



**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

**MICHIGAN**

**RADIATION ENVIRONMENTAL MONITORING**

**PROGRAM REPORT**

**1958-1996**

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PROGRAM REPORT  
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Prepared by

Michigan Department of Environmental Quality  
Drinking Water and Radiological Protection Division  
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**Executive Summary**

Recognizing that the peaceful use of nuclear energy to produce electricity could have an adverse impact on public health and the environment, the state of Michigan established the Michigan Radiation Environmental Monitoring Program (MREMP) in 1958 to monitor the environs near the nuclear plant sites to assure that Michigan's citizens and its environment are not adversely impacted. Environmental samples in the form of air **particulates**, air vapors, milk, surface water, and direct radiation are taken from various sites in Michigan and analyzed to determine if any radiological effects due to nuclear power plants can be detected.

Historically, sample results from all media have indicated elevated levels of radioactivity, but the vast majority of these elevated levels are attributable to past atmospheric testing of nuclear weapons. Analytical results that could be attributed to nuclear power plant operations have only been detected on-site at the plants and were within the allowable U. S. Nuclear Regulatory Commission (NRC) limits. No analytical results attributable to nuclear power plants operations have been detected off site at any of the plants.

During the report focus years of 1995 and 1996, no samples were found to contain radioactivity attributable to nuclear power plant operations. The influence of atmospheric fallout from past testing of nuclear weapons can no longer be readily seen in environmental samples, and monitoring levels from all samples now fluctuate in the range of natural background radiation.

In conclusion, the results of the MREMP indicate that:

1. No public health or environmental radiological impact has yet been detected in the environs of Michigan's nuclear power plants due to the operation of nuclear power reactors.
2. The data provided by the MREMP form a useful baseline to compare environmental radioactivity measurements in the event of a potential nuclear reactor accident should such an unlikely event ever occur.
3. The data provided by the MREMP show a consistent sensitivity to and downward trending of the overall levels of radioactive fallout from past atmospheric testing of nuclear weapons and from the Chernobyl nuclear reactor accident.
4. The operation of the MREMP provides assurance to the citizens of this state that the potential impact of nuclear power plant operations on public health and the environment will be continuously evaluated.

## Introduction

### Program History

The world's first electricity from nuclear power was generated in 1951 by an experimental breeder reactor (EBR-1) in Idaho. This demonstration of a peaceful use for nuclear energy eventually led to the worldwide development of this energy source and along with it a great concern for its potential impact on the environment and public health. The state of Michigan recognized this concern, and in 1958 the Michigan Department of Health established the MREMP to determine the impact of nuclear power plants on the environment and public health. Specific statutory authority for an environmental monitoring program was provided to the Michigan Department of Public Health in 1972 with the enactment of 1972 PA 305. Later, the Public Health Code (1978 PA 368) provided this authority in Section 13518 of Part 135 of the Code. The environmental monitoring program has been in continuous operation since its inception in 1958. In April 1996 it was transferred to the Michigan Department of Environmental Quality by Executive Order 1996-1, along with other radioactive material radiation protection programs.

Michigan's commercial nuclear power industry was born in 1956 as construction was started on the Enrico Fermi Fast Breeder Reactor near the city of Monroe in southeast Michigan. The Enrico Fermi plant finally went into operation in 1963 (Michigan's second operational nuclear power plant) after a long series of construction delays. For a variety of technical reasons, the plant was operated only intermittently over its entire lifetime and only operated at full capacity for a few hundred hours before its final shutdown in the early 1970s. Among the various problems encountered by the Enrico Fermi plant staff during the plant's brief lifetime was a major incident that occurred on October 5, 1966 when a zirconium metal fitting broke loose and clogged a liquid sodium coolant duct, causing part of the reactor core to melt. The plant reactor and other damaged systems were repaired and it briefly attained a record 61,000 kilowatt (kW) power output in 1970, shortly before the plant owners decided to dismantle the plant for final decommissioning.

### Nuclear Power Plants in Michigan

#### Bia Rock Point

Consumers Power Company's Big Rock Point plant, a boiling water reactor (BWR) near Charlevoix, was the second plant constructed and the first operational nuclear power plant in Michigan. The 240 megawatt thermal (MWt) plant commenced electrical power production in 1962 and is nearing the end of its licensed operational life, with the final reactor refueling scheduled for 1999. The plant has been in, essentially, continuous operation since 1962 and has been under MREMP surveillance since July 1960.

#### Palisades

Located near South Haven, Michigan is Consumers Power Company's Palisades plant, a 2530 MWt pressurized water reactor (PWR), that went into operation in 1971 becoming Michigan's third nuclear power plant. The Palisades plant has been in, essentially, continuous operation since 1971 except for two lengthy periods, one in the mid-1970s and another in the fall of 1990, when extensive steam generator repair and/or steam generator replacement took place. MREMP surveillance of the plant was initiated in 1968.

#### D. C. Cook

Michigan's fourth nuclear power plant is American Electric Power Company's D. C. Cook plant, a two-reactor facility located near Bridgman, Michigan. D. C. Cook I, a 3250 MWt PWR, commenced operation in early 1975 and has operated, essentially, continuously ever since. D. C. Cook II, a 3411 MWt PWR, commenced electrical power production in 1978 and, with the exception of a steam generator replacement in 1988, has been in, essentially, continuous operation ever since. MREMP surveillance of the plant was initiated in 1971.



## Fermi

Fermi 2, Michigan's newest nuclear power plant is located on the same site as was the original Enrico Fermi nuclear power plant near Monroe, Michigan. The 3430 MWt BWR achieved initial criticality in June 1985 but, due to a variety of problems, did not start reliable electrical power production until November 1988. Fermi 2 followed a routine operational format until Christmas Day in 1993, when a failure of one of the low pressure turbines caused major damage to the turbine and the main generator. After a thirteen month outage to repair the damaged non-nuclear plant components and clean up the affected areas of the plant, the plant was once again operational and has been in routine power production mode ever since. Since the Fermi 2 plant is adjacent to the Enrico Fermi plant, MREMP surveillance of the plant was technically initiated in 1958. Monitoring at the plant site was scaled back in 1975, with the completion of the original Enrico Fermi plant decommissioning, and expanded in the fall of 1983 just prior to the scheduled initial date of operation for Fermi 2.

### **Pre-Operational Monitoring**

The purpose of the MREMP is to assess the environmental impact from operating nuclear power plants in Michigan and to determine any public health impact that may be the result of plant operations. This program also provides verification of the plant operated effluent monitoring system for each nuclear plant as well as its associated radiological environmental monitoring network, and also serves as an in-place baseline sampling network in the event of an accidental release. Atmospheric, terrestrial, aquatic, and direct radiation pathways are monitored to determine the potential impact of nuclear power plant operations on the environment and public health.

Pre-operational environmental samples are collected and analyzed to provide background data on natural radioactivity and/or man-made sources of radioactivity in the vicinity of a planned operational nuclear power plant. Data accumulated during the pre-operational period establish a baseline with which to compare operational measurements. A minimum of one year of data is usually collected prior to reactor operation for an adequate pre-operational monitoring program. For all four nuclear power plant sites in Michigan, at least two years of data were collected. In addition to the pre-operational monitoring conducted in the environs of Michigan's four nuclear power plant sites, a background reference station is operated in Lansing, Michigan for data comparison.

The operational phase of the radiological environmental monitoring program is a natural extension of the pre-operational monitoring program. Once the reactor becomes operational, environmental samples are collected from the network of sampling sites established for the pre-operational phase, and individual and cumulative measurement results are compared to baseline data to discern any trends that may be indicative of the impact of plant operations. Measurement results from each of the four nuclear plant areas are also compared to the results from the Lansing reference station, as well as the results from the other three plants environs to assure that data anomalies and/or trends could be adequately assessed.

## Atmospheric Monitoring

### Sampling Network

The atmospheric monitoring network consists of three to six sampling stations in the vicinity of each of the four Michigan nuclear power plant sites and a background reference station in Lansing. At each station a highly efficient vacuum pump continuously draws ambient air, first through a particulate filter and then through a charcoal filter to collect air **particulates** and air vapors, respectively. Particulate filters are analyzed for gross beta activity three days after the end of sample collection, and charcoal filters are analyzed as soon as possible after the end of sample collection for the presence of radioactive iodine isotopes. Radiation atmospheric monitoring in Michigan was initiated in November 1958, with the first sampling station at the Fermi plant site. Air monitoring stations were added to the Fermi site vicinity as well as setting up multiple sampling stations in the vicinities of the Big Rock Point (July 1960), Palisades (November 1968), and D. C. Cook (September 1971) plant sites. The background reference station in Lansing became operational in February 1961.

### Historical Air Monitoring Trends

From July 1945, when the first atomic bomb was detonated on a New Mexico desert, through September 1980, when the People's Republic of China detonated its last atmospheric nuclear device, literally hundreds of nuclear devices had been detonated on or above the earth's surface. With each of these detonations, fallout was formed by particles being "sucked up" from the earth's surface into the mushroom cloud by convection currents produced by the intense heat of the explosion. The particles become contaminated by the radioactive fission products within the cloud and eventually fall back to earth. Where and when the radioactive particles fall back to earth depends on a number of factors, including but not limited to: the size of the detonation, the size of the particles, the height above the earth's surface the nuclear device was detonated, the meteorological conditions prevalent at the time of the detonation, and ongoing atmospheric transport mechanisms. These factors determine if the cloud of radioactive particles is: (1) isolated in the troposphere [the first seven to ten miles of atmosphere above the earth's surface], (2) isolated in the stratosphere [the portion of the earth's atmosphere above the troposphere], or (3) to some degree in both the troposphere and the stratosphere.

Radioactive particles which reside in the troposphere tend to fallout near the location of the detonation site or are carried by the winds characteristic of the latitude at which the explosion takes place. Deposition ultimately takes the form of west to east bands over the earth's surface and tends to occur relatively soon after the explosion, residing in the troposphere for only about 20 to 30 days. During the first few weeks after an atmospheric nuclear detonation, particles contained in the stratosphere are moved by atmospheric air currents around the earth with fallout deposition patterns usually following the jet streams prevalent at the time. For time periods greater than a few weeks, atmospheric air currents move the stratospheric particles over the earth's poles where the discontinuity between the troposphere and stratosphere in the temperate regions (most of the United States is in a temperate region) displays turbulence, particularly in the late winter and early spring. This turbulence increases the transport of the stratospheric debris into the troposphere for eventual return to the earth's surface. The time during which the radioactive debris from a given atmospheric detonation resides in the stratosphere is much longer than the 20 to 30 days of typical troposphere residence time, extending into a range of 7 to 15 years.

During the mid-1950s the United States, the United Kingdom, and the Soviet Union routinely engaged in atmospheric nuclear weapons testing until the fall of 1958. At that time the three nations announced a moratorium on further atmospheric weapons testing which lasted until the summer of 1961, when the Soviet Union unilaterally broke the moratorium and detonated about 50 nuclear devices during the remainder of the year. This was followed by a series of atmospheric tests by the United States and another series of tests by the Soviet Union in 1962. The signing of the Limited Test Ban Treaty in September 1963 marked a close of atmospheric nuclear weapons testing for the signatory nations, which did not include the People's Republic of China. Atmospheric testing by China started in the mid-1960s and continued through 1980.

In November 1958 the MREMP officially became operational when air monitoring was initiated at the construction site of the Enrico Fermi nuclear power plant. This air monitoring station has been in, essentially, continuous operation ever since, and the analytical results of the nearly 2000 weekly air particulate filters collected provide an interesting historical view of the atmospheric radioactivity levels in Michigan. Monthly average gross beta concentrations from the **37-plus** years of sample collection for Fermi air monitoring station are shown in Figure 1. Visual examination of Figure 1 reveals that air particulate gross beta levels have decreased by a factor of over 100 over the **37-year** period. Focusing on the period from 1958 to 1964, the initial high levels in 1958-1959 followed by a period of lower levels and then the dramatic rise in levels in 1962 and the downward trend in 1964 reflect the 1958 three nation moratorium, the resumption of atmospheric testing by the Soviet Union and the United States, and the signing of the Limited Test Ban Treaty, as described in the previous paragraph. From 1964 to 1981, Figure 1 shows an overall declining level of gross beta air particulate activity with a series of peaks which are a result of atmospheric testing conducted by the People's Republic of China during that period of time. From 1982 through 1995, air particulate gross beta levels have remained relatively constant with the one notable exception being the peak in the spring of 1986. This very narrow and well defined peak is a result of the Chernobyl nuclear power plant accident in the former Soviet Union. The levels of fallout radioactivity in environmental sample media are a primary factor in understanding the background level of radioactivity to which the impact of nuclear power plant operations are compared.

With the expansion of the MREMP air monitoring network to include stations at the Big Rock Point, Palisades, and D. C. Cook nuclear power plant sites and the Lansing background reference station, a more detailed picture of statewide atmospheric radiation became available. Figure 2 displays quarterly average air particulate gross beta results for the four nuclear power plant sites and the Lansing site from the initiation of sampling at each site through 1995. From Figure 2 we can see that the quarterly average gross beta results for the Fermi, Big Rock Point, and Lansing sites are virtually identical from the early 1960s through 1995 and that the Palisades and D. C. Cook site results closely match the other three site results over the last 25 years. For reasons discussed previously, it can be concluded that statewide overall trends, as well as the individual rises and falls in atmospheric gross beta activity, can be directly correlated with past atmospheric detonations of nuclear devices or the Chernobyl accident in 1986.

Throughout the more than 37 years of atmospheric monitoring, only on very few occasions have the charcoal filters indicated the presence of any radioactive iodine or any other air vapor radionuclides. For almost all of these occasions, the concentrations measured were just above the minimum detectable activity level and, as such, did not represent any finding of noteworthy significance. One exception to this was in January 1985 when the monitoring station at the reactor site of the D. C. Cook nuclear plant indicated  $0.38 \text{ pCi/m}^3$  of  $^{131}\text{I}$ . The plant had released a small quantity of radioiodine which was well within plant technical specifications allowable amounts. The sampling station, which is within a few hundred feet of the reactor building, picked up the release. The second exception was in April 1985 at the D. C. Cook plant, when the monitor station at the reactor site showed  $0.61 \text{ pCi/m}^3$  and  $0.8 \text{ pCi/m}^3$  of  $^{131}\text{I}$  on two consecutive sampling weeks. Again the plant had released small quantities of radioiodines during the two-week period, which were picked up by the air sampling station located a few hundred feet from the reactor building. Weather conditions were just right during both of these events for the reactor site monitoring station to pickup the iodine releases, but the releases were not detectable at any of the other MREMP Cook air monitoring stations including the station near the lake shore at the south end of the plant property.

Air vapor samples indicated the presence of  $^{131}\text{I}$  during May and June of 1986, when radioactive debris from the Chernobyl plant accident passed over Michigan with some of this debris falling out of the **upper** atmosphere and, thus, becoming part of the ambient air. Over a three- to four-week period,  $^{131}\text{I}$  concentrations were detected statewide and peaked out at slightly over  $1 \text{ pCi/m}^3$  at the Big Rock Point monitoring stations in the northern part of the state and to just over  $0.2 \text{ pCi/m}^3$  at the other three **plant** sites and the Lansing background reference station in the southern part of the state. Unlike the  $^{131}\text{I}$  release at the Cook plant in April 1985 that could not be detected off site, the  $^{131}\text{I}$  Chernobyl fallout could be detected throughout the state as demonstrated by its detection at the Lansing background reference station which is not located near any type of nuclear facility.

# Monthly Average Air Particulate Activity Permi Nuclear Power Plant Site

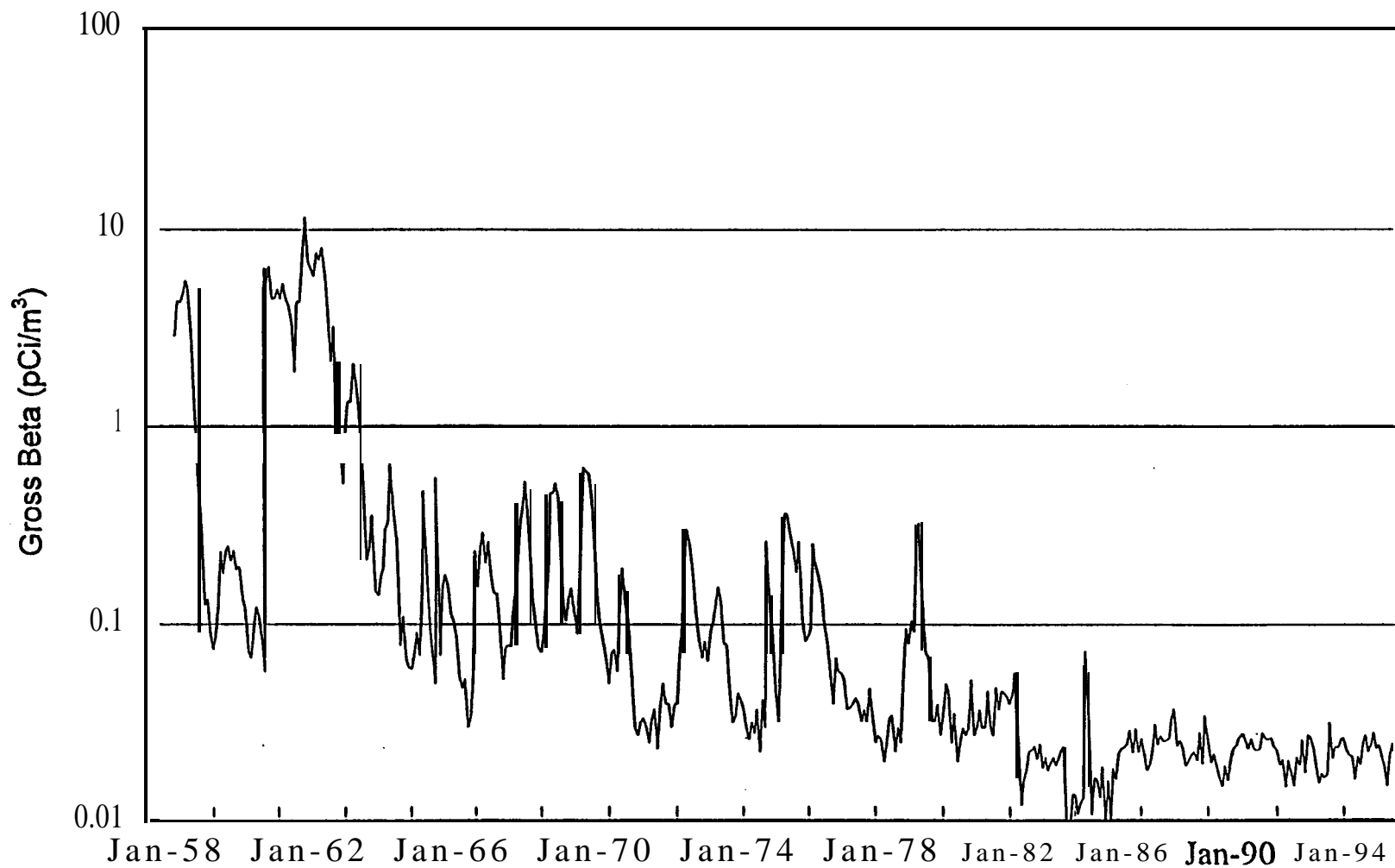
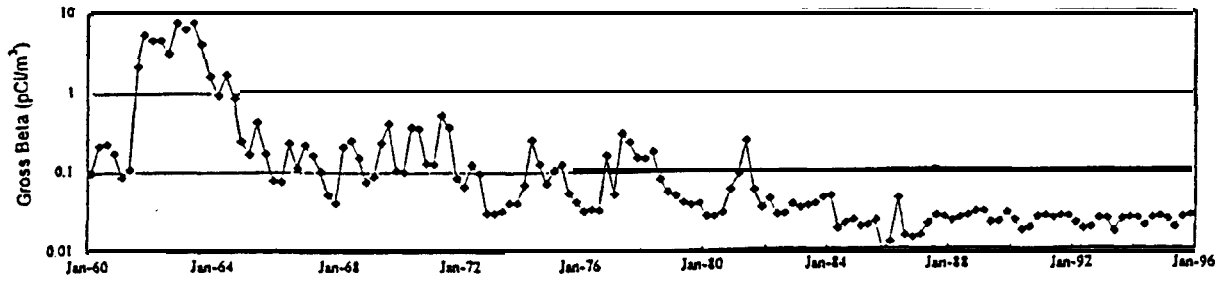
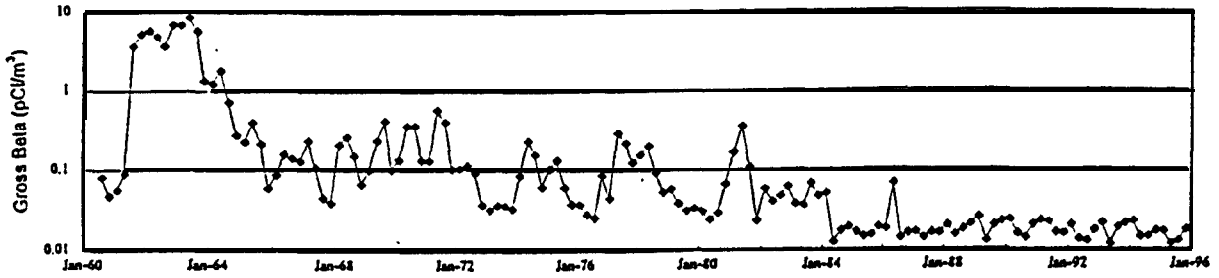


Figure 2

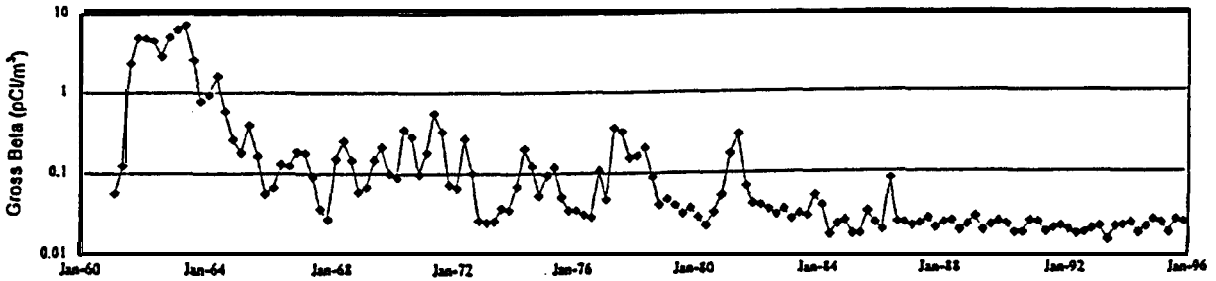
Quarterly Average Air Particulate Activity  
Fermi Nuclear Power Plant Site



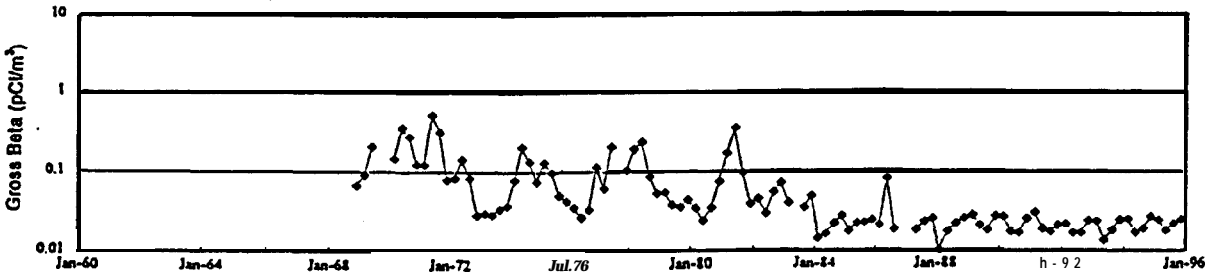
Quarterly Average Air Particulate Activity  
Big Rock Point Nuclear Power Plant



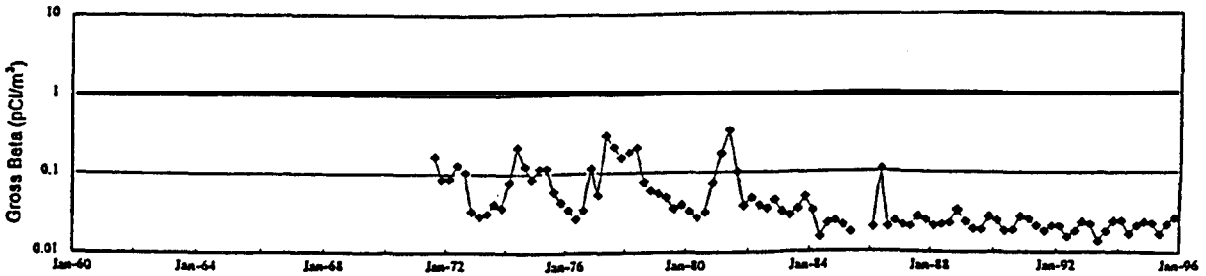
Quarterly Average Air Particulate Activity  
Lansing Background Reference Site



Quarterly Average Air Particulate Activity  
Fallsides Nuclear Power Plant Site



Quarterly Average Air Particulate Activity  
D.C. Cook Nuclear Power Plant Site



## Pm-Operational Air Monitoring

### Big Rock Point

Atmospheric monitoring at the Big Rock Point plant was initiated in July 1960 with the plant under construction and still more than 12 months away from completion. During the first 13 months of air monitoring at Big Rock Point, air particulate gross beta levels remained fairly constant and generally fell into a range of 0.03-0.10 pCi/m<sup>3</sup>. In September 1961 air particulate gross beta levels dramatically increased, as a direct result of the Soviet Union's resumption of atmospheric testing of nuclear devices, peaking in mid-September at slightly over 40 pCi/m<sup>3</sup> and remaining above 1 pCi/m through the end of 1961 (see Figure 2). With the plant becoming operational in 1962, the 17 months of air monitoring results from July 1960 through December 1961 become the pre-operational baseline data to be used for comparison with operational air monitoring results from 1962 to the present. Since the elevated air particulate activity levels over the last four months of this period did not reflect normal conditions, this data is not used for the purpose of determining the pre-operational air monitoring baseline.

Four air monitoring stations were operated at and in the vicinity of the Big Rock Point plant during the pre-operational monitoring period from late July 1960 through early September 1961. Air particulate gross beta results for the four stations were analyzed for central tendencies and measurement extremes, and the results of these analyses are presented in Table 1. The highest gross beta levels for all four stations occurred in June 1961 and was the result of fallout from atmospheric testing conducted prior to the fall of 1958 moratorium on atmospheric testing. Historically, the fallout from atmospheric testing tends to fall back to earth during the first four to eight months of the year. The lowest levels were measured during November 1960 when fallout from previous testing is typically at its lowest. Arithmetic means and geometric means for all four stations were almost equal indicating that the set of results for each station were normally distributed. There were no distinguishable differences in gross beta results for the four stations.

	Reactor Site	Charlevoix	Burgess	Nine Mile Point
Number of Samples	58	60	60	57
Highest Result (pCi/m <sup>3</sup> )	0.13	0.15	0.14	0.14
Lowest Result (pCi/m <sup>3</sup> )	0.02	0.02	0.03	0.02
Arithmetic Mean (pCi/m <sup>3</sup> )	0.07	0.07	0.07	0.06
Geometric Mean (pCi/m <sup>3</sup> )	0.06	0.06	0.06	0.06

### Palisades

Atmospheric monitoring at the Palisades plant was initially started in November 1968 and was suspended the following May when it became apparent that plant operation would be delayed due to construction problems. Monitoring was restarted in March 1970, and the pre-operational monitoring results were collected from then through the end of April 1971 when the Palisades plant became operational. During the pre-operational monitoring period, the Peoples Republic of China conducted atmospheric testing which led to increased gross beta air particulate levels during the spring months of 1970 and 1971. As a result of this atmospheric testing, the pre-operational monitoring gross beta levels for the Palisades plant were much higher than they were for the Big Rock Point plant. For most of the 14 months, the levels fluctuated between 0.1 and 0.7 pCi/m<sup>3</sup>. Since the data collected from late 1968 through mid-spring 1969 was not collected over an entire year to cover all the seasonal variations, the 14 months of data from March 1970 through April 1971 were selected for use for the pre-operational monitoring baseline.

Four air monitoring stations were operated at and in the vicinity of the Palisades plant during the pre-operational monitoring period. Air particulate gross beta results for the four stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 2.

The highest gross beta results for all four stations occurred in the spring months of 1970 and 1971 as might be expected with the usual seasonal fallout pattern. The lowest levels were measured during December 1970 and January 1971 when seasonal atmospheric fallout is usually at its low point. Arithmetic means and geometric means for all four Palisades air monitoring stations were very similar indicating a normal distribution of results for each station. There were no significant differences in results between the four stations.

Table 2 PALISADES PRE-OPERATIONAL AIR PARTICULATE MONITORING RESULTS				
	Reactor Site	Covert	Township Park	South Haven
Number of Samples	57	55	47	44
Highest Result (pCi/m <sup>3</sup> )	0.70	0.92	0.74	0.64
Lowest Result (pCi/m <sup>3</sup> )	0.06	0.06	0.08	0.07
Arithmetic Mean (pCi/m <sup>3</sup> )	0.24	0.25	0.29	0.25
Geometric Mean (pCi/m <sup>3</sup> )	0.19	0.20	0.23	0.21

#### D. C. Cook

Atmospheric monitoring at the D. C. Cook plant was initiated with one air monitoring station at the reactor site in September 1971 with the plant more than three years away from operation. Pre-operational air monitoring for the D. C. Cook plant was also influenced by fallout from atmospheric nuclear testing conducted by the Peoples Republic of China. The Chinese detonated a series of devices in early 1972 and detonated a single device in early 1974 resulting in abnormally high gross beta levels for both 1972 and 1974. Air monitoring results during 1973 were not significantly influenced by the Chinese testing of 1972 and could be used for pre-operational purposes. But since only the one monitoring station (reactor site) was operational during 1973, there were no samples collected from the off-site environs for operational plant comparison purposes. For general reference purposes, the central tendencies and measure extremes for the reactor site station in 1973 were: arithmetic mean of 0.04 pCi/m<sup>3</sup>, geometric mean of 0.03 pCi/m<sup>3</sup>, highest result of 0.07 pCi/m<sup>3</sup>, and lowest result of 0.01 pCi/m<sup>3</sup>. The 1974 air monitoring results were selected as the pre-operational data set for the Cook plant.

Five air monitoring stations were operated at and in the vicinity of the D. C. Cook plant during the pre-operational monitoring period with the non-reactor site stations operating during the last seven months of 1974. Air particulate gross beta results for the four stations were analyzed for central tendencies and measurement extremes, and the results of these analyzes are presented in Table 3. The highest gross beta levels for all five stations occurred during the spring of 1974 as would be expected with the normal seasonal fallout pattern. The lowest levels during 1974 were measured during the later fall months consistent with previous years. Arithmetic means and geometric means for all four D. C. Cook air monitoring stations were very similar indicating a normal distribution of results for each station. There were no significant differences in results between the five stations.

Table 3 D. C. COOK PRE-OPERATIONAL AIR MONITORING RESULTS					
	Reactor Site	Bridgman	Stevensville	Livingston Road	Peddy Farm
Number of Samples	48	22	30	25	28
Highest Result (pCi/m <sup>3</sup> )	0.34	0.24	0.37	0.37	0.20
Lowest Result (pCi/m <sup>3</sup> )	0.04	0.05	0.04	0.04	0.03
Arithmetic Mean (pCi/m <sup>3</sup> )	0.13	0.13	0.11	0.09	0.10
Geometric Mean (pCi/m <sup>3</sup> )	0.11	0.11	0.09	0.08	0.08

## Fermi 2

Atmospheric monitoring at the Fermi 2 plant was initiated in November 1982 with the plant under construction and more than 2.5 years away from initial operation. The Fermi 2 air particulate gross beta results through the end of May 1985, when the plant became operational, were dramatically different than those encountered during pre-operational monitoring at the other three Michigan nuclear power plants, in that there was a definite absence of atmospheric fallout. This was due to the Peoples Republic of China suspension of atmospheric testing of nuclear devices with their final detonation in September 1980 and their subsequent joining with the other nations that ceased atmospheric testing some 17 years earlier when they signed the Limited Test Ban Treaty of 1963. As a result, the entire 2.5 years of air monitoring results were selected for the pre-operational air monitoring baseline.

Six air monitoring stations were operated at and in the vicinity of the Fermi 2 plant during the pre-operational monitoring period from November 1982 through May 1985. Air particulate gross beta results for the four stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 4. There were no trends for the time of year the highest and lowest gross beta levels were measured for all six stations, and for most of the stations the highest and lowest levels were recorded multiple times during the 2.5 year period. Arithmetic means and geometric means for all four stations were almost equal indicating that the set of results for each station were normally distributed. There were no distinguishable differences in gross beta results for the six stations.

	Reactor Site	Rockwood	Pointe Aux Peaux Rd.	Nadeau Rd.	Dixie Hwy.	Fix Farm
Number of Samples	125	132	106	130	127	131
Highest Result (pCi/m <sup>3</sup> )	0.09	0.09	0.08	0.11	0.07	0.07
Lowest Result (pCi/m <sup>3</sup> )	0.01	0.01	0.01	0.01	0.01	0.01
Arithmetic Mean (pCi/m <sup>3</sup> )	0.03	0.03	0.03	0.03	0.03	0.03
Geometric Mean (pCi/m <sup>3</sup> )	0.03	0.02	0.03	0.03	0.03	0.03

## **1995 Air Monitoring**

As stated previously, overall air particulate gross beta levels statewide have remained fairly constant over the past decade with the last occurrence of elevated results being in the spring of 1986. For 1995, the monitoring results from the four nuclear power plants and their surrounding stations and the Lansing background reference station stayed true to this trend. Also following the previously established trend were the air vapor <sup>131</sup>I results with no sample results exceeding the analytical Minimum Detectable Activity (MDA) level of 0.02 to 0.03 pCi/m<sup>3</sup> decay corrected to the end of sample collection. Details of the 1995 air particulate gross beta monitoring results for each of the four plants with comparisons to their respective pre-operational baseline data and to the Lansing station are discussed below. Also, plots of gross beta results of each station for 1995 are shown in Figures 3-20 following the 1995 air monitoring result discussion. The 1995 MREMP air monitoring results are shown in tabular form in Appendix A.

### Big Rock Point

Atmospheric monitoring for Big Rock Point in 1995 consisted of the three monitoring stations, with one at the reactor site, one east of the plant site in Burgess, and one in Charlevoix. Fifty-one sets of air particulate and air vapor samples from each of the three sites were collected and analyzed during the year with one week's shipment of samples lost in transit to the laboratory in Lansing. There were no distinguishable peaks or trends in the gross beta results for all three stations during 1995, with the levels hovering around 0.02 pCi/m<sup>3</sup>. Gross beta data from the three stations were analyzed for central tendencies and measurement extremes, and the results of these analyses are presented in Table 5.



	Reactor Site	Charlevoix	Burgess
Number of Samples	51	51	51
Highest Result (pCi/m <sup>3</sup> )	0.029	0.024	0.023
Lowest Result (pCi/m <sup>3</sup> )	0.005	0.001	0.005
Arithmetic Mean (pCi/m <sup>3</sup> )	0.014	0.016	0.014
Geometric Mean (pCi/m <sup>3</sup> )	0.014	0.014	0.013

The arithmetic mean air particulate gross beta concentration during the pre-operational monitoring period was 0.07 pCi/m<sup>3</sup> for all three stations at Big Rock Point. This pre-operational gross beta concentration is four to five times higher than the average concentrations measured in 1995 for the same three stations. The average air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m<sup>3</sup> during 1995, which is a little more than 50% higher than the average levels at the three Big Rock Point stations. The difference in average gross beta levels between Lansing and Big Rock Point is not significant and is likely due to the influence of Lake Michigan and the lack of industrial and agricultural activities in the area along with the low population density of the area, which are factors that tend to correlate to lesser amounts of particulate matter in the air compared to the Lansing area.

### Palisades

Three atmospheric monitoring stations were operated in the environs of the Palisades plant during 1995. One station was at the plant site, a second station was in South Haven, and the third station was in Covert. The Covert monitoring station was shut down during the first part of 1995 due to a re-roofing project at its original site, and the station was eventually relocated to a new site a short distance from the original site. There were 51 sets of air samples collected from the monitoring station at the reactor site, 50 from the South Haven station, and 26 from the Covert station. The one set of samples from the reactor site and the two sets from South Haven that were not collected were caused by mechanical problems with the sampler vacuum pump. There were no distinguishable peaks or trends in the gross beta results for all three stations during 1995, with the levels hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the three stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 6.

	Reactor Site	Covert	South Haven
Number of Samples	51	26	50
Highest Result (pCi/m <sup>3</sup> )	0.054	0.046	0.052
Lowest Result (pCi/m <sup>3</sup> )	0.01	0.005	0.005
Arithmetic Mean (pCi/m <sup>3</sup> )	0.022	0.021	0.025
Geometric Mean (pCi/m <sup>3</sup> )	0.021	0.018	0.023

The arithmetic mean gross beta air particulate concentration during the pre-operational monitoring period was 0.24 pCi/m<sup>3</sup> for the reactor site and 0.25 pCi/m<sup>3</sup> for the Covert and South Haven monitoring sites. This pre-operational gross beta concentration is approximately ten times higher than the average concentrations measured in 1995 for the same three stations. The average air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m<sup>3</sup> during 1995, which is almost identical to the average levels at the three Palisades stations.

### D. C. Cook

Five atmospheric monitoring stations were operated in the environs of the D. C. Cook plant during 1995. One station was at the reactor site, a second station was in Bridgman, a third station was in Stevensville, a fourth station was at the Peddy Farm about three miles east of the plant, and the fifth station was on the

plant property at the end of Livingston Road. There were 51 sets of air samples collected from the monitoring stations at the reactor site, Stevensville, and the Peddy Farm and 52 sets of samples collected from the Bridgman and Livingston Road stations. All three sets of missing samples were due to mechanical problems with the vacuum pump air sampler. There were no distinguishable peaks or trends in the gross beta results for all five stations during 1995, with the levels hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the five stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 7.

	Reactor Site	Bridgman	Stevensville	Livingston Road	Peddy Farm
Number of Samples	51	52	51	52	51
Highest Result (pCi/m <sup>3</sup> )	0.051	0.054	0.060	0.060	0.045
Lowest Result (pCi/m <sup>3</sup> )	0.009	0.006	0.01	0.01	0.008
Arithmetic Mean (pCi/m <sup>3</sup> )	0.022	0.023	0.023	0.021	0.019
Geometric Mean (pCi/m <sup>3</sup> )	0.020	0.021	0.021	0.019	0.018

The arithmetic mean gross beta air particulate concentration during the pre-operational monitoring period was 0.13 pCi/m<sup>3</sup> for the reactor site and Bridgman, 0.11 pCi/m<sup>3</sup> for the Stevensville site, 0.10 pCi/m<sup>3</sup> for the Peddy Farm site, and 0.09 pCi/m<sup>3</sup> for the Livingston Road sites. This pre-operational gross beta concentration is approximately five times higher than the average concentrations measured in 1995 for the same five stations. The **average** air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m<sup>3</sup> during 1995, which is almost identical to the average levels at the five D. C. Cook stations.

### Fermi 2

Six atmospheric monitoring stations were operated in the environs of the Fermi 2 plant during 1995. One station was at the reactor site, a second station was in Rockwood, a third station was at the fire station on Pointe Aux Peaux Road, a fourth station was at the fire station on Nadeau Road, a fifth station was on Dixie Highway due west of the plant, and the sixth station was at the Fix Farm northwest of the plant on Post Road. There were 52 sets of air samples collected from the monitoring stations at the reactor site, Rockwood, at the Pointe Aux Peaux fire station, at Dixie Highway, and the Fix Farm and 50 sets of samples collected from the fire station on Nadeau Road monitoring station. Both sets of missing samples at the Nadeau Road fire station were due to mechanical problems with the vacuum sampler. There were no distinguishable peaks or trends in the gross beta results for all six stations during 1995, with the levels hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the six stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 8.

	Rctor Site	Rockwood	Pointe Aux Peaux Rd.	Nadeau Rd.	Dixie Hwy.	Fix Farm
Number of Samples	52	52	52	50	52	52
Highest Result (pCi/m <sup>3</sup> )	0.043	0.046	0.042	0.044	0.047	0.047
Lowest Result (pCi/m <sup>3</sup> )	0.01	0.01	0.01	0.01	0.009	0.01
Arithmetic Mean (pCi/m <sup>3</sup> )	0.023	0.024	0.023	0.025	0.025	0.025
Geometric Mean (pCi/m <sup>3</sup> )	0.022	0.023	0.022	0.024	0.023	0.024

The arithmetic mean air particulate gross beta concentration during the pre-operational monitoring period was 0.03 pCi/m<sup>3</sup> for all six stations at Fermi 2. This pre-operational gross beta concentration is just slightly higher than the average concentrations measured in 1995 for the same six stations. The average

air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m<sup>3</sup> during 1995, which is almost identical to the average levels measured at the six Fermi 2 stations.

## 1996 Air Monitoring

Atmospheric monitoring results for 1996 were consistent with 1995 air monitoring results for all four nuclear power plants and their surrounding stations and for the Lansing background reference station. Yearly air particulate gross beta results averages for 1996 were: 0.016 pCi/m<sup>3</sup> for the Big Rock Point plant area, 0.021 pCi/m<sup>3</sup> for the Palisades plant area, 0.022 pCi/m<sup>3</sup> for the Cook plant area, 0.023 pCi/m<sup>3</sup> for the Fermi 2 plant area, and 0.023 pCi/m<sup>3</sup> for the Lansing background reference station. These 1996 averages are virtually the same as the 1995 averages of: 0.015 pCi/m<sup>3</sup> for the Big Rock Point plant area, 0.023 pCi/m<sup>3</sup> for the Palisades plant area, 0.022 pCi/m<sup>3</sup> for the Cook plant area, 0.024 pCi/m<sup>3</sup> for the Fermi 2 plant area, and 0.023 pCi/m<sup>3</sup> for the Lansing background reference station. Air vapor monitoring results for 1996 once again did not exceed the minimum detectable activity level of 0.02 to 0.03 pCi/m decay corrected to the end of sample collection. Details of the 1996 air particulate gross beta monitoring results for each of the four plants with comparisons to the Lansing reference station are discussed below. Also, plots of gross beta results of each stations for 1995 are shown in Figures 21-38 at the end of this section, and the 1996 MREMP air monitoring results are shown in tabular form in Appendix A.

### Big Rock Point

The 1996 Big Rock Point atmospheric monitoring utilized the same three stations that were used in 1995. Fifty-three sets of air samples were collected from the Charlevoix and Burgess stations and 52 sets of samples were collected from the reactor station, with the one missing set due to a sampling pump failure. There were no distinguishable peaks or trends in the air particulate gross beta results for all three stations during 1996. Gross beta data from all three stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 9.

	Reactor Site	Charlevoix	Burgess
Number of Samples	52	53	53
Highest Result (pCi/m <sup>3</sup> )	0.031	0.027	0.028
Lowest Result (pCi/m <sup>3</sup> )	0.009	0.007	0.005
Arithmetic Mean (pCi/m <sup>3</sup> )	0.017	0.015	0.015
Geometric Mean (pCi/m <sup>3</sup> )	0.016	0.014	0.014

The 1996 average gross beta air particulate concentrations for each of the three Big Rock Point monitoring stations were slightly higher than they were for the same three stations in 1995, but were again lower than the 0.023 pCi/m<sup>3</sup> average level for the Lansing reference station in 1996. Overall, the gross beta levels from these three stations were once again the lowest for all of the MREMP stations throughout the state.

### Palisades

The same three air monitoring stations were operated in the environs of the Palisades plant during 1996 as were during 1995. There were 52 sets of air samples collected from the monitoring station at the reactor site, 53 from the South Haven station, and 53 from the Covert station. The one set of missing samples from the reactor site was caused by mechanical problems with the sampler vacuum pump. There were no distinguishable peaks or trends in the gross beta results for all three stations during 1996, with the levels again hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the three stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 10.

Table 10 1996 PALISADES AIR PARTICULATE MONITORING RESULTS			
	Reactor Site	Covert	South Haven
Number of Samples	52	53	53
Highest Result (pCi/m <sup>3</sup> )	0.037	0.050	0.041
Lowest Result (pCi/m <sup>3</sup> )	0.007	0.009	0.01
Arithmetic Mean (pCi/m <sup>3</sup> )	0.021	0.019	0.022
Geometric Mean (pCi/m <sup>3</sup> )	0.020	0.018	0.021

Air particulate gross beta averages for the three Palisades monitoring stations were all slightly less than the 1995 averages. When compared to the 1996 gross beta results for the Lansing reference station, the three Palisades station results were overall very similar with slightly lower yearly averages.

#### D. C. Cook

The same five air monitoring stations were operated in the environs of the D. C. Cook plant during 1996 as were in 1995. There were 53 sets of air samples collected from the monitoring stations at the reactor site, Bridgman, and Livingston Road, 50 sets of samples collected from the Peddy Farm station and 49 sets of samples from the Stevensville station. All seven sets of missing samples were due to mechanical problems with the vacuum pump air sampler. There were no distinguishable peaks or trends in the gross beta results for all five stations during 1996, with the levels hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the five stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 11.

Table 11 1996 D. C. COOK AIR PARTICULATE MONITORING RESULTS					
	Reactor Site	Bridgman	Stevensville	Livingston Road	Peddy Farm
Number of Samples	53	53	49	53	50
Highest Result (pCi/m <sup>3</sup> )	0.045	0.039	0.039	0.037	0.033
Lowest Result (pCi/m <sup>3</sup> )	0.008	0.009	0.01	0.007	0.008
Arithmetic Mean (pCi/m <sup>3</sup> )	0.025	0.022	0.022	0.020	0.019
Geometric Mean (pCi/m <sup>3</sup> )	0.024	0.021	0.021	0.019	0.018

The 1996 average gross beta air particulate concentrations for all five D. C. Cook monitoring stations were almost the same as the average concentrations measured in 1995 for the same five stations. The average air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m during 1996, which was very similar to the average levels at the five D. C. Cook stations.

#### Fermi 2

During 1996, the same six monitoring stations that were used in 1995 were again used to collect weekly air samples from the environs of the Fermi 2. There were 53 sets of air samples collected from the monitoring stations at the reactor site, Dixie Highway, and the Fix Farm, 52 sets of samples collected from the Rockwood station, and 51 sets of samples from the fire stations on Nadeau and Pointe Aux Peaux Roads. All five sets of missing samples were due to mechanical problems with the vacuum sampler. There were no distinguishable peaks or trends in the gross beta results for all six stations during 1996, with the levels hovering around 0.03 pCi/m<sup>3</sup>. Gross beta data from the six stations were analyzed for central tendencies and measurement extremes. The results of these analyses are presented in Table 12.

Table 12 1996 FERMI 2 AIR PARTICULATE MONITORING RESULTS						
	Reactor Site	Rockwood	Pointe Aux Peaux Rd.	Nadeau Rd.	Dixie Hwy.	Fix Farm
Number of Samples	53	52	51	51	53	53
Highest Result (pCi/m <sup>3</sup> )	0.062	0.046	0.039	0.050	0.067	0.076
Lowest Result (pCi/m <sup>3</sup> )	0.01	0.01	0.01	0.009	0.01	0.01
Arithmetic Mean (pCi/m <sup>3</sup> )	0.023	0.024	0.023	0.024	0.025	0.024
Geometric Mean (pCi/m <sup>3</sup> )	0.022	0.023	0.022	0.023	0.024	0.023

The arithmetic mean air particulate gross beta concentrations for all six monitoring stations during 1996 were virtually identical to those measured in 1995 for the same stations. The average air particulate gross beta concentration for the Lansing background reference station was 0.023 pCi/m<sup>3</sup> during 1996, which is almost the same as the average levels measured at the six Fermi 2 stations.

