce-141 | < | 6.00E+00 | | | < | 6.00E+00 | | |
| Ce-144 | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Ra-226 | < | 7.00E+01 | | | < | 7.00E+01 | | |
| Th-228 | < | 7.00E+00 | | | < | 6.00E+00 | | |

# FERMI 2
# SEDIMENT ANALYSIS

**S-1 (Indicator)**
(pCi/kg dry)

| Nuclide | 3-MAY | | | | 4-OCT | | | |
|---|---|---|---|---|---|---|---|---|
| Sr-89 | < | 9.00E+01 | | | < | 1.00E+02 | | |
| Sr-90 | < | 6.00E+01 | | | < | 4.00E+01 | | |
| Be-7 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 1.03E+04 | +/- | 1.00E+03 | | 1.26E+04 | +/- | 1.30E+03 |
| Mn-54 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 6.00E+01 | | | < | 7.00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Zn-65 | < | 6.00E+01 | | | < | 7.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ru-106 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 5.00E+01 | | | < | 7.00E+01 | | |
| Ce-141 | < | 4.00E+01 | | | < | 5.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Ra-226 | < | 4.00E+02 | | | | 5.20E+02 | +/- | 2.91E+02 |
| Th-228 | | 1.97E+02 | +/- | 2.50E+01 | | 2.85E+02 | +/- | 3.90E+01 |

**S-2 (Indicator)**
(pCi/kg dry)

| Nuclide | 3-MAY | | | | 10-OCT | | | |
|---|---|---|---|---|---|---|---|---|
| Sr-89 | < | 2.00E+02 | | | < | 1.00E+02 | | |
| Sr-90 | < | 2.00E+02 | | | | 8.70E+01 | +/- | 3.60E+01 |
| Be-7 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 9.01E+03 | +/- | 9.00E+02 | | 1.03E+04 | +/- | 1.00E+03 |
| Mn-54 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 5.00E+01 | | | < | 5.00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 4.00E+01 | | | < | 5.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 1.00E+02 | | | < | 5.00E+01 | | |
| Ce-141 | < | 5.00E+01 | | | < | 4.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Ra-226 | | 7.78E+02 | +/- | 2.24E+02 | | 7.60E+02 | +/- | 2.38E+02 |
| Th-228 | | 2.30E+02 | +/- | 2.30E+01 | | 3.48E+02 | +/- | 3.50E+01 |

# FERMI 2
# SEDIMENT ANALYSIS

### S-3 (Indicator)
(pCi/kg dry)

| Nuclide | 3-MAY | | | | 10-OCT | | | |
|---|---|---|---|---|---|---|---|---|
| Sr-89 | < | 1.00E+02 | | | < | 4.00E+01 | | |
| Sr-90 | < | 4.00E+01 | | | < | 2.00E+01 | | |
| Be-7 | < | 2.00E+02 | | | < | 3.00E+02 | | |
| K-40 | | 1.20E+04 | +/- | 1.20E+03 | | 1.15E+04 | +/- | 1.10E+03 |
| Mn-54 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Fe-59 | < | 5.00E+01 | | | < | 7.00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Zn-65 | < | 4.00E+01 | | | < | 8.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ba/La-140 | < | 4.00E+01 | | | < | 8.00E+01 | | |
| Ce-141 | < | 4.00E+01 | | | < | 6.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Ra-226 | | 6.17E+02 | +/- | 2.54E+02 | | 7.40E+02 | +/- | 4.04E+02 |
| Th-228 | | 2.07E+02 | +/- | 2.10E+01 | | 2.34E+02 | +/- | 3.00E+01 |

### S-4 (Indicator)
(pCi/kg dry)

| Nuclide | 4-MAY | | | | 9-OCT | | | |
|---|---|---|---|---|---|---|---|---|
| Sr-89 | < | 7.00E+01 | | | < | 7.00E+01 | | |
| Sr-90 | < | 3.00E+01 | | | | 7.10E+01 | +/- | 4.60E+01 |
| Be-7 | < | 3.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 9.87E+03 | +/- | 9.90E+02 | | 9.66E+03 | +/- | 9.70E+02 |
| Mn-54 | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Fe-59 | < | 6.00E+01 | | | < | 7.00E+01 | | |
| Co-60 | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 7.00E+01 | | | < | 6.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Ru-106 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Cs-137 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Ba/La-140 | < | 5.00E+01 | | | < | 7.00E+01 | | |
| Ce-141 | < | 6.00E+01 | | | < | 6.00E+01 | | |
| Ce-144 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Ra-226 | | 1.06E+03 | +/- | 4.80E+02 | < | 5.00E+02 | | |
| Th-228 | | 3.17E+02 | +/- | 4.50E+01 | | 1.94E+02 | +/- | 2.80E+01 |

# FERMI 2
# SEDIMENT ANALYSIS

**S-5 (Control)**
(pCi/kg dry)

| Nuclide | 5-MAY | | | | 11-OCT | | | |
|---|---|---|---|---|---|---|---|---|
| Sr-89 | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Sr-90 | < | 1.00E+02 | | | < | 6.00E+01 | | |
| Be-7 | < | 3.00E+02 | | | < | 4.00E+02 | | |
| K-40 | | 1.29E+04 | +/- | 1.30E+03 | | 1.03E+04 | +/- | 1.00E+03 |
| Mn-54 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Co-58 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Fe-59 | < | 7.00E+01 | | | < | 1.00E+02 | | |
| Co-60 | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Zn-65 | < | 8.00E+01 | | | < | 8.00E+01 | | |
| Zr/Nd-95 | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Ru-103 | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Ru-106 | < | 3.00E+02 | | | < | 3.00E+02 | | |
| Cs-134 | < | 4.00E+01 | | | < | 4.00E+01 | | |
| Cs-137 | < | 4.00E+01 | | | | 1.10E+02 | +/- | 3.30E+01 |
| Ba/La-140 | < | 6.00E+01 | | | < | 1.00E+02 | | |
| Ce-141 | < | 6.00E+01 | | | < | 7.00E+01 | | |
| Ce-144 | < | 2.00E+02 | | | < | 2.00E+02 | | |
| Ra-226 | | 1.01E+03 | +/- | 4.90E+02 | | 9.21E+02 | +/- | 4.57E+02 |
| Th-228 | | 5.00E+02 | +/- | 5.00E+01 | | 4.36E+02 | +/- | 4.40E+01 |

# FERMI 2
# FISH ANALYSIS

**F-1 (Control)**
(pCi/kg wet)

| Nuclide | 5-MAY Walleye | | | | 5-MAY Sucker | | | | 5-MAY Crappie | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 1.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 3.72E+03 | +/- | 3.70E+02 | | 3.56E+03 | +/- | 3.60E+02 | | 2.52E+03 | +/- | 2.50E+02 |
| Mn-54 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Co-58 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Fe-59 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 6.00E+01 | | |
| Co-60 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Zr/Nd-95 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 1.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Cs-137 | | 3.72E+01 | +/- | 1.17E+01 | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ba/La-140 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 6.00E+01 | | |
| Ce-141 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Ce-144 | < | 7.00E+01 | | | < | 8.00E+01 | | | < | 1.00E+02 | | |
| Ra-226 | < | 2.00E+02 | | | < | 3.00E+02 | | | < | 5.00E+02 | | |
| Th-228 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Sr-89 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Sr-90 | | 9.60E+00 | +/- | 2.10E+00 | | 1.90E+01 | +/- | 3.00E+00 | | 4.50E+01 | +/- | 1.00E+01 |

| Nuclide | 5-MAY Perch | | | | 11-OCT Pike | | | | 11-OCT Walleye | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 3.00E+02 | | | < | 1.00E+02 | | | < | 1.00E+02 | | |
| K-40 | | 3.87E+03 | +/- | 3.90E+02 | | 2.67E+03 | +/- | 2.70E+02 | | 2.97E+03 | +/- | 3.00E+02 |
| Mn-54 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Co-58 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Fe-59 | < | 7.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Co-60 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Zn-65 | < | 6.00E+01 | | | < | 4.00E+01 | | | < | 3.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+01 | | |
| Ru-103 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ru-106 | < | 3.00E+02 | | | < | 1.00E+02 | | | < | 1.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Cs-137 | < | 4.00E+01 | | | | 2.94E+01 | +/- | 1.29E+01 | | 2.29E+01 | +/- | 1.11E+01 |
| Ba/La-140 | < | 6.00E+01 | | | < | 2.00E+01 | | | < | 2.00E+01 | | |
| Ce-141 | < | 6.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Ce-144 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 8.00E+01 | | |
| Ra-226 | < | 7.00E+02 | | | < | 4.00E+02 | | | < | 3.00E+02 | | |
| Th-228 | < | 6.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Sr-89 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Sr-90 | | 5.00E+01 | +/- | 6.00E+00 | < | 4.00E+00 | | | | 7.60E+00 | +/- | 3.40E+00 |