Figure 3

Weekly Air Particulate Activity  
Big Rock Point Reactor Site - 1995

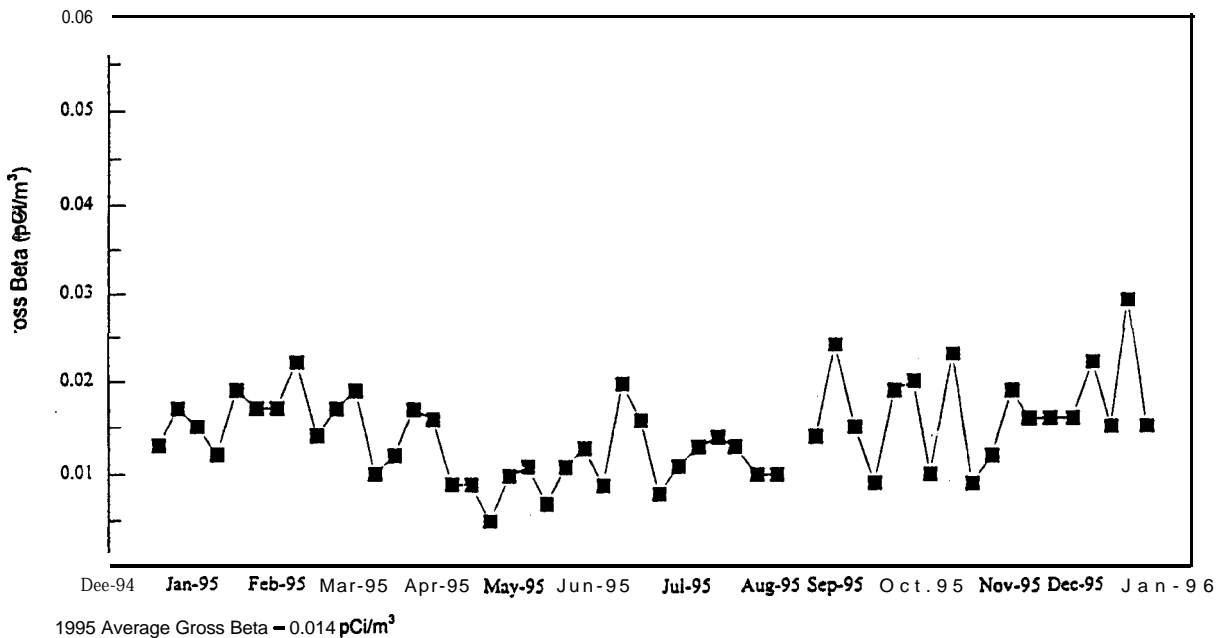


Figure 4

Weekly Air Particulate Activity  
Big Rock Point Charlevoix Site - 1995

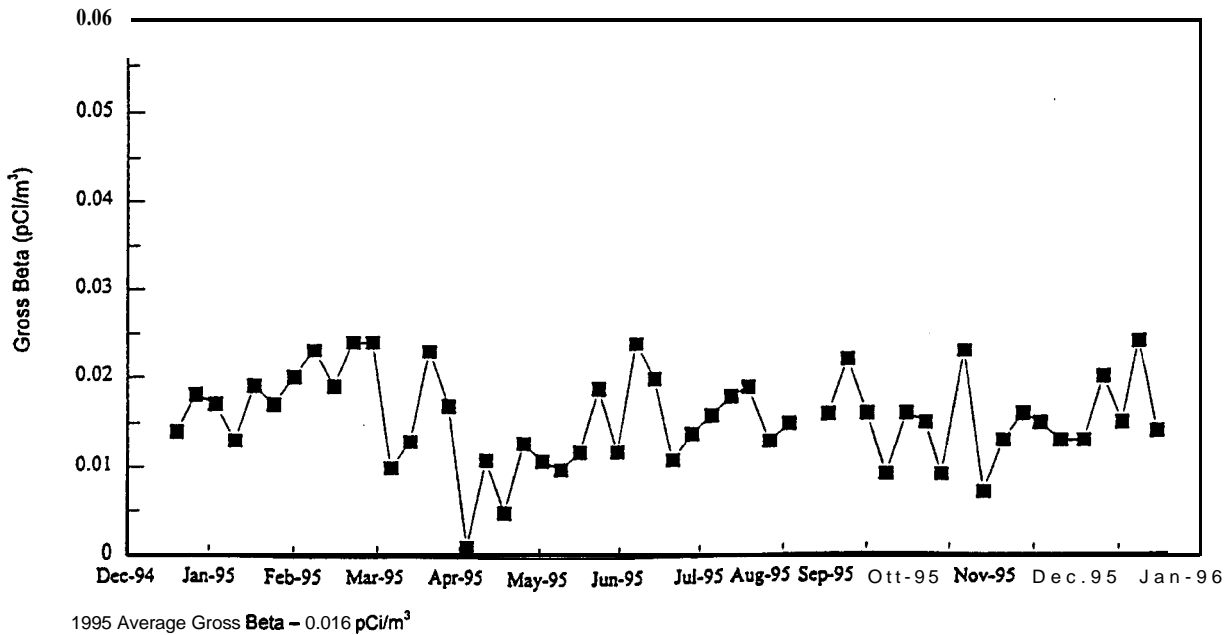
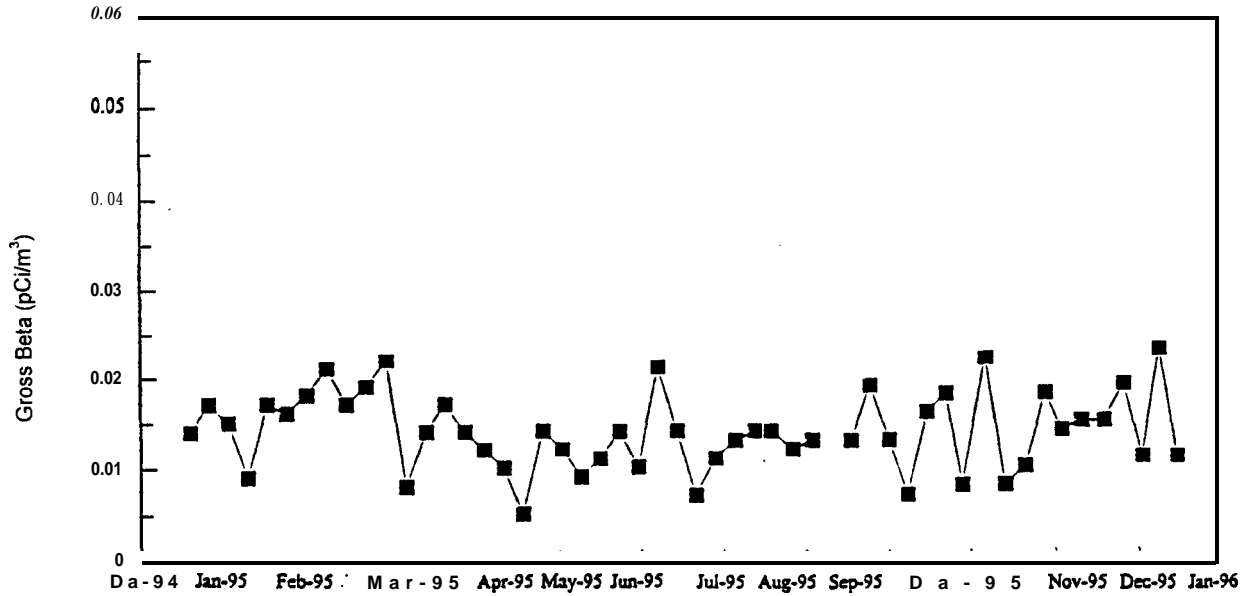


Figure 5

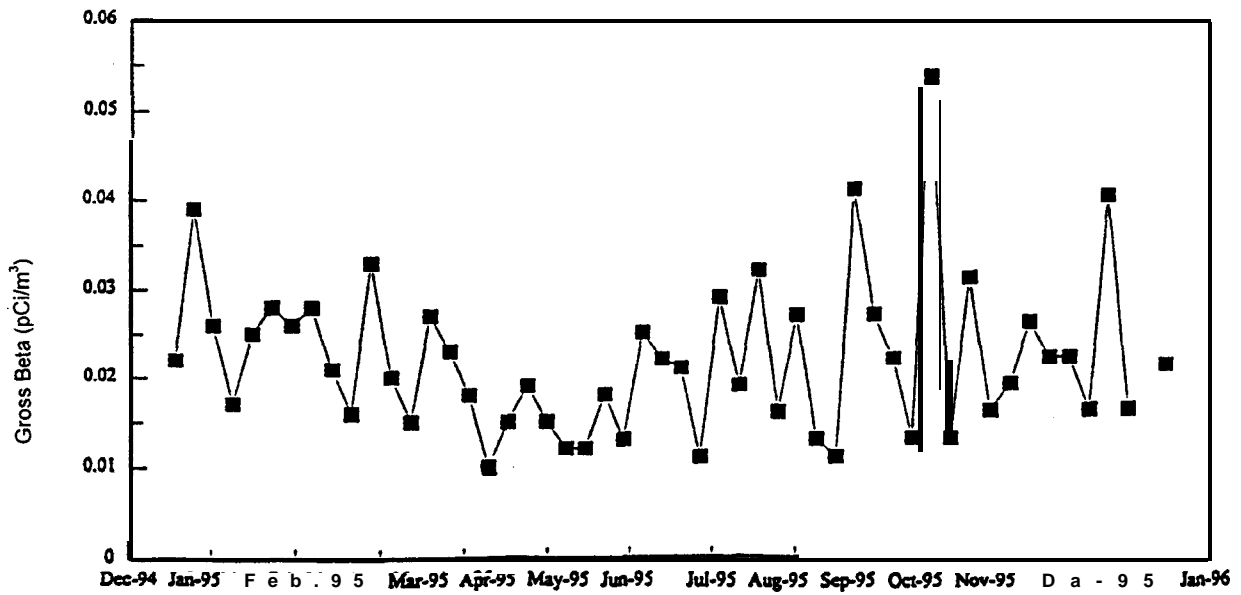
**Weekly Air Particulate Activity  
Big Rock Point Burgess Site - 1995**



1995 Average Gross Beta = 0.014 pCi/m<sup>3</sup>

Figure 6

**Weekly Air Particulate Activity  
Palisades Reactor Site - 1995**



1995 Average Gross Beta = 0.016 pCi/m<sup>3</sup>

Figure 7

Weekly Air Particulate Activity  
Palisades Covert Site • 1995

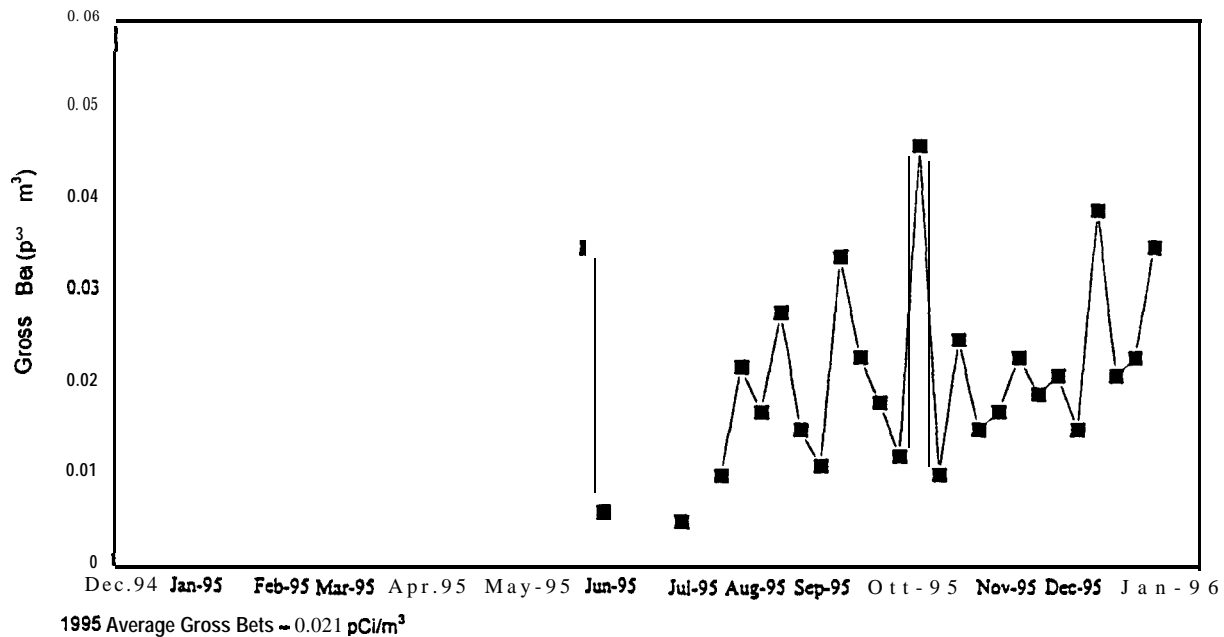


Figure 8

Weekly Air Particulate Activity  
Palisades South Haven Site • 1995

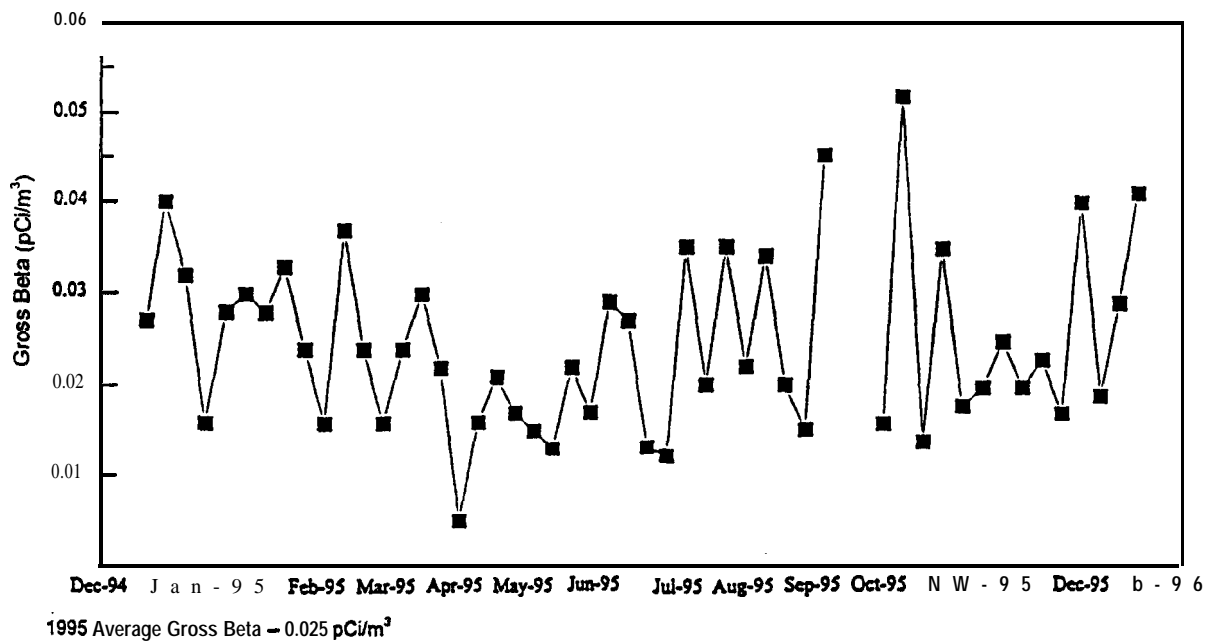
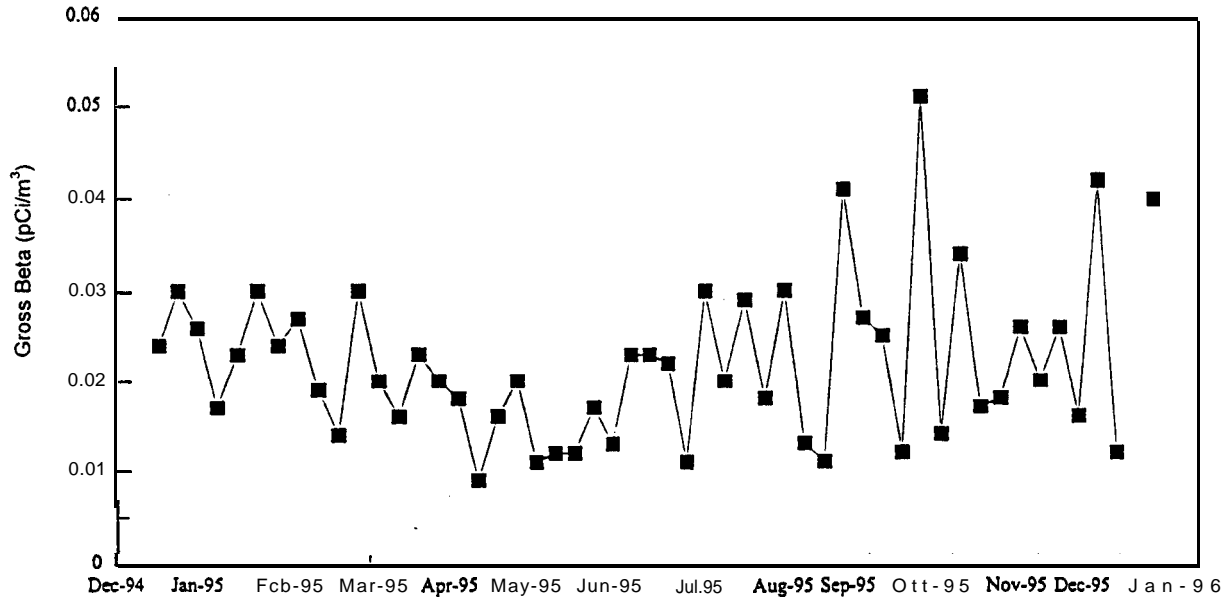




Figure 9

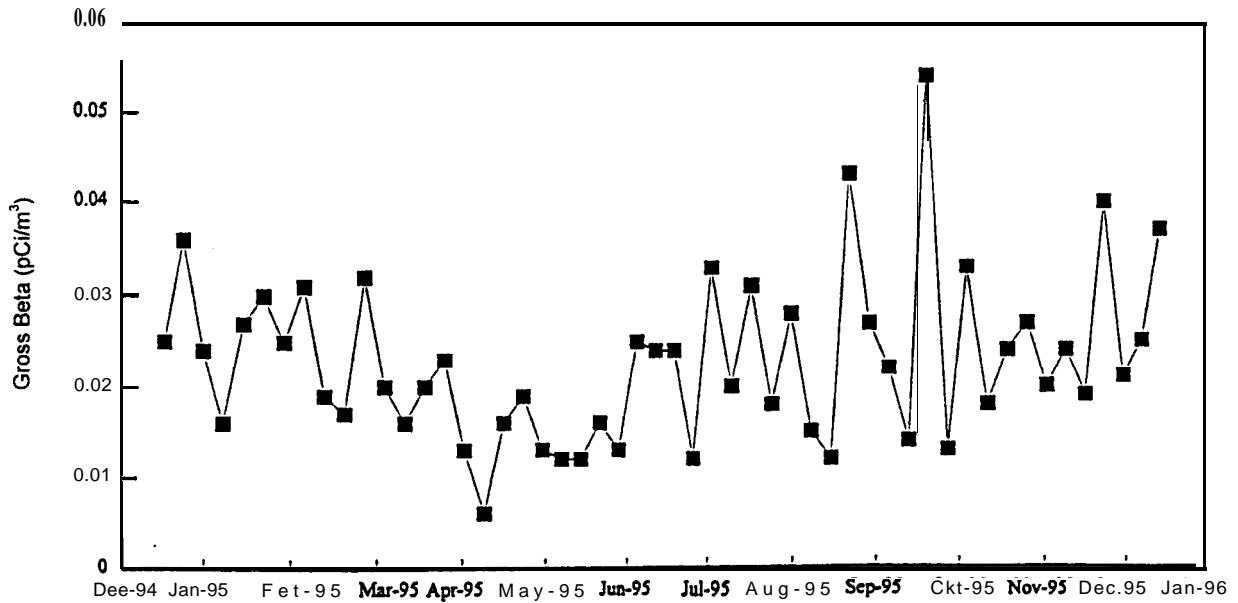
**Weekly Air Particulate Activity**  
D. C. Cook Reactor Site • 1995



1995 Average Gross Beta – 0.022 pCi/m<sup>3</sup>

Figure 10

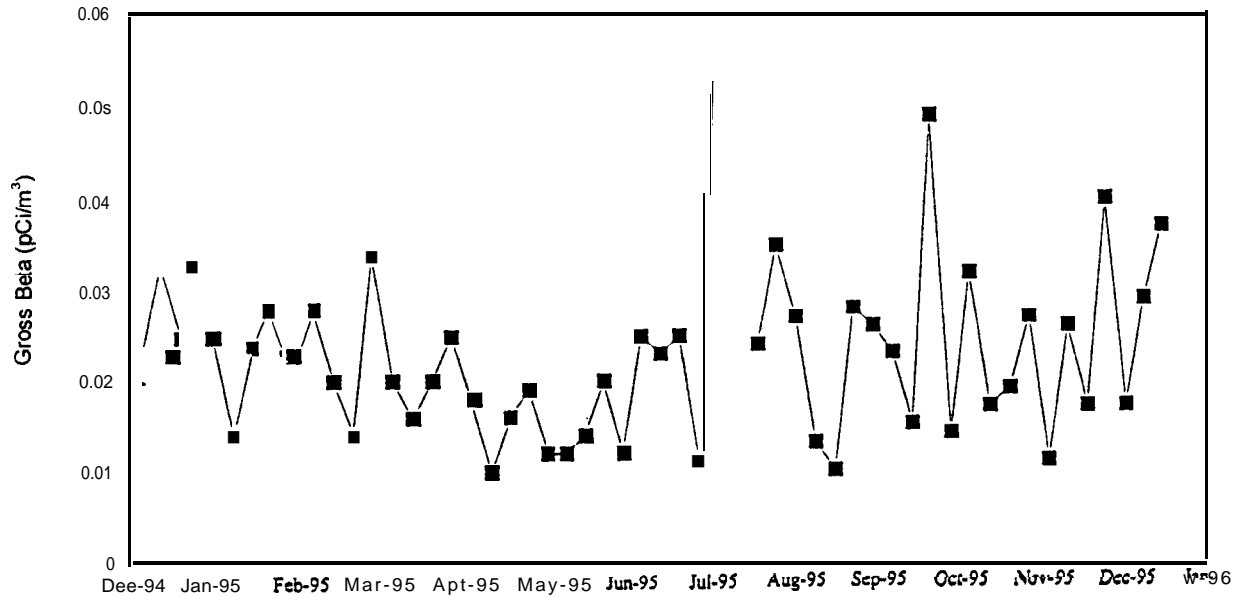
**Weekly Air Particulate Activity**  
D. C. Cook Bridgman Site • 1995



1995 Average Gross Beta – 0.023 pCi/m<sup>3</sup>

Figure 11

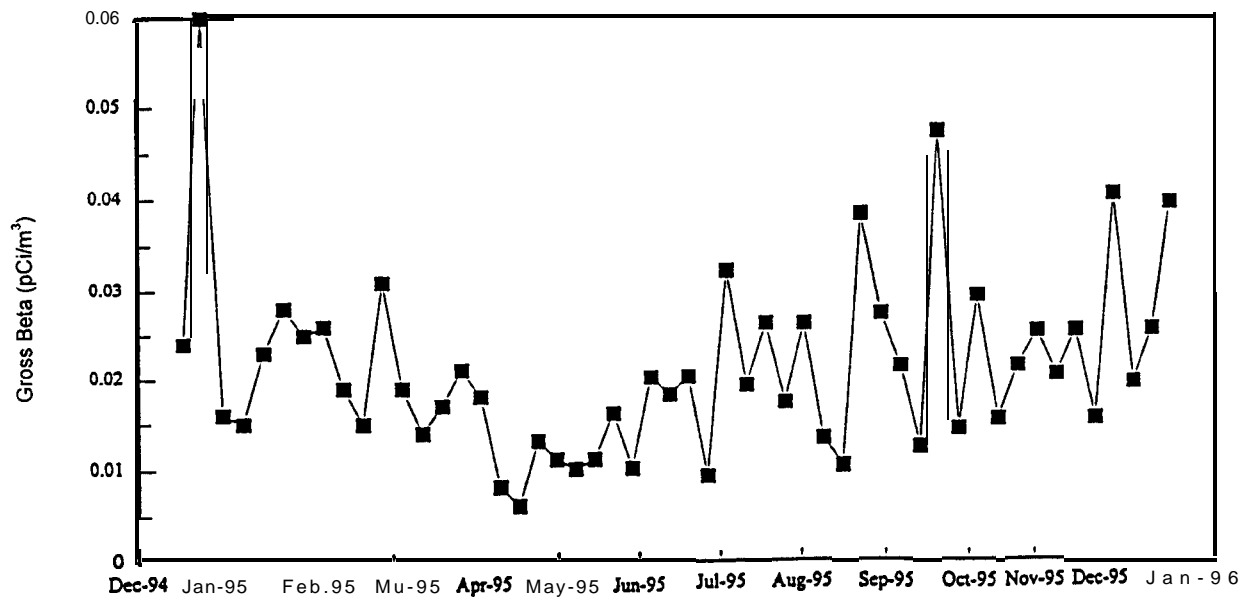
Weekly Air Particulate Activity  
D. C. Cook Stevensville Site - 1995



1995 Average Gross Beta = 0.023 pCi/m<sup>3</sup>

Figure 12

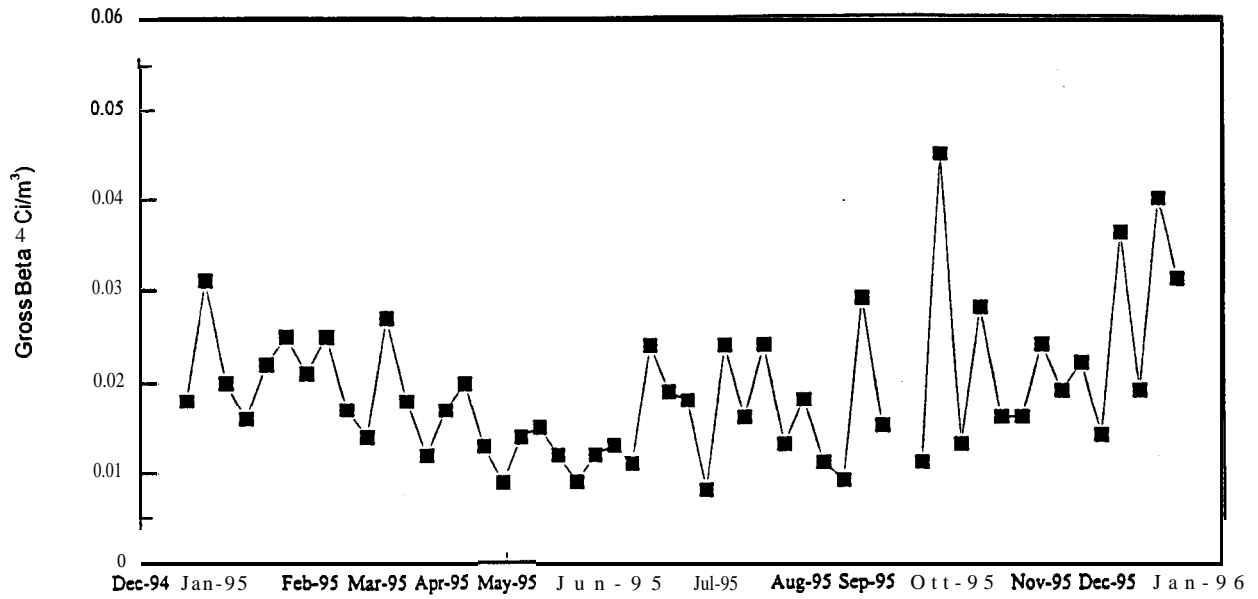
Weekly Air Particulate Activity  
D. C. Cook Livingston Road Site - 1995



1995 Average Gross Beta = 0.021 pCi/m<sup>3</sup>

Figure 13

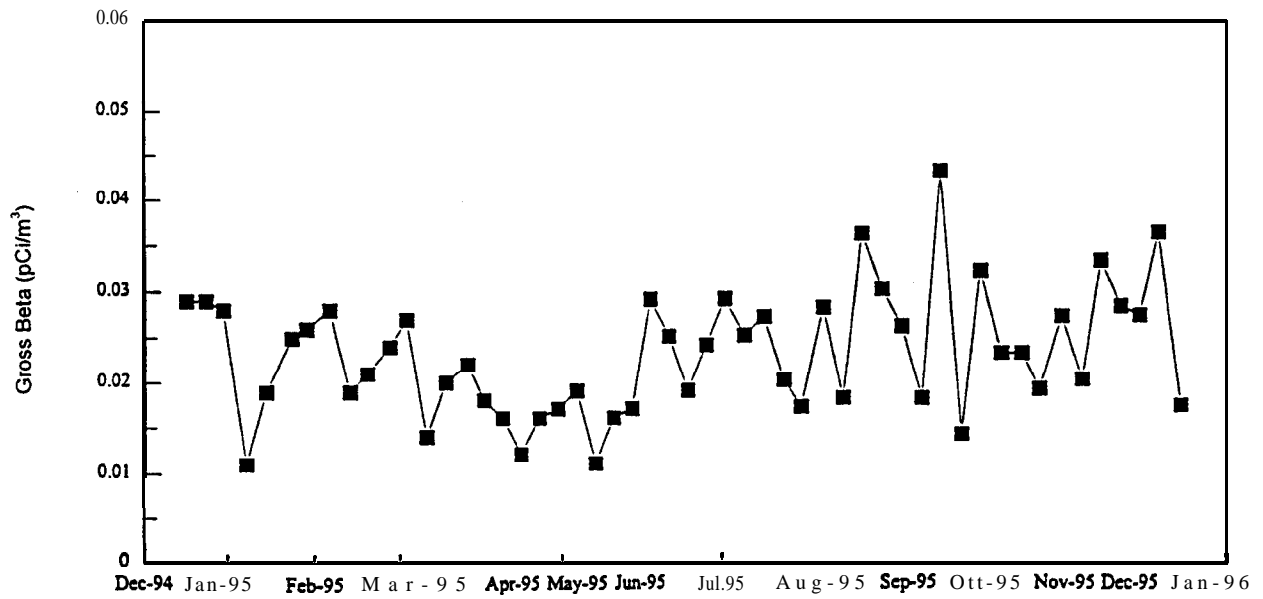
Weekly Air Particulate Activity  
D. C. Cook Peddy Farm Site - 1995



1995 Average Gross Beta = 0.019 pCi/m³

Figure 14

Weekly Air Particulate Activity  
Fermi 2 Reactor Site - 1995



1995 Average Gross Beta = 0.023 pCi/m³

Figure 15

Weekly Air Particulate Activity  
Fermi 2 Rockwood Site • 1995

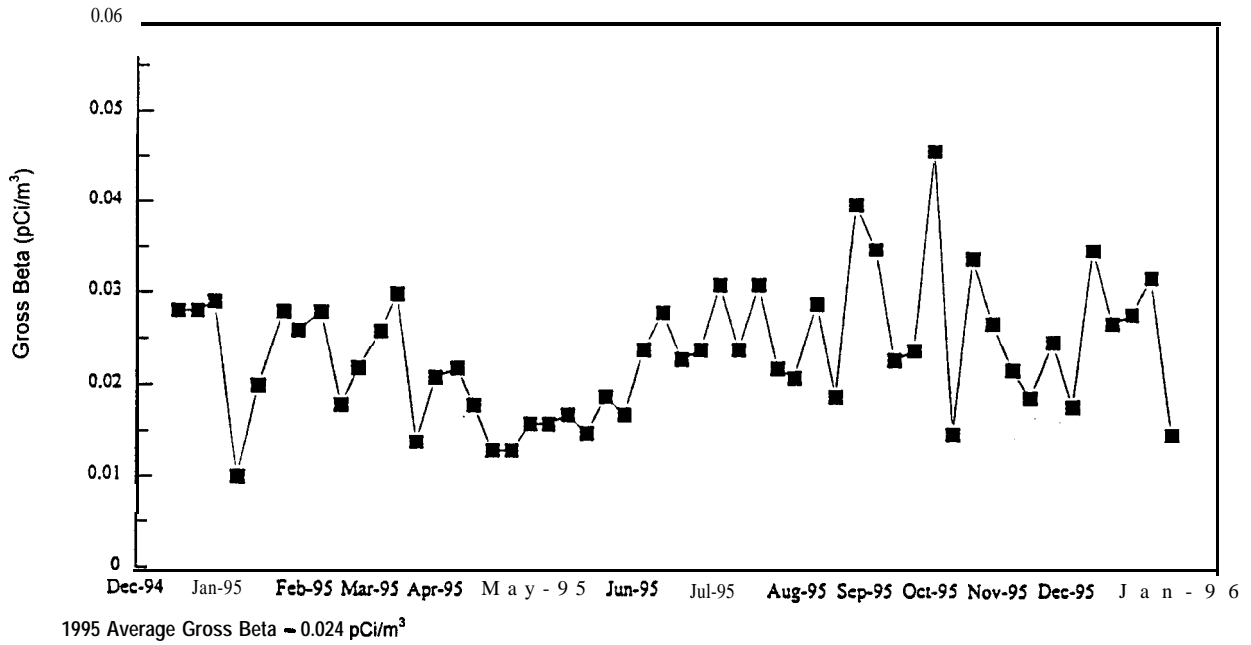


Figure 16

Weekly Air Particulate Activity  
Fermi 2 Pointe Aux Peaux Road Site • 1995

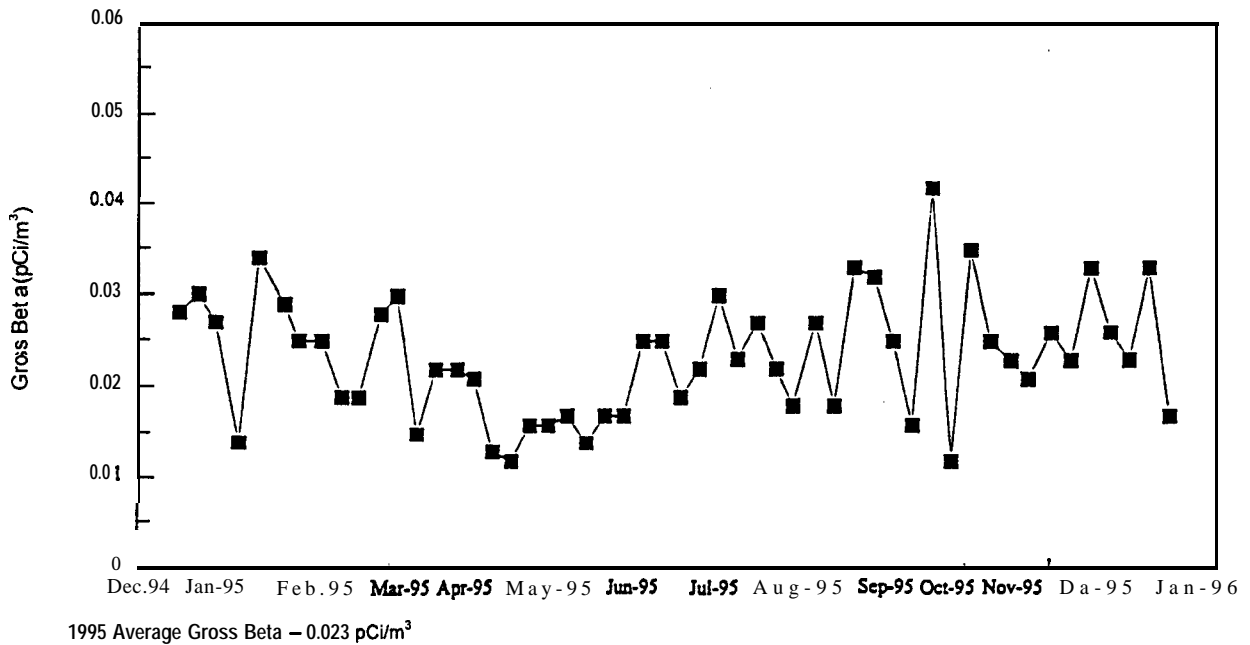
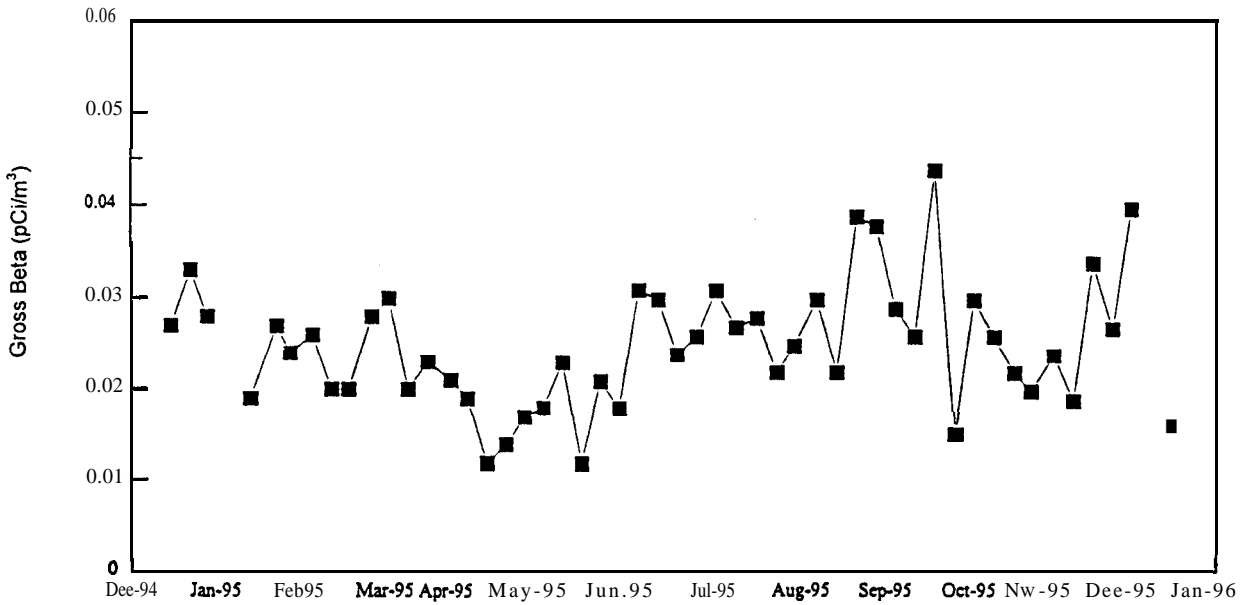


Figure 17

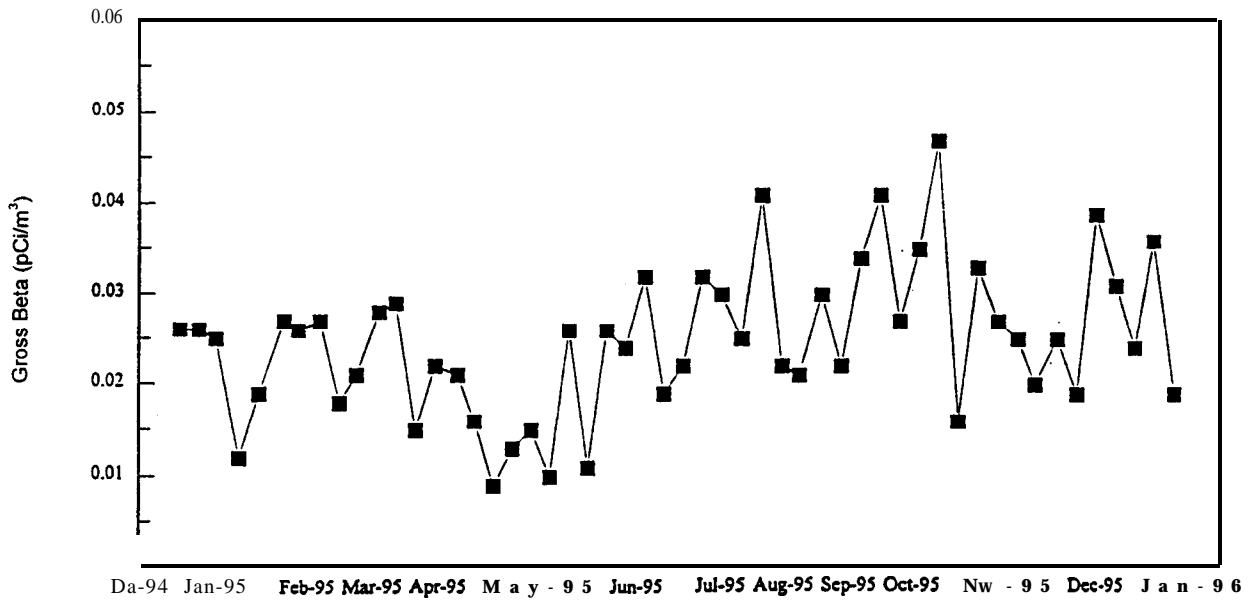
**Weekly Air Particulate Activity  
Fermi 2 Nadeau Road Site - 1995**



1995 Average Gross Beta = 0.025 pCi/m<sup>3</sup>

Figure 18

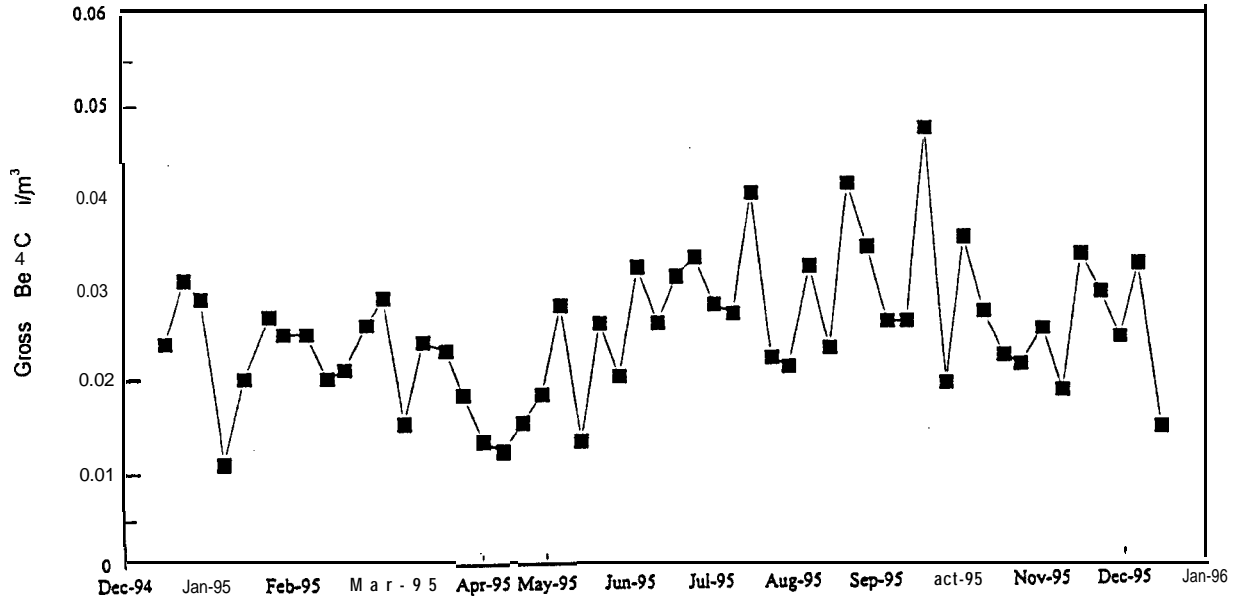
**Weekly Air Particulate Activity  
Fermi 2 Dixie Highway Site - 1995**



1995 Average Gross Beta = 0.025 pCi/m<sup>3</sup>

Figure 19

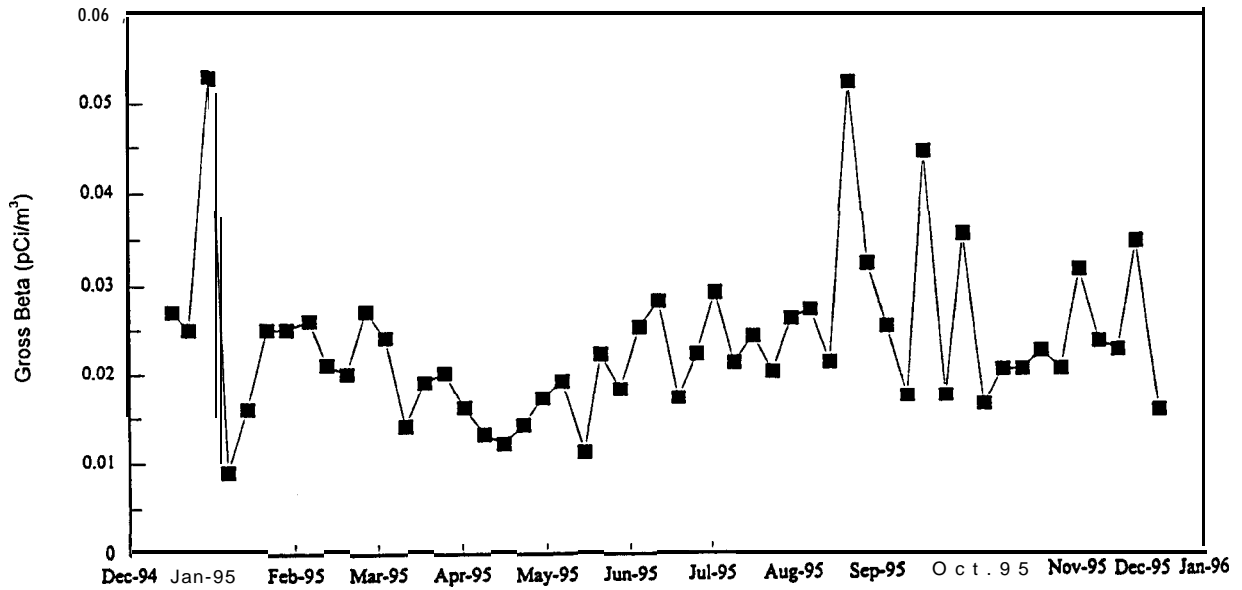
Weekly Air Particulate Activity  
Fermi 2 Fix Farm Site - 1995



1995 Average Gross Beta = 0.025 pCi/m<sup>3</sup>

Figure 20

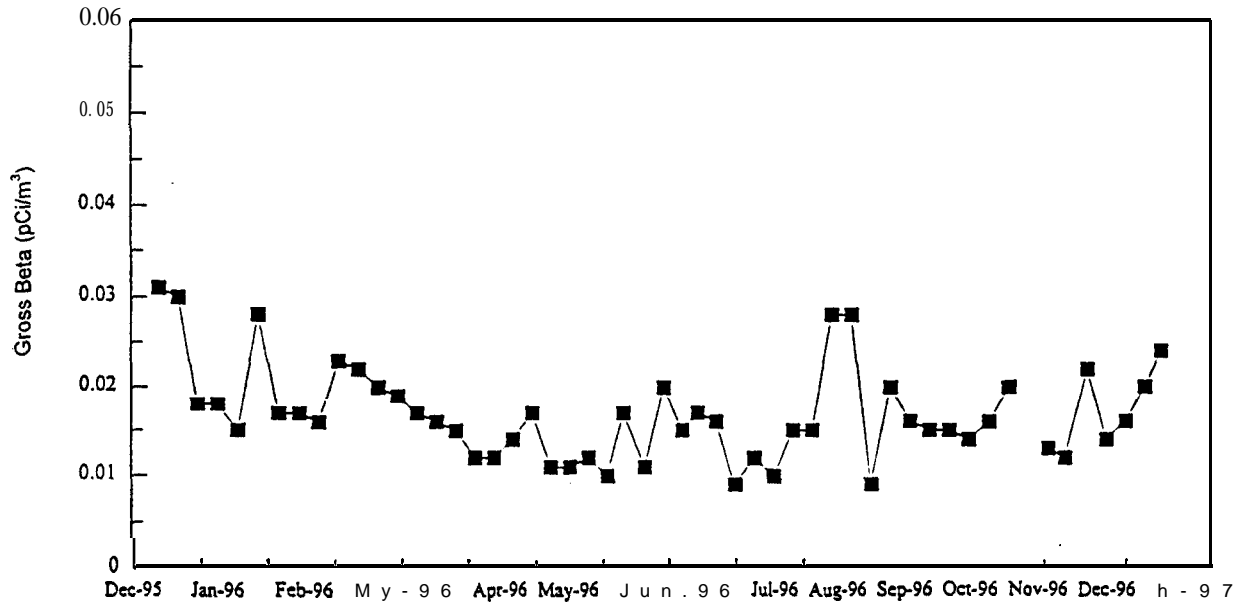
Weekly Air Particulate Activity  
Lansing Reference Site - 1995