# FERMI 2
# FISH ANALYSIS

**F-1 (Control)**
(pCi/kg wet)

| Nuclide | 11-OCT Crappie | | | |
|---|---|---|---|---|
| Be-7 | < | 2.00E+02 | | |
| K-40 | | 2.94E+03 | +/- | 2.90E+02 |
| Mn-54 | < | 2.00E+01 | | |
| Co-58 | < | 3.00E+01 | | |
| Fe-59 | < | 6.00E+01 | | |
| Co-60 | < | 3.00E+01 | | |
| Zn-65 | < | 6.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+01 | | |
| Ru-103 | < | 3.00E+01 | | |
| Ru-106 | < | 2.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | |
| Cs-137 | < | 3.00E+01 | | |
| Ba/La-140 | < | [illegible]E+01 | | |
| Ce-141 | < | [illegible]E+01 | | |
| Ce-144 | < | 1.00E+02 | | |
| Ra-226 | < | 4.00E+02 | | |
| Th-228 | < | 4.00E+01 | | |
| Sr-89 | < | 2.00E+01 | | |
| Sr-90 | | 4.20E+01 | +/- | 7.00E+00 |

# FERMI 2
# FISH ANALYSIS

**F-2 (Indicator)**
(pCi/kg wet)

| Nuclide | 4-MAY Walleye | | | | 4-MAY Sucker | | | | 4-MAY Perch | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 3.90E+03 | +/- | 3.90E+02 | | 4.21E+03 | +/- | 4.20E+02 | | 2.60E+03 | +/- | 2.60E+02 |
| Mn-54 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 5.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 4.00E+01 | | | < | 3.00E+01 | | | < | 3.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 2.0[illegible]01 | | |
| Ru-106 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 1.00[illegible]02 | | |
| Cs-134 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ce-141 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 8.00E+01 | | | < | 8.00E+01 | | |
| Ra-226 | < | 4.00E+02 | | | < | 3.00E+02 | | | < | 3.00E+02 | | |
| Th-228 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Sr-89 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 1.00E+01 | | |
| Sr-90 | | 7.70E+00 | +/- | 2.10E+00 | < | 4.00E+00 | | | | 2.50E+01 | +/- | 5.00E+00 |

| Nuclide | 4-MAY Drum | | | | 3-OCT Walleye | | | | 3-OCT Crappie | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 3.00E+02 | | |
| K-40 | | 2.18E+03 | +/- | 2.20E+02 | | 2.65E+03 | +/- | 2.70E+02 | | 2.42E+03 | +/- | 3.00E+02 |
| Mn-54 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Co-58 | < | 2.0[illegible]01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Fe-59 | < | 4.0[illegible]01 | | | < | 4.00E+01 | | | < | [illegible]00E+01 | | |
| Co-60 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 3.0[illegible] | | |
| Zn-65 | < | 4.00E+01 | | | < | 3.00E+01 | | | < | 6.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ru-106 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 3.00E+02 | | |
| Cs-134 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ba/La-140 | < | 4.00E+01 | | | < | 3.00E+01 | | | < | 7.00E+01 | | |
| Ce-141 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Ce-144 | < | 9.00E+01 | | | < | 8.00E+01 | | | < | 1.00E+02 | | |
| Ra-226 | < | 3.00E+02 | | | < | 3.00E+02 | | | < | 4.00E+02 | | |
| Th-228 | < | 3.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Sr-89 | < | 4.00E+01 | | | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Sr-90 | < | 1.00E+01 | | | | [illegible].30E+00 | +/- | 2.80E+00 | | 6.50E+01 | +/- | 1.20E+01 |

# FERMI 2
# FISH ANALYSIS

**F-2 (Indicator)**
(pCi/kg wet)

| Nuclide | 3-OCT Carp | | | |
|---|---|---|---|---|
| Be-7 | < | 2.00E+02 | | |
| K-40 | | 2.26E+03 | +/- | 2.30E+02 |
| Mn-54 | < | 2.00E+01 | | |
| Co-58 | < | 2.00E+01 | | |
| Fe-59 | < | 4.00E+01 | | |
| Co-60 | < | 2.00E+01 | | |
| Zn-65 | < | 4.00E+01 | | |
| Zr/Nd-95 | < | 2.00E+01 | | |
| Ru-103 | < | 2.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | |
| Cs-134 | < | 2.00E+01 | | |
| Cs-137 | < | 2.00E+01 | | |
| Ba/La-140 | < | 3.00E+01 | | |
| Ce-141 | < | 3.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | |
| Ra-226 | < | 3.00E+02 | | |
| Th-228 | < | 2.00E+01 | | |
| Sr-89 | < | 2.00E+01 | | |
| Sr-90 | < | 6.00E+00 | | |

# FERMI 2
# FISH ANALYSIS

**F-3 (Control)**
(pCi/kg wet)

| Nuclide | 3-MAY Walleye | | | | 3-MAY Carp | | | | 3-MAY Drum | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 9.00E+01 | | | < | 1.00E+02 | | | < | 4.00E+02 | | |
| K-40 | | 4.40E+03 | +/- | 4.40E+02 | | 2.51E+03 | +/- | 2.50E+02 | | 2.52E+03 | +/- | 3.50E+02 |
| Mn-54 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Co-58 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Fe-59 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 1.00E+02 | | |
| Co-60 | < | 1.00E+01 | | | < | 9.00E+00 | | | < | 4.00E+01 | | |
| Zn-65 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 9.00E+01 | | |
| Zr/Nd-95 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 5.00E+01 | | |
| Ru-103 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 5.00E+01 | | |
| Ru-106 | < | 9.00E+01 | | | < | 1.00E+02 | | | < | 4.00E+02 | | |
| Cs-134 | < | 9.00E+00 | | | < | 1.00E+01 | | | < | 5.00E+01 | | |
| Cs-137 | | 2.51E+01 | +/- | 9.30E+00 | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Ba/La-140 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 9.00E+01 | | |
| Ce-141 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 6.00E+01 | | |
| Ce-144 | < | 7.00E+01 | | | < | 7.00E+01 | | | < | 2.00E+02 | | |
| Ra-226 | < | 2.00E+02 | | | < | 2.00E+02 | | | < | 8.00E+02 | | |
| Th-228 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 7.00E+01 | | |
| Sr-89 | < | 5.00E+00 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Sr-90 | < | 2.00E+00 | | | < | 8.00E+00 | | | | 4.70E+01 | +/- | 1.20E+01 |

| Nuclide | 3-MAY Sucker | | | | 3-OCT Walleye | | | | 3-OCT Sucker | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 1.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 4.28E+03 | +/- | 4.30E+02 | | 3.37E+03 | +/- | 3.40E+02 | | 3.53E+03 | +/- | 3.50E+02 |
| Mn-54 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 6.00E+01 | | |
| Co-60 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 6.00E+01 | | |
| Zr/Nd-95 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Ru-103 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 3.00E+01 | | |
| Ru-106 | < | 1.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 1.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 2.00E+01 | | | < | 1.00E+01 | | | < | 4.00E+01 | | |
| Ce-141 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 4.00E+01 | | |
| Ce-144 | < | 7.00E+01 | | | < | 9.00E+01 | | | < | 2.00E+02 | | |
| Ra-226 | < | 2.00E+02 | | | < | 2.00E+02 | | | < | 5.00E+02 | | |
| Th-228 | < | 2.00E+01 | | | < | 2.00E+01 | | | < | 5.00E+01 | | |
| Sr-89 | < | 1.00E+01 | | | < | 3.00E+01 | | | < | 2.00E+01 | | |
| Sr-90 | < | 4.00E+00 | | | < | 7.00E+00 | | | < | 1.00E+01 | | |