1995 Average Gross Beta = 0.023 pCi/m<sup>3</sup>

Figure 21

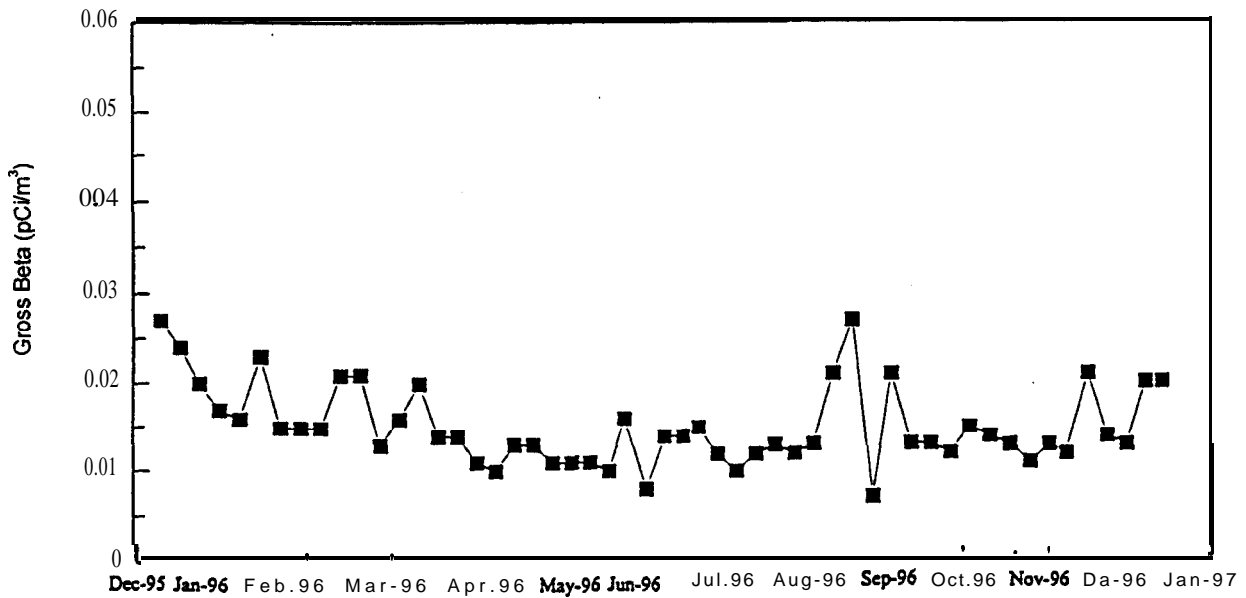
**Weekly Air Particulate Activity**  
Big Rock Point Reactor Site • 1996



1996 Average Gross Beta = 0.017 pCi/m<sup>3</sup>

Figure 22

**Weekly Air Particulate Activity**  
Big Rock Point Charlevoix Site • 1996



1996 Average Gross Beta = 0.015 pCi/m<sup>3</sup>

Figure 23

**Weekly Air Particulate Activity**  
Palisades Covert Site -1996

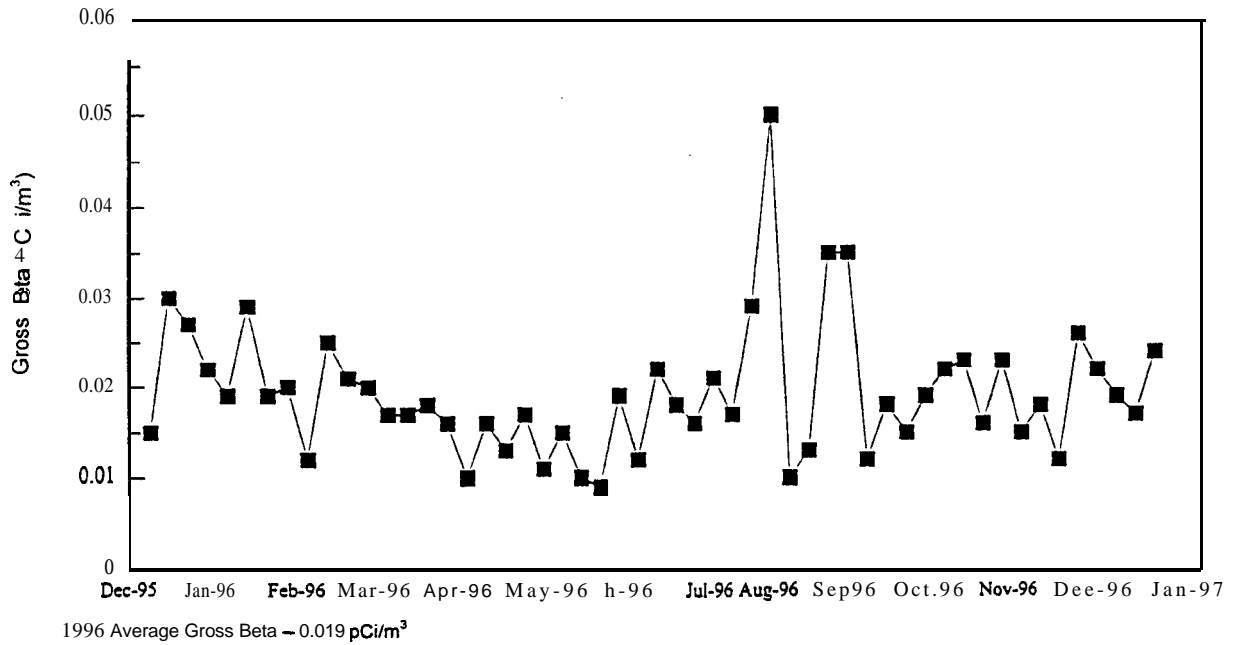


Figure 24

**Weekly Air Particulate Activity**  
Palisades South Haven Site -1996

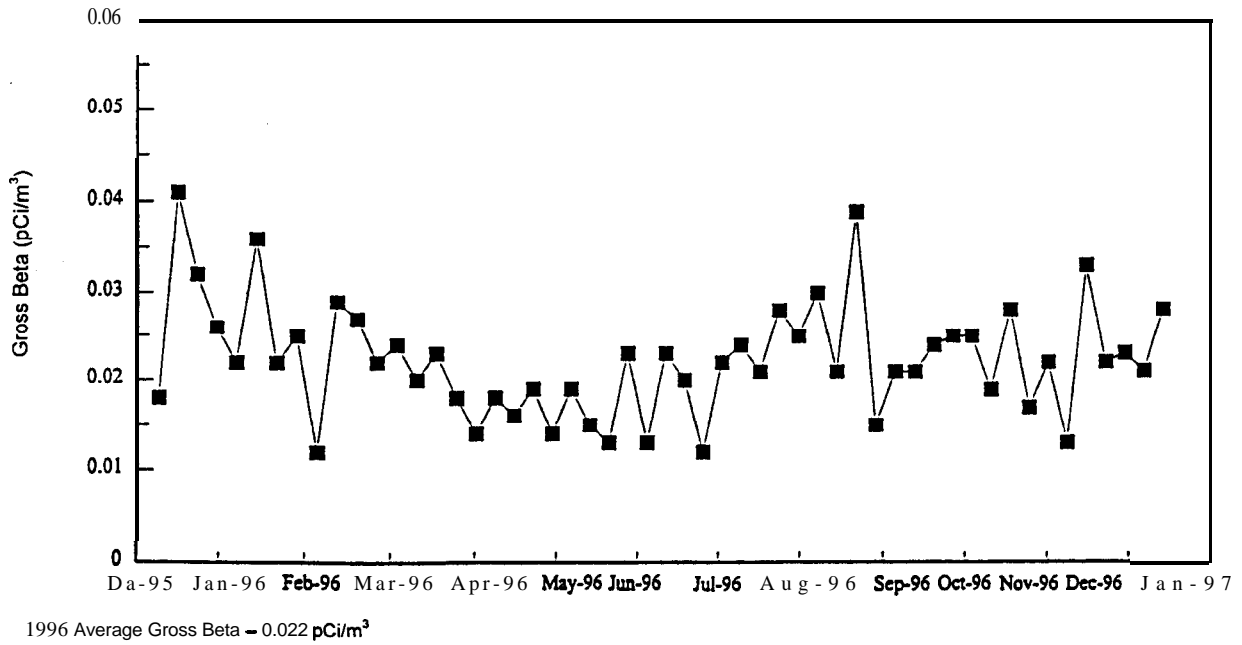




Figure 25

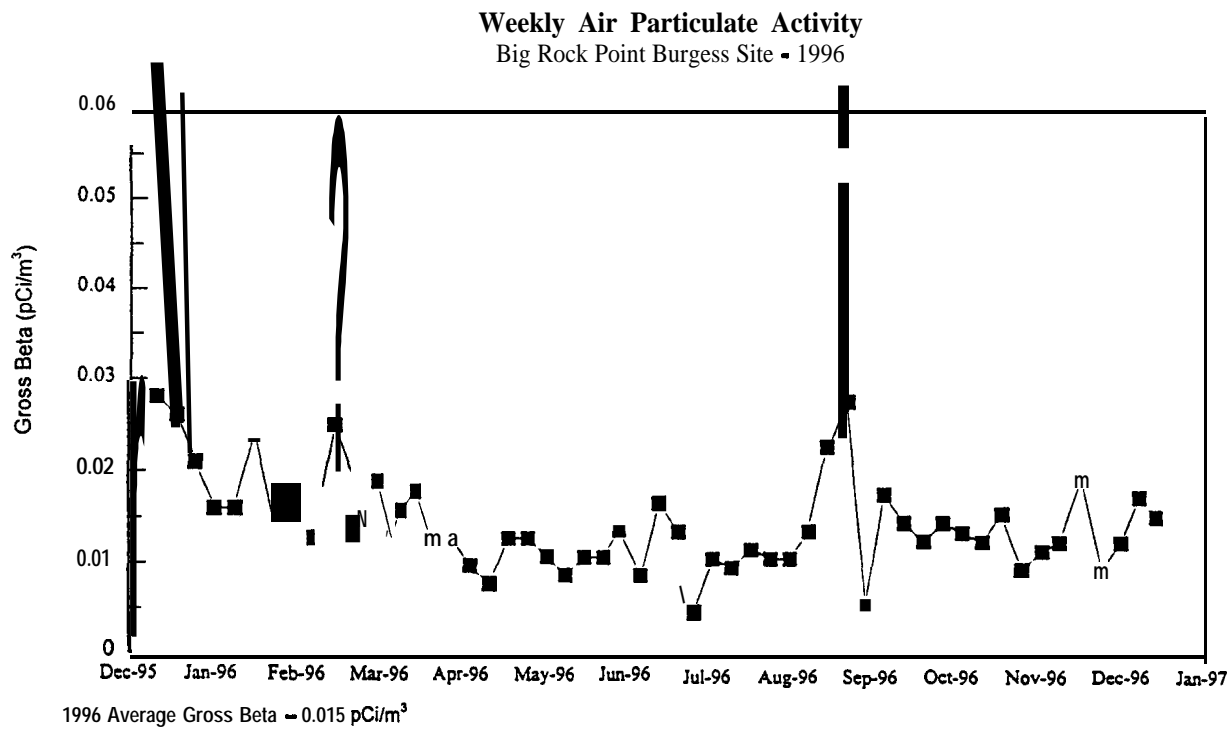


Figure 26

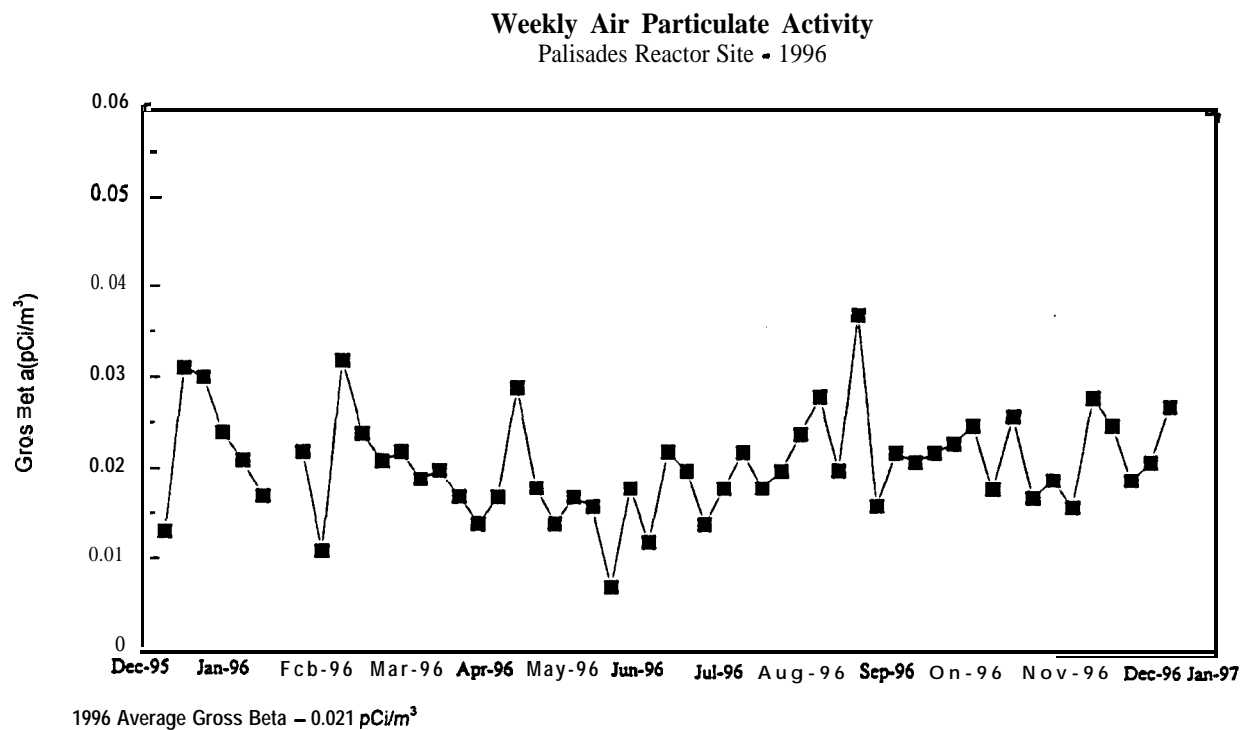
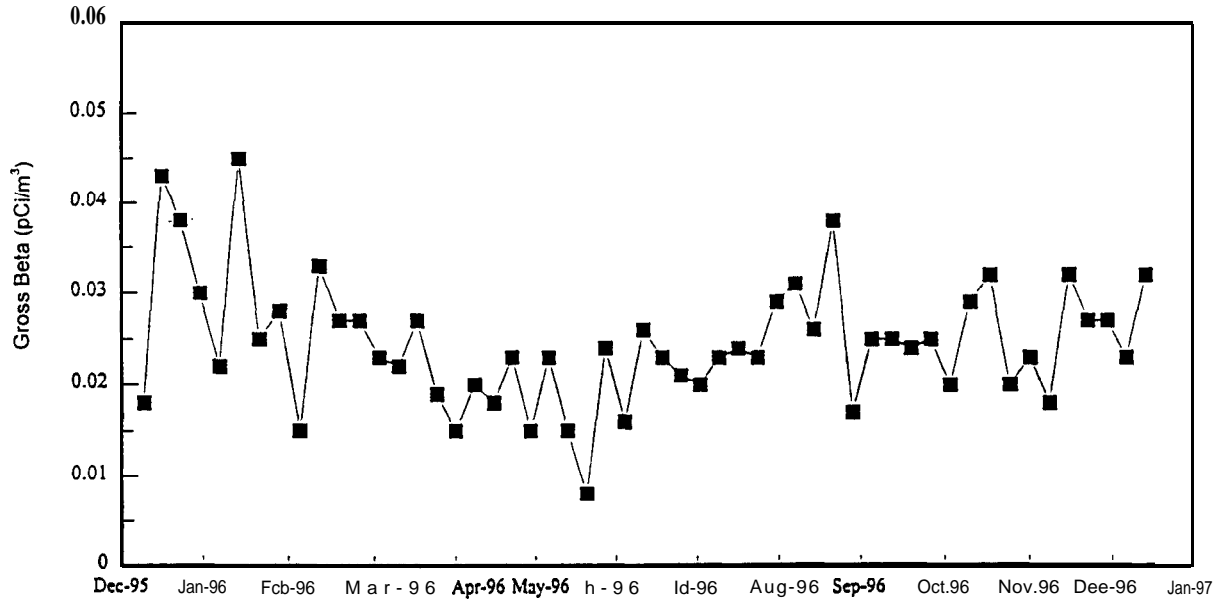


Figure 27

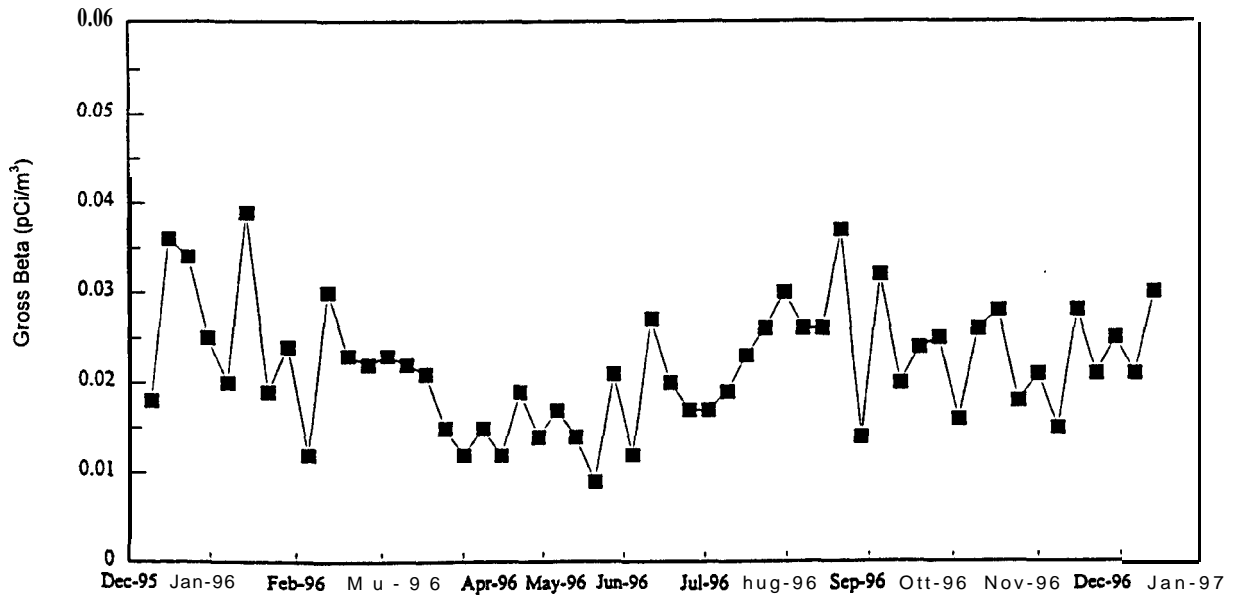
**Weekly Air Particulate Activity  
D. C. Cook Reactor Site - 1996**



1996 Average Gross Beta = 0.025 pCi/m<sup>3</sup>

Figure 28

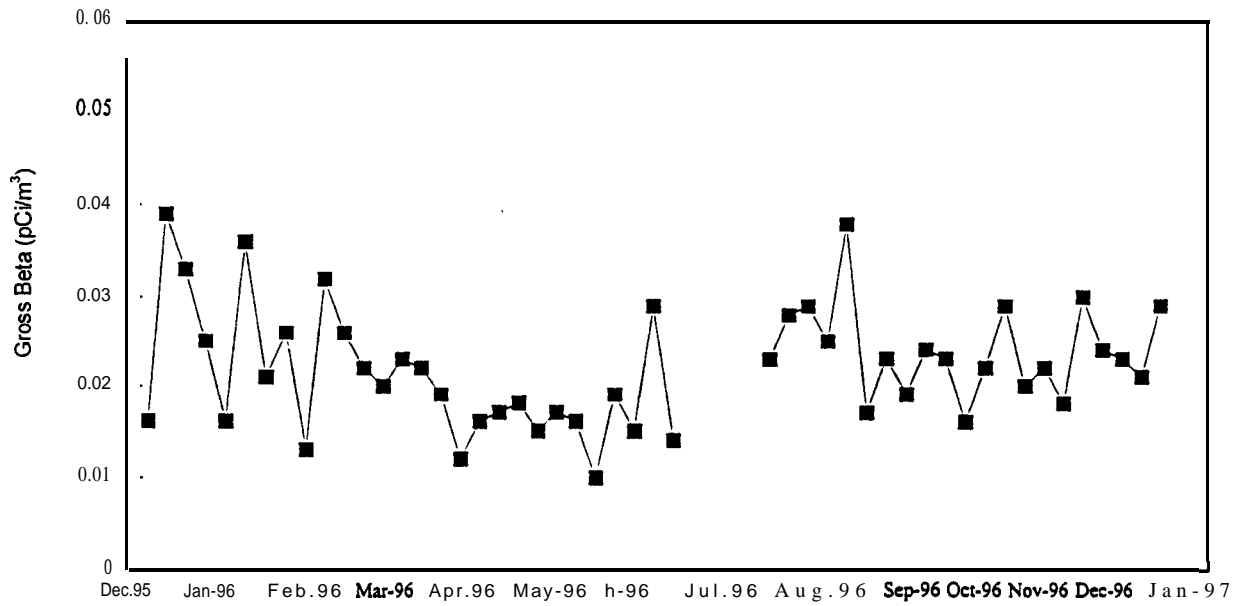
**Weekly Air Particulate Activity  
D. C. Cook Bridgman Site - 1996**



1996 Average Gross Beta = 0.022 pCi/m<sup>3</sup>

Figure 29

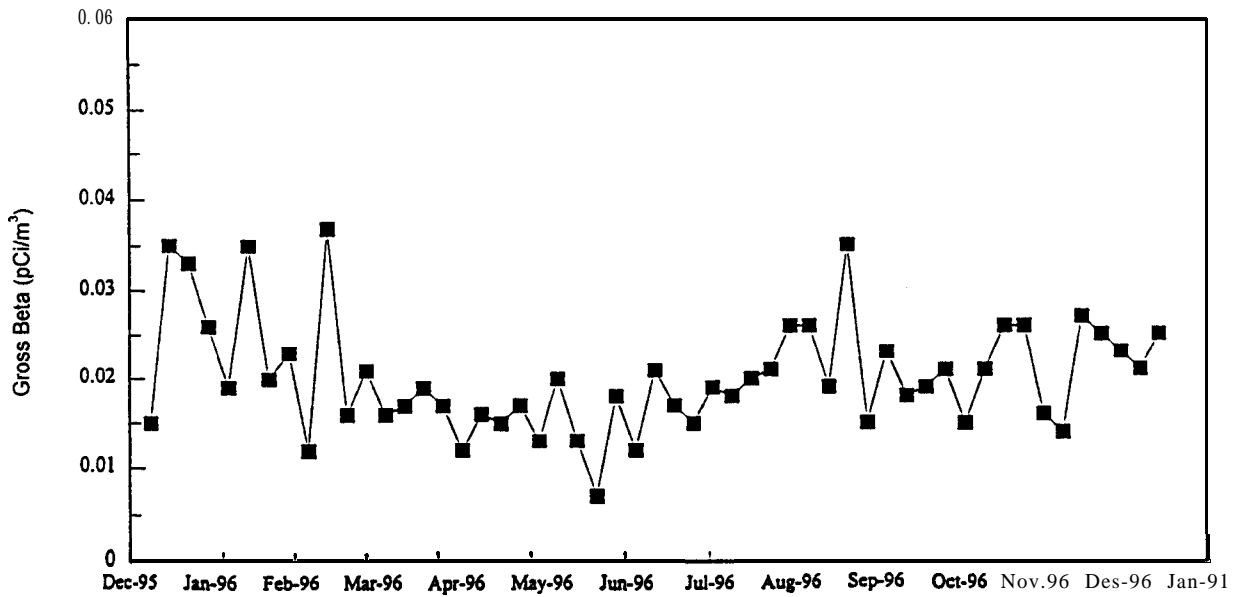
**Weekly Air Particulate Activity  
D. C. Cook Stevensville Site - 1996**



1996 Average Gross Beta = 0.022 pCi/m<sup>3</sup>

Figure 30

**Weekly Air Particulate Activity  
D. C. Cook Livingston Road Site - 1996**



1996 Average Gross Beta = 0.020 pCi/m<sup>3</sup>

Figure 31

Weekly Air Particulate Activity  
D. C. Cook Peddy Farm Site - 1996

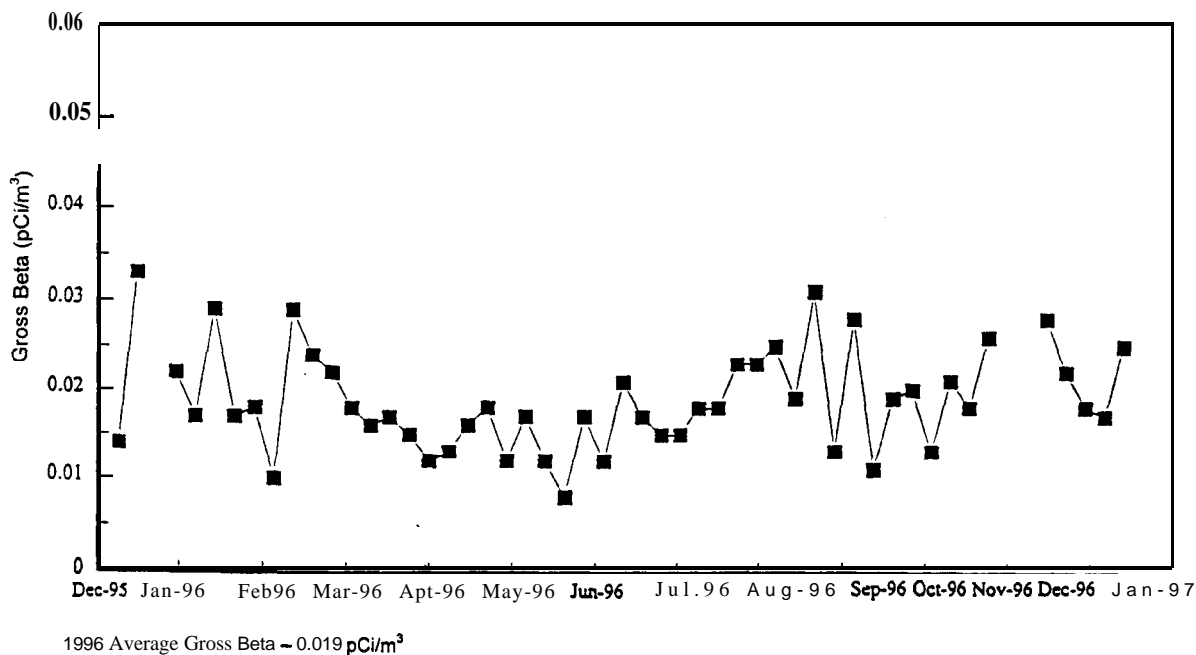


Figure 32

Weekly Air Particulate Activity  
Fermi 2 Reactor Site - 1996

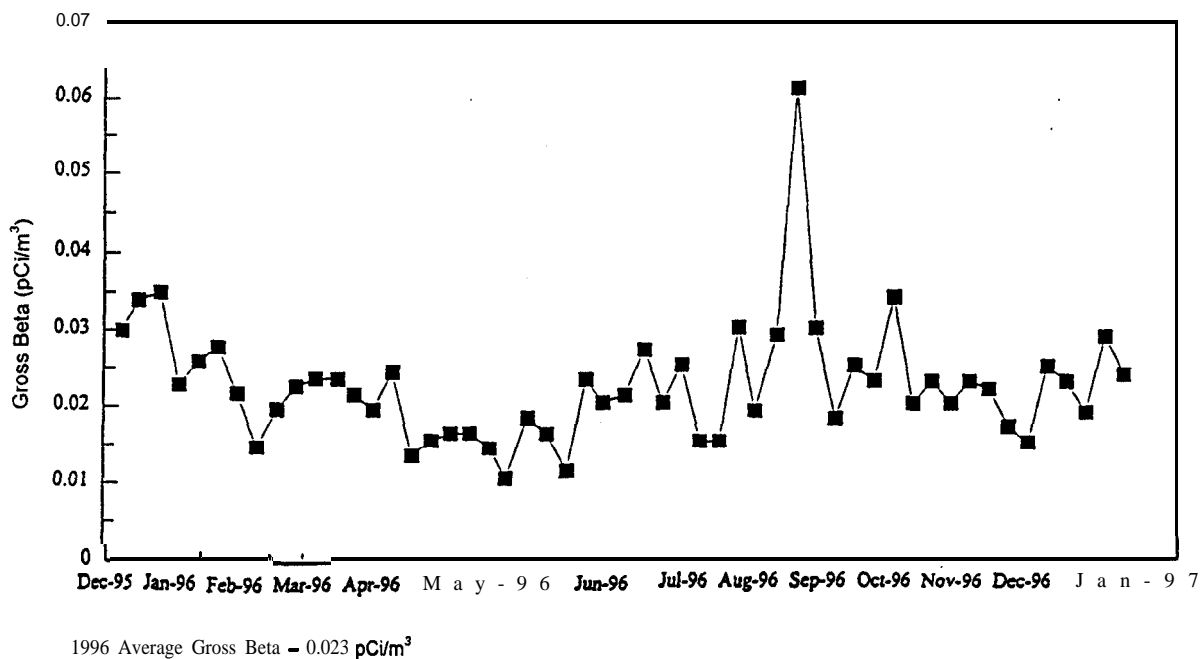
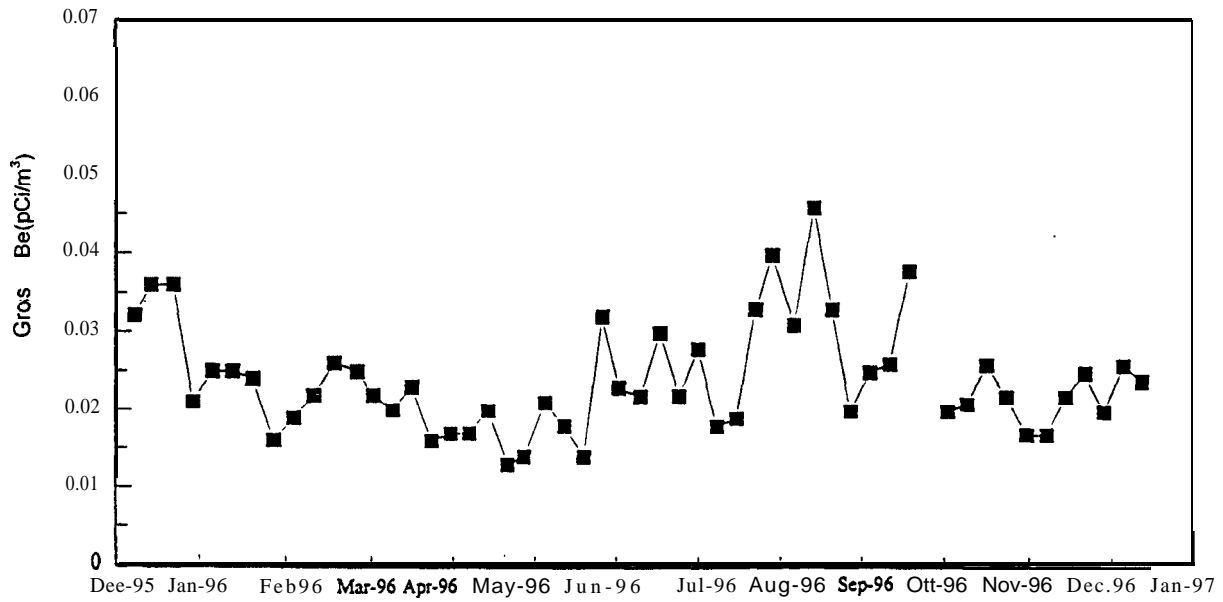


Figure 33

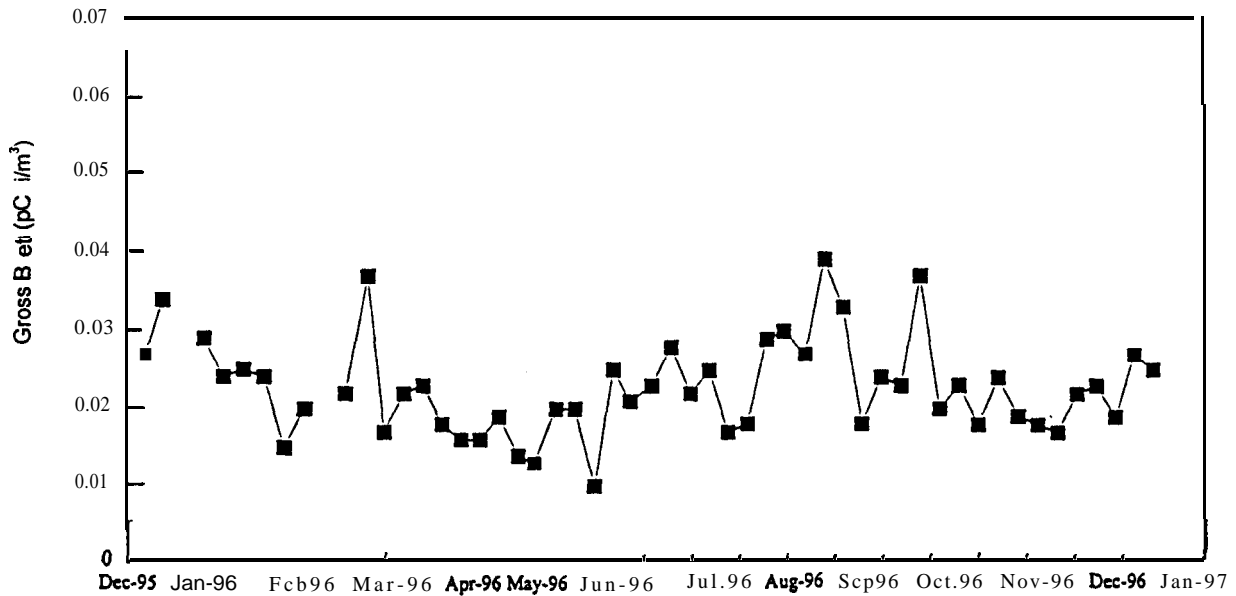
Weekly Air Particulate Activity  
Fermi 2 Rockwood Site • 1996



1996 Average Gross Beta = 0.024 pCi/m³

Figure 34

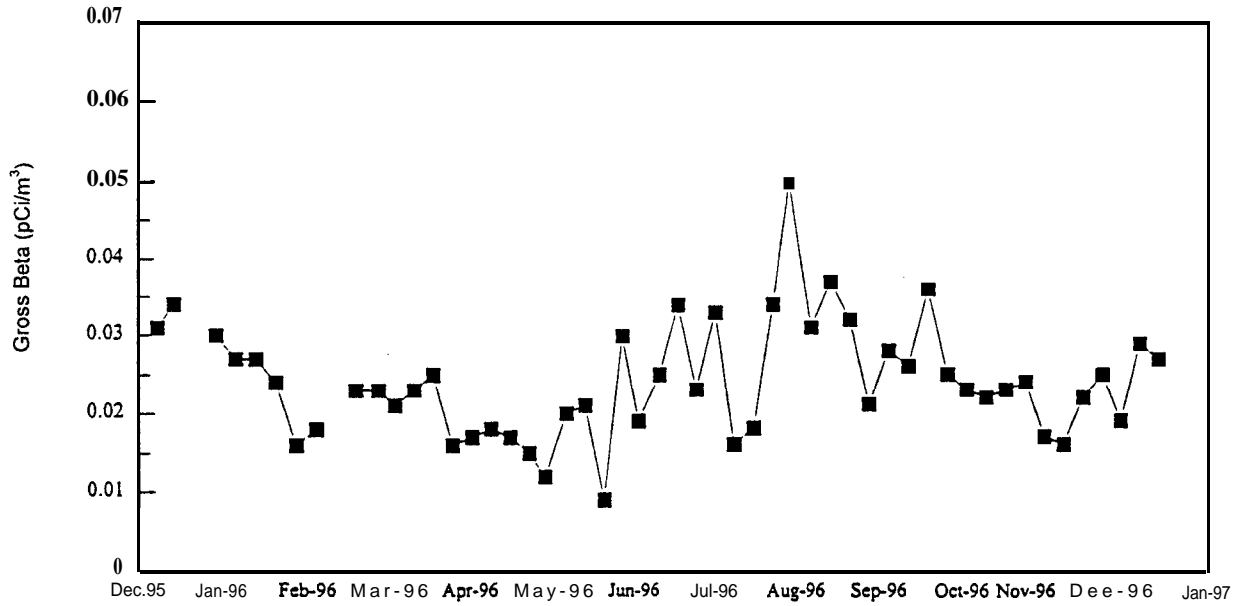
Weekly Air Particulate Activity  
Fermi 2 Pointe Aux Peaux Road Site • 1996



1996 Average Gross Beta = 0.023 pCi/m³

Figure 35

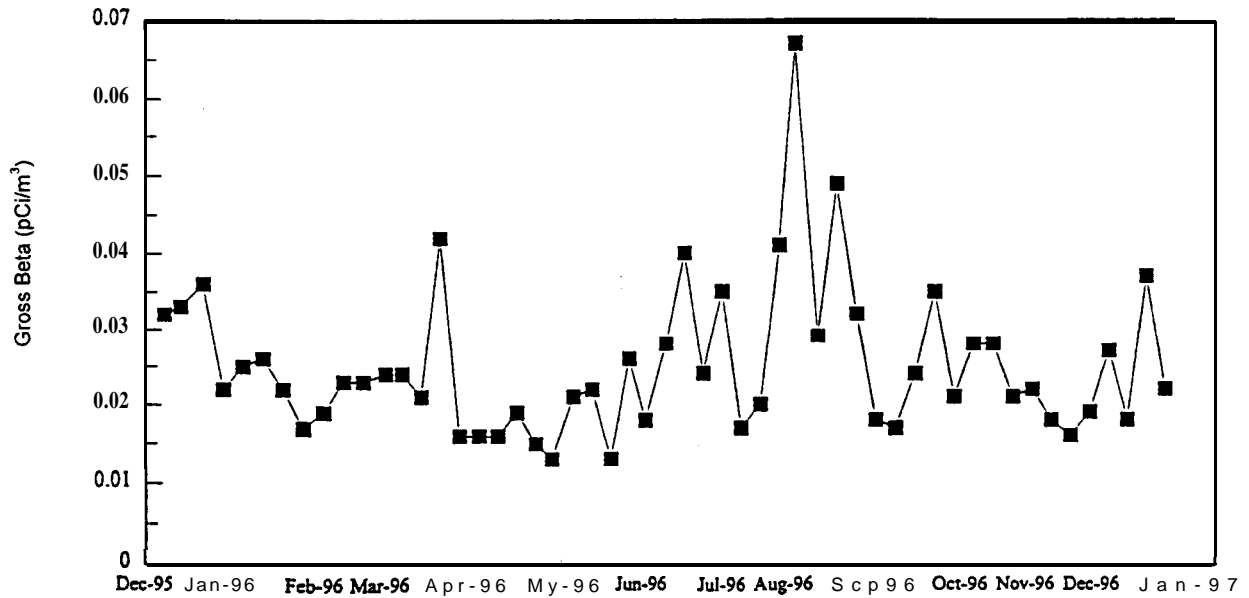
Weekly Air Particulate Activity  
Fermi 2 Nadeau Road Site - 1996



1996 Average Gross Beta = 0.024 pCi/m<sup>3</sup>

Figure 36

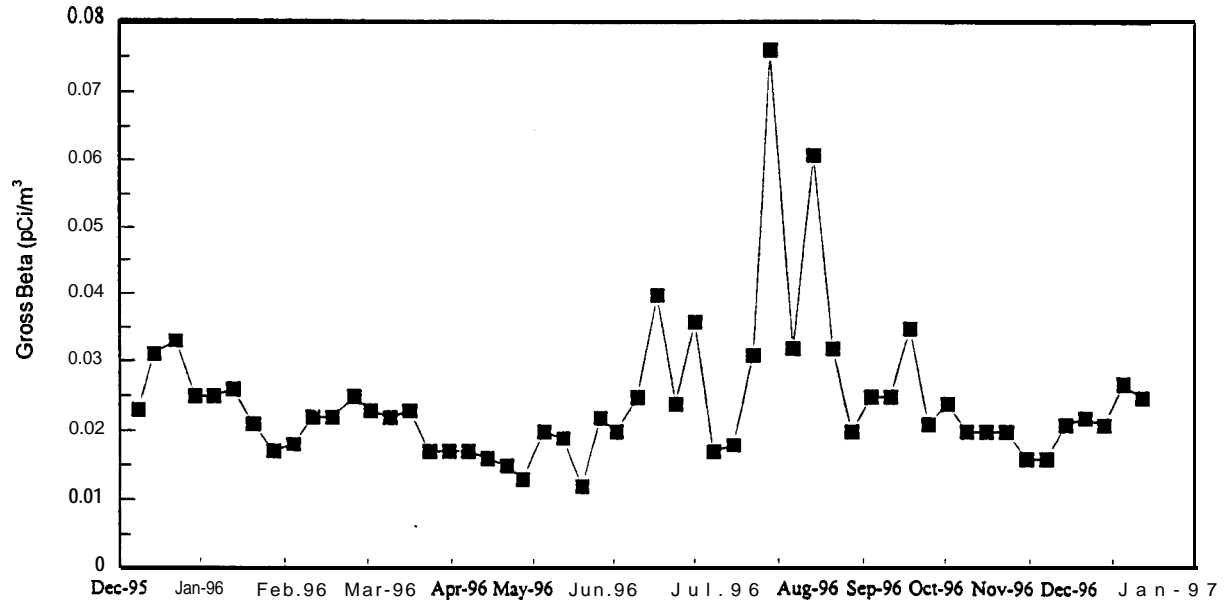
Weekly Air Particulate Activity  
Fermi 2 Dixie Highway Site - 1996



1996 Average Gross Beta = 0.025 pCi/m<sup>3</sup>

Figure 37

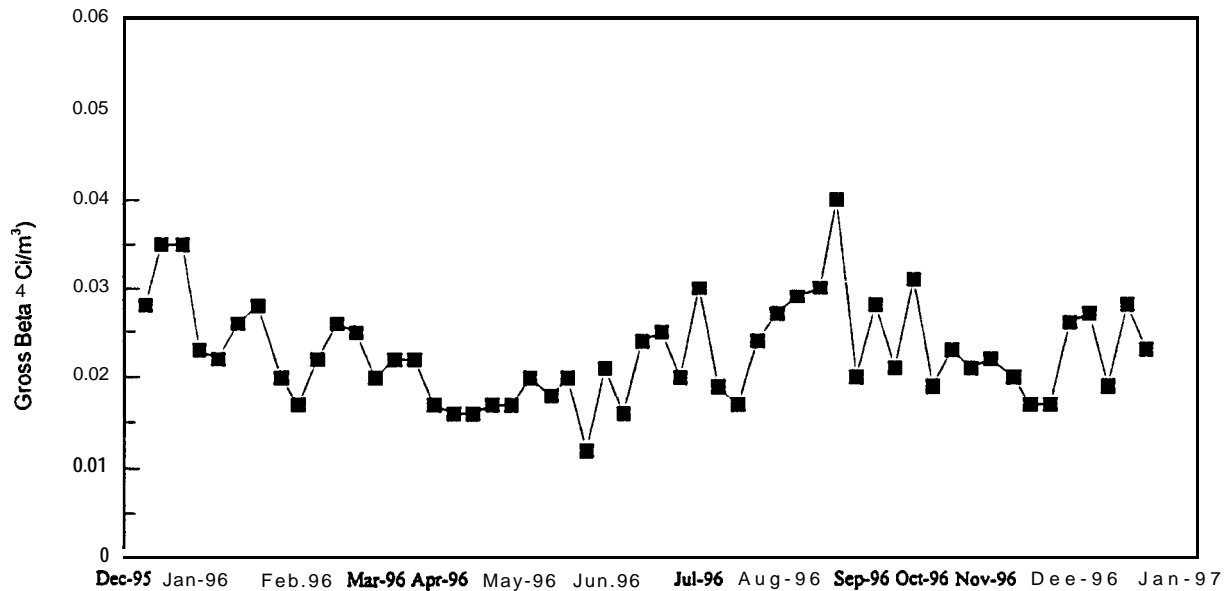
**Weekly Air Particulate Activity  
Fermi 2 Fix Farm Site - 1996**



1996 Average Gross Beta = 0.024 pCi/m<sup>3</sup>

Figure 38

**Weekly Air Particulate Activity  
Lansing Reference Site - 1996**



1996 Average Gross Beta = 0.023 pCi/m<sup>3</sup>

## Terrestrial Monitoring

### Sampling Network

The terrestrial monitoring network consists of seven milk sampling stations, three of which are located near the state's nuclear power plants and the other four scattered around the state for geographical and population coverage. Sampling at the Charlevoix, Detroit, Grand Rapids, Lansing, Marquette, and Monroe milk stations was initiated in late 1962 and the South Haven milk station was added in 1969. Originally, milk samples were collected on a weekly basis for all seven stations, but over the years the sampling schedule evolved to weekly samples for the Charlevoix and South Haven stations, biweekly for the Lansing, Marquette, and Monroe stations, and monthly for the Detroit and Grand Rapids stations. Pasteurized milk samples from a local dairy were collected for all seven stations until the late 1970s. During the late 1970s and the early 1980s, all local dairies in the Charlevoix, Monroe, and South Haven areas closed and sampling for these three stations were shifted to raw milk samples from a local dairy farm. Pasteurized milk samples, collected from a local dairy, for the Detroit, Grand Rapids, Lansing, and Marquette stations have continued through 1996. All samples are analyzed for gamma emitting radionuclides and one sample per month from each station is analyzed for  $^{90}\text{Sr}$  by a chemical separation method using ion exchange and beta counting.

### Historical Milk Monitoring Trends

Because milk is a sensitive indicator of public health impact of environmental radioactivity, due to its widespread consumption, especially by infants and children, it is perhaps the most important aspect of the MREMP. In late 1962, when milk sampling was added to the MREMP, atmospheric nuclear testing was at its historical high point and air monitoring results impacted by atmospheric radioactive fallout were also at or near the highest levels ever recorded in Michigan. As a direct result of the high levels of radioactive fallout in 1963, vegetation used for dairy animal feed also became contaminated with the fallout materials. Subsequently, the milk produced by the cows also showed the transport of some of these radioactive materials.