# FERMI 2
# FISH ANALYSIS

**F-3 (Control)**
(pCi/kg wet)

| Nuclide | 3-OCT Crappie | | | | 3-OCT Catfish | | | | 3-OCT Perch | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Be-7 | < | 2.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| K-40 | | 3.58E+03 | +/- | 3.60E+02 | | 2.32E+03 | +/- | 2.30E+02 | | 2.97E+03 | +/- | 3.10E+02 |
| Mn-54 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Co-58 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Fe-59 | < | 6.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Co-60 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Zn-65 | < | 6.00E+01 | | | < | 3.00E+01 | | | < | 4.00E+01 | | |
| Zr/Nd-95 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ru-103 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ru-106 | < | 3.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Cs-134 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Cs-137 | < | 3.00E+01 | | | < | 1.00E+01 | | | < | 2.00E+01 | | |
| Ba/La-140 | < | 4.00E+01 | | | < | 2.00E+01 | | | < | 3.00E+01 | | |
| Ce-141 | < | 3.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Ce-144 | < | 1.00E+02 | | | < | 1.00E+02 | | | < | 2.00E+02 | | |
| Ra-226 | < | 4.00E+02 | | | < | 3.00E+02 | | | < | 6.00E+02 | | |
| Th-228 | < | 4.00E+01 | | | < | 3.00E+01 | | | < | 5.00E+01 | | |
| Sr-89 | < | 5.00E+01 | | | < | 5.00E+00 | | | < | 2.00E+01 | | |
| Sr-90 | | 4.70E+01 | +/- | 1.70E+01 | < | 2.00E+00 | | | | 3.10E+01 | +/- | 6.00E+00 |

# *Glossary of Terms*

## 14. Glossary of Terms

activation products — Radioactive material that is created when stable substances are bombarded by neutron radiation.

ALARA — Acronym for "As Low As Reasonably Achievable," a basic concept of radiation protection that specifies radioactive discharges from nuclear plants and radiation exposure to personnel be kept as far below regulatory limits as possible.

alpha particle — A positively charged particle ejected from the nuclei of some radioactive elements. It is identical to a helium nucleus, and has a mass number 4 and a charge of +2. It has low penetrating power and short range. Alpha particles are easily stopped by a thin layer of paper or fabric, or the dead outer layer of skin cells.

atom — The smallest portion of an element that shares the general characteristics of that element and cannot be divided or broken up by chemical means. An atom has a nucleus, composed of positively charged protons and electrically neutral neutrons, around which orbit negatively charged electrons.

background radiation — The radiation in man's environment, including cosmic rays from space and radiation that exists everywhere--in the air, in the earth, and in man-made materials that surround us, In the United States, most people receive 100 to 250 millirem of background radiation per year. Common sources of man-made background radiation include consumer products such as color televisions, radium dials on watches or clocks, smoke detectors, coast-to-coast jet flights, construction materials, and certain foods.

beta particle — A charged particle emitted from a nucleus during radioactive decay, with a mass equal to 1/1837 that of a proton. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron. Beta particles are easily stopped by a thin sheet of metal, plastic or wood.

composite sample — A sample made of grab or continuous samples combined to represent a particular location or a set period of time (e.g., four weekly water samples combined to make one monthly composite sample).

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| continuous sample | A continuous sample is one that collects samples non-stop and is used to evaluate conditions over a specific period of time. The typical continuous samples collected at Fermi 2 include TLDs and air samples. |
| control location | A sample collection location generally more than 10 miles away from Fermi 2. Analyses of samples collected at control locations provide information on normally-occurring background radiation and radioactivity. |
| coolant | A fluid, usually water, used to cool the nuclear reactor core by transferring the heat energy emitted during the fission process into the fluid medium. |
| cosmic radiation | Penetrating ionizing radiation, both particulate and electromagnetic, that originates in space. |
| critical receptor | The segment of the population that could receive the greatest radiation dose. |
| curie (Ci) | The basic unit used to describe the intensity of radioactivity in a sample or material. One curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of one gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second. |
| dose | A quantity (total or accumulated) of ionizing radiation received. |
| dose rate | The radiation dose delivered per unit of time. Measured, for example, in rem per hour. |
| effluent | In general, a waste material, such as smoke, liquid, industrial refuse, or sewage discharged into the environment. Effluents discharged from the Fermi 2 Nuclear Power Plant include liquid and gaseous media containing extremely small concentrations of radionuclides. The concentrations released are well below the limits established by the NRC. |
| electron | An elementary particle with a negative charge and a mass 1/1837 that of the proton. Electrons orbit around the positively charged nucleus. In an electrically neutral atom, the negative charges of the electrons are balanced by the positive charges of the protons. |

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| exposure | The absorption of radiation or ingestion of a radionuclide. Acute exposure is generally accepted to be a large exposure received over a short period of time. Chronic exposure is low level exposure received during a lifetime or over a long period of time. |
| external radiation | Exposure to ionizing radiation when the radiation source is located outside of the body. |
| fission | The splitting or breaking apart of a heavy atom into two or more fragments. When a heavy atom such as uranium is split, large amounts of energy in the form of heat, radiation, and one or more neutrons are released. |
| fission gases | Those fission products that exist in the gaseous state. Primarily the noble gases (krypton, xenon, etc.). |
| fission products | The fragments formed by the fission of heavy elements, plus the nuclides formed by the fragments' radioactive decay. |
| gamma ray | High energy, short wavelength electromagnetic radiation emitted from the nucleus of a radioactive atom. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating but may be shielded by dense materials, such as lead or concrete. Gamma rays are similar to X-rays, but are usually more energetic. |
| grab samples | A grab sample represents a single sample collected in a finite period of time. |
| half-life | The time in which half the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years. |
| indicator location | A sample collection location generally within 10 miles of Fermi 2. Analyses from samples collected at indicator locations provide information on the radiological impact, if any, Fermi 2 has on the surrounding environment. |
| internal radiation | Nuclear radiation resulting from radioactive substances in the body. Some examples are iodine-131 deposited in the thyroid gland and strontium-90 and plutonium-239 deposited in bone tissue. |

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| ionizing radiation | Any radiation capable of displacing electrons from atoms or molecules, thereby producing ions. For example, alpha and beta particles, gamma and X-rays, neutrons, and ultraviolet light. |
| isotope | One of two or more atoms with the same number of protons, but different numbers of neutrons in their nuclei. Thus, carbon-12, carbon-13, and carbon-14 are isotopes of the element carbon; the numbers denoting their approximate atomic weights. Isotopes have the same chemical properties, but often different physical properties (for example, carbon-12 and carbon-13 are stable, while carbon-14 is radioactive). |
| 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 present. The LLD is actually a measure of the ability of an individual analysis to detect extremely minute amounts of radioactivity in a sample. |
| mean | Arithmetic average. In a series of 3 or more numbers, the mean is calculated by the equation: $X = (xl + x2 + ...xn)/n$ Where n is the number of observations in a data set, and xl, x2, ...xn are the various observations. |
| microcurie | One-millionth of a curie. |
| millirem | One-thousandth of a rem. |
| neutron | An uncharged elementary particle with a mass slightly greater than that of a proton, and found in the nucleus of every atom heavier than hydrogen-1. |
| noble gas | A gaseous chemical element that does not readily enter into chemical combination with other elements. An inert gas such as krypton, xenon, neon or argon. |
| nuclide | A general term referring to all known isotopes, both stable (279) and unstable (about 5000), of the chemical elements. |
| picocurie | One-trillionth of a curie. |

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| quality control (QC) | The field check or verification of work while it is being performed to assure that the task is properly done. |
| radiation | The conveyance of energy through space, for example, the radiation of heat from a stove. Ionizing radiation is the emission of particles or gamma rays from the nucleus of an unstable (radioactive) atom as a result of radioactive decay. |
| radioactive decay | The decrease in the amount of radioactivity with the passage of time due to the spontaneous emission of particulate or gamma radiation from the atomic nuclei. |
| radioactivity | The spontaneous emission of radiation from the nucleus of an unstable isotope. Radioactivity is a process and radiation is the product. |
| radioiodine | A radioactive isotope of iodine. The radioisotopes of iodine are among the most abundant of the fission products. All told, 27 isotopes of iodine are known to exist, but only the naturally-occurring iodine-127 is stable. Of the remaining 26 radioisotopes, 12 are produced during fission and these have half-lives ranging from 1.5 seconds to 16 million years. |
| radioisotope | The term "radioisotope" is used to specifically describe the relationship between an element and a radioactive isotope of that element. For instance, in describing Cs-137, one could state that Cs-137 is a radioisotope of cesium (stable). |
| rem | Acronym for "roentgen equivalent man". The unit of dose of any ionizing radiation that produces the same biological effect as a unit of absorbed dose of X-rays. |
| Technical Specifications (Tech Specs) | A part of the operating license for any nuclear facility issued by the Nuclear Regulatory Commission (NRC), the Tech Specs delineate the requirements the facility must meet in order to maintain its operating license. |
| terrestrial radiation | The portion of natural radiation (background) that is emitted by naturally occurring radioactive materials in the earth. |

tritium — A radioactive isotope of hydrogen (one proton, two neutrons). Because it is chemically identical to natural hydrogen, tritium can easily be taken into the body by any ingestion path. Tritium decays by beta emission. Its radioactive half-life is about 12-1/2 years.