Due to the biological processes involved in the production of milk, only certain radionuclides are metabolized and found in significant quantities in milk. Gamma emitting radionuclides commonly found in milk as a result of radioactive atmospheric fallout are  $^{131}\text{I}$  and  $^{137}\text{Cs}$  and to a much lesser degree  $^{140}\text{Ba}$ . Also commonly found in milk as a result of radioactive fallout is the beta emitting  $^{90}\text{Sr}$  isotope. Many factors influence whether or not a milk sample will show fallout radionuclides when analyzed in the laboratory. First and foremost among these factors is whether or not the atmospheric fallout deposited sufficient amounts of radioactive material in the local area of the dairy farm. Another factor is whether or not a dairy herd is being fed with stored feed or is in the pasture feeding on contaminated vegetation. Milk produced by animals on stored feed usually will not indicate fresh radioactive fallout products. There is usually a long time delay before any of the milk produced by animals on stored feed indicates the fallout and then only the long half-life radionuclides such as  $^{137}\text{Cs}$  ( $T_{1/2}=30$  years) and  $^{90}\text{Sr}$  ( $T_{1/2}=28.6$  years) are commonly found. On the other hand, milk produced by animals feeding on pasture vegetation is more likely to show the shorter half-life fallout products such as  $^{131}\text{I}$  ( $T_{1/2}=8.08$  days) and  $^{140}\text{Ba}$  ( $T_{1/2}=12.8$  days) in addition to  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ . The third factor has to do with where the sample is collected. Raw milk samples collected at the producing farm have a direct correlation to the amount of fallout at the farm and to the type of feeding used for its dairy herd. Pasteurized milk samples collected from a dairy or from a store represent milk blended from more than one farm, each of which will be characterized by its own feeding scheme. The last major factor is the amount of time that elapses between the time the radioactive fallout is deposited on the vegetation and the time the milk sample is analyzed in the laboratory. The longer the time period between the two events the less likely the analysis will indicate the presence of the short half-life  $^{131}\text{I}$  and  $^{140}\text{Ba}$  isotopes, but also the concentrations of the longer half-life  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  isotopes will usually decrease due to precipitation washing of the vegetation feed.



In November 1962, the MREMP was expanded to include milk samples and by the end of 1995 just over 7800 samples had been collected and analyzed. During the 34 years of milk analysis, and especially during the first 15 or so years, elevated levels of  $^{90}\text{Sr}$ ,  $^{131}\text{I}$ ,  $^{137}\text{Cs}$ , and  $^{140}\text{Ba}$  were commonly measured. These elevated results usually occurred during the first few weeks after an atmospheric nuclear detonation for the shorter lived radionuclides ( $^{131}\text{I}$  and  $^{140}\text{Ba}$ ), but for the longer lived radionuclides ( $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ ) the elevated levels would often continue for a number of months. Elevated levels of  $^{131}\text{I}$  were often found at much higher levels than any of the other radionuclides, whereas  $^{140}\text{Ba}$  was not found to occur very often and usually at levels much lower than the other radionuclides present in milk. When the analytical results from each station are averaged on an annual basis, the  $^{131}\text{I}$  and  $^{140}\text{Ba}$  annual averages never exceeded the MDA level for any of the sampling stations because so few of the samples during a given year show elevated  $^{131}\text{I}$  and  $^{140}\text{Ba}$  activity. For the long-lived radionuclides ( $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ ) annual averages were above the MDA levels from 1963 through about 1980. Annual average  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  concentrations are shown in Figures 39-52 for the seven milk sampling stations. Each year's bar indicates the average level for either  $^{137}\text{Cs}$  or  $^{90}\text{Sr}$  with the lower part of the bar indicating the MDA portion. Referring to Figures 39-50 we find the highest annual average levels for both  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  in 1963 through 1965, which correlates to the atmospheric nuclear weapon testing conducted in the two years prior to the signing of the Limited Test Ban Treaty. Figures 39-52 all show a steady overall decrease in annual average activity for both  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  from 1965 onward, with occasional increases due to atmospheric tests conducted by the Peoples Republic of China. By the early 1980s, the annual average levels for all seven stations were finally below the MDA levels for both  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ . The figures for the Detroit, Grand Rapids, Lansing, and South Haven milk monitoring stations also show the annual average  $^{137}\text{Cs}$  activity in milk once again rose to levels above the MDA in 1986, as a result of the Chernobyl accident, but these average levels were nowhere near the ones produced in the 1960s by atmospheric nuclear testing.

Figure 39

Annual Average Cs-137 Activity  
Charlevoix Milk Station

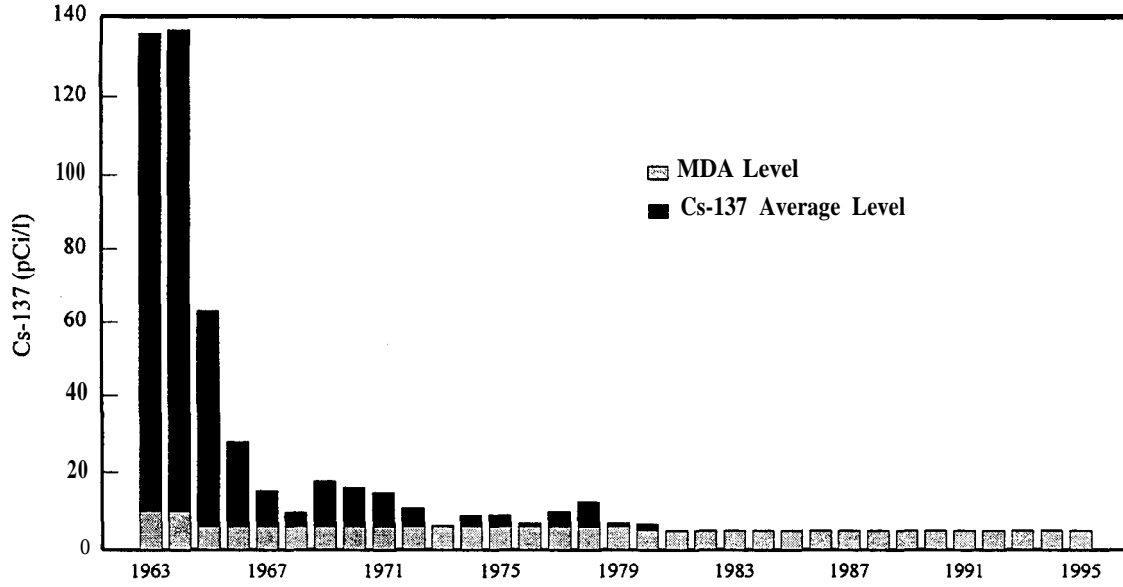


Figure 40

Annual Average Sr-90 Activity  
Charlevoix Milk Station

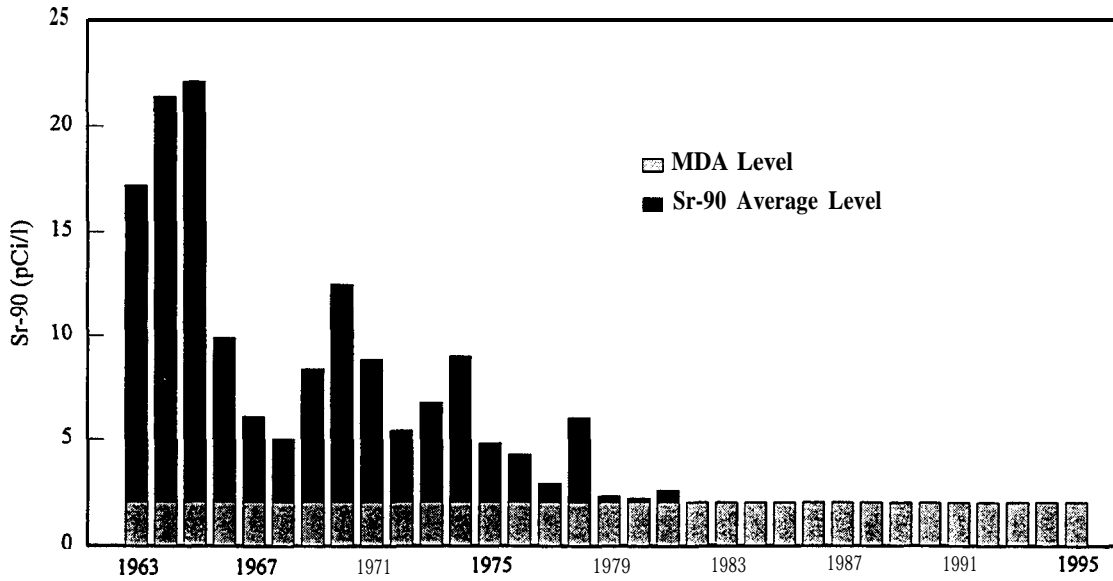


Figure 41

### Annual Average Cs-137 Activity Detroit Milk Station

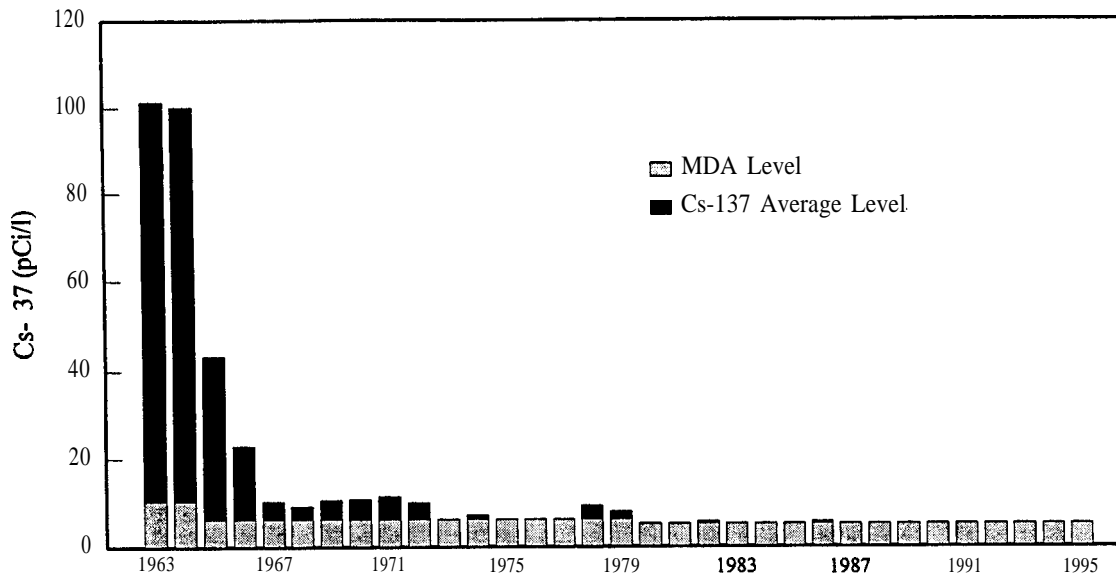


Figure 42

### Annual Average Sr-90 Activity Detroit Milk Station

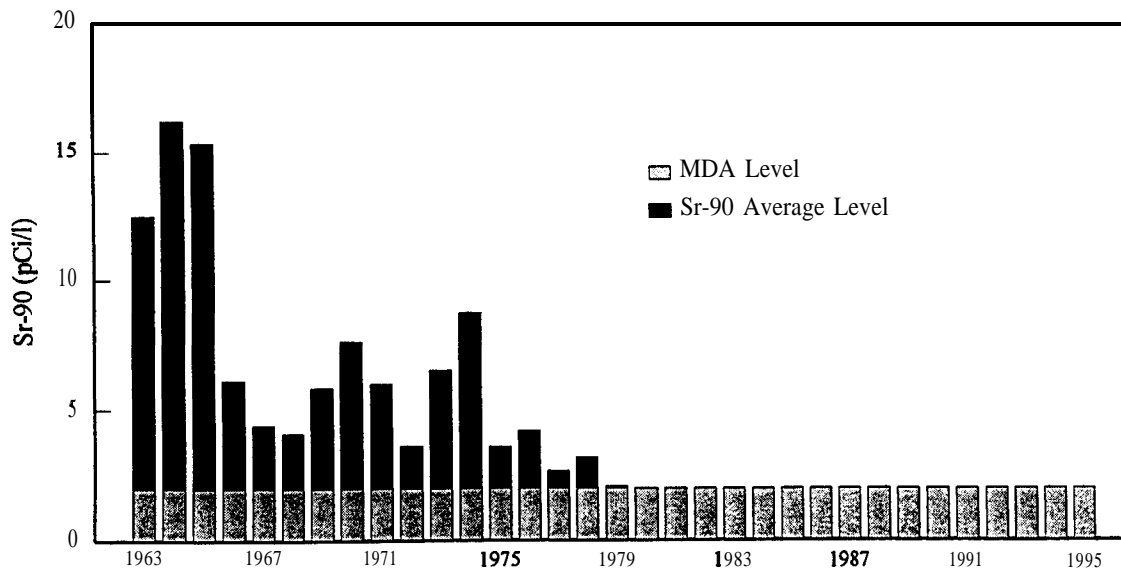


Figure 43

**Annual Average Cs-137 Activity  
Grand Rapids Milk Station**

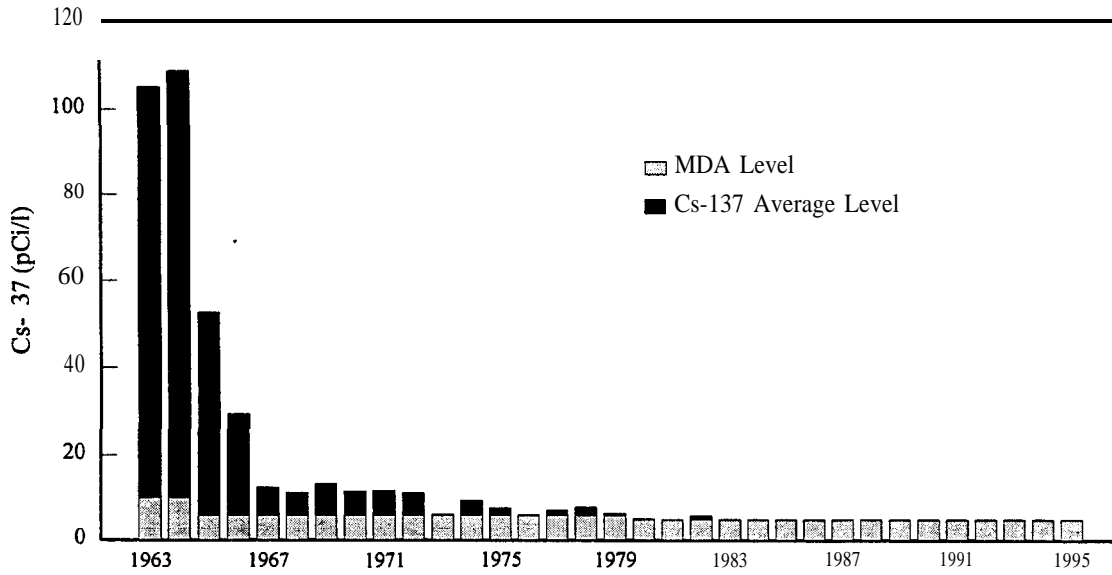


Figure 44

**Annual Average Sr-90 Activity  
Grand Rapids Milk Station**

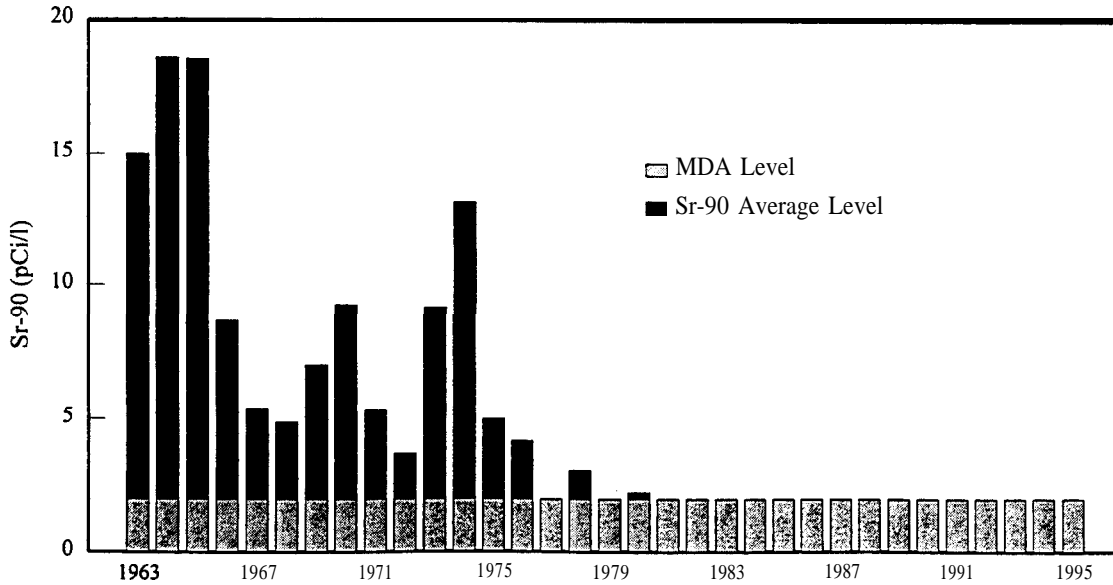


Figure 45

**Annual Average Cs-137 Activity  
Lansing Milk Station**

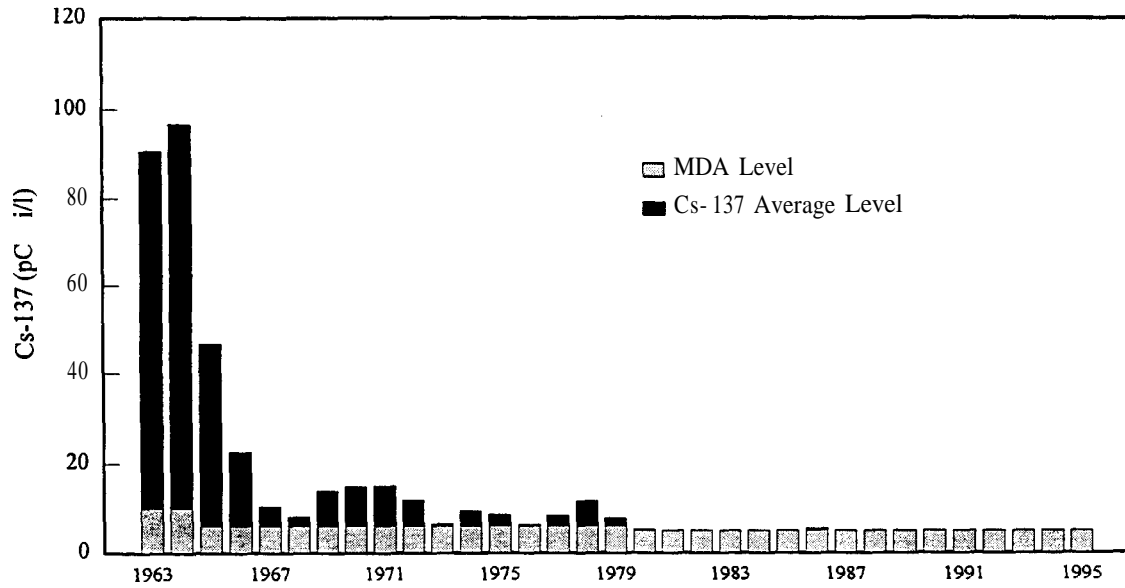


Figure 46

**Annual Average Sr-90 Activity  
Lansing Milk Station**

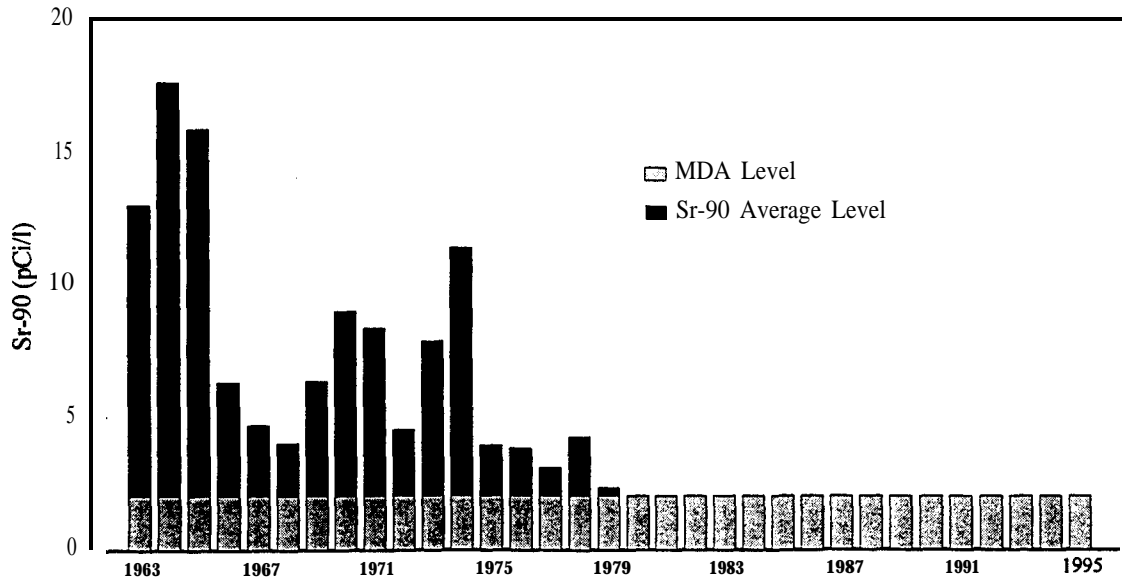


Figure 47

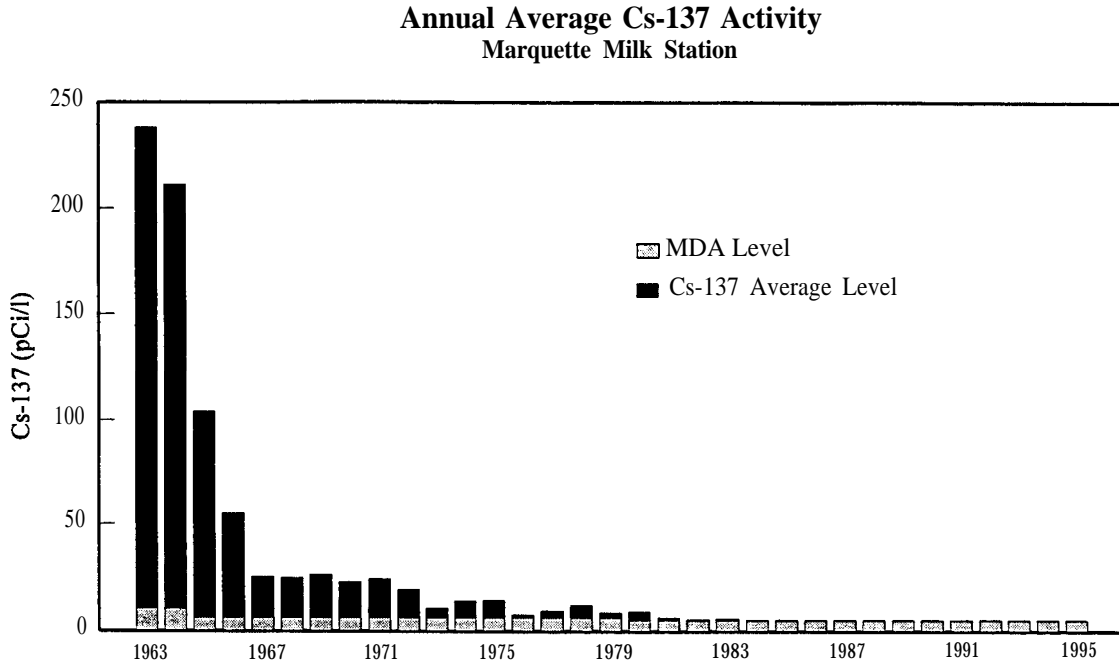


Figure 48

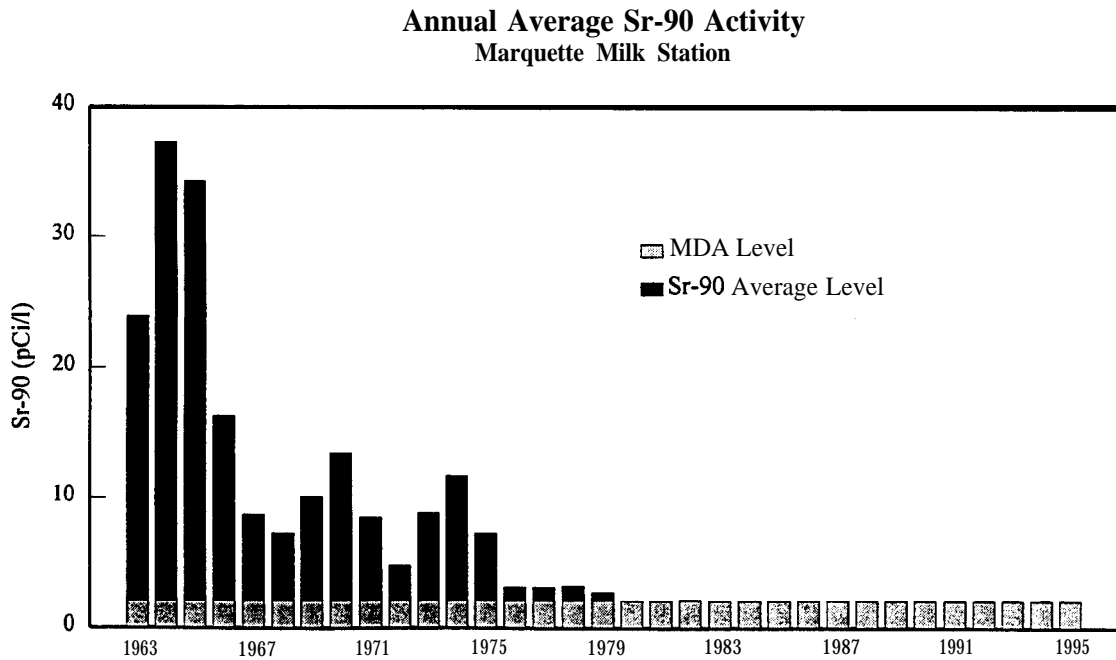


Figure 49

### Annual Average Cs-137 Activity Monroe Milk Station

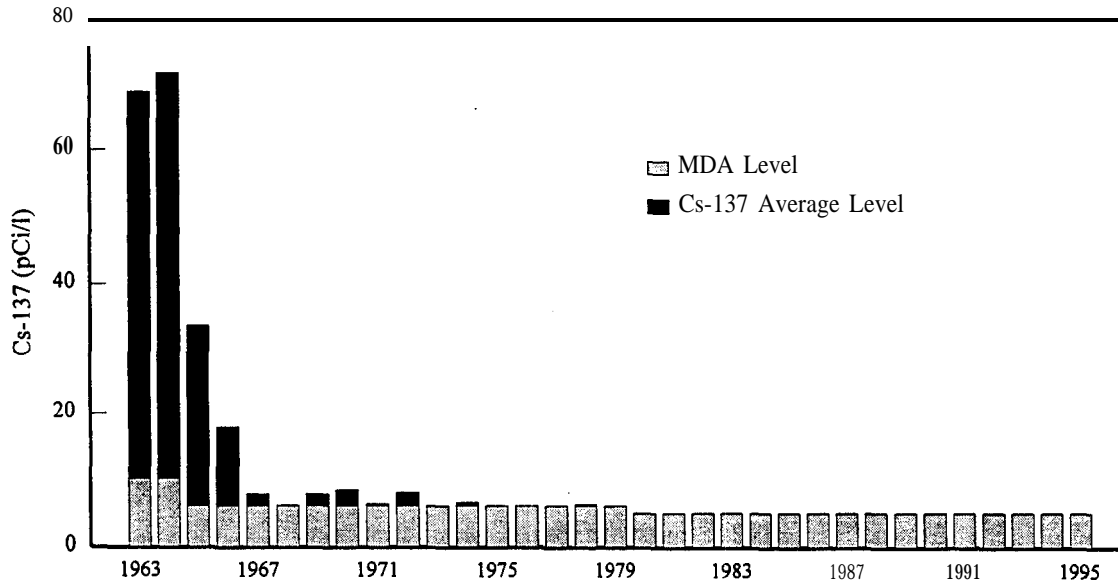


Figure 50

### Annual Average Sr-90 Activity Monroe Milk Station

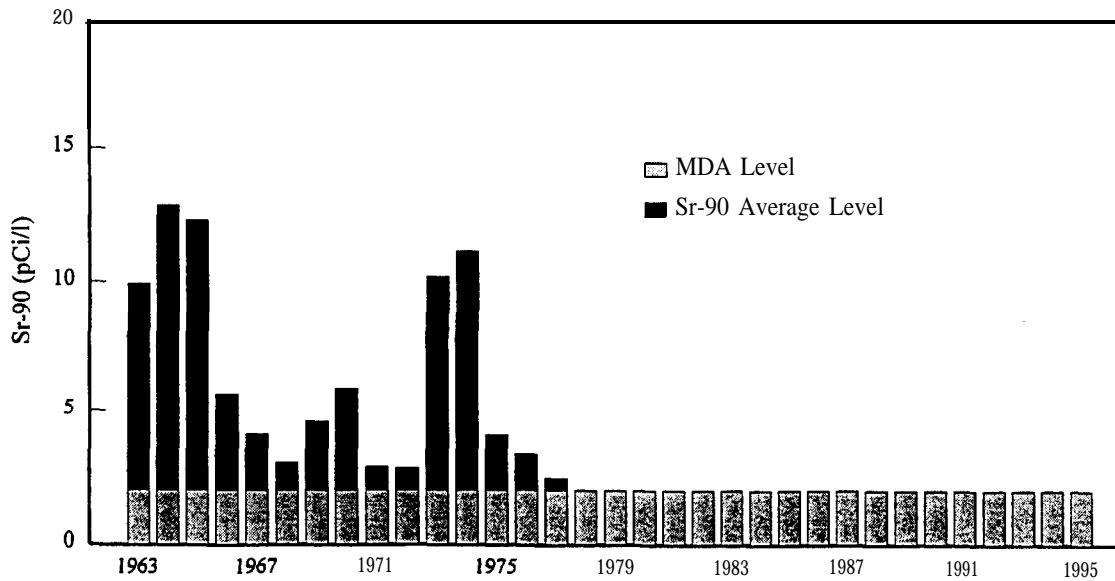


Figure 51

**Annual Average Cs-137 Activity  
South Haven Milk Station**

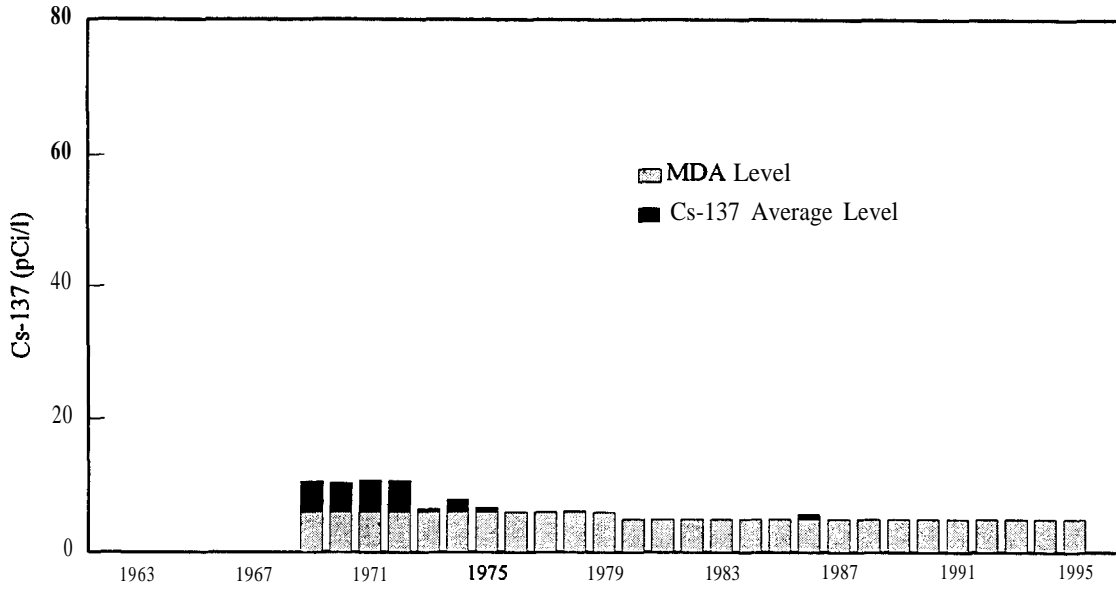
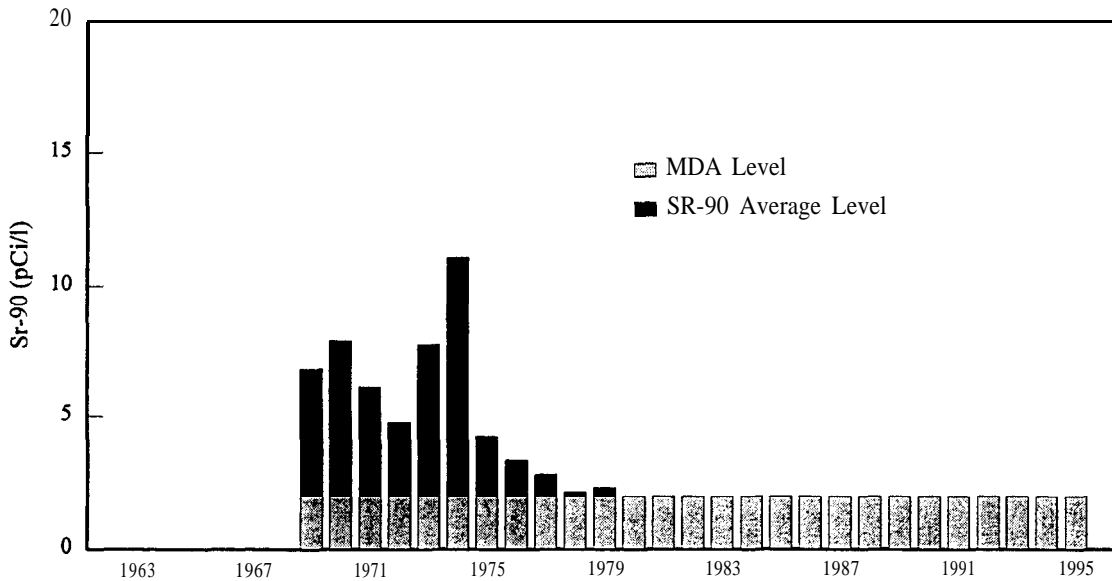


Figure 52

**Annual Average Sr-90 Activity  
South Haven Milk Station**





## Pre-Operational Terrestrial Monitoring

### Big Rock Point

The MREMP initiated milk monitoring statewide in late 1962. Since this was almost a year after Big Rock Point nuclear power plant commenced power operation, no MREMP pre-operational milk baseline data exists for this plant. Early milk monitoring results for the Charlevoix milk station, as well as statewide, were strongly influenced by the atmospheric nuclear tests conducted in the early 1960s, and for the long half-life radionuclides ( $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ ) the influence continued for several years beyond the signing of the Limited Test Ban Treaty in September of 1963. With no true pre-operational milk monitoring results for the Big Rock Point plant and several years of elevated milk results due to atmospheric testing during the first few years of plant operation, the milk results for 1963 and 1964 are substituted for the pre-operational baseline data and used for comparison with 1995 and 1996 milk results. The Charlevoix milk sampling station averages, highest and lowest sample results, and the average results for the other MREMP milk sampling stations throughout the state for the 1963-64 pre-operational monitoring period are detailed in Table 13.

<b>Table 13</b>			
<b>BIG ROCK POINT PRE-OPERATIONAL MILK MONITORING RESULTS</b>			
	$^{131}\text{I}$ (pCi/l)	$^{137}\text{Cs}$ (pCi/l)	$^{90}\text{Sr}$ (pCi/l)
<b>1963 Milk Monitoring Results</b>			
Charlevoix Average	Less than 20	136	17
Charlevoix Highest	Less than 20	232	22
Charlevoix Lowest	Less than 20	70	11
Detroit Average	Less than 20	101	15
Grand Rapids Average	Less than 20	105	12
Lansing Average	Less than 20	91	13
Marquette Average	Less than 20	238	24
Monroe Average	Less than 20	69	10
Statewide Average without Charlevoix	Less than 20	119	15
<b>1964 Milk Monitoring Results</b>			
Charlevoix Average	Less than 20	137	21
Charlevoix Highest	Less than 20	182	29
Charlevoix Lowest	Less than 20	71	13
Detroit Average	Less than 20	100	16
Grand Rapids Average	Less than 20	109	19
Lansing Average	Less than 20	97	18
Marquette Average	Less than 20	211	37
Monroe Average	Less than 20	72	13
Statewide Average without Charlevoix	Less than 20	116	19

Table 13 shows that the annual average  $^{131}\text{I}$  concentration for the Charlevoix milk sampling station, as well as all of the other MREMP milk stations, was less than the MDA value of 20 pCi/l during 1963 and 1964. Table 13 also reveals that the Charlevoix milk sample average  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  concentrations were slightly higher than the average  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  concentrations from the stations in the southern part of the state and much less than the Marquette station averages. The highest and lowest Charlevoix individual  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  results fall into the range of MREMP milk station annual average results. There were no significant anomalies in the Charlevoix milk results during the 1963-64 period, and the milk results from all seven MREMP sampling stations followed a similar pattern during the two years.

Palisades

Milk sampling in the vicinity of the Palisades plant was initiated in January 1969, a little more than two years prior to the plant commencing power operation. Results from 1969 and 1970 are used for the pre-operational baseline data, with the South Haven milk monitoring station averages, highest and lowest sample results, and the station average monitoring results for the other MREMP milk sampling stations throughout the state are detailed in Table 14.

<b>Table 14 PALISADES PRE-OPERATIONAL MILK MONITORING RESULTS</b>			
	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>90</sup> Sr (pCi/l)
<b>1969 Milk Monitoring Results</b>			
South Haven Average	Less than 14	11	7
South Haven Highest	Less than 14	16	8
South Haven Lowest	Less than 14	6	6
Charlevoix Average	Less than 14	18	8
Detroit Average	Less than 14	10	6
Grand Rapids Average	Less than 14	13	7
Lansing Average	Less than 14	14	6
Marquette Average	Less than 14	26	10
Monroe Average	Less than 14	8	5
Statewide Average without South Haven	Less than 14	15	7
<b>1970 Milk Monitoring Results</b>			
South Haven Average	Less than 14	11	8
South Haven Highest	Less than 14	41	9
South Haven Lowest	Less than 14	Less than 6	6
Charlevoix Average	Less than 14	16	13
Detroit Average	Less than 14	10	8
Grand Rapids Average	Less than 14	12	9
Lansing Average	Less than 14	15	9
Marquette Average	Less than 14	22	13
Monroe Average	Less than 14	8	6
Statewide Average without South Haven	Less than 14	14	10

Pre-operational baseline milk results for the Palisades plant show that the annual average <sup>131</sup>I concentrations were less than the MDA for all stations, and that the MDA values were lower than it was in earlier years due to improved instrumentation. Average milk <sup>137</sup>Cs and <sup>90</sup>Sr concentrations were consistently above the MDA values for all milk sampling stations during these two years, but are much lower than they were in 1963-64. Overall, South Haven milk <sup>137</sup>Cs and <sup>90</sup>Sr average concentrations were lower than most of the other MREMP milk stations for 1969-70.

D. C. Cook

Since there were no operational dairies in the immediate vicinity of the Cook plant in the early 1970s, since one of the closest dairies to the Cook plant was the one in South Haven which **was** already being used for the Palisades plant milk samples, and since the milk processed in that plant came from dairy farms in the area of both plants, it was decided that the South Haven milk sampling station would be utilized for both plants. With the D. C. Cook Unit I becoming operational in early 1975, the milk monitoring results from 1973 and 1974 are used for the pre-operational baseline data. South Haven milk station averages, highest and lowest sample results, and the station average results for the other MREMP milk stations are detailed in Table 15.

Table 15 D. C. COOK PRE-OPERATIONAL MILK MONITORING RESULTS			
	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>90</sup> Sr (pCi/l)
<b>1973 Milk Monitoring Results</b>			
South Haven Average	Less than 14	6	8
South Haven Highest	Less than 14	20	18
South Haven Lowest	Less than 14	Less than 6	Less than 2
Charlevoix Average	Less than 14	6	7
Detroit Average	Less than 14	Less than 6	7
Grand Rapids Average	Less than 14	6	9
Lansing Average	Less than 14	6	8
Marquette Average	Less than 14	10	9
Monroe Average	Less than 14	Less than 6	10
Statewide Average without South Haven	Less than 14	7	8
<b>1974 Milk Monitoring Results</b>			
South Haven Average	Less than 14	8	11
South Haven Highest	Less than 14	17	27
South Haven Lowest	Less than 14	Less than 6	5
Charlevoix Average	Less than 14	9	9
Detroit Average	Less than 14	7	9
Grand Rapids Average	Less than 14	9	13
Lansing Average	Less than 14	9	11
Marquette Average	Less than 14	14	12
Monroe Average	Less than 14	7	11
Statewide Average without South Haven	Less than 14	9	11

Pre-operational baseline milk results for the Cook plant show that the annual average <sup>131</sup>I concentrations were less than the MDA for all stations during 1973 and 1974. Average milk <sup>137</sup>Cs concentrations were mostly above the MDA values and <sup>90</sup>Sr concentrations were consistently above the MDA values for all milk sampling stations during these two years, but both were much lower than they were in 1963-64 and also slightly lower than they were during the 1969-70 period. Overall, South Haven milk <sup>137</sup>Cs and <sup>90</sup>Sr average concentrations were slightly lower than most of the other MREMP milk stations for the 1973-74 pre-operational period for this plant.

### Fermi 2

Milk sampling in the vicinity of the Fermi 2 plant was initiated in late 1962 prior to completion of the Enrico Fermi Fast Breeder Reactor, which shares the same site with the Fermi 2 reactor. Monroe milk sampling station results from 1983 and 1984 are used for the pre-operational baseline data for the Fermi 2 plant. Monroe milk station averages, highest and lowest sample results, and the station average results for the other MREMP milk sampling stations throughout the state are detailed in Table 16.

Table 16 FERMI 2 PRE-OPERATIONAL MILK MONITORING RESULTS			
	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>90</sup> Sr (pCi/l)
<b>1983 Milk Monitoring Results</b>			
Monroe Average	Less than 6	Less than 5	Less than 2
Monroe Highest	Less than 6	13	2
Monroe Lowest	Less than 6	Less than 5	Less than 2
Charlevoix Average	Less than 6	Less than 5	Less than 2
Detroit Average	Less than 6	Less than 5	Less than 2
Grand Rapids Average	Less than 6	Less than 5	Less than 2
Lansing Average	Less than 6	Less than 5	Less than 2
Marquette Average	Less than 6	6	Less than 2
South Haven Average	Less than 6	Less than 5	Less than 2
Statewide Average without Monroe	Less than 6	Less than 5	Less than 2
<b>1984 Milk Monitoring Results</b>			
Monroe Average	Less than 6	Less than 5	Less than 2
Monroe Highest	Less than 6	6	2
Monroe Lowest	Less than 6	Less than 5	Less than 2
Charlevoix Average	Less than 6	Less than 5	Less than 2
Detroit Average	Less than 6	Less than 5	Less than 2
Grand Rapids Average	Less than 6	Less than 5	Less than 2
Lansing Average	Less than 6	Less than 5	Less than 2
Marquette Average	Less than 6	Less than 5	Less than 2
South Haven Average	Less than 6	Less than 5	Less than 2
Statewide Average without Monroe	Less than 6	Less than 5	Less than 2

Pre-operational baseline milk results for the Fermi 2 plant show that the annual average <sup>131</sup>I concentrations were less than the MDA for all stations during 1983 and 1984, and that the MDA values were lower than they were in earlier years due to improved instrumentation. Average milk <sup>137</sup>Cs and <sup>90</sup>Sr concentrations were consistently below the MDA values for all milk sampling stations during these two years with the exception of the Marquette station in 1983 which was just above the MDA level.

## 1995 Terrestrial Monitoring

The 1995 milk monitoring results were almost all less than the MDA levels, and the average levels for each monitoring Station are summarized in Table 17. Of the 204 milk samples analyzed during 1995, there were none with detectable amounts of  $^{131}\text{I}$ ; four samples with detectable amounts of  $^{137}\text{Cs}$  (three at 6 pCi/l and one at 5 pCi/l); and two samples with detectable amounts of  $^{90}\text{Sr}$  (one at 2 pCi/l and one at 1 pCi/l). The detectable amounts of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  were either at or slightly above the MDA levels indicating that very little, if any, of the long-lived radioactive fallout from past atmospheric testing or the Chernobyl accident are still present in milk produced in Michigan. Also, the six samples with detectable amounts of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  represent less than 3% of the total MREMP milk samples analyzed during 1995. Overall, the milk monitoring results from all sampling stations were lower than levels recorded during pre-operational monitoring periods or, in the case of Big Rock Point, during the early years of plant Operation. A tabular presentation of MREMP milk monitoring results for 1995 is located in Appendix B.

	Number of Samples	$^{131}\text{I}$ (pCi/l)	$^{137}\text{Cs}$ (pCi/l)	$^{90}\text{Sr}$ (pCi/l)
Charlevoix	52	Less than 7	Less than 5	Less than 2
Detroit	12	Less than 6	Less than 5	Less than 2
Grand Rapids	12	Less than 6	Less than 5	Less than 2
Lansing	26	Less than 5	Less than 5	Less than 2
Marquette	24	Less than 7	Less than 5	Less than 2
Monroe	26	Less than 5	Less than 5	Less than 2
South Haven	52	Less than 5	Less than 5	Less than 2
Statewide	204	Less than 6	Less than 5	Less than 2

## 1996 Terrestrial Monitoring

The 1996 milk monitoring results were almost all less than the MDA levels. The average levels for each monitoring station are summarized in Table 18. Of the 205 milk samples analyzed during 1996, there were none with detectable amounts of  $^{131}\text{I}$ ; four samples with detectable amounts of  $^{137}\text{Cs}$  (one at 6 pCi/l, one at 4 pCi/l, and two at 3 pCi/l); and one sample with a detectable amount of  $^{90}\text{Sr}$  (4 pCi/l). The detectable amounts of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  in milk samples were either at or slightly above the MDA levels, which for the  $^{137}\text{Cs}$  analysis in particular and for gamma analysis in general, the MDA values were lowered during 1996 due to improved instrumentation. Also, the five samples with detectable amounts of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  represent less than 3% of the total MREMP milk samples analyzed during 1996. Overall, the milk monitoring results from all sampling stations were lower than levels recorded during pre-operational monitoring periods or, in the case of Big Rock Point, during the early years of plant operation. A tabular presentation of MREMP milk monitoring results for 1996 is located in Appendix B.

	Number of Samples	$^{131}\text{I}$ (pCi/l)	$^{137}\text{Cs}$ (pCi/l)	$^{90}\text{Sr}$ (pCi/l)
Charlevoix	53	Less than 6	Less than 4	Less than 2
Detroit	11	Less than 6	Less than 4	Less than 2
Grand Rapids	12	Less than 5	Less than 4	Less than 2
Lansing	27	Less than 4	Less than 4	Less than 2
Marquette	24	Less than 7	Less than 4	Less than 2
Monroe	25	Less than 5	Less than 4	Less than 2
South Haven	53	Less than 5	Less than 4	Less than 2
Statewide	205	Less than 5	Less than 4	Less than 2



## Aquatic Monitoring

### Sampling Network

The MREMP aquatic monitoring network was inherited from the Michigan Department of Natural Resources in the fall of 1971. The original inherited network consisted of five surface water sampling stations for the Big Rock Point plant, five for the Palisades plant, and five for the Enrico Fermi plant site, and the network was expanded to include five additional stations for the D. C. Cook plant in the summer of 1972. The number of sampling stations in the network has changed often during the 25 years of MREMP operation, and by 1995 the network consisted of nine surface water sampling stations for the four plant sites. At the Big Rock Point plant, a monthly grab sample is collected for the plant discharge canal, which is one of the original stations for that plant. A monthly grab sample is collected from the Palisades plant discharge line, which is one of the original stations for that plant. At the D. C. Cook plant, the original sampling station at the plant was located at the beach directly out in front of the plant. Since the Cook plant discharges out in the lake and not at the shoreline, the original sampling station has been replaced with two stations, one for each reactor, from the holding tanks just prior to lake discharge. A monthly surface water grab sample is collected from Lake Erie in front of the Fermi plant, and four daily composite surface/drinking water sampling stations of the Detroit Edison Company are split with the MREMP on a monthly basis. All samples are analyzed for gamma emitting radionuclides, gross beta and tritium activity.

### Historical Surface Water Monitoring Trends

Surface water samples analyzed over the last 25 plus years have rarely indicated any unusual amounts of radioactive material concentrations due to nuclear power plant operations, nor has there been any significant impact on surface water from atmospheric fallout. During the **1970s**, samples collected from the reactor site stations would occasionally show elevated levels of gross beta and/or tritium activity that could almost always be attributed to controlled releases by the plants (within NRC allowable limits) which were ongoing at the time of collection. Events of this type have greatly diminished over the last 20 years, with the last five years having no events of this type. Also during the **1970s**, slightly elevated gross beta levels were sometimes found at all of the sampling stations of one of the plants, with no pattern or other information to indicate the plant being the source. These slightly elevated results were almost always found for samples collected shortly after an atmospheric nuclear test, and many times the elevated results would have been found at more than one plant that had been sampled within a few days of each other.

Historical yearly average gross beta results for the four reactor site surface sampling stations are shown in Figures **53-56**. All four graphs show an overall decreasing gross beta activity trend from the early 1970s through 1995, with 1995 levels averaging about 2 pCi/l at all four plants. One interesting anomaly stands out in the Big Rock Point results for 1979, with a yearly average gross beta level of 24.5 pCi/l. This unusually high yearly average was caused by one sample that was collected on September 18, 1979, that had a gross beta level of 221 pCi/l. The sample had been collected during a plant controlled release which was within allowable limits. If the September 18, 1979 sample is deleted from the yearly average calculation, the 1979 gross beta average becomes 4.5 pCi/l which is fairly typical for that period of time.





Figure 53

Annual Average Gross Beta Activity  
Big Rock Point Reactor Site Surface Water

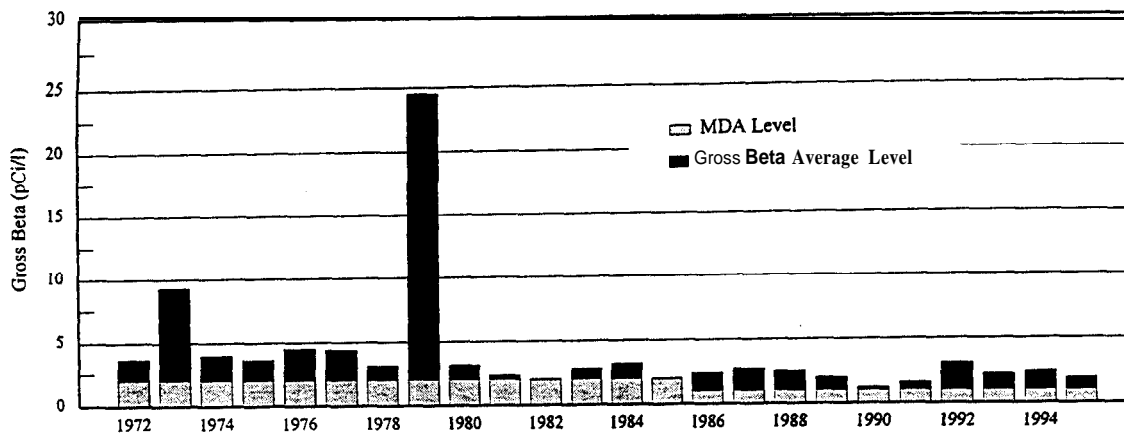


Figure 54

Annual Average Gross Beta Activity  
Palisades Reactor Site Surface Water

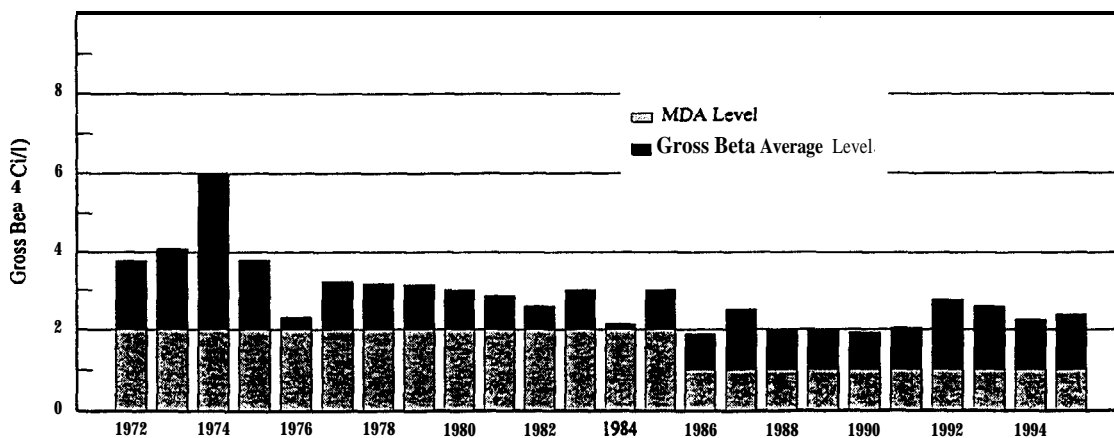


Figure 55

Annual Average Gross Beta Activity  
D. C Cook Reactor Site Surface Water

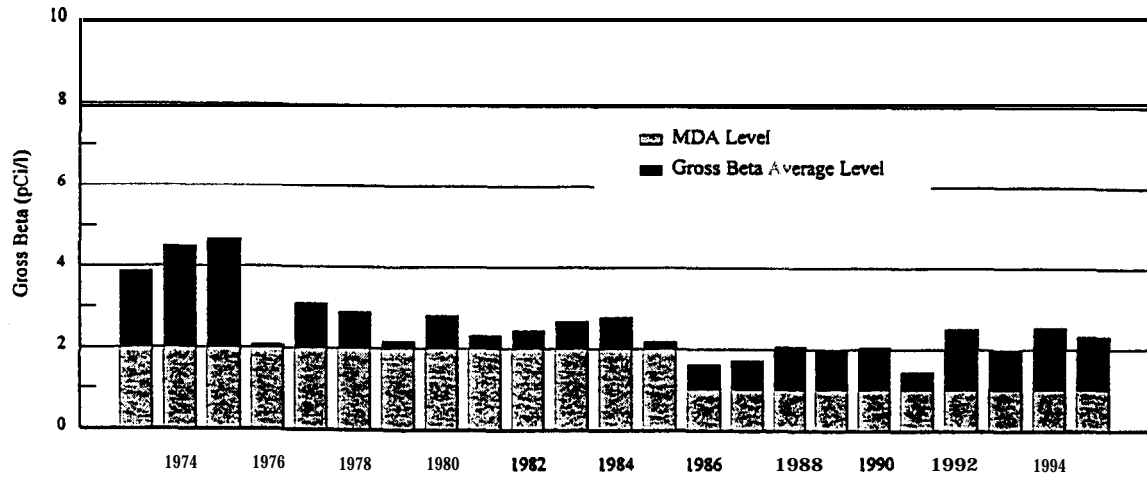
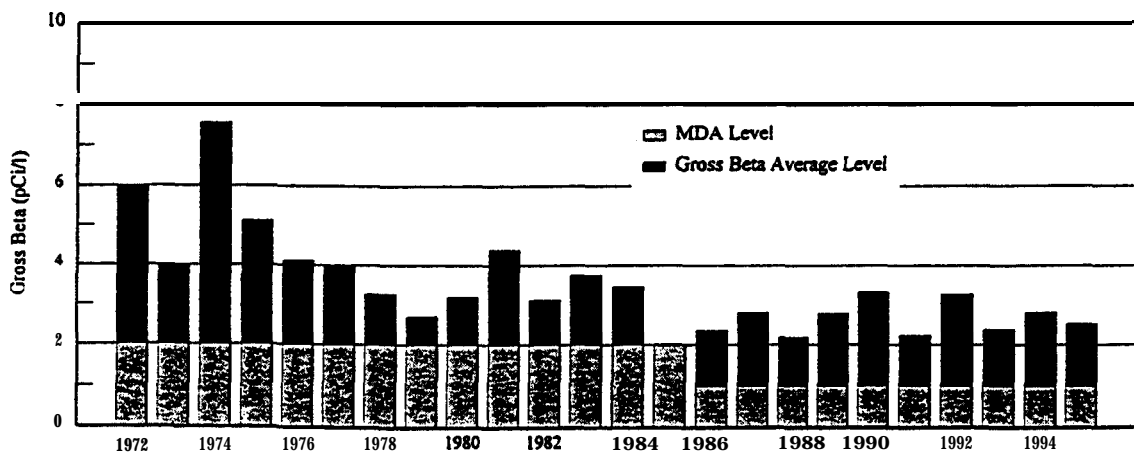


Figure 56

Annual Average Cross Beta Activity  
Fermi 2 Reactor Site Surface Water



## Pre-Operational Aquatic Monitoring

### Big Rock Point

By late 1971, when the MREMP was expanded to include surface water sampling, the Big Rock Point plant had been in operation for almost ten years. As such, no MREMP pre-operational baseline surface water data exists for the Big Rock Point plant. Surface water data collected during 1972 and 1973 was selected for baseline comparison purposes and are summarized in Table 19. In December 1973, the reactor site was sampled during a controlled release by the plant, and the sample analysis revealed 64 pCi/l of gross beta activity and 11,100 pCi/l of tritium activity. The non-reactor site about one-half mile from the reactor discharge in the prevailing current direction also indicated this release with 23 pCi/l of gross beta activity and 6,700 pCi/l of tritium activity. These four results raised both the reactor site and the non-reactor sites two-year averages for both gross beta and tritium significantly. To adjust for the skewed averages, a second set of reactor site and non-reactor sites averages were calculated without the December 1973 samples. The resulting revised averages are also shown in Table 19.

Table 19 1972-73 BIG ROCK POINT SURFACE WATER RESULT AVERAGES		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	7.1	1100
Reactor Site (without 12/73 sample)	3.8	400
Non-Reactor Sites	3.9	500
Non-Reactor Sites (without 12/73 sample)	3.5	300

### Palisades

The Palisades plant also commenced operation before MREMP surface water sampling was initiated. Therefore no associated pre-operational baseline data exists for the plant. Surface water data collected during 1972 and 1973 will be used for baseline comparison purposes and are summarized in Table 20. The average gross beta level for the non-reactor site stations was slightly higher than for the reactor site during the 1972-73 period and was the result of slightly elevated gross beta levels at all five stations (one at the reactor site and four others between 0.5 to 5 miles from the site) in October 1973. These widespread elevated gross beta levels were likely caused by radioactive fallout from atmospheric tests conducted by the Peoples Republic of China just prior to sample collection.

Table 20 1972-73 PALISADES SURFACE WATER RESULT AVERAGES		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	4.0	300
Non-Reactor Sites	5.1	200

### D. C. Cook

Pre-operational surface water baseline data for the D. C. Cook plant was collected during 1973 and 1974. Average gross beta and tritium levels for the baseline monitoring period are summarized in Table 21. No unusual gross beta or tritium results were found for the Cook plant during 1973-74.

Table 21 1973-74 D. C. COOK SURFACE WATER RESULT AVERAGES		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	4.2	300
Non-Reactor Sites	4.4	300

## Fermi 2

Due to staff attrition and budget constraints, the pre-operational surface water baseline data for the Fermi 2 plant consists of only samples collected at the reactor site during 1983 and 1984. The average gross beta and tritium levels for the baseline monitoring period are summarized in Table 22. There were no unusual results encountered during the Fermi 2 baseline monitoring period.

Table 22 <b>1983-84 FERMI 2 SURFACE WATER RESULT AVERAGE;</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	3.6	200

## **1995 Aquatic Monitoring**

The 1995 surface water results for all four plant sites were generally in alignment with results from recent years. Gross beta and tritium levels measured in 1995 were very close to the MDA levels, and none of the 1995 samples showed any activity from gamma emitting radionuclides above the MDA levels. Details of the 1995 surface water monitoring results for the four plants and comparisons to their respective pre-operational baseline data are discussed below. Figures 57-74 at the end of this section show gross beta and tritium results for the nine sampling stations for 1995. A tabular presentation of 1995 surface water results is provided in Appendix C.

## Big Rock Point

Aquatic monitoring for Big Rock Point in 1995 consisted of the one sampling station at the reactor site. Monthly grab samples were collected from the reactor discharge canal and analyzed in the same manner as they were during the baseline assessment period. The results are summarized in Table 23. The 1.9 pCi/l gross beta average for 1995 is much lower than the 3.8 pCi/l average measured during the 1972-73 baseline assessment period, and the less than 100 pCi/l tritium average is also much less than the 400 pCi/l tritium level measured during 1972-73.

Table 23 <b>1995 BIG ROCK POINT SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	1.9	Less Than 100

## Palisades

Aquatic monitoring for Palisades in 1995 consisted of the one sampling station at the reactor site. Monthly grab samples were collected from the reactor discharge and analyzed in the same manner as they were during the baseline assessment period. The results are summarized in Table 24. Palisades surface water result averages for 1995 were also much less than the baseline assessment period gross beta average of 4.0 pCi/l and tritium average of 300 pCi/l.

Table 24 <b>1995 PALISADES SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	2.4	Less Than 100

## D. C. Cook

Aquatic monitoring for D. C. Cook in 1995 consisted of the two sampling stations at the reactor site, one for each reactor unit. Monthly grab samples were collected from the reactor discharge holding tank for each unit and analyzed in the same manner as they were during the baseline assessment period. The results are summarized in Table 25. Cook surface water result averages for 1995 were also much less than the pre-operational baseline assessment period, which indicated a gross beta average of 4.2 pCi/l and a tritium average of 300 pCi/l at the reactor site.

	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site - Unit 1	2.2	Less Than 100
Reactor Site - Unit 2	2.4	Less Than 100

## Fermi 2

Aquatic monitoring for Fermi 2 in 1995 consisted of five sampling stations. A monthly grab sample is collected from the Lake Erie shore directly in front of the reactor site by MREMP staff and four daily composite samples are collected monthly by Fermi 2 plant staff and split with the MREMP from the Monroe drinking water intake site, the Trenton channel site, the Allen Park drinking water intake site, and the Fermi 2 intake site. All monthly samples are analyzed in the same manner as they were during the baseline assessment period. The results are summarized in Table 26. Fermi 2 surface water result averages for 1995 were slightly lower than the pre-operational baseline assessment period gross beta average of 3.6 pCi/l and virtually the same as the baseline tritium average of 200 pCi/l at the reactor site, and there were no distinguishable differences in 1995 between the non-reactor site result averages and the 1995 reactor site averages.

	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	2.5	200
Monroe Intake Site	2.0	100
Trenton Channel Site	2.2	200
Allen Park Intake Site	1.6	200
Fermi 2 Intake Site	2.6	200

## **1996 Aquatic Monitoring**

The 1996 surface water results for all four plant sites were slightly lower than 1995 surface water results. Gross beta and tritium levels measured in 1996 were, again, very close to the MDA levels and none of the 1996 samples showed any activity from gamma emitting radionuclides above the MDA levels. Details of the 1996 surface water monitoring results for the four plants are discussed below. Figures 75-92 at the end of this section show gross beta and tritium results for the nine sampling stations for 1996. A tabular presentation of 1996 surface water results is provided in Appendix C. Big Rock Point.

## Bia Rock Point

Big Rock Point aquatic monitoring in 1996 consisted of the one sampling station at the reactor site. Monthly grab samples were collected from the reactor discharge canal and analyzed in the same manner as they were in past years. The results are summarized in Table 27. The 1.6 pCi/l gross beta average for 1996 is slightly lower than the 1.9 pCi/l average measured during 1995, and the less than 100 pCi/l tritium average is the same as the 1995 average level.

<b>Table 27</b>		
<b>1996 BIG ROCK POINT SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	1.6	Less Than 100

### Palisades

Aquatic monitoring for Palisades in 1996 consisted of the one sampling station at the reactor site. Monthly grab samples were collected from the reactor discharge and analyzed as they were in previous years. The 1996 surface water average results are summarized in **Table 28**. The Palisades average gross beta level for 1996 was also slightly less than the 1995 average levels of 2.4 pCi/l gross beta while the 1996 tritium average level was the same as the 1995 average level.

<b>Table 28</b>		
<b>1996 PALISADES SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	2.2	Less Than 100

### D. C. Cook

D. C. Cook aquatic monitoring in 1996 consisted of the two sampling stations at the reactor site, one for each reactor unit. Monthly grab samples were collected from the reactor discharge holding tank for each unit and analyzed as they were during 1995. The results are summarized in Table 29. Cook surface water gross beta averages for 1996 were slightly lower for Unit 1 and exactly the same for Unit 2, when compared to 1995 levels. The 1996 tritium averages for both units were the same as 1995 tritium averages.

<b>Table 29</b>		
<b>1996 D. C. COOK SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site - Unit 1	2.0	Less Than 100
Reactor Site - Unit 2	2.4	Less Than 100

### Fermi 2

Aquatic monitoring for Fermi 2 in 1996 consisted of the same five sampling stations that were used in 1995. A monthly grab sample is collected from the Lake Erie shore directly in front of the reactor site by MREMP staff and four daily composite samples are collected monthly by Fermi 2 plant staff and split with the MREMP from the Monroe drinking water intake site, the Trenton channel site, the Allen Park drinking water intake site, and the Fermi 2 intake site. All samples were analyzed as they were during 1995. The results are summarized in Table 30. Fermi 2 surface water result averages for 1996 were overall slightly lower than 1995 averages, and there were no distinguishable differences in 1996 between the non-reactor site result averages and the 1996 reactor site averages.

<b>Table 30</b>		
<b>1996 FERMI 2 SURFACE WATER RESULT AVERAGES</b>		
	Gross Beta (pCi/l)	Tritium (pCi/l)
Reactor Site	2.0	100
Monroe Intake Site	1.7	100
Trenton Channel Site	1.8	100
Allen Park Intake Site	1.6	100
Fermi 2 Intake Site	2.4	Less Than 100

Figure 57

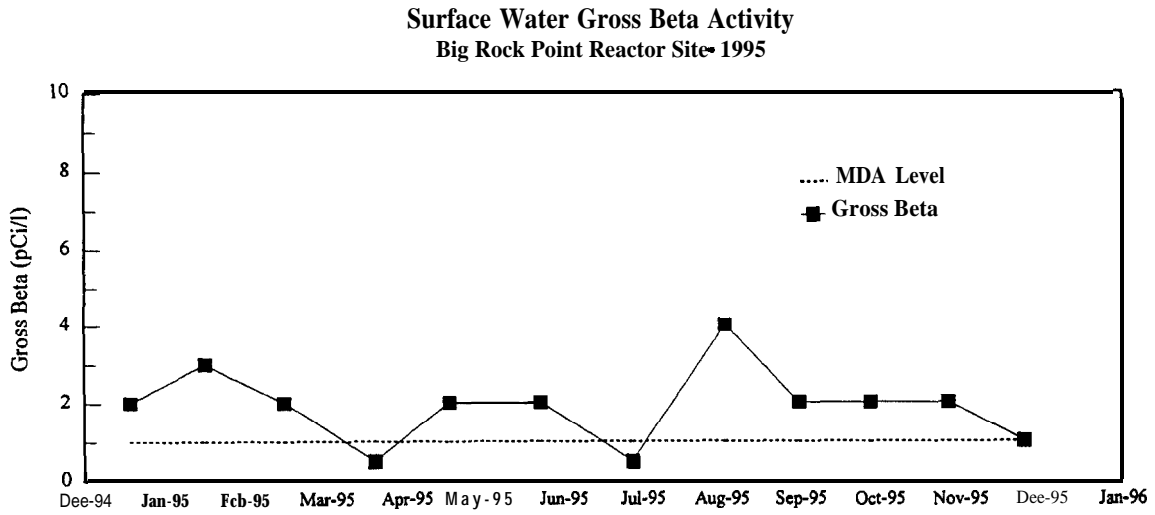


Figure 58

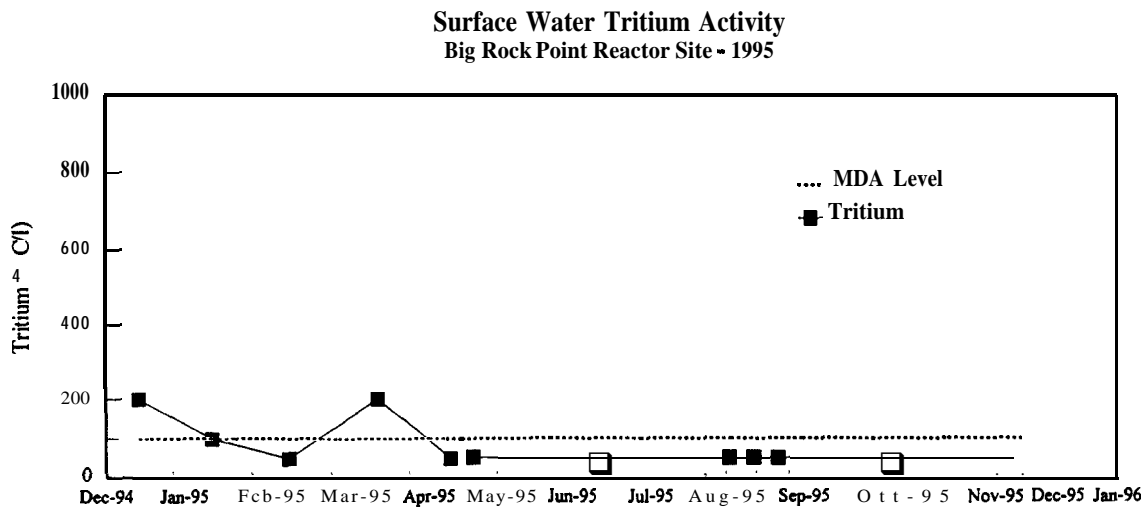


Figure 59

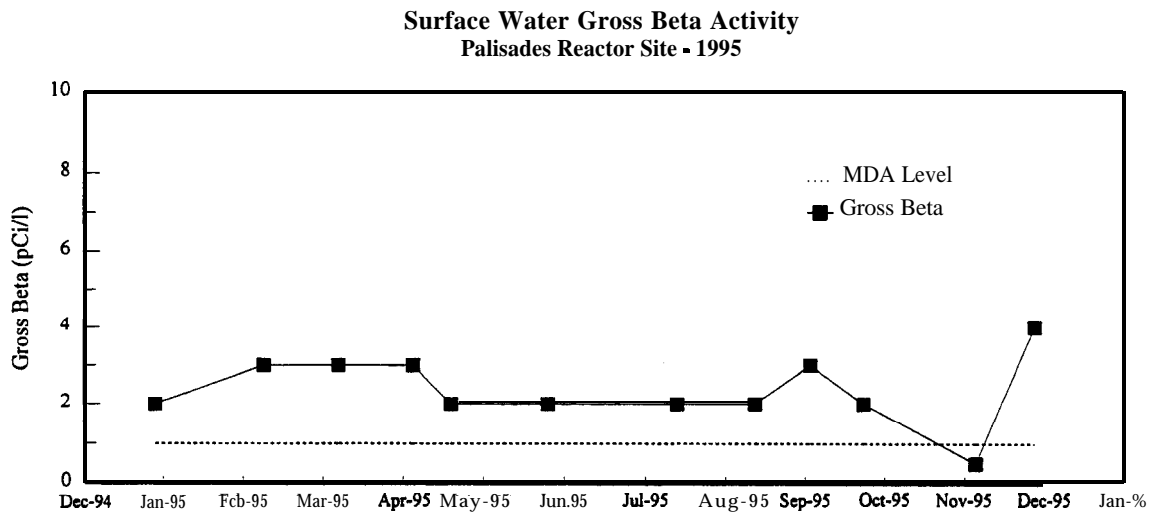


Figure 60

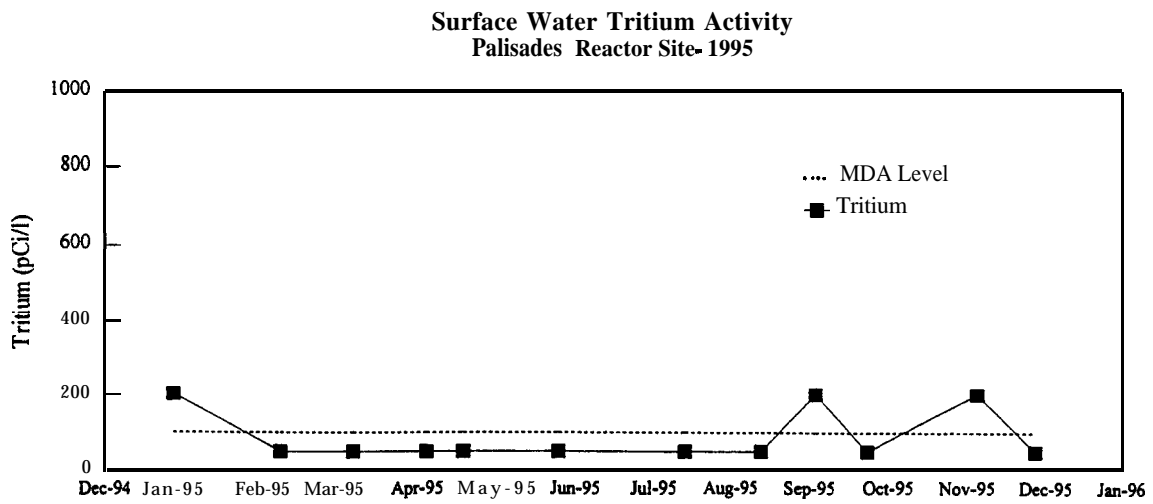




Figure 61

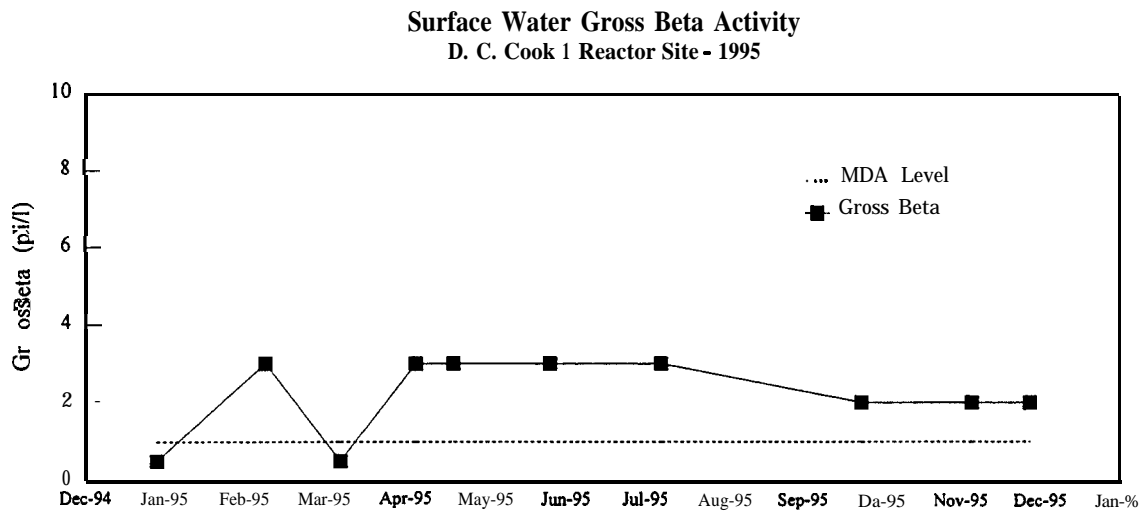


Figure 62

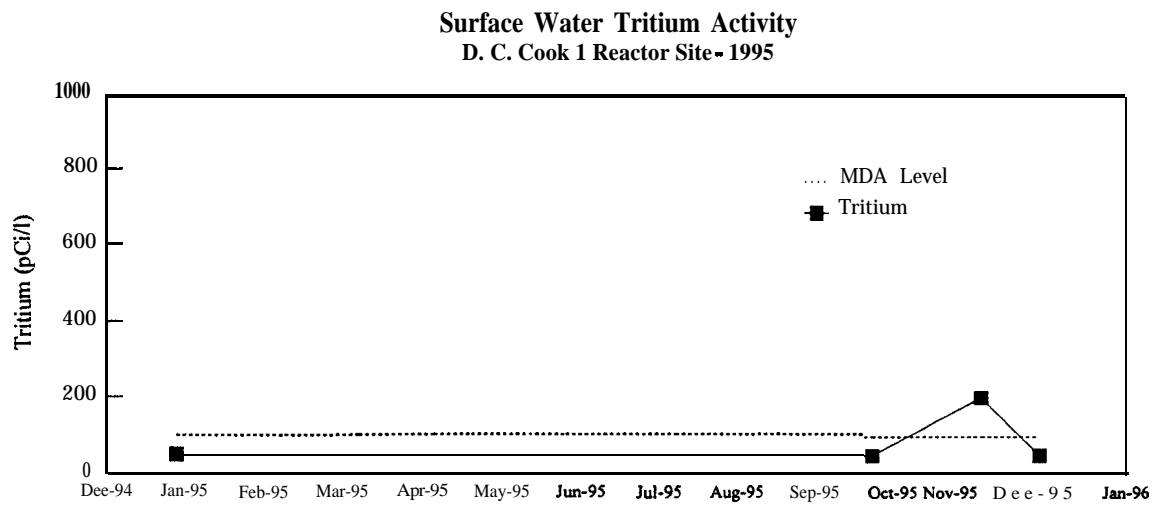


Figure 63

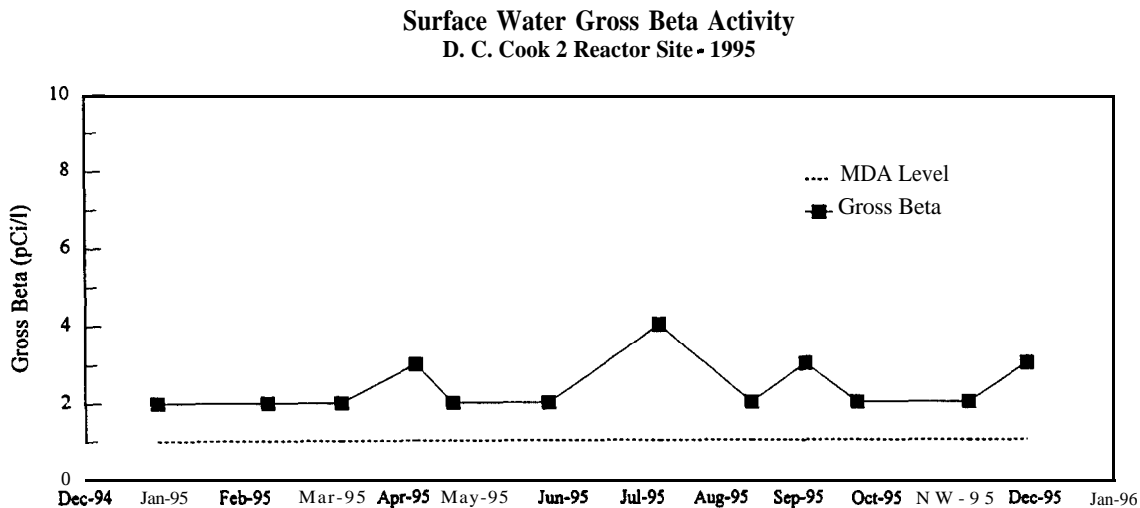


Figure 64

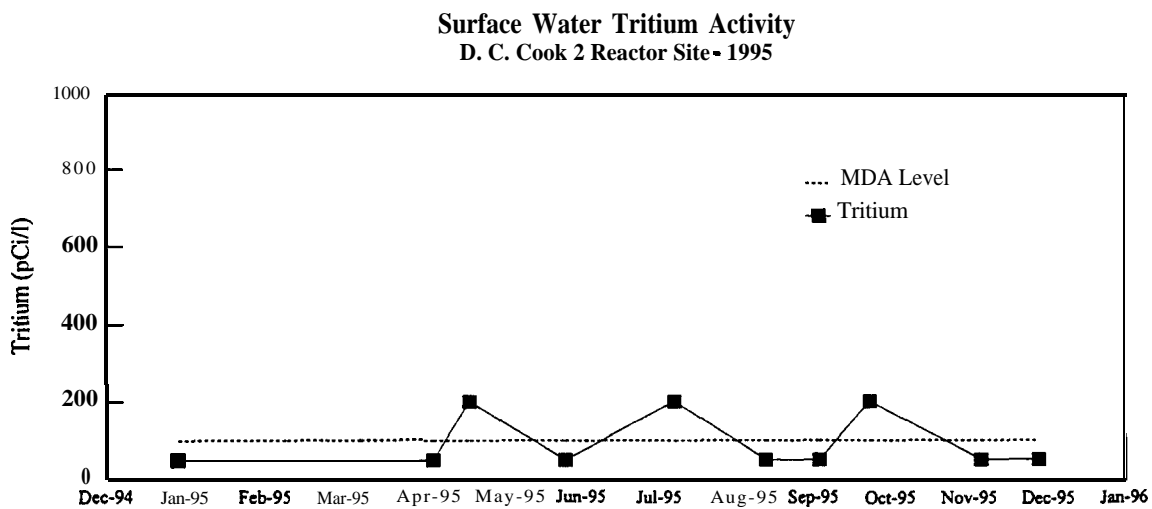


Figure 65

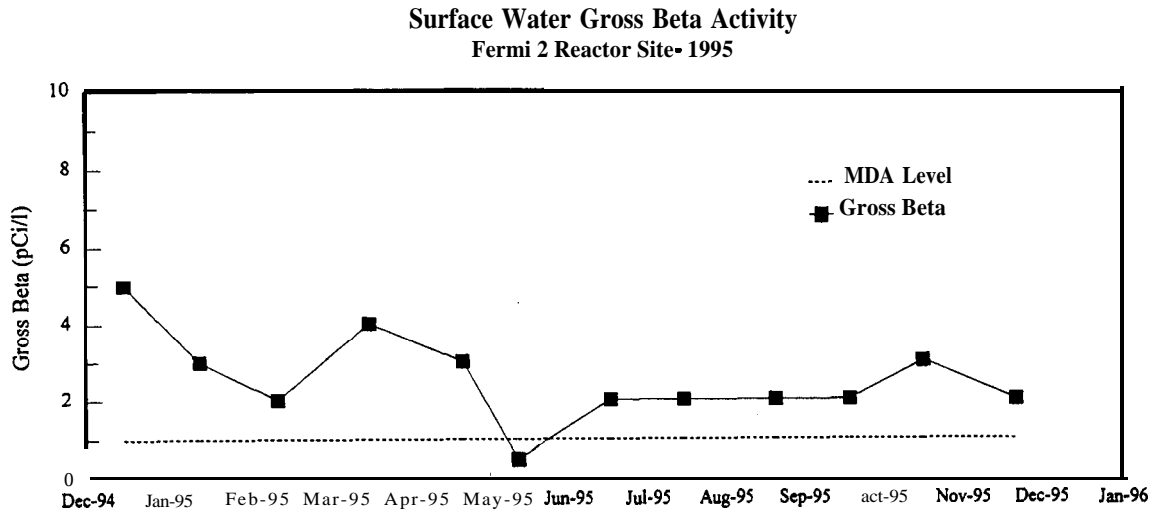


Figure 66

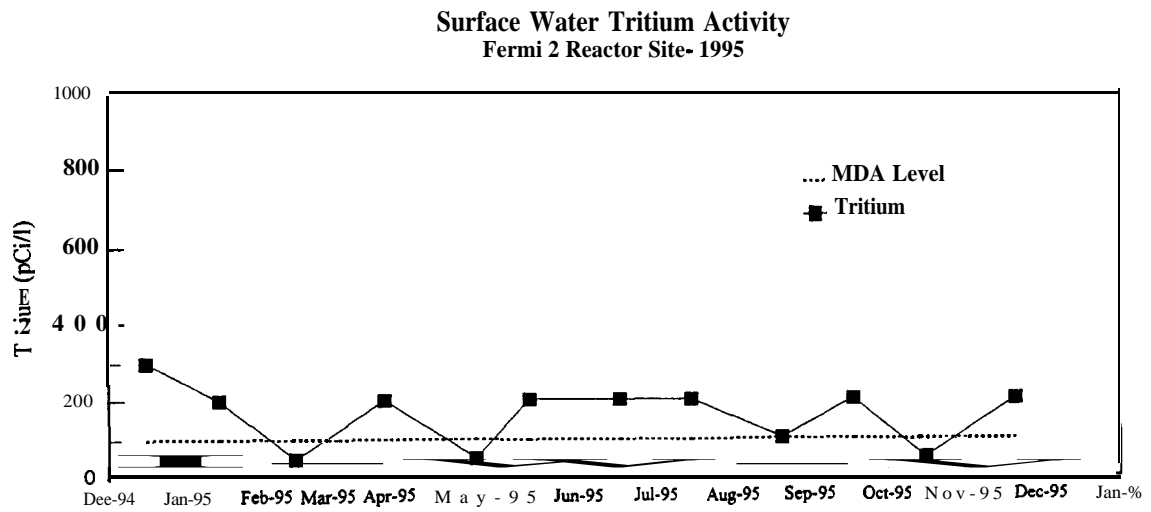


Figure 67

Surface Water Gross Beta Activity  
Fermi 2 Monroe Intake Site - 1995

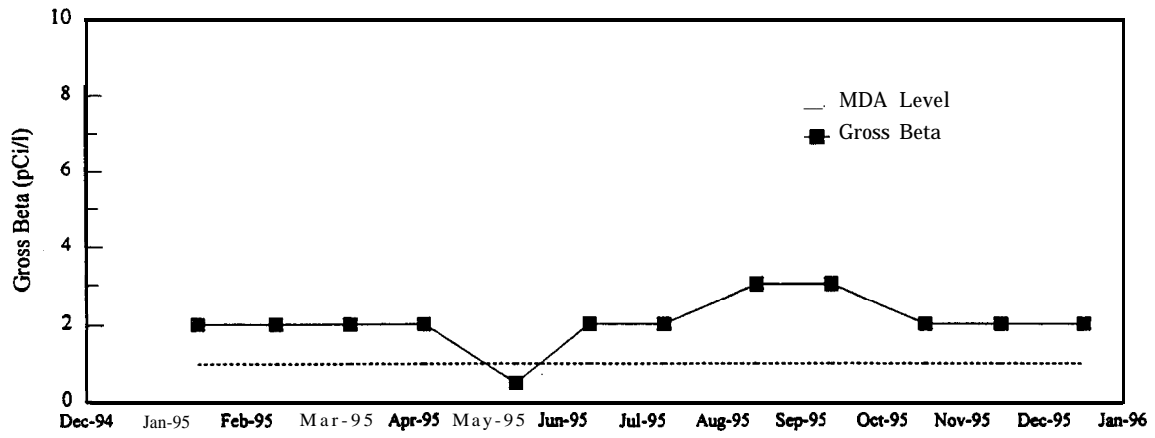


Figure 68

Surface Water Tritium Activity  
Fermi 2 Monroe Intake Site - 1995

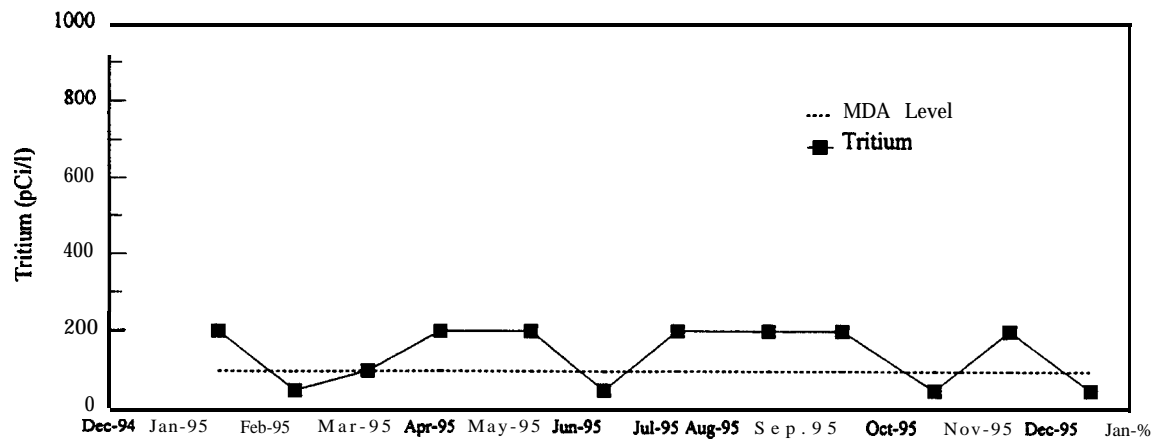


Figure 69

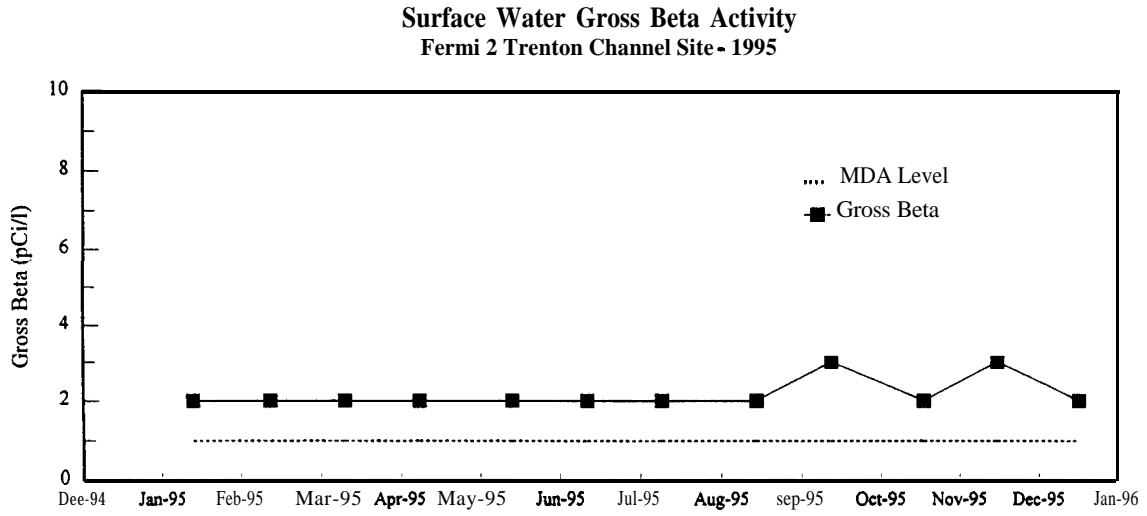


Figure 70

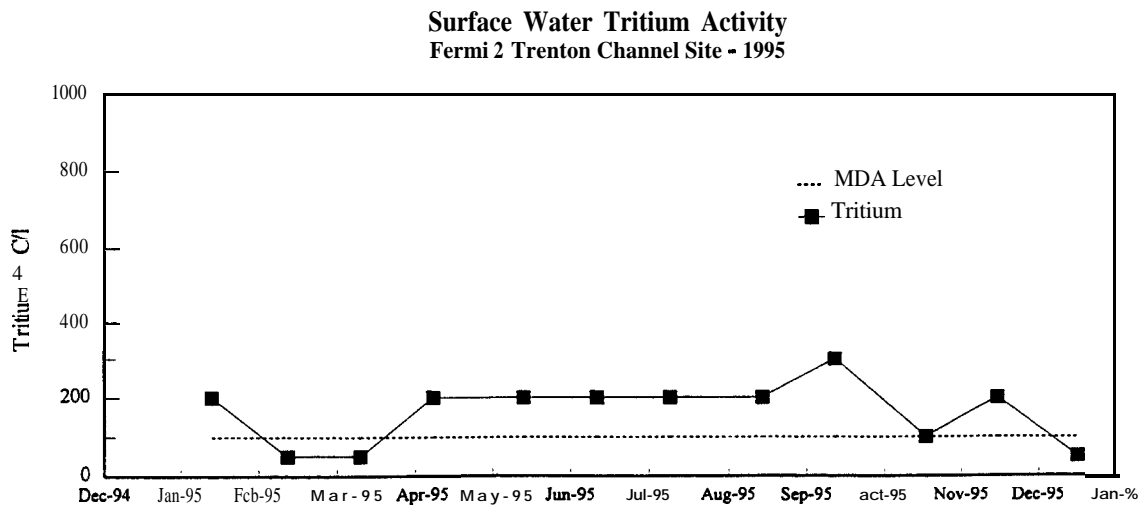


Figure 71

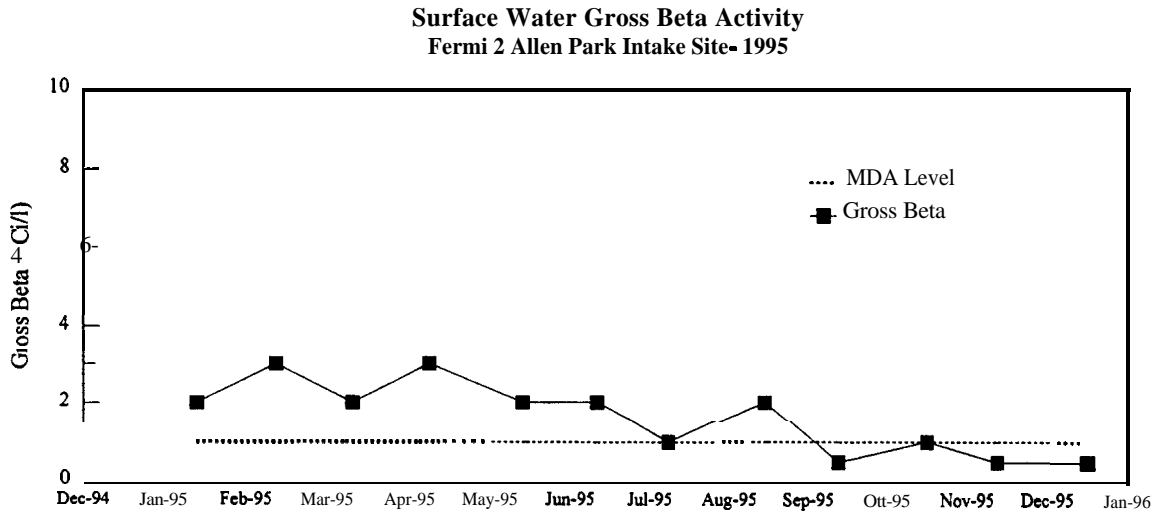


Figure 72

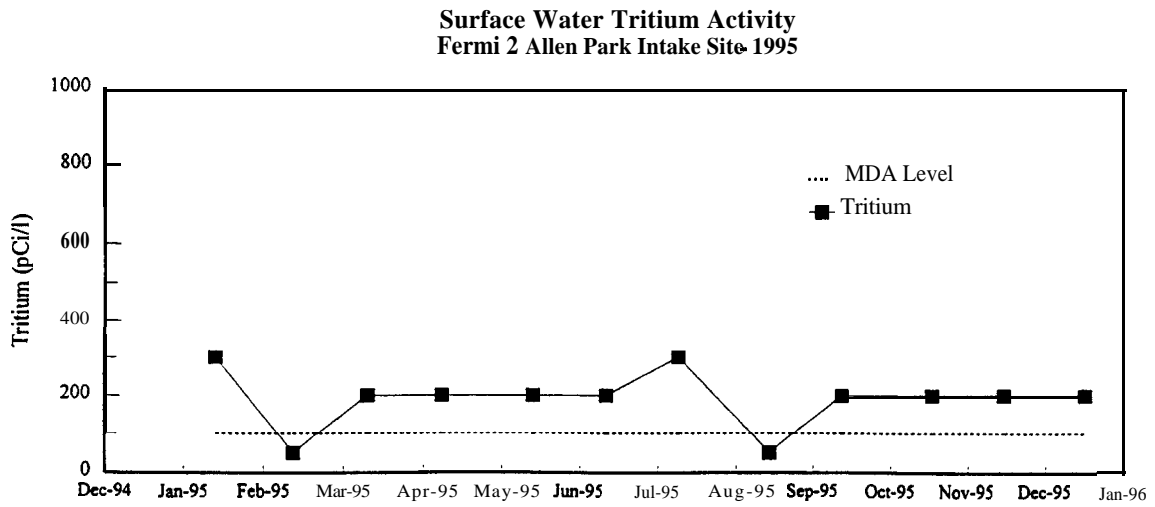


Figure 73

Surface Water Gross Beta Activity  
Fermi 2 Intake Site - 1995

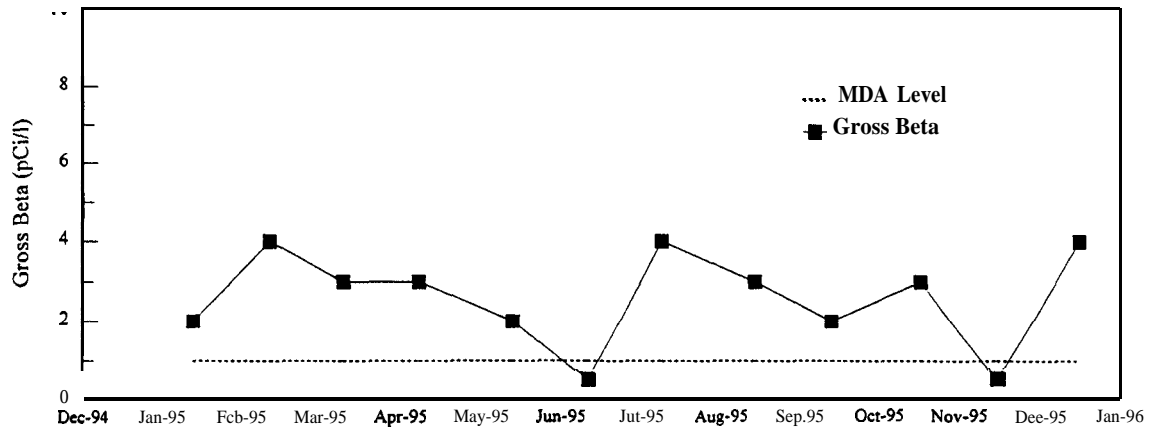


Figure 74

Surface Water Tritium Activity  
Fermi 2 Intake Site - 1995

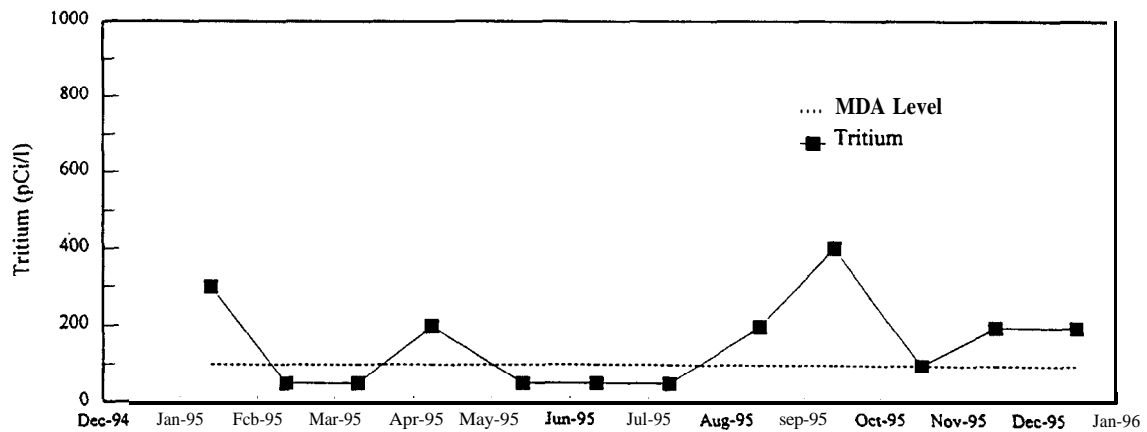


Figure 75

Surface Water Gross Beta Activity  
Big Rock Point Reactor Site- 1996

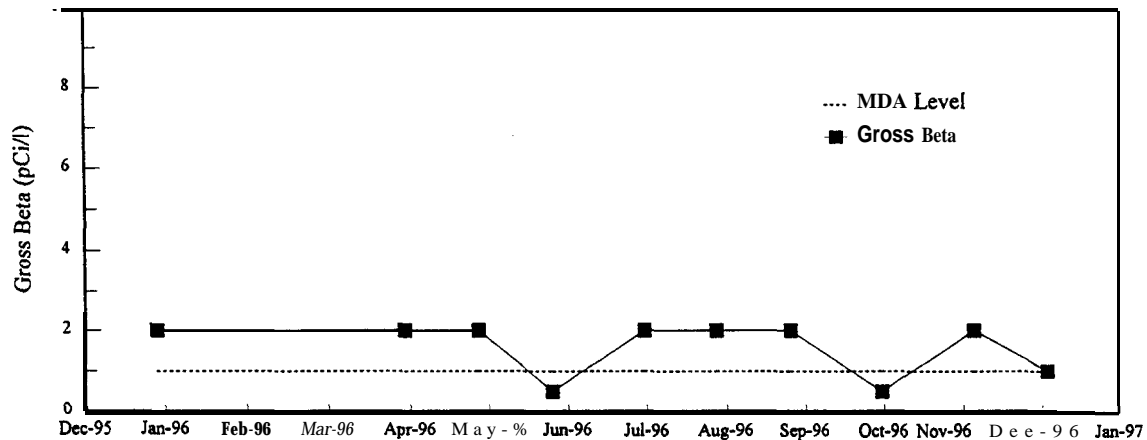


Figure 76

Surface Water Tritium Activity  
Big Rock Point Reactor Site- 1996

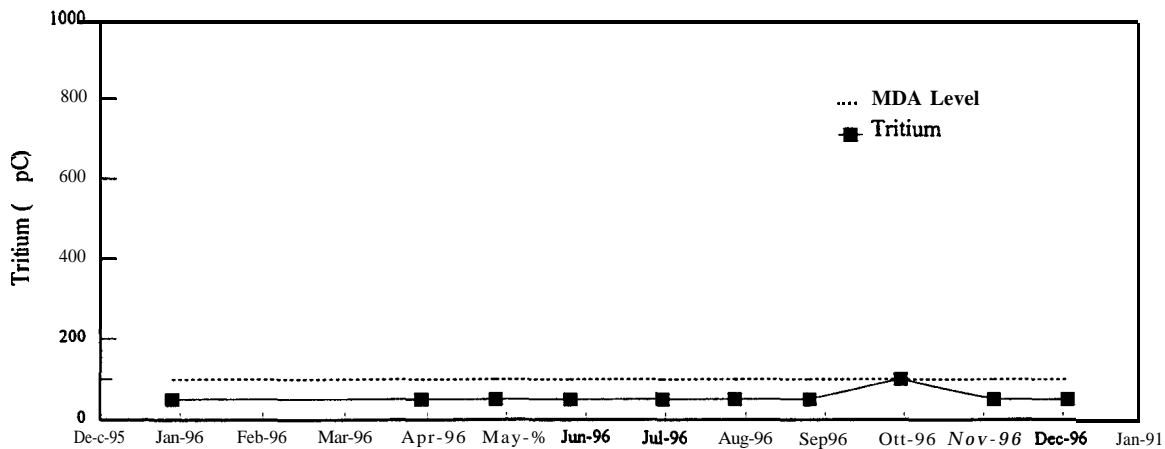




Figure 77

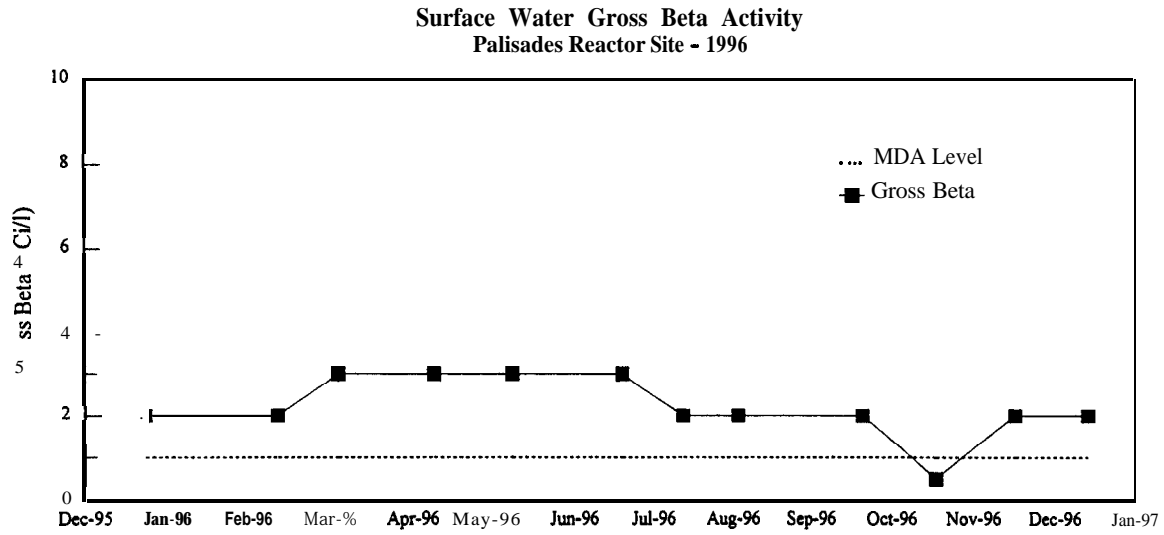


Figure 78

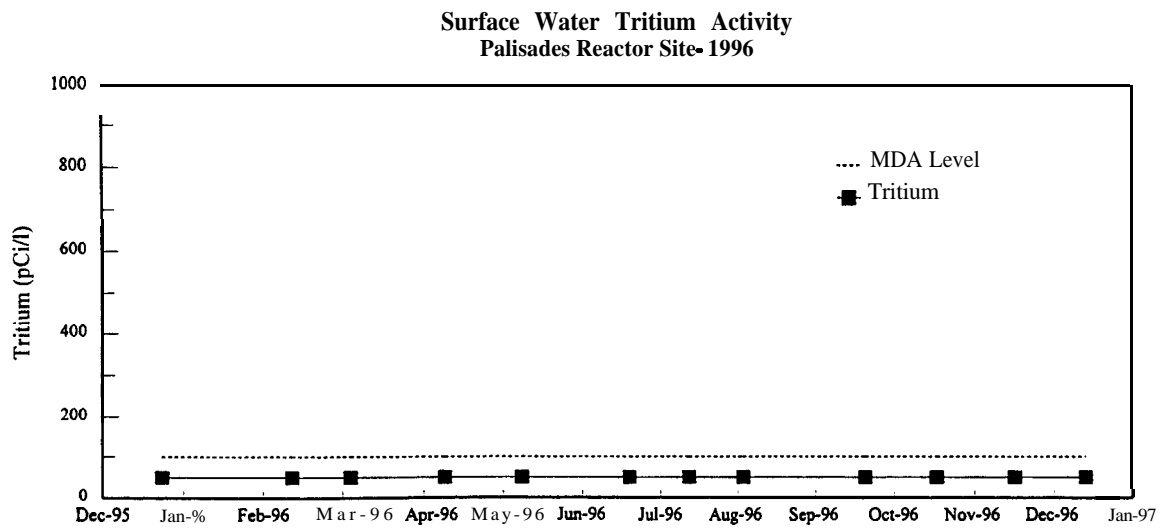


Figure 79

Surface Water Gross Beta Activity  
D. C. Cook 1 Reactor Site • 1996

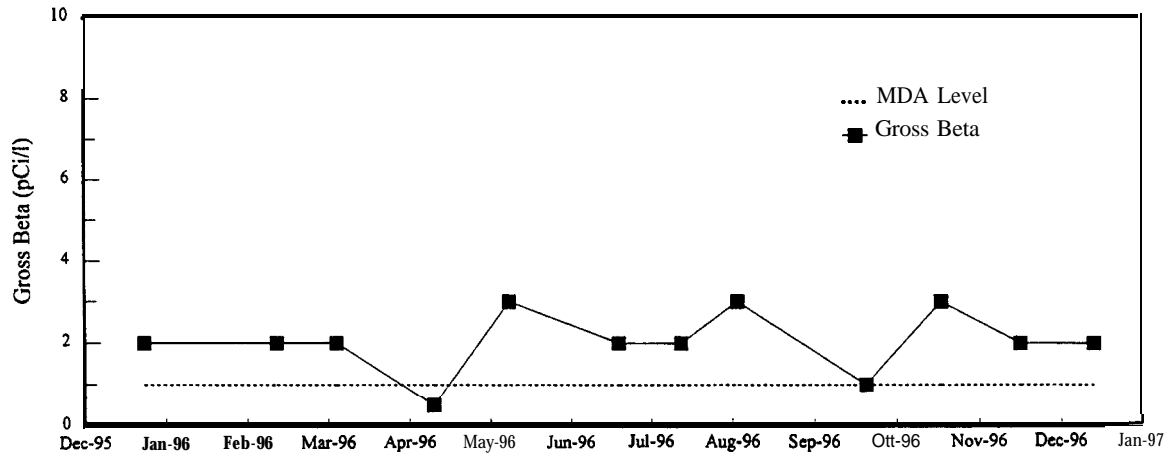


Figure 80

Surface Water Tritium Activity  
D. C. Cook 1 Reactor Site - 1996

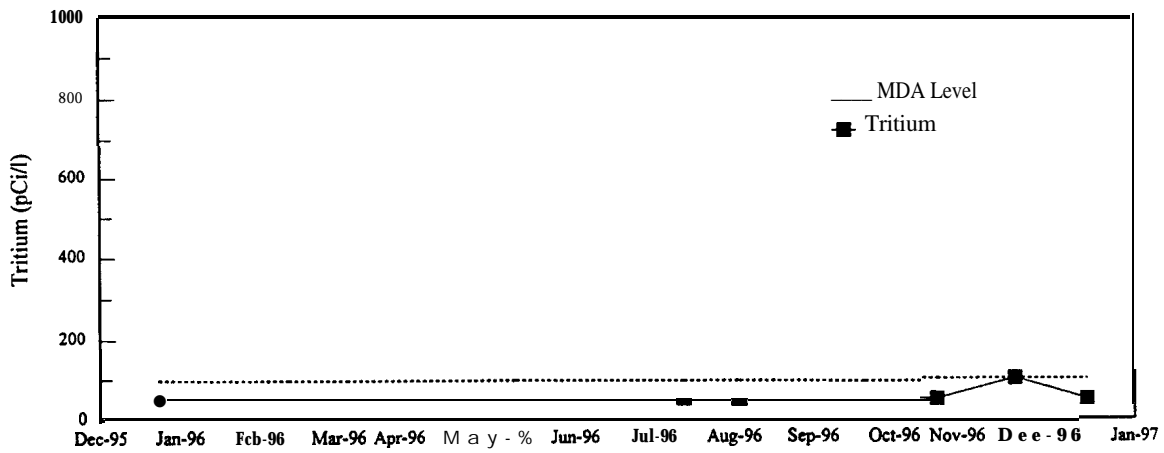


Figure 81

**Surface Water Gross Beta Activity**  
D. C. Cook 2 Reactor Site- 1996

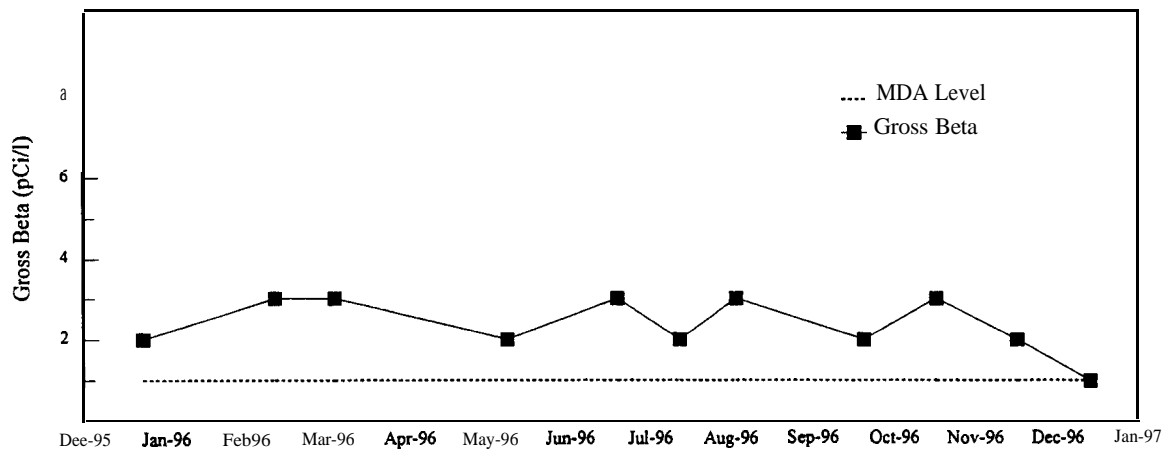


Figure 82

**Surface Water Tritium Activity**  
D. C. Cook 2 Reactor Site- 1996

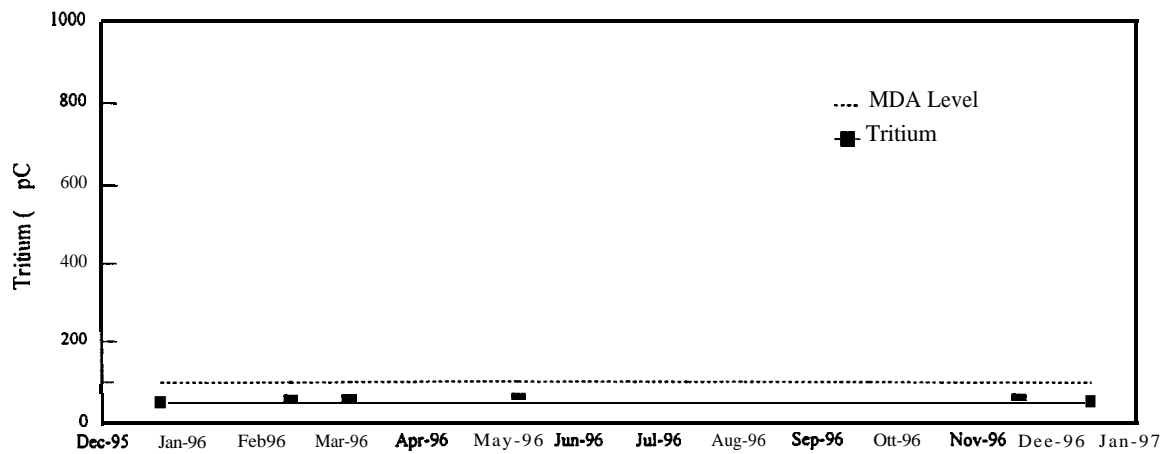


Figure 83

**Surface Water Gross Beta Activity  
Fermi 2 Reactor Site - 1996**

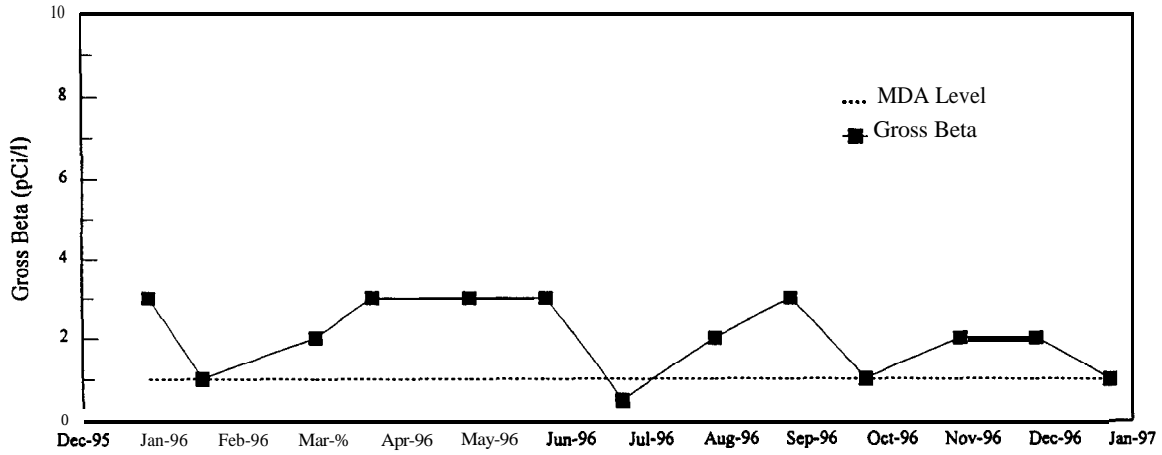


Figure 84

**Surface Water Tritium Activity  
Fermi 2 Reactor Site - 1996**

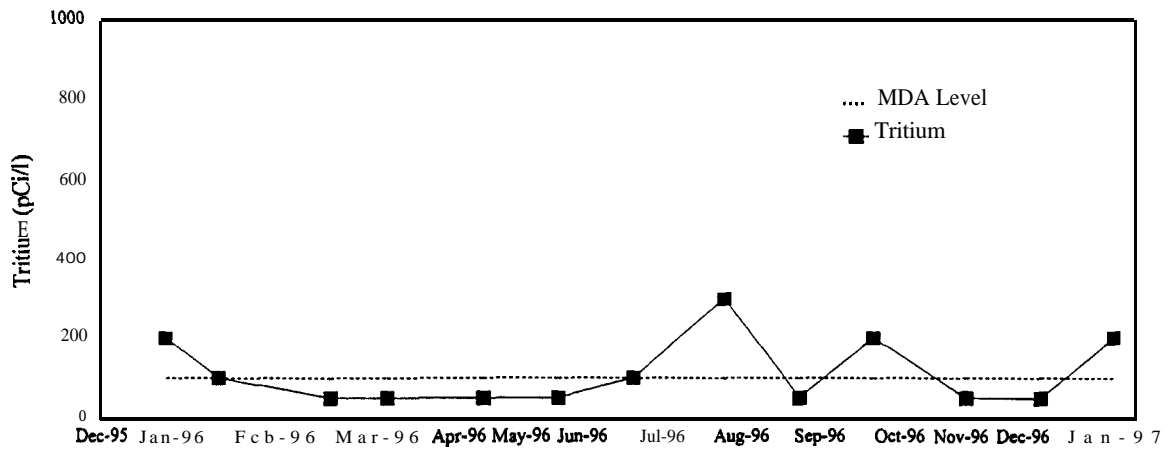


Figure 85

**Surface Water Gross Beta Activity  
Fermi 2 Monroe Intake Site- 1996**

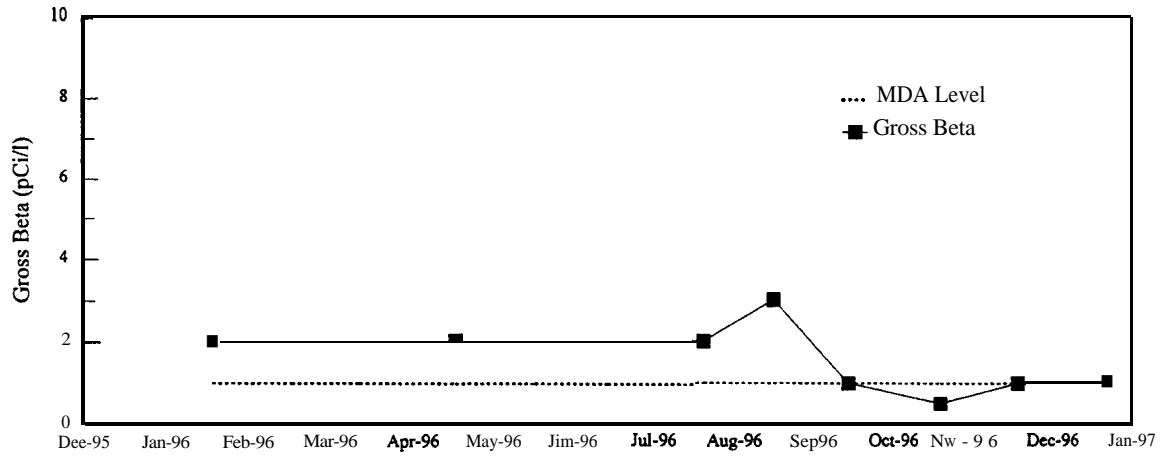


Figure 88

**Surface Water Tritium Activity  
Fermi 2 Monroe Intake Site- 1996**

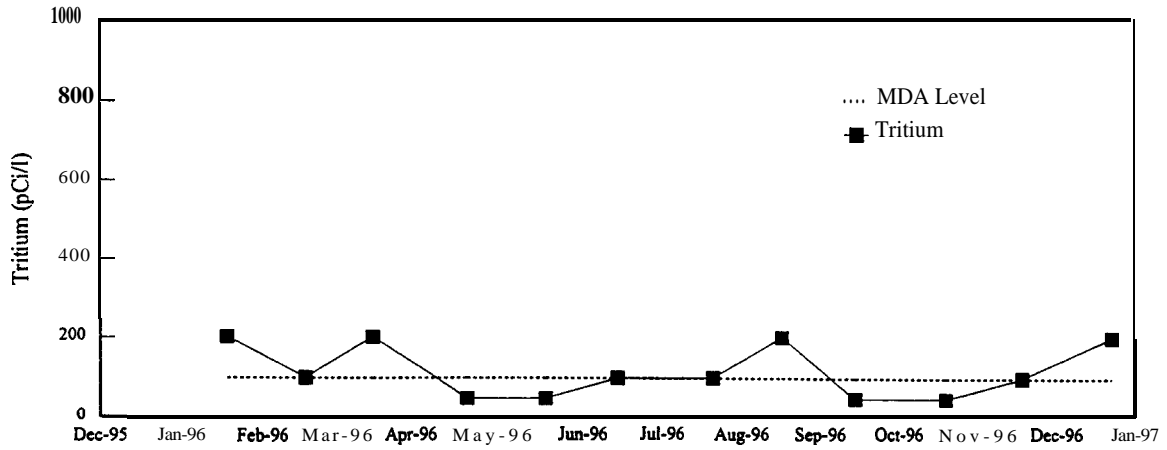


Figure 87

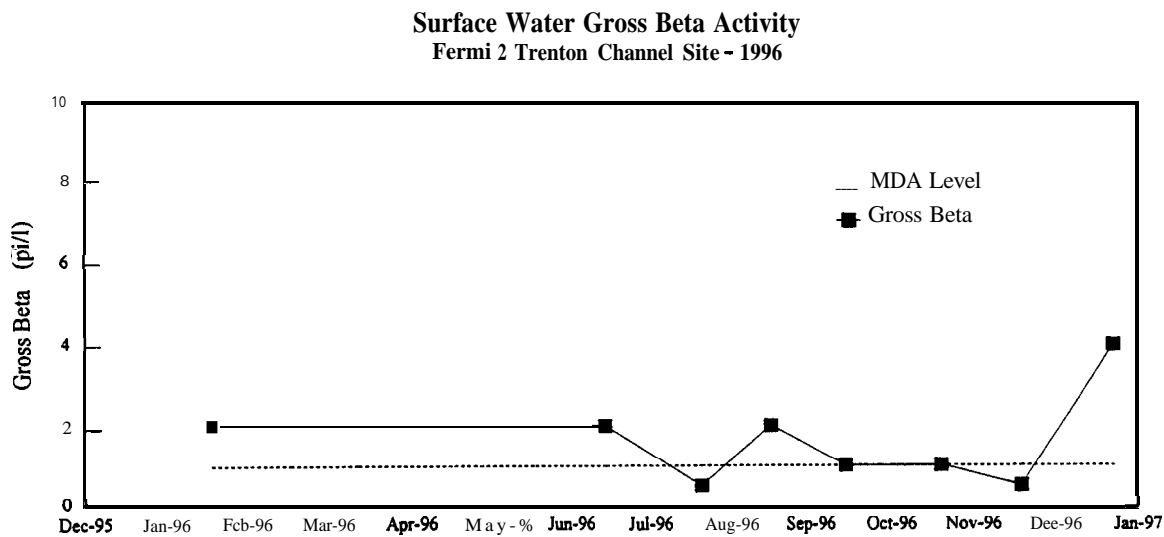


Figure 88

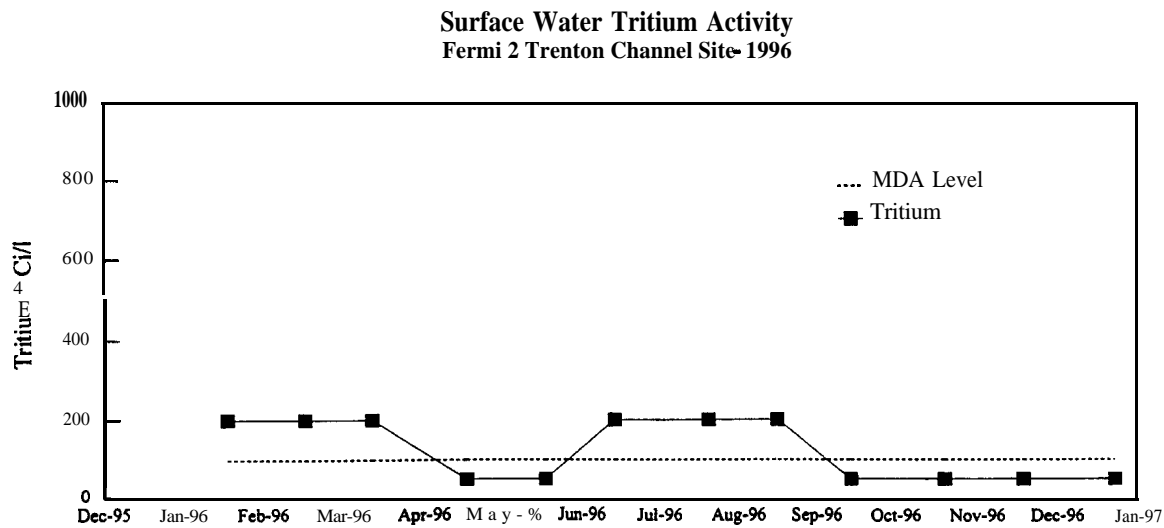


Figure 89

Surface Water Gross Beta Activity  
Fermi 2 Allen Park Intake Site- 1996

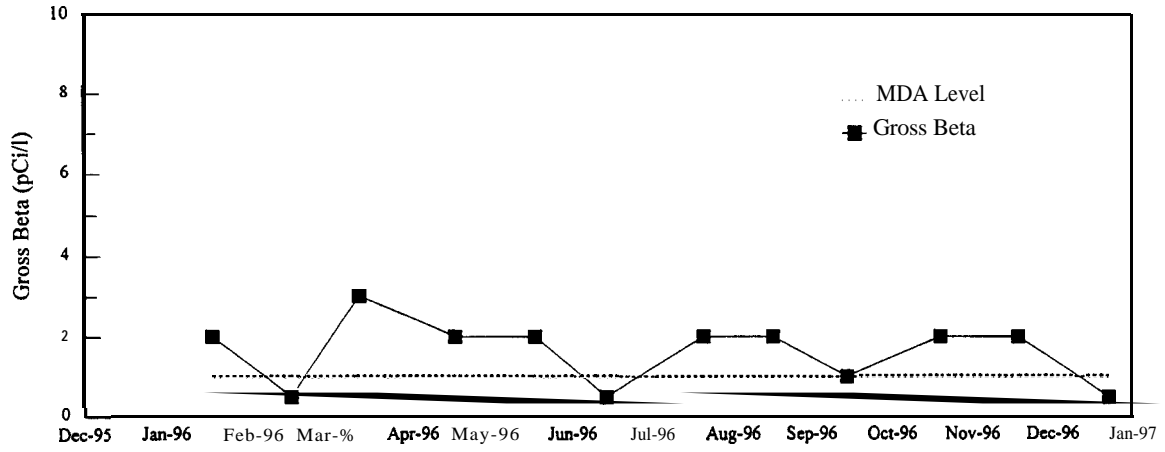


Figure 90

Surface Water Tritium Activity  
Fermi 2 Allen Park Intake Site- 1996

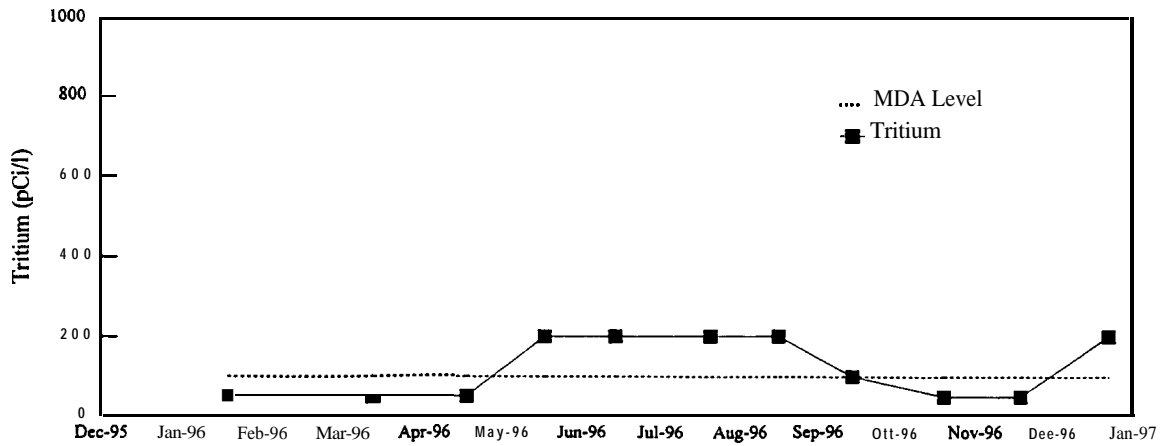


Figure 91

Surface Water Gross Beta Activity  
Fermi 2 Intake Site- 1996

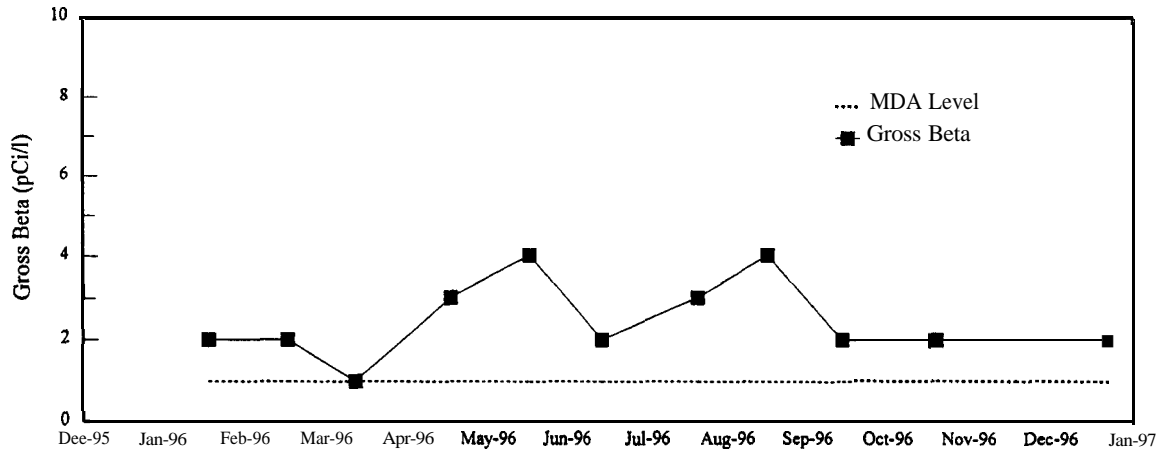
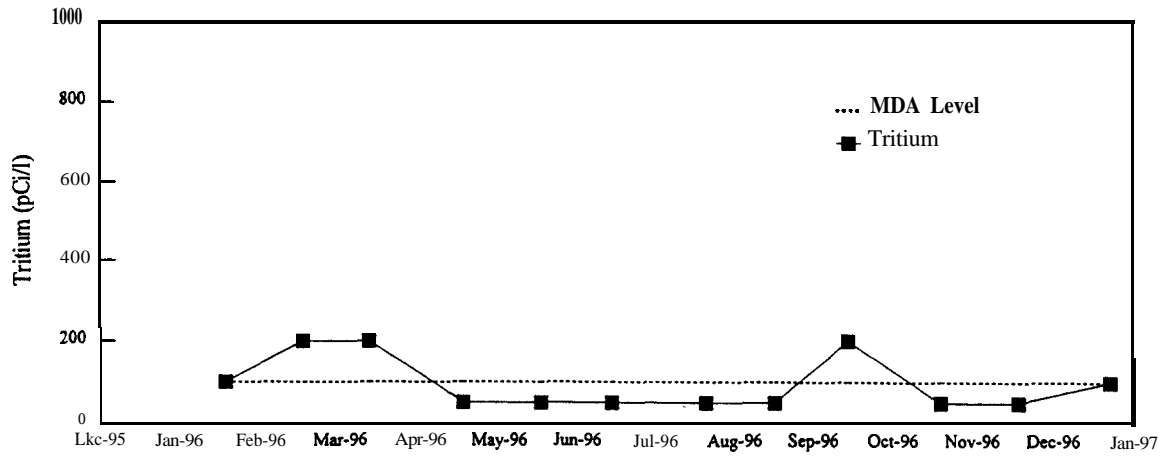


Figure 92

Surface Water Tritium Activity  
Fermi 2 Intake Site- 1996





## Direct Radiation Monitoring

### Sampling Network

The direct radiation monitoring network consists of 33 to 43 measurement sites in the vicinity of each of the four Michigan nuclear power plants and a background reference measurement site in Lansing. Four types of direct radiation dosimeters utilized for the measurements, include: (1) monthly film badge/thermoluminescent dosimeter (TLD) packets from a commercial supplier located at most of the MREMP atmospheric monitoring stations and a few other sites near the nuclear plants, (2) quarterly TLDs from a commercial supplier located on the property of the four nuclear power plants and in Lansing, (3) quarterly glass bulb TLD located at 15 monitoring sites in the vicinity of the Big Rock Point plant and in Lansing, and (4) quarterly TLD from the NRC located in the area surrounding each of the four plant sites. The monthly direct radiation monitoring with film badges was initiated in the fall of 1964 in the vicinities of the Big Rock Point and Fermi plants and at the Lansing background reference site and was expanded to include the Palisades (1968) and Cook (1974) plants. Monthly TLDs were added to the film badge packets in the fall of 1971 and, at the same time, the quarterly TLD monitoring was initiated at the Big Rock Point, Palisades, Fermi, and Lansing sites with the quarterly TLD monitoring for Cook added in 1975. The quarterly glass bulb network was initiated in 1974 for the Big Rock Point plant and in Lansing but, for a variety of reasons, was never expanded to the other three plants. The NRC network of quarterly TLDs were initially placed in the spring of 1981 for the Big Rock Point, Palisades, and Cook plants and was expanded to include the Fermi 2 plant in the summer of 1982.

### Historical Direct Radiation Monitoring Trends

Direct radiation monitoring is a cumulative measure of ionizing radiation over a relatively long period of time, usually one to three months. Direct radiation is comprised of radiation from natural sources such as cosmic radiation from outer space and naturally occurring radionuclides present in the earth's crust, which together make up what is commonly referred to as "natural background" and radiation from man-made sources such as fallout from past nuclear weapons testing or effluents from nuclear power plants. Radiation from both natural and man-made sources interact identically with direct radiation monitoring devices so it cannot be directly determined how much of a contribution comes from either of these sources. Hence long-term trend monitoring is necessary to determine if there is any influence from nuclear power plant operations which stands out significantly from the natural direct radiation background.

Direct radiation monitoring results for monthly film badge/TLD and quarterly TLD, supplied and analyzed by a commercial vendor, are reported in exposure units of milliroentgens (mR) or often converted by a unity factor to dose units of millirem. A minimum reportable level of 10 mR is used by the vendor, so that any commercially supplied dosimeters receiving less than 10 mR during an exposure period would be reported with a less than 10 mR value. Dosimeters receiving greater than 10 mR during the exposure period are rounded to the nearest 10 mR.

Since the inception of the monthly direct radiation monitoring in the fall of 1964, more than one-half of the monthly reports for all network monitoring sites have had all the results reported as less than the minimum exposure of 10 mR. For the months with reported values of greater than or equal to 10 mR, the only apparent trend is for the Big Rock Point plant monitoring site which is located on a fence surrounding the transmission yard within the plant exclusion area less than 100 yards from the reactor. Readings from this site typically are in the range of 10 to 30 mR per month with a occasional 40 or 50 mR, when they are not reported as less than 10 mR. The site's close proximity to the reactor subjects dosimeters at the site to direct radiation from both the stack effluent and the plant buildings, explaining the detectable readings.

All of the other monthly film badge/TLD monitoring sites in the network have had monthly direct radiation exposures reported that were greater than the minimum reading, but no trends were discernible for any of the sites. Often when a reading of greater than 10 mR was reported, there would be readings of greater than 10 mR reported for all the stations at one plant or all the stations in the network for the same month including the low background control dosimeters, which are stored in a lead shield during the month.

Further compounding the reliability of the monthly film badge/TLD packets is that excess heat (dosimeters placed directly in the sun during summer months) can and does produce reportable exposures above the minimum value for the film badges. After careful examination of more than 34 years of monthly direct radiation monitoring network results, it was decided to discontinue this portion of the program, pending the planned implementation of a replacement direct radiation monitoring system expected to occur in 1998.

The commercial quarterly direct radiation monitoring TLD network of sites exhibited virtually the same results as the commercial monthly network, with only the Big Rock Point plant site having a discernible trend of elevated readings. Typical quarterly TLD exposures reported for the Big Rock Point plant site were in the 30 to 50 mR range when not reported as a less than minimum value. Again, more than half of the quarterly reports from the commercial supplier, since the network was established in 1971, showed no monitoring sites with exposure readings at or above the minimum 10 mR value. Overall, reliability of the commercially supplied quarterly TLD was slightly better than the monthly film badge/TLD, but it still does not meet the program's needs and will also be replaced in early 1998.

The Big Rock Point glass bulb TLD network, which has been operational since 1974, showed a similar trend for the monitoring site on the fence of the Big Rock Point plant transmission yard, as did the commercially supplied monthly and quarterly dosimeters. The network of 15 monitoring sites (one within 100 yards of the reactor, six others on plant property between  $\frac{1}{4}$  and  $\frac{1}{2}$  miles from the reactor, and eight more scattered around in the plant vicinity between 1 and 10 miles from the plant) initially produced realistic results. In the early years of operation, the transmission yard fence site consistently showed from 30 to 60 mR per quarter, while the other 14 sites showed 10 to 15 mR per quarter with no discernible differences between the 14 sites. Over the years, the transmission yard monitoring site continued to be about two to six times higher than the other 14 sites, but the quarterly readings for all 15 sites slowly drifted upward by a factor of between two and three times. By 1996, the transmission yard site consistently showed quarterly readings of over 100 mR, and the other 14 sites were consistently in the 60 to 100 mR per quarter range. A thorough examination of the glass bulb dosimeter system revealed that the dosimeter reader was the culprit, and that it was not worth the time or resources to repair. Since the use of the glass bulb dosimeter system had never been expanded to include the other three plant sites, and since a new direct radiation monitoring system was already being planned to replace the faulty commercial monitoring systems, it was decided to terminate the glass bulb system.

The NRC's direct radiation monitoring around the four Michigan nuclear power plant sites has been in operation for more than 15 years and has produced very consistent and reliable results. Under an ongoing contract with the NRC, the Michigan Department of Environmental Quality performs the dosimeter field exchange services for dosimeters supplied and analyzed by the NRC. One hundred and ten NRC monitoring sites (21 for Big Rock Point, 24 for Palisades, 24 for D. C. Cook, and 41 for Fermi 2) are used each quarter for direct radiation monitoring in the vicinity of the four plants, with the NRC reporting the measurement results in net mR per standard quarter (ninety days) and no censoring of the results with a minimum reporting cutoff value, as done by the commercial dosimeter supplier. To examine historical direct radiation trends for the four plants, quarterly averages were calculated for all dosimeters between 0-2 miles, 2-5 miles, and greater than 5 miles from each plant and for the upwind control dosimeters for each plant, with the results displayed in Figures 93-96. Examination of the four figures reveals similar decreasing trends for the Big Rock Point, Palisades, and D. C. Cook plants, (which seems to parallel trends observed with other types of samples previously discussed in the report) while the Fermi 2 plant results remain relatively flat over the 15-year period. Looking at results for each plant, as a function of distance, reveals very similar and consistent patterns with no definite trend that could be attributed to nuclear plant operations for any of the four plants. Also, it can be noted that almost all the 90 days quarterly average results for all four plants are within the range of 10 to 20 mR. The 10 to 20 mR range is equivalent to an exposure rate of 5 to 10  $\mu\text{R/hr}$  which is a typical background direct radiation exposure rate in Michigan and further supports the conclusion that the results do not indicate any statistically significant influence from nuclear plant operations.

## Pm-Operational Direct Radiation Monitoring

### Big Rock Point, Palisades, and D. C. Cook

For two reasons, the pre-operational direct radiation monitoring assessment for the Big Rock Point, Palisades, and D. C. Cook plant cannot be done in any meaningful manner. First, the monthly film badge/TLD and the quarterly TLD's from the commercial supplier, which have been used for the longest period of time at all three plants, have not produced reliable results and were also reported in the censored format, which does not accommodate central tendency calculations which are used for comparison with current operational results. Second, since the initiation of the NRC TLD program in the early 1980s (several years after all three of these plants became operational), the measurement data from this program could not be realistically used for pre-operational comparisons.

### Fermi 2

The NRC TLD results for 1983 and 1984 will be used for the pre-operational baseline data for the Fermi 2 plant. Two-year average exposure levels for all dosimeters between 0-2 miles, 2-5 miles, greater than 5 miles, and for the upwind control dosimeters are summarized in Table 31. In Table 32 are the two-year averages for all dosimeters in the standard 22.5 degree compass sectors that are not covering the water of Lake Erie. There were no unusual results for any of the individual monitoring sites during the baseline assessment period.

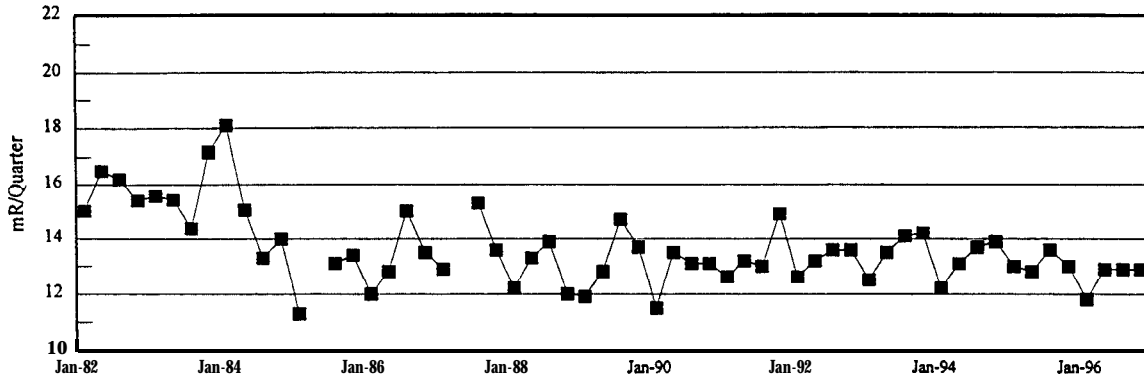
Table 31 <b>1983-84 FERMI 2 DIRECT RADIATION AVERAGES BY DISTANCE</b>	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	16.0 ± 2.0
2-5	16.4 ± 1.4
>5	15.2 ± 1.4
Unwind Control	14.6 ± 0.6

Table 32 <b>1983-84 FERMI 2 DIRECT RADIATION AVERAGES BY DIRECTION</b>	
Compass Direction (22.5° Sector)	Average Exposure (mR)
N	16.4 ± 1.3
NNE	15.9 ± 1.8
NE	14.4 ± 1.8
	15.5 ± 0.8
SSW	16.1 ± 1.1
SW	15.5 ± 1.7
WSW	15.5 ± 1.4
W	15.9 ± 1.6
WNW	16.1 ± 1.1
NW	15.8 ± 1.1
NNW	15.6 ± 1.5

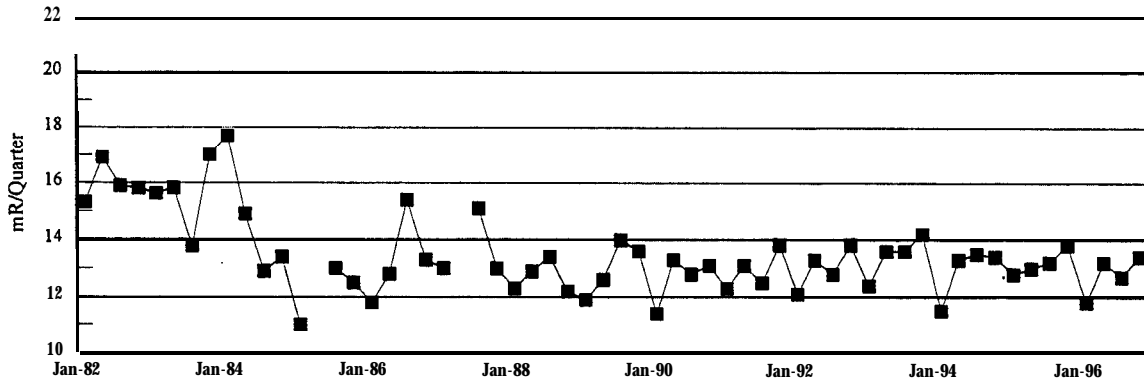


Figure 93

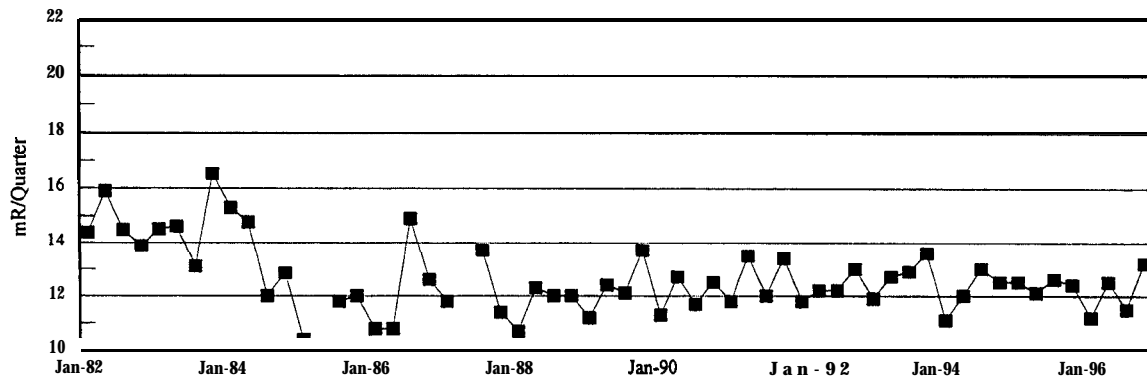
Quarterly Direct Radiation  
Big Rock Point Plant (0-2 Miles)



Quarterly Direct Radiation  
Big Rock Point Plant (2-5 Miles)



Quarterly Direct Radiation  
Big Rock Point Plant (>5 Miles)



Quarterly Direct Radiation  
Big Rock Point Plant (Upwind Control)

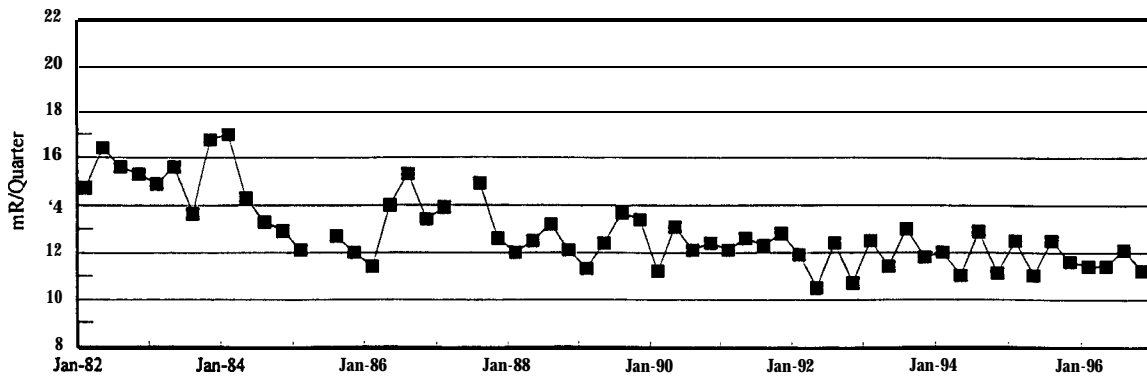
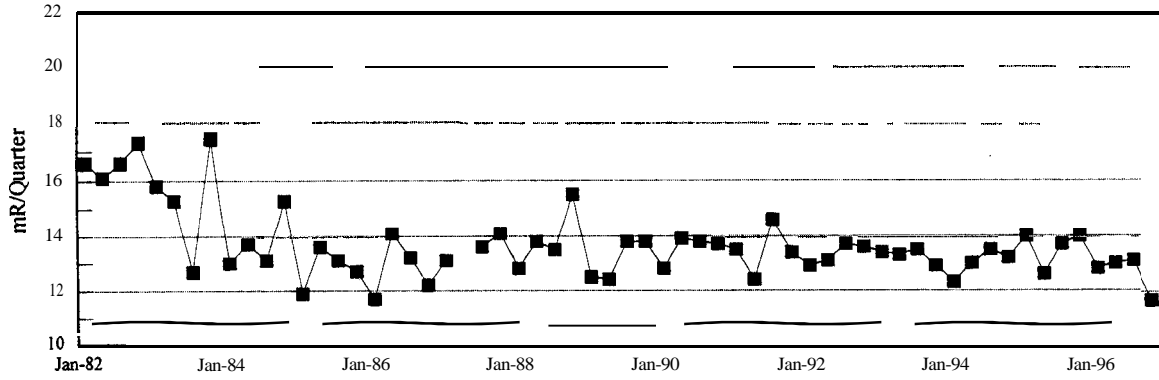
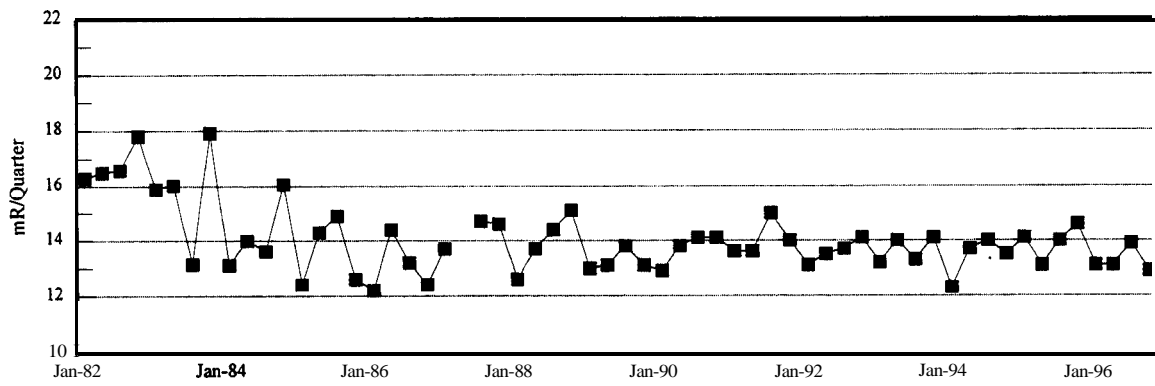


Figure 94

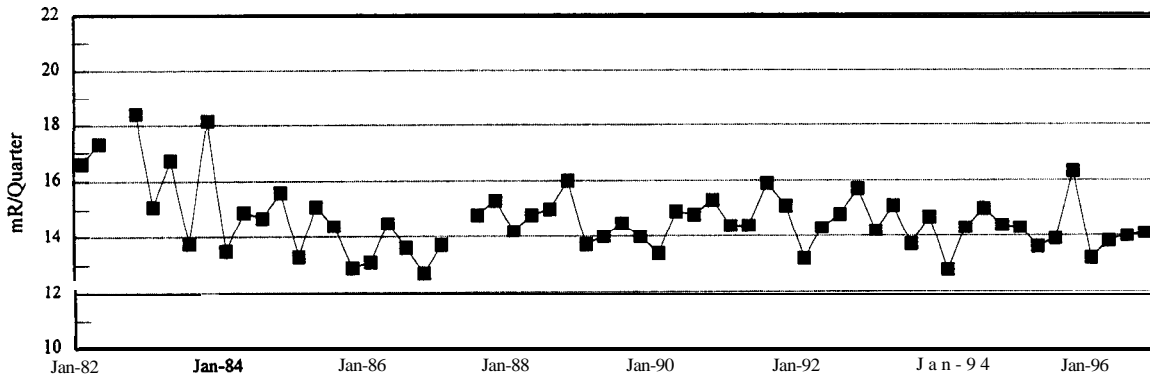
Quarterly Direct Radiation  
Palisades Plant (0-2 Miles)



Quarterly Direct Radiation  
Palisades Plant (2-5 Miles)



Quarterly Direct Radiation  
Palisades Plant (>5 Miles)



Quarterly Direct Radiation  
Palisades Plant (Upwind Control)

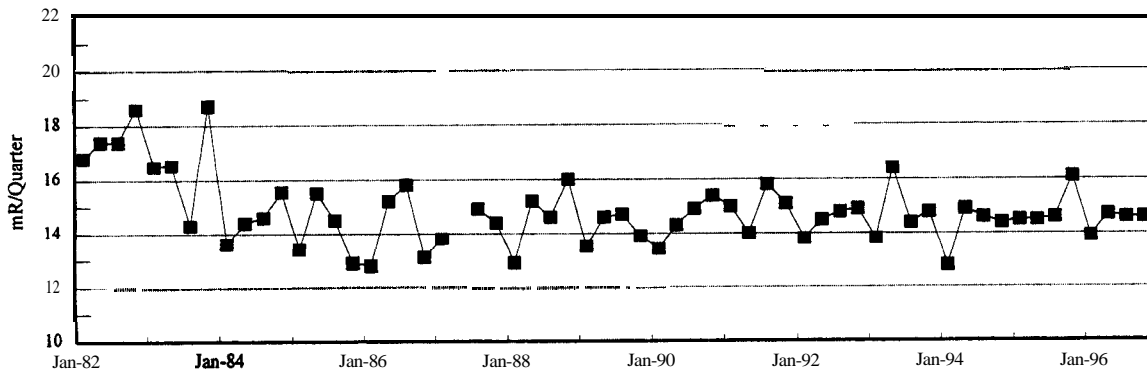
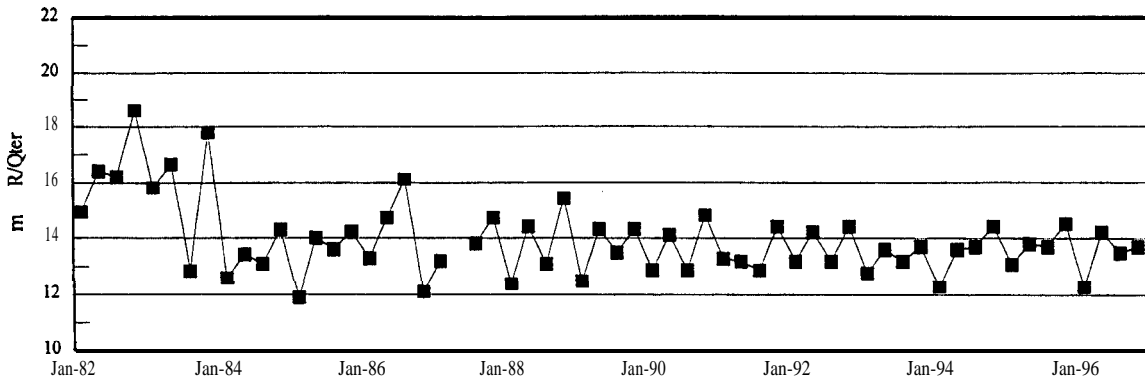
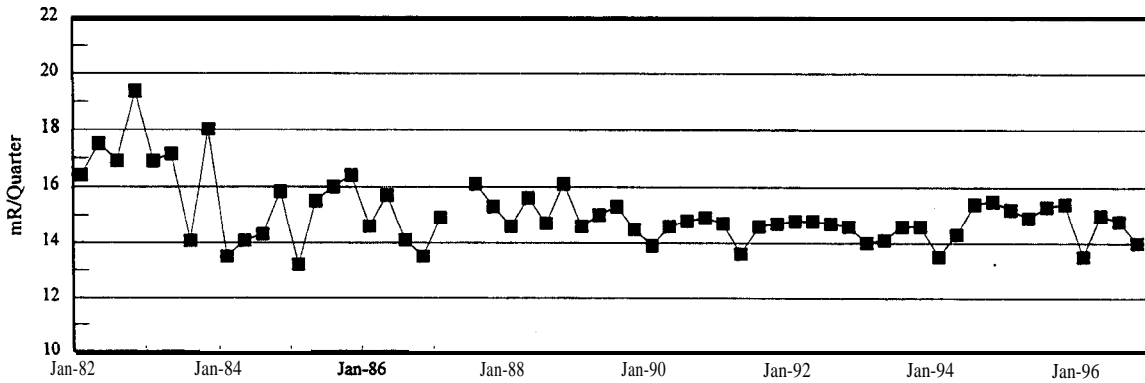


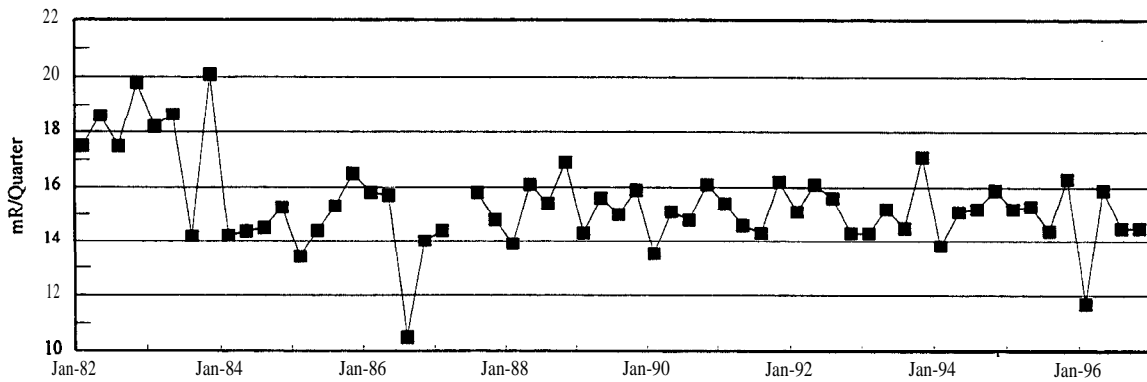
Figure 95  
**Quarterly Direct Radiation**  
 D. C. Cook Plant (0-2 Miles)



**Quarterly Direct Radiation**  
 D. C. Cook Plant (2-5 Miles)



**Quarterly Direct Radiation**  
 D. C. Cook Plant (≥5 Miles)



**Quarterly Direct Radiation**  
 D. C. Cook Plant (Upwind Control)

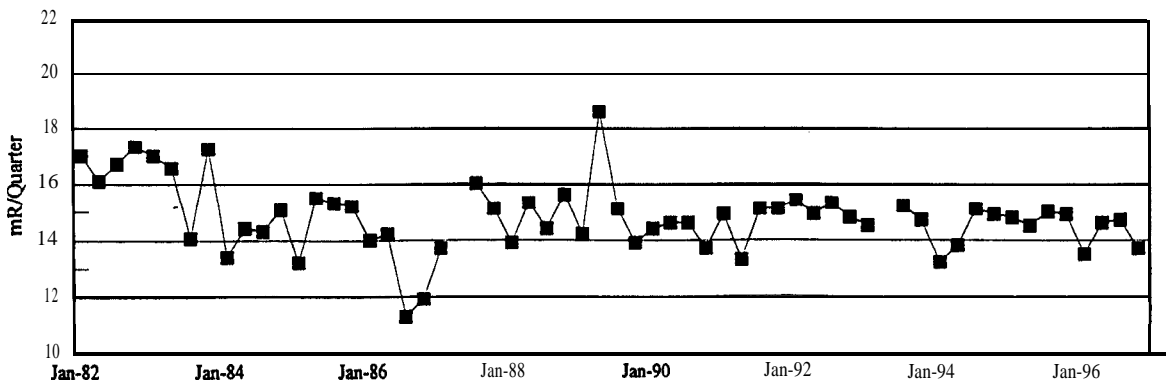
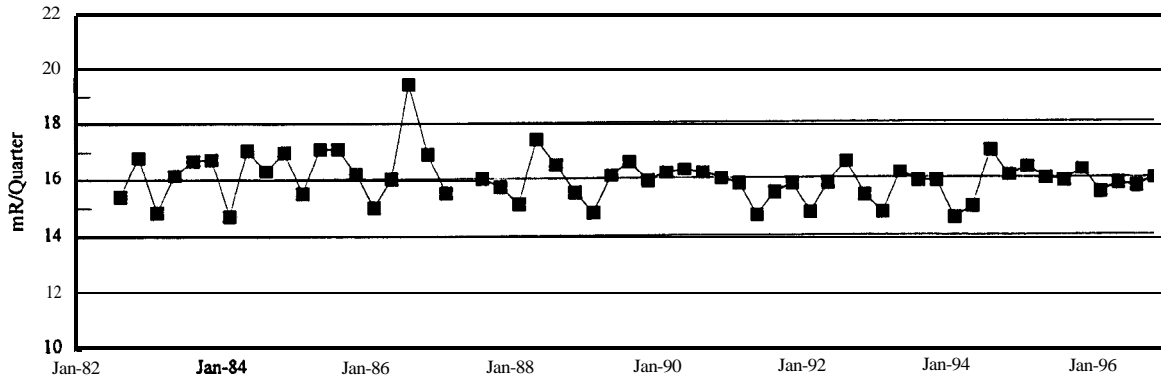
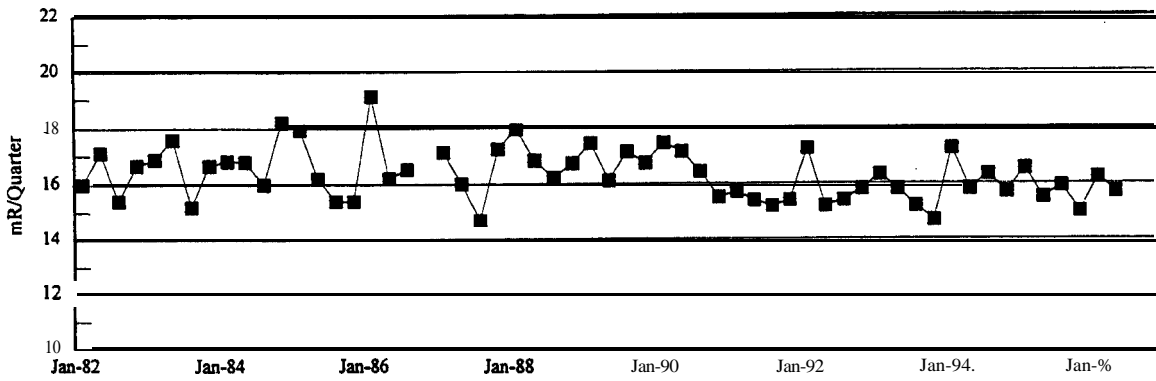


Figure 96

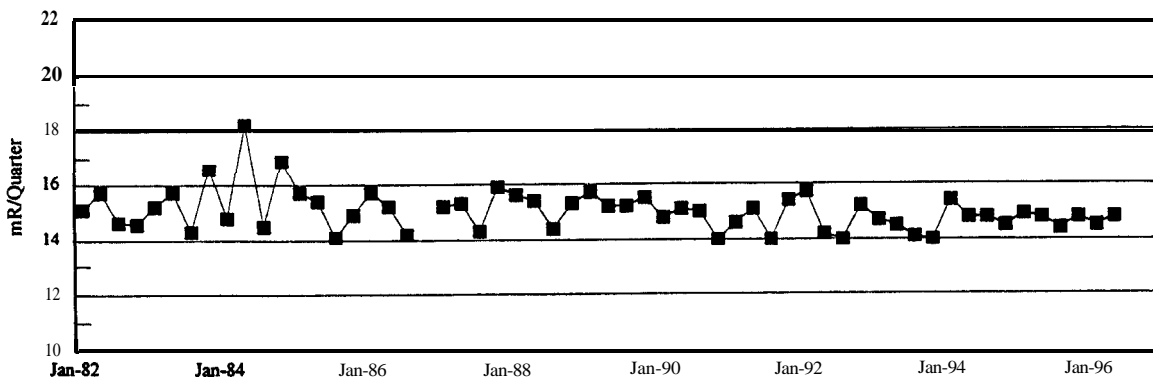
**Quarterly Direct Radiation**  
Fermi 2 Plant (0-2 Miles)



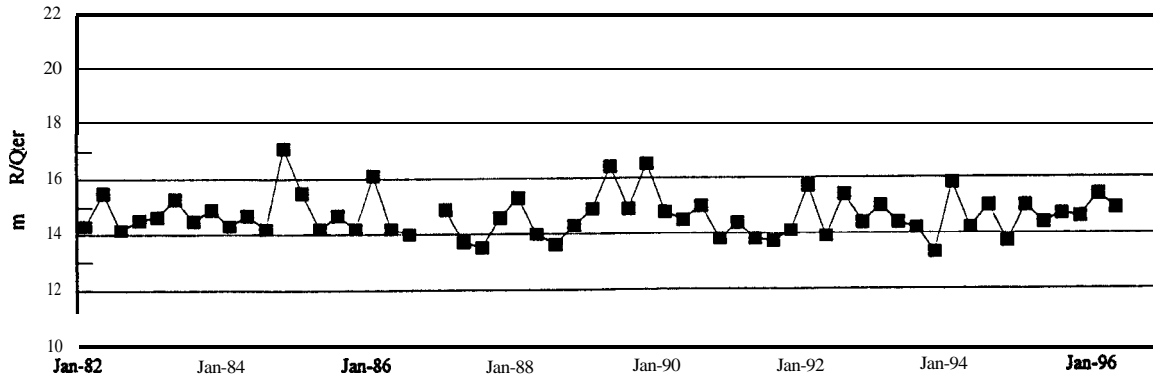
**Quarterly Direct Radiation**  
Fermi 2 Plant (2-5 Miles)



**Quarterly Direct Radiation**  
Fermi 2 Plant (>5 Miles)



**Quarterly Direct Radiation**  
Fermi 2 Plant (Upwind Control)





## 1995 Direct Radiation Monitoring

The 1995 direct radiation results for all four Michigan nuclear power plant sites were consistent with results from previous years with no unusual anomalies. Details of the 1995 direct radiation monitoring results for each of the four plants are discussed below. Figures 97-100 at the end of this section show the quarterly exposure measurement results as a function of distance from the plant followed by Figures 101-104, which show the 1995 results as a function of direction, and a tabular presentation of the measurements results for 1995 is presented in Appendix D.

### Bia Rock Point

Collectively, the NRC quarterly TLD results for 1995 were, on the average, the lowest of the four plants which is consistent with the atmospheric monitoring results. The average of all measurements taken at the 21 monitoring sites during 1995 was 12.9 mR. The 1995 annual averages as a function of distance and compass direction are presented in Tables 33 and 34, respectively.

Table 33 1995 BIG <b>ROCK POINT</b> DIRECT RADIATION AVERAGES BY DISTANCE	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	13.1 ± 1.2
2-5	13.2 ± 1.1
>5	12.4 ± 0.2
Upwind Control	11.9 ± 0.8

Table 34 1995 BIG <b>ROCK POINT</b> DIRECT RADIATION AVERAGES BY COMPASS DIRECTION	
Compass Direction (22.5° Sector)	Average Exposure (mR)
ENE	11.8 ± 0.4
E	12.7 ± 0.5
ESE	14.1 ± 1.0
SE	14.2 ± 1.0
SSE	12.4 ± 0.6
S	12.9 ± 0.6
SSW	13.4 ± 1.0
SW	12.3 ± 1.5

### Palisades

NRC direct radiation for the Palisades plant consisted of 24 monitoring sites during 1995. The average of all direct radiation measurements taken at the 24 monitoring sites during 1995 was 13.9 mR, and the annual average direct radiation levels as a function of distance from the plant and compass direction are presented in Tables 35 and 36, respectively.

Table 35 1995 <b>PALISADES</b> DIRECT RADIATION AVERAGES BY DISTANCE	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	13.6 ± 1.1
2-5	13.9 ± 1.5
>5	14.3 ± 1.2
Upwind Control	14.9 ± 0.9

Compass Direction (22.5° Sector)	Average Exposure (mR)
NNE	14.1 ± 1.5
NE	14.7 ± 1.9
ENE	13.6 ± 1.3
F	13.5 ± 1.5
ESE	14.5 ± 0.7
SE	13.8 ± 1.0
SSE	13.8 ± 1.2
S	13.2 ± 1.0
SSW	13.3 ± 0.7

### D. C. Cook

NRC direct radiation for the Cook plant consisted of 24 monitoring sites during 1995. The average of all direct radiation measurements taken at the 24 monitoring sites during 1995 was 14.6 mR, and the annual average direct radiation levels as a function of distance from the plant and compass direction are presented in Tables 37 and 38, respectively.

Distance From the Reactor (miles)	Average Exposure (mR)
0-2	13.8 ± 1.5
2-5	15.2 ± 1.8
>5	15.3 ± 2.4
Upwind Control	14.8 ± 0.6

Compass Direction (22.5° Sector)	Average Exposure (mR)
NNE	14.7 ± 2.2
NE	14.7 ± 1.4
ENE	14.4 ± 1.7
E	13.2 ± 0.8
ESE	15.4 ± 1.0
SE	15.4 ± 2.5
SSE	16.5 ± 2.0
S	14.8 ± 2.1
SSW	13.3 ± 0.5

### Fermi 2

Collectively, the NRC quarterly TLD results for 1995 were, on the average, the highest of the four plants with an average of all measurements taken at the 41 monitoring sites during 1995 of 15.5 mR. The 1995 annual averages as a function of distance from the plant and compass direction were almost the same as they were during the pre-operational baseline period and are presented in Tables 39 and 40, respectively.

Table 39 1995 FERMII 2 DIRECT RADIATION AVERAGES BY DISTANCE	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	16.1 ± 1.9
2-5	16.0 ± 2.4
>5	14.8 ± 1.8
Upwind Control	14.6 ± 1.1

Table 40 1995 FERMII 2 DIRECT RADIATION AVERAGES BY COMPASS DIRECTION	
Compass Direction (22.5° Sector)	Average Exposure (mR)
N	16.6 ± 3.0
NNE	15.3 ± 2.3
NE	11.1 ± 0.5
S	16.5 ± 1.0
SSW	15.9 ± 0.1
SW	15.2 ± 1.9
WSW	14.3 ± 1.1
W	16.3 ± 2.4
WSW	15.6 ± 1.1
NW	15.7 ± 1.3
NNW	15.8 ± 1.3

### 1996 Direct Radiation Monitoring

The 1996 direct radiation results for all four Michigan nuclear power plant sites were consistent with results from previous years with no unusual anomalies. Details of the 1996 direct radiation monitoring results for each of the four plants are discussed below. Figures 97-100 at the end of this section show the quarterly exposure measurement results as a function of distance from the plant followed by Figures 105-108, which show the 1996 results as a function of direction, and a tabular presentation of the measurements results for 1996 is presented in Appendix D.

#### Bia Rock Point

As in 1995, the Big Rock Point plant quarterly TLD results for 1996 were the lowest of the four plants with an average of all measurements taken at the 21 monitoring sites during 1996 of 12.5 mR. The 1995 annual averages as a function of distance from the plant and compass direction are presented in Tables 41 and 42, respectively.

Table 41 1996 BIG ROCK POINT DIRECT RADIATION AVERAGES BY DISTANCE	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	12.6 ± 1.3
2-5	12.8 ± 1.2
>5	12.1 ± 0.9
Upwind Control	11.5 ± 0.6

Compass Direction (22.50 Sector)	Average Exposure (mR)
ENE	11.7 ± 0.6
E	12.7 ± 1.1
ESE	13.1 ± 1.4
SE	13.3 ± 0.9
SSE	11.8 ± 1.0
S	12.4 ± 0.7
SSW	13.0 ± 1.3
SW	11.8 ± 0.5

### Palisades

Direct radiation monitoring for the Palisades plant consisted of 24 NRC sites during 1996. The average of all direct radiation measurements taken at the 24 monitoring sites during 1996 was 13.2 mR and the annual average direct radiation levels as a function of distance from the plant and compass direction are presented in Tables 43 and 44, respectively.

Distance From the Reactor (miles)	Average Exposure (mR)
0-2	12.7 ± 1.2
2-5	13.2 ± 1.3
>5	13.8 ± 0.7
Upwind Control	14.4 ± 0.5

Compass Direction (22.5' Sector)	Average Exposure (mR)
NNE	13.4 ± 1.3
NE	14.0 ± 1.6
ENE	12.6 ± 1.0
E	12.8 ± 1.5
ESE	14.1 ± 1.0
SE	12.9 ± 1.2
SSE	13.2 ± 1.0
S	12.2 ± 1.0
SSW	12.6 ± 0.8

### D. C. Cook

NRC direct radiation for the Cook plant consisted of 24 monitoring sites during 1996. The average of all direct radiation measurements taken at the 24 monitoring sites during 1996 was 14.0 mR and the annual average direct radiation levels as a function of distance from the plant and compass direction are presented in Tables 45 and 46, respectively.

Table 45 <b>1996 D. C. COOK DIRECT RADIATION AVERAGES BY DISTANCE</b>	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	13.4 ± 1.7
2-5	<b>14.3 ± 1.8</b>
>5	14.5 ± 2.7
Upwind Control	14.2 ± 0.7

Table 46 <b>1996 D. C. COOK DIRECT RADIATION AVERAGES BY COMPASS DIRECTION</b>	
Compass Direction (22.5° Sector)	Average Exposure (mR)
NNE	13.8 ± 2.4
NE	<b>13.9 ± 1.0</b>
ENE	13.9 ± 2.2
E	<b>12.8 ± 1.0</b>
ESE	<b>14.9 ± 1.0</b>
SE	14.9 ± 2.2
SSE	15.7 ± 1.8
<b>S</b>	14.1 ± 1.8
<b>SSW</b>	12.5 ± 0.7

Fermi 2

The NRC quarterly TLD results for 1996 were again, on the average, the highest of the four plants with an average of all measurements taken at the 41 monitoring sites during 1996 of 15.3 mR. The 1996 annual averages as a function of distance from the plant and compass direction were almost the same as they were during the pre-operational baseline period and are presented in Tables 47 and 48, respectively.

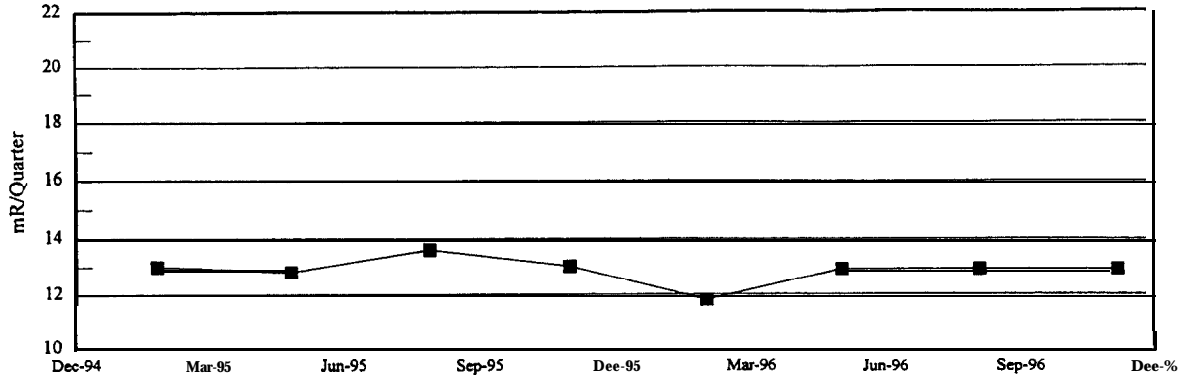
Table 47 <b>1996 FERMI 2 DIRECT RADIATION AVERAGES BY DISTANCE</b>	
Distance From the Reactor (miles)	Average Exposure (mR)
0-2	<b>15.8 ± 1.8</b>
2-5	15.7 ± 2.3
>5	14.6 ± 1.5
Upwind Control	14.9 ± 0.9

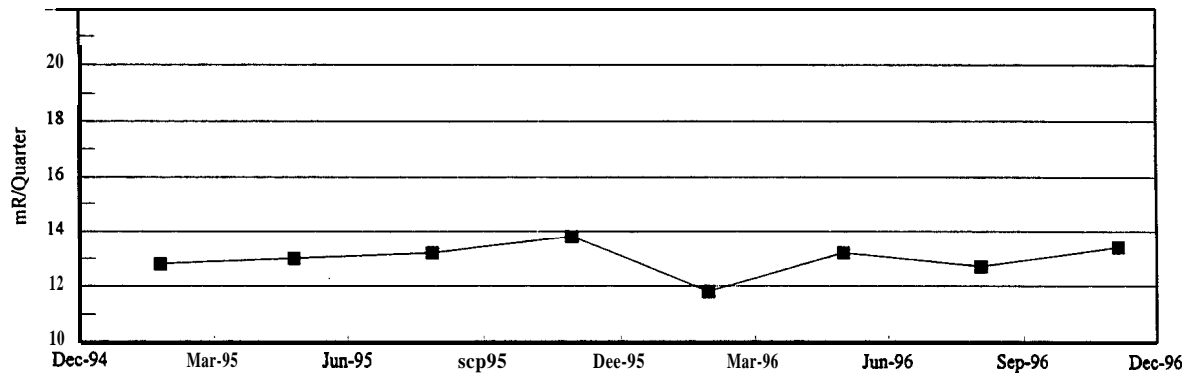
Table 48 <b>1996 FERMI 2 DIRECT RADIATION AVERAGES BY COMPASS DIRECTION</b>	
Compass Direction (22.5° Sector)	Average Exposure (mR)
N	16.2 ± 2.7
NNE	15.0 ± 2.2
NE	12.1 ± 0.7
S	16.2 ± 0.4
<b>SSW</b>	14.9 ± 0.6
<b>SW</b>	<b>15.3 ± 1.8</b>
<b>WSW</b>	14.4 ± 1.0
W	<b>16.5 ± 2.4</b>
<b>WSW</b>	15.3 ± 0.8
NW	14.8 ± 1.3
NNW	15.3 ± 1.0



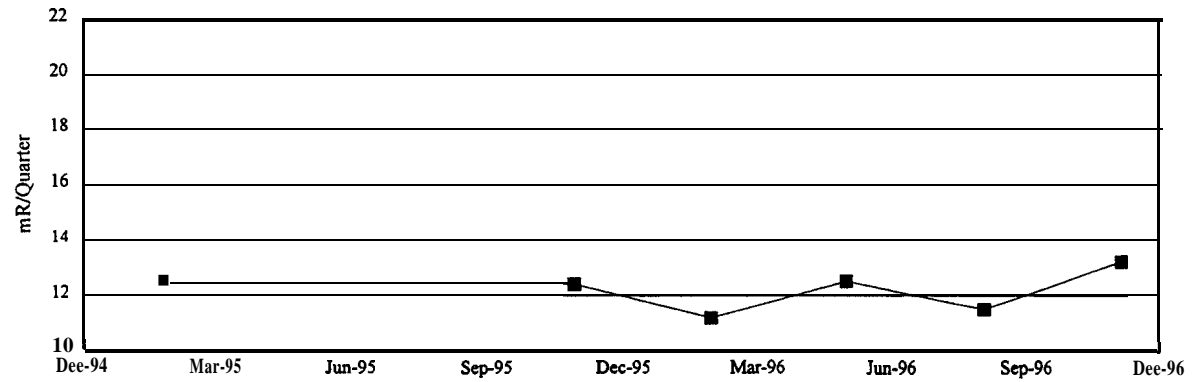
Figure 97  
 Quarterly Direct Radiation  
 Big Rock Point Plant (0-2 Miles)



Quarterly Direct Radiation  
 Big Rock Point Plant (2-5 Miles)



Quarterly Direct Radiation  
 Big Rock Point Plant (>5 Miles)



Quarterly Direct Radiation  
 Big Rock Point Plant (Upwind Control)

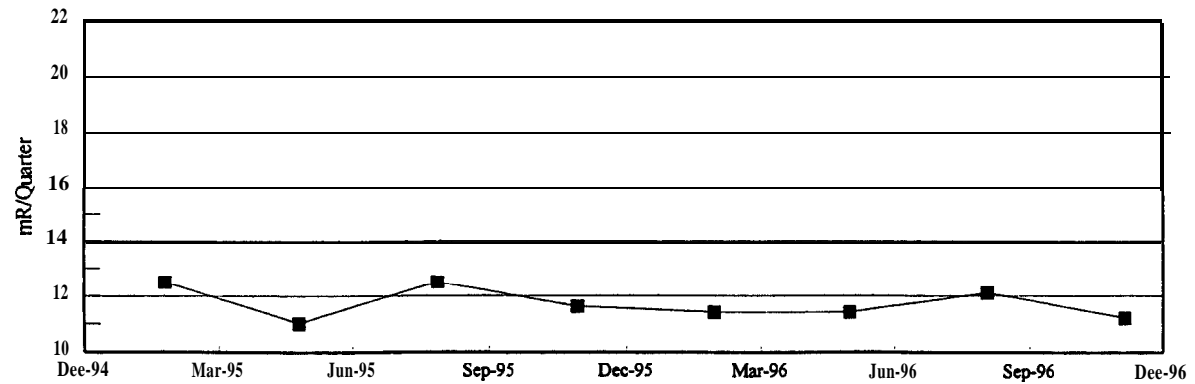
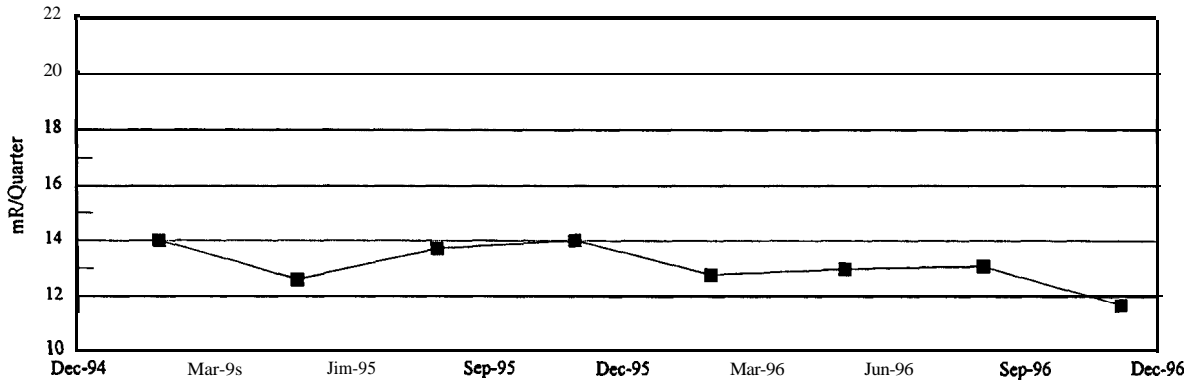
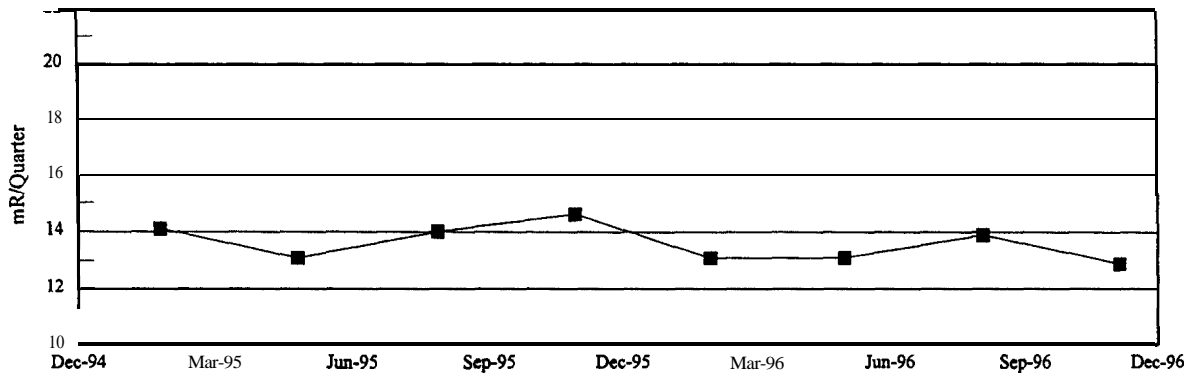


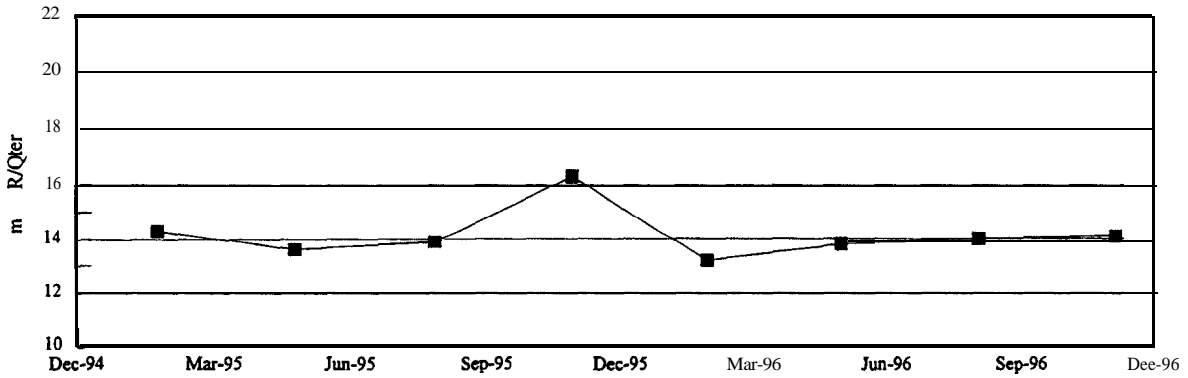
Figure 98  
 Quarterly Direct Radiation  
 Palisades Plant (0-2 Miles)



Quarterly Direct Radiation  
 Palisades Plant (2-5 Miles)



Quarterly Direct Radiation  
 Palisades Plant (>5 Miles)



Quarterly Direct Radiation  
 Palisades Plant (Upwind Control)

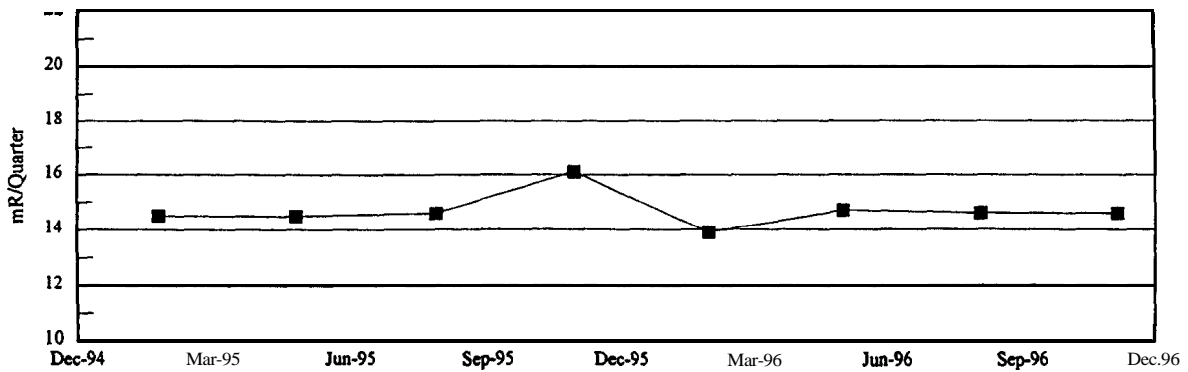
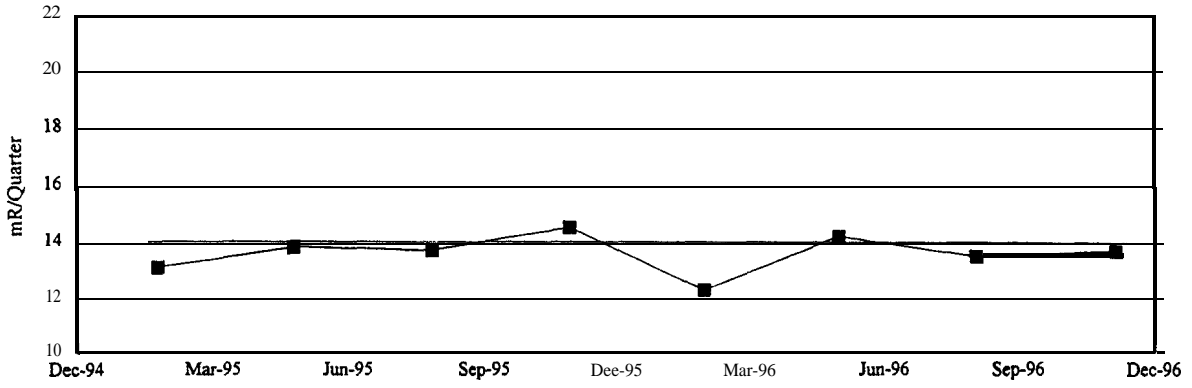
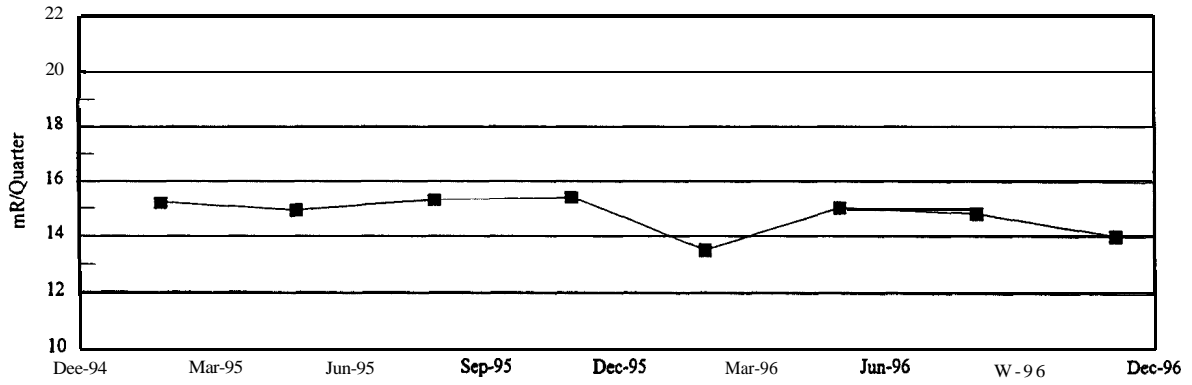




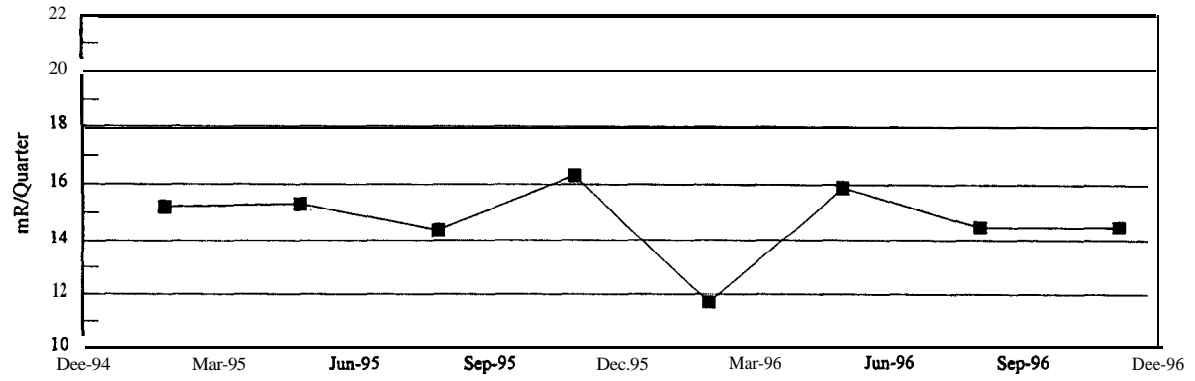
Figure 99  
 Quarterly Direct Radiation  
 D. C. Cook Plant (0-2 Miles)



Quarterly Direct Radiation  
 D. C. Cook Plant (2-5 Miles)



Quarterly Direct Radiation  
 D. C. Cook Plant (>5 Miles)



Quarterly Direct Radiation  
 D. C. Cook Plant (Upwind Control)

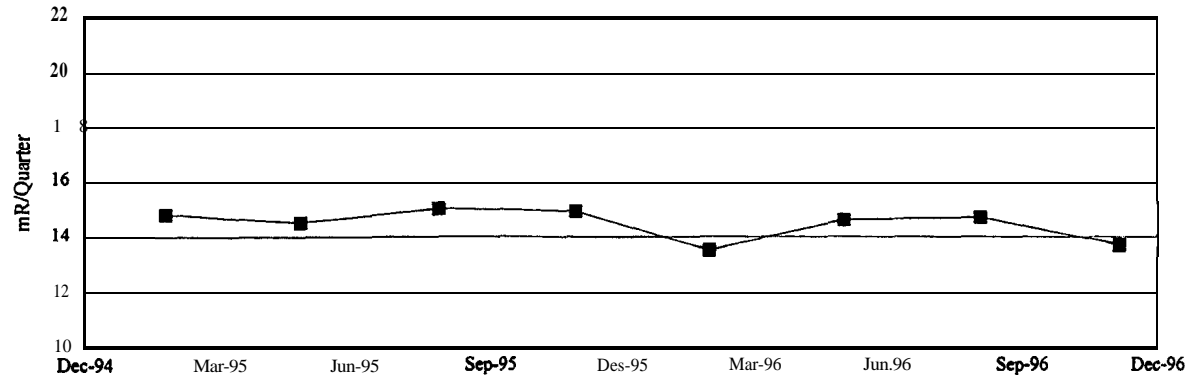
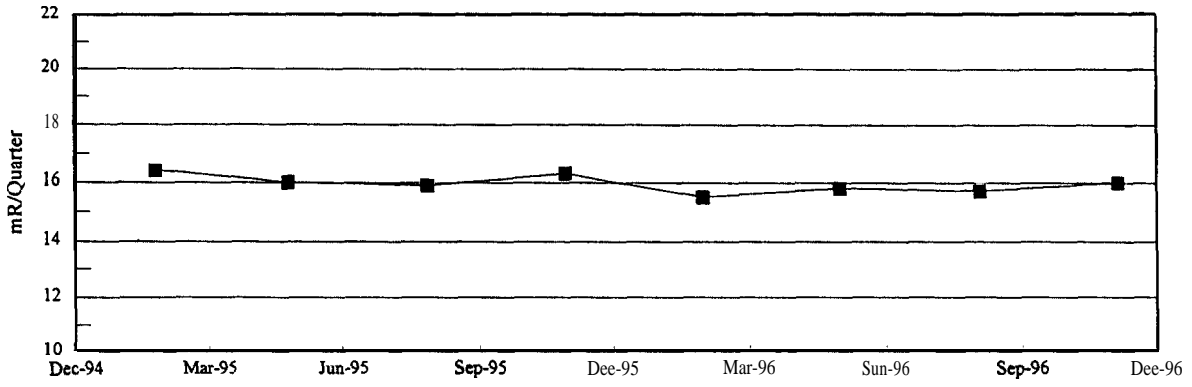
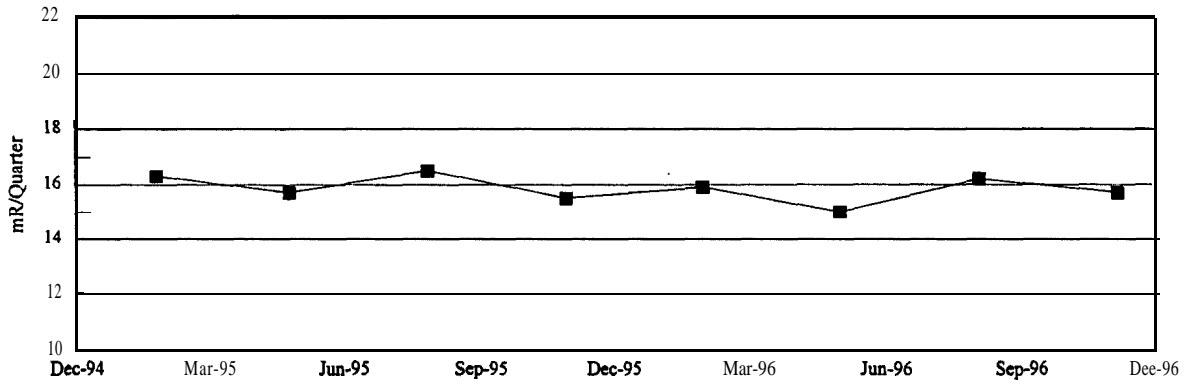


Figure 100

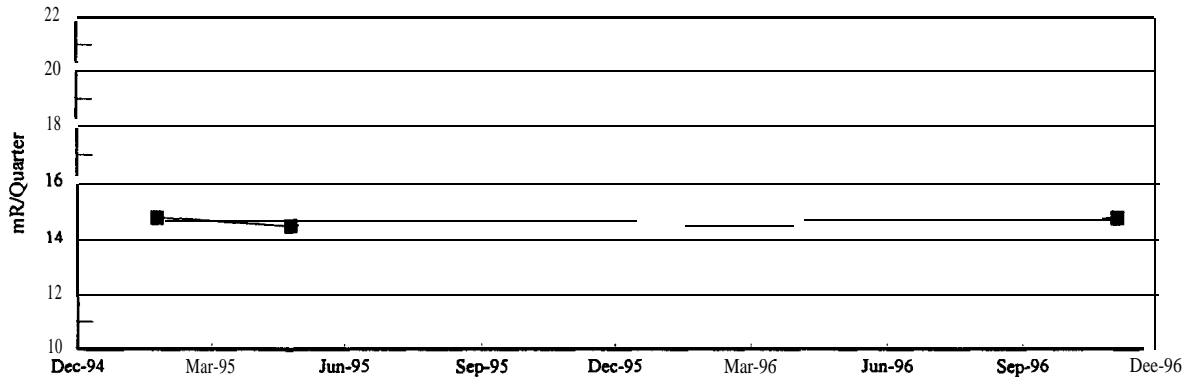
**Quarterly Direct Radiation**  
Fermi 2 Plant (0-2 Miles)



**Quarterly Direct Radiation**  
Fermi 2 Plant (2-5 Miles)



**Quarterly Direct Radiation**  
Fermi 2 Plant (>5 Miles)



**Quarterly Direct Radiation**  
Fermi 2 Plant (Upwind Control)

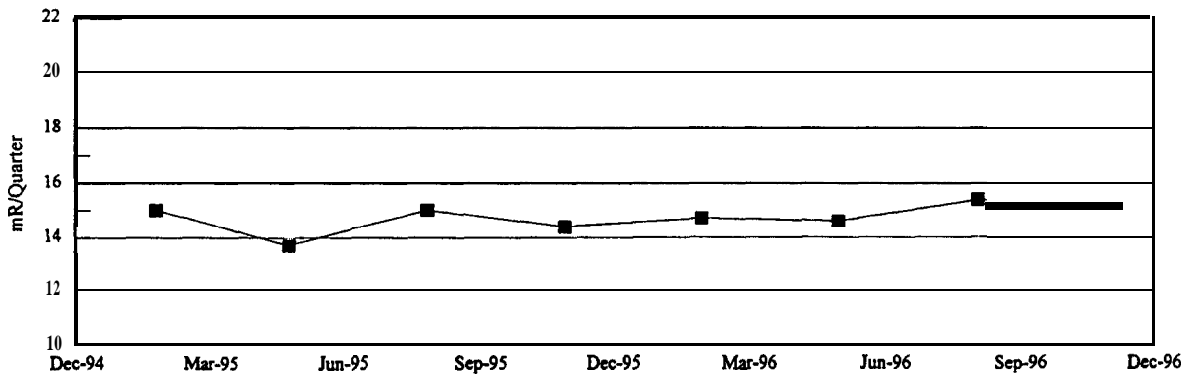
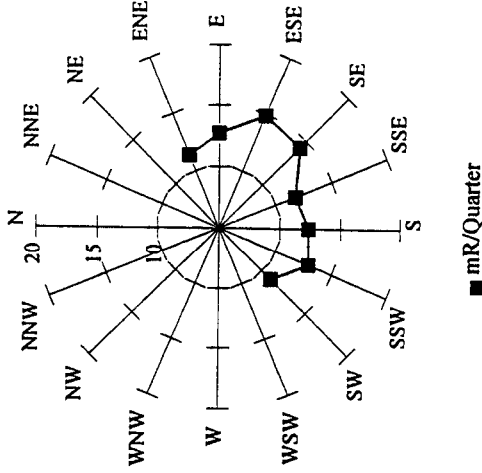
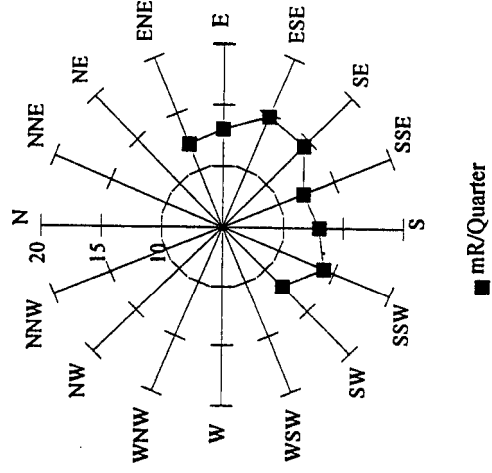


Figure 101

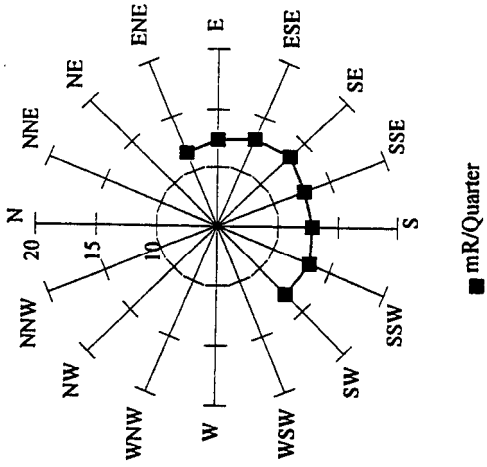
**Direct Radiation**  
**Big Rock Point Plant - Second Quarter 1995**



**Direct Radiation**  
**Big Rock Point Plant - Fourth Quarter 1995**



**Direct Radiation**  
**Big Rock Point Plant - First Quarter 1995**



**Direct Radiation**  
**Big Rock Point Plant - Third Quarter 1995**

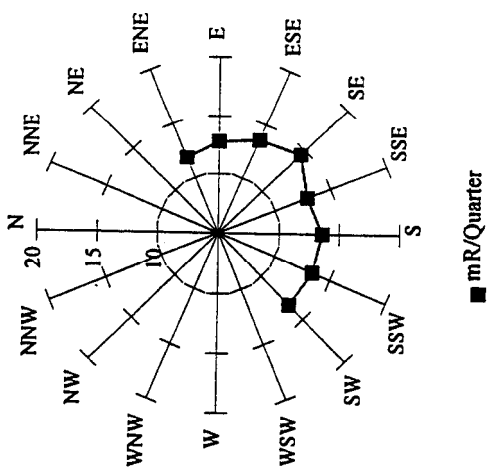
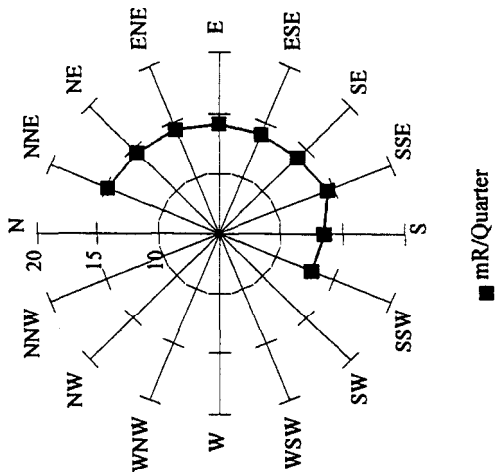
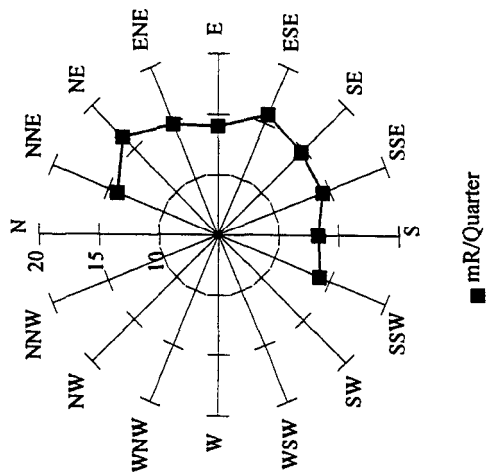


Figure 102

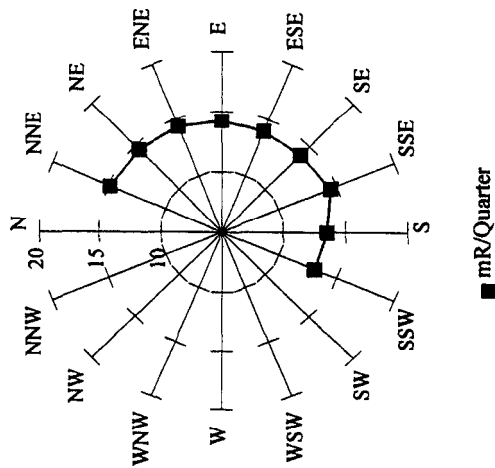
**Direct Radiation**  
Palisades Plant - Second Quarter 1995



**Direct Radiation**  
Palisades Plant - Fourth Quarter 1995



**Direct Radiation**  
Palisades Plant - First Quarter 1995



**Direct Radiation**  
Palisades Plant - Third Quarter 1995

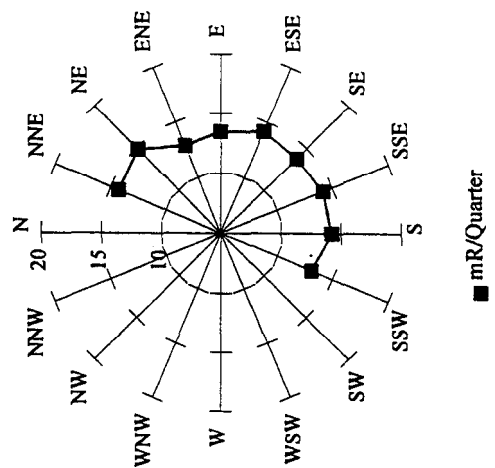


Figure 103

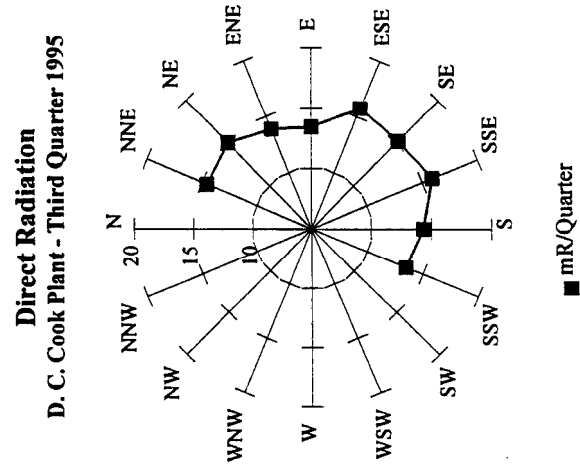
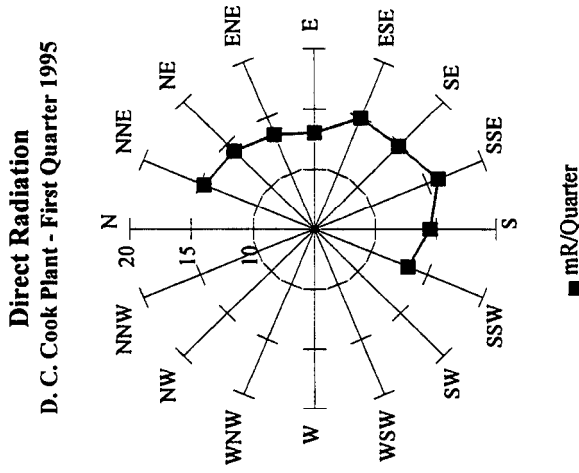
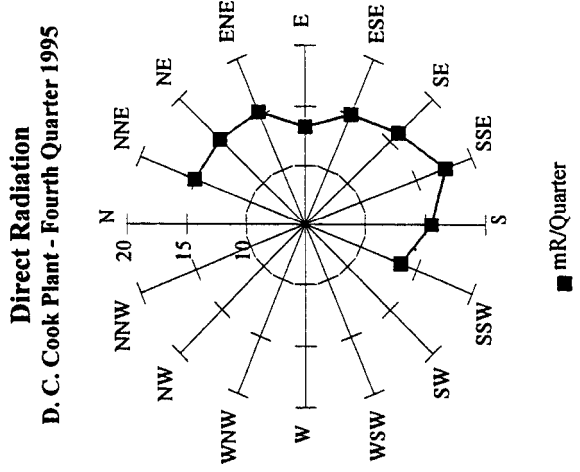
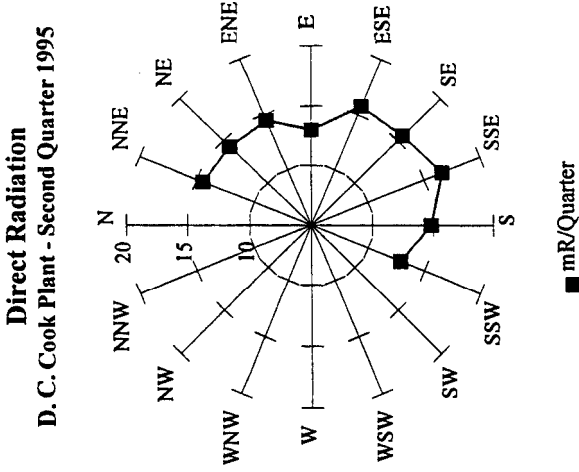
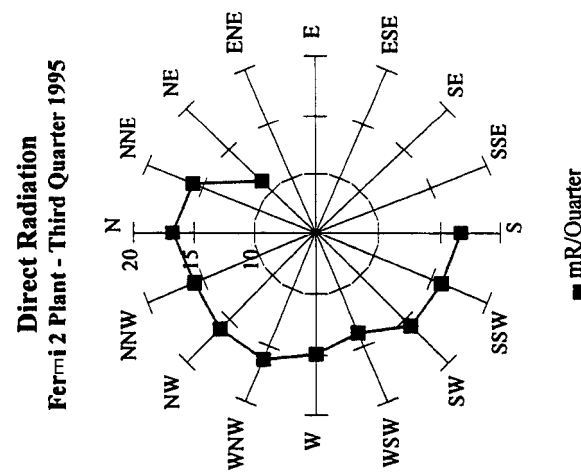
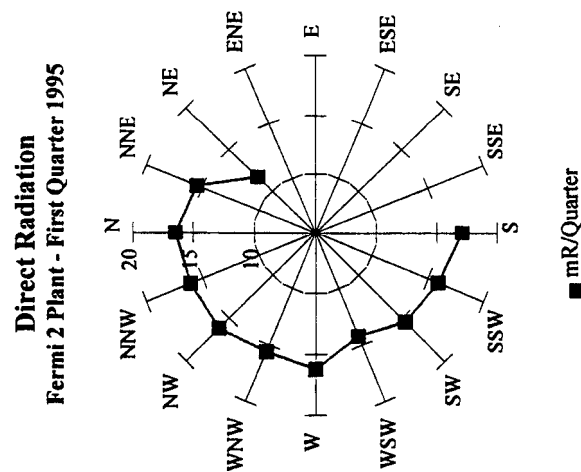
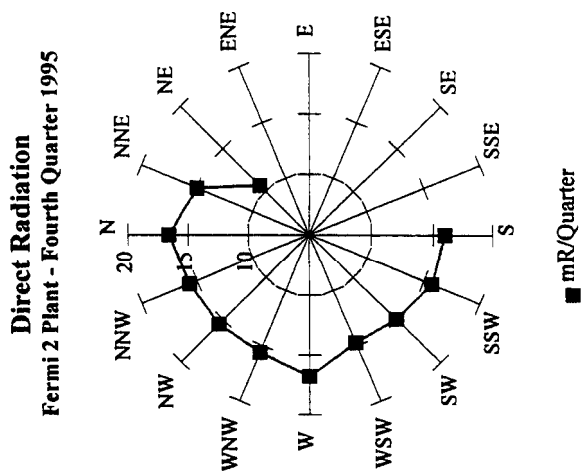
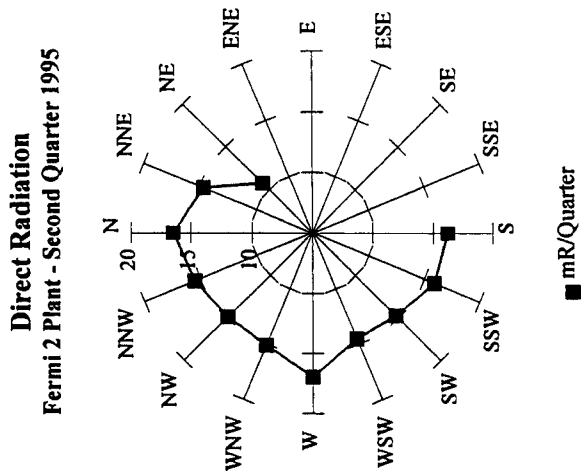
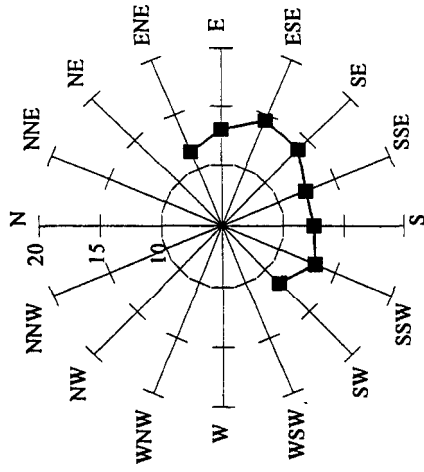


Figure 104

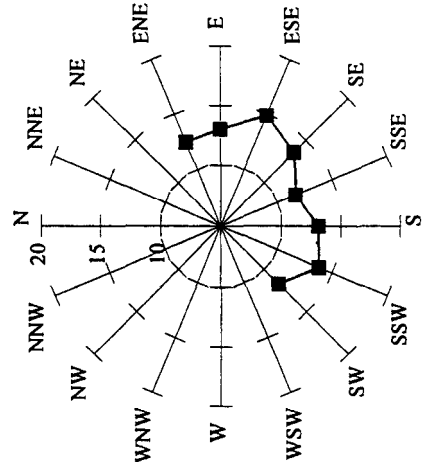


**Direct Radiation**  
Big Rock Point Plant - Second Quarter 1996



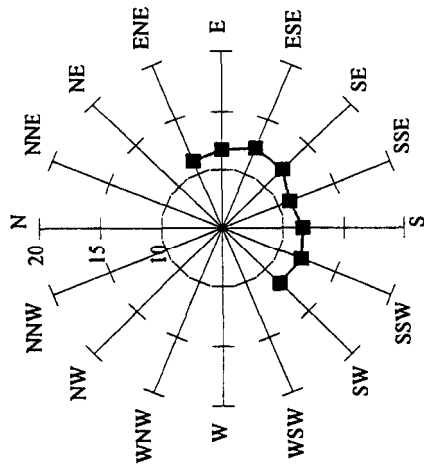
■ mR/Quarter

**Direct Radiation**  
Big Rock Point Plant - Fourth Quarter 1996



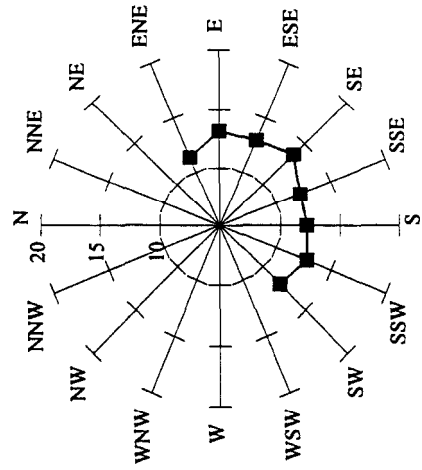
■ mR/Quarter

**Direct Radiation**  
Big Rock Point Plant - First Quarter 1996



■ mR/Quarter

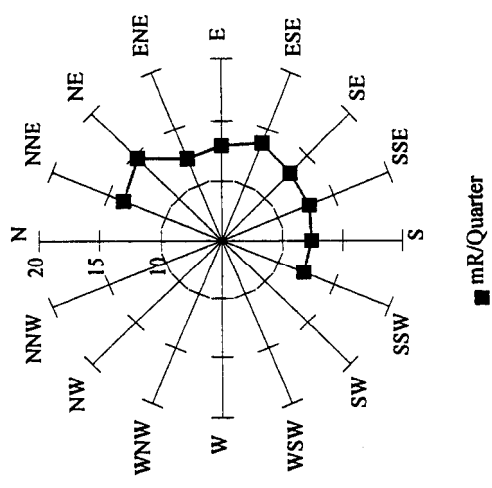
**Direct Radiation**  
Big Rock Point Plant - Third Quarter 1996



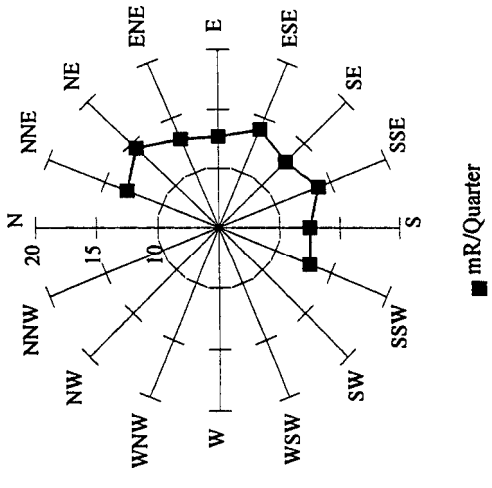
■ mR/Quarter

Figure 105

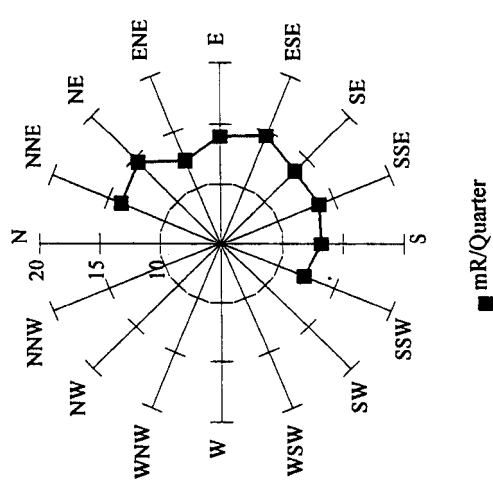
**Direct Radiation**  
Palisades Plant - First Quarter 1996



**Direct Radiation**  
Palisades Plant - Second Quarter 1996



**Direct Radiation**  
Palisades Plant - Third Quarter 1996



**Direct Radiation**  
Palisades Plant - Fourth Quarter 1996

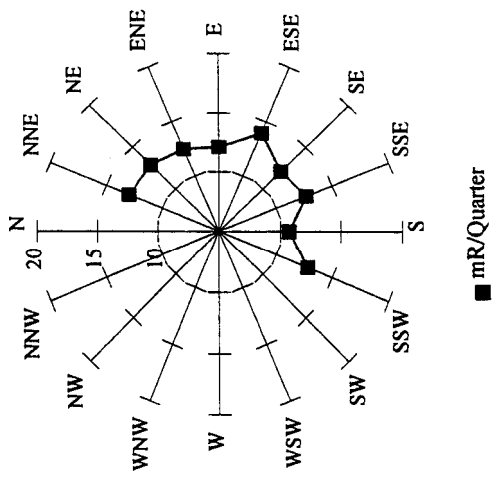
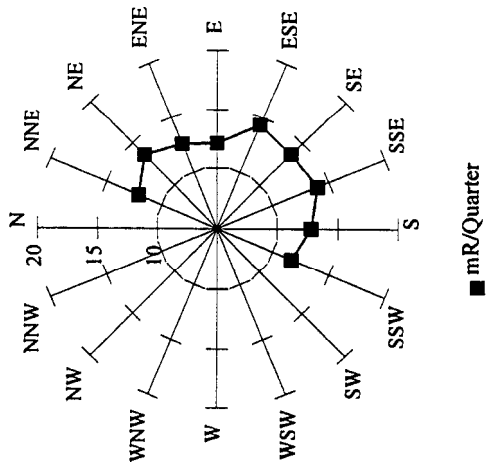


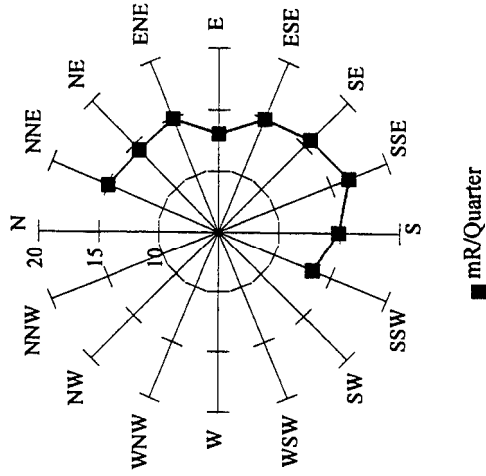
Figure 106



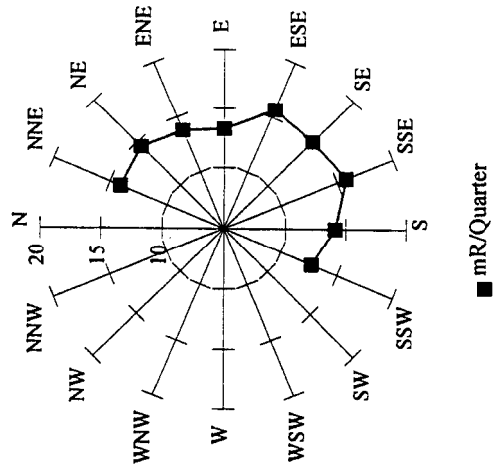
**Direct Radiation**  
D. C. Cook Plant - First Quarter 1996



**Direct Radiation**  
D. C. Cook Plant - Second Quarter 1996



**Direct Radiation**  
D. C. Cook Plant - Third Quarter 1996



**Direct Radiation**  
D. C. Cook Plant - Fourth Quarter 1996

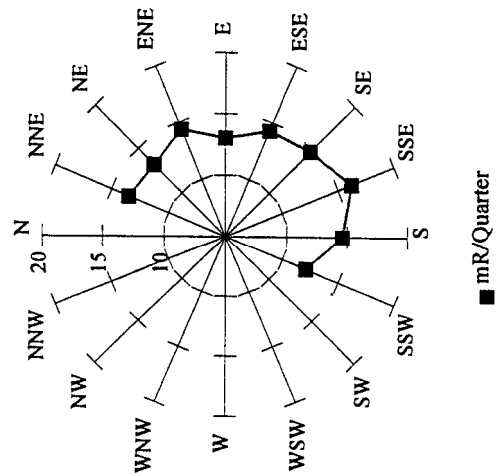
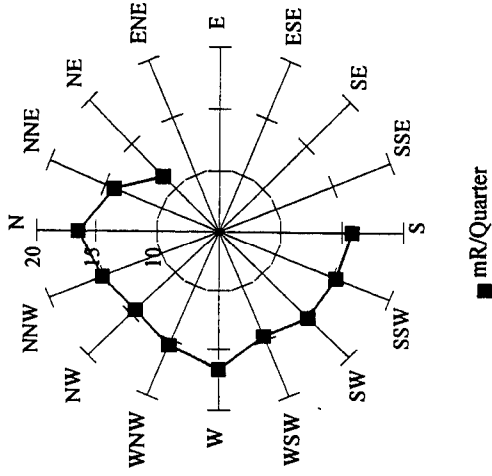


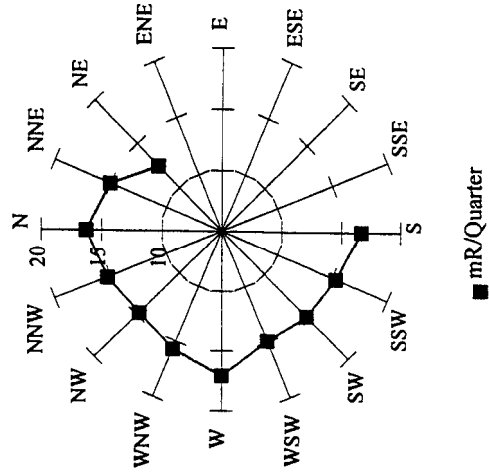
Figure 107

Figure 108

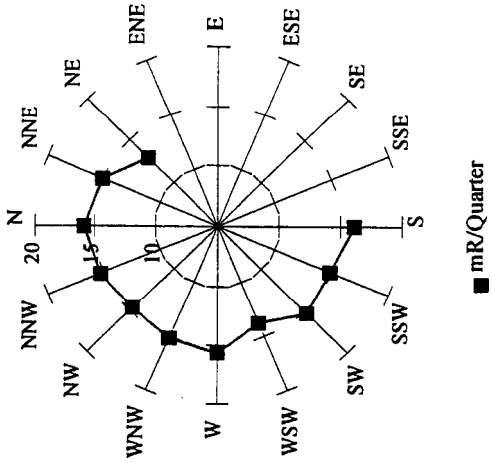
**Direct Radiation**  
Fermi 2 Plant - Second Quarter 1996



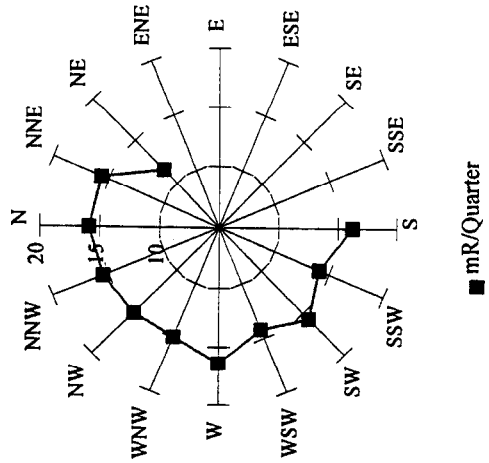
**Direct Radiation**  
Fermi 2 Plant - Fourth Quarter 1996



**Direct Radiation**  
Fermi 2 Plant - First Quarter 1996



**Direct Radiation**  
Fermi 2 Plant - Third Quarter 1996



## Summary and Conclusions

Recognizing that the peaceful use of nuclear energy to produce electricity could have an adverse impact on public health and the environment, the state of Michigan established the Michigan Radiation Environmental Monitoring Program (MREMP) in 1958 to monitor the environs near the nuclear plant sites to assure that Michigan's citizens and its environment are not adversely impacted. Environmental samples in the form of air particulates, air vapors, milk, surface water, and direct radiation are taken from various sites in Michigan and analyzed to determine if any radiological effects due to nuclear power plants can be detected.

Seasonal and geographic variations in atmospheric air particulate monitoring are evident, especially from 1958 through 1980, and are primarily attributable to fallout from atmospheric test of nuclear devices during that period. No air particulate sample analytical results have been found to be indicative of nuclear power plant operations, with 1995-96 levels reflecting only the normal fluctuations in natural background. In contrast, atmospheric air vapor samples have, on a very few occasions, indicated the effects of nuclear plant operations, but the levels detected were extremely low (well within regulatory limits) and only detected at the plant site itself and not in areas where it would be of concern to the general public or the environment. Air vapor results for 1995-96 were all less than the minimum detectable activity level.

Terrestrial milk samples consistently showed the effects of atmospheric fallout from nuclear device testing from the onset of monitoring in 1963 through the early 1980s, and since then only in a small number of samples have very low levels of the long-lived radionuclides been detected. Over the 35 years of analyzing milk samples, no milk radioactivity results have been attributed to nuclear plant operations and the levels measured in 1995-96 have fallen to below the minimum detectable level.

Although aquatic monitoring surface water samples did occasionally indicate the impact of nuclear plant operations, especially during the 1970s, the elevated levels were always found to correlate to plant controlled releases that were in accordance with U. S. Nuclear Regulatory Commission allowable limits. Unlike air particulate and milk samples, surface water analysis results did not dramatically rise immediately after an atmospheric nuclear test, but the overall pattern of results over the 25 years of monitoring do follow a similar trend as the air and milk samples, with the results, basically, exhibiting the fluctuation in natural background from the early 1980s to the present.

Similar to aquatic monitoring, the direct radiation monitoring results have indicated nuclear plant operations but only at the plant site very near to the reactor. Off-site direct radiation monitoring has historically shown levels reflecting the natural background of cosmic and terrestrial radiation. Direct radiation levels during 1995-96 follow the natural background trend with no pattern that would indicate an adverse impact due to nuclear power plant operations.

In conclusion, the results of the MREMP indicate that:

1. No public health or environmental radiological impact has yet been detected in the environs of Michigan's nuclear power plants due to the operation of nuclear power reactors.
2. The data provided by the MREMP form a useful baseline to compare environmental radioactivity measurements in the event of a potential nuclear reactor accident should such an unlikely event ever occur.
3. The data provided by the MREMP show a consistent sensitivity to and downward trending of the overall levels of radioactive fallout from past atmospheric testing of nuclear weapons and from the Chernobyl nuclear reactor accident.
4. The operation of the MREMP provides assurance to the citizens of this state, that the potential impact of nuclear power plant operations on public health and the environment will be continuously evaluated.

Appendix A

Atmospheric Monitoring  
Big Rock Point  
1995  
Charlevoix Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/05/95	0.014 ± 0.002	LT 0.03	07/06/95	0.011 ± 0.002	LT 0.03
01/12/95	0.018 ± 0.003	LT 0.03	07/13/95	0.014 ± 0.002	LT 0.03
01/19/95	0.017 ± 0.002	LT 0.02	07/20/95	0.016 ± 0.003	LT 0.02
01/26/95	0.013 ± 0.002	LT 0.03	07/27/95	0.018 ± 0.003	LT 0.03
02/02/95	0.019 ± 0.003	LT 0.03	08/02/95	0.019 ± 0.003	LT 0.03
02/09/95	0.017 ± 0.003	LT 0.02	08/10/95	0.013 ± 0.002	LT 0.03
02/16/95	0.020 ± 0.003	LT 0.03	08/17/95	0.015 ± 0.002	LT 0.02
02/23/95	0.023 ± 0.003	LT 0.03	08/24/95	*	*
03/02/95	0.019 ± 0.003	LT 0.03	08/31/95	0.016 ± 0.003	LT 0.03
03/09/95	0.024 ± 0.003	LT 0.03	09/07/95	0.022 ± 0.003	LT 0.03
03/16/95	0.024 ± 0.003	LT 0.03	09/14/95	0.016 ± 0.002	LT 0.03
03/23/95	0.010 ± 0.002	LT 0.03	09/21/95	0.009 ± 0.002	LT 0.03
03/30/95	0.013 ± 0.002	LT 0.03	09/28/95	0.016 ± 0.003	LT 0.02
04/06/95	0.023 ± 0.003	LT 0.03	10/05/95	0.015 ± 0.002	LT 0.02
04/13/95	0.017 ± 0.003	LT 0.02	10/11/95	0.009 ± 0.002	LT 0.03
04/20/95	LT 0.001	LT 0.02	10/19/95	0.023 ± 0.003	LT 0.02
04/27/95	0.011 ± 0.002	LT 0.02	10/26/95	0.007 ± 0.002	LT 0.03
05/04/95	0.005 ± 0.002	LT 0.03	11/02/95	0.013 ± 0.002	LT 0.03
05/11/95	0.013 ± 0.002	LT 0.02	11/09/95	0.016 ± 0.003	LT 0.03
05/18/95	0.011 ± 0.002	LT 0.03	11/15/95	0.015 ± 0.003	LT 0.03
05/25/95	0.010 ± 0.002	LT 0.02	11/22/95	0.013 ± 0.002	LT 0.04
06/01/95	0.012 ± 0.002	LT 0.03	11/30/95	0.013 ± 0.002	LT 0.02
06/08/95	0.019 ± 0.003	LT 0.03	12/07/95	0.020 ± 0.003	LT 0.03
06/15/95	0.012 ± 0.002	LT 0.02	12/14/95	0.015 ± 0.002	LT 0.02
06/22/95	0.024 ± 0.003	LT 0.03	12/20/95	0.024 ± 0.003	LT 0.04
06/29/95	0.020 ± 0.003	LT 0.03	12/27/95	0.014 ± 0.002	LT 0.03

LT - Less than

\* - Samples lost in transit to laboratory

Appendix A

Atmospheric Monitoring  
Big Rock Point  
1995  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/05/95	0.013 ± 0.002	LT 0.03	07/06/95	0.008 ± 0.002	LT 0.03
01/12/95	0.017 ± 0.003	LT 0.03	07/13/95	0.011 ± 0.002	LT 0.03
01/19/95	0.015 ± 0.002	LT 0.02	07/20/95	0.013 ± 0.002	LT 0.02
01/26/95	0.012 ± 0.002	LT 0.03	07/27/95	0.014 ± 0.002	LT 0.02
02/02/95	0.019 ± 0.003	LT 0.03	08/02/95	0.013 ± 0.002	LT 0.03
02/09/95	0.017 ± 0.003	LT 0.02	08/10/95	0.010 ± 0.002	LT 0.02
02/16/95	0.017 ± 0.003	LT 0.03	08/17/95	0.010 ± 0.002	LT 0.02
02/23/95	0.022 ± 0.003	LT 0.03	08/24/95	*	*
03/02/95	0.014 ± 0.003	LT 0.03	08/31/95	0.014 ± 0.002	LT 0.03
03/09/95	0.017 ± 0.003	LT 0.03	09/07/95	0.024 ± 0.003	LT 0.03
03/16/95	0.019 ± 0.003	LT 0.03	09/14/95	0.015 ± 0.002	LT 0.03
03/23/95	0.010 ± 0.002	LT 0.02	09/21/95	0.009 ± 0.002	LT 0.03
03/30/95	0.012 ± 0.002	LT 0.03	09/28/95	0.019 ± 0.003	LT 0.02
04/06/95	0.017 ± 0.003	LT 0.02	10/05/95	0.020 ± 0.003	LT 0.02
04/13/95	0.016 ± 0.003	LT 0.02	10/11/95	0.010 ± 0.003	LT 0.03
04/20/95	0.009 ± 0.002	LT 0.02	10/19/95	0.023 ± 0.003	LT 0.02
04/27/95	0.009 ± 0.002	LT 0.02	10/26/95	0.009 ± 0.002	LT 0.03
05/04/95	0.005 ± 0.002	LT 0.03	11/02/95	0.012 ± 0.002	LT 0.03
05/11/95	0.010 ± 0.002	LT 0.02	11/09/95	0.019 ± 0.003	LT 0.03
05/18/95	0.011 ± 0.002	LT 0.02	11/15/95	0.016 ± 0.003	LT 0.03
05/25/95	0.007 ± 0.002	LT 0.03	11/22/95	0.016 ± 0.003	LT 0.04
06/01/95	0.011 ± 0.002	LT 0.03	11/30/95	0.016 ± 0.002	LT 0.02
06/08/95	0.013 ± 0.003	LT 0.03	12/07/95	0.022 ± 0.003	LT 0.03
06/15/95	0.009 ± 0.002	LT 0.02	12/14/95	0.015 ± 0.003	LT 0.02
06/22/95	0.020 ± 0.003	LT 0.02	12/20/95	0.029 ± 0.004	LT 0.04
06/29/95	0.016 ± 0.003	LT 0.03	12/27/95	0.015 ± 0.003	LT 0.03

LT - Less than

\* - Samples lost in transit to laboratory

Appendix A

Atmospheric Monitoring  
Big Rock Point  
1995  
Burgess Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/05/95	0.014 ± 0.002	LT 0.03	07/06/95	0.007 ± 0.002	LT 0.03
01/12/95	0.017 ± 0.003	LT 0.03	07/13/95	0.011 ± 0.002	LT 0.03
01/19/95	0.015 ± 0.002	LT 0.02	07/20/95	0.013 ± 0.002	LT 0.02
01/26/95	0.009 ± 0.002	LT 0.03	07/27/95	0.014 ± 0.002	LT 0.02
02/02/95	0.017 ± 0.003	LT 0.03	08/02/95	0.014 ± 0.003	LT 0.03
02/09/95	0.016 ± 0.003	LT 0.02	08/10/95	0.012 ± 0.002	LT 0.02
02/16/95	0.018 ± 0.003	LT 0.03	08/17/95	0.013 ± 0.002	LT 0.02
02/23/95	0.021 ± 0.003	LT 0.03	08/24/95	*	*
03/02/95	0.017 ± 0.003	LT 0.03	08/31/95	0.013 ± 0.002	LT 0.03
03/09/95	0.019 ± 0.003	LT 0.03	09/07/95	0.019 ± 0.003	LT 0.03
03/16/95	0.022 ± 0.003	LT 0.03	09/14/95	0.013 ± 0.002	LT 0.03
03/23/95	0.008 ± 0.002	LT 0.02	09/21/95	0.007 ± 0.002	LT 0.03
03/30/95	0.014 ± 0.002	LT 0.03	09/28/95	0.016 ± 0.002	LT 0.02
04/06/95	0.017 ± 0.003	LT 0.02	10/05/95	0.018 ± 0.003	LT 0.02
04/13/95	0.014 ± 0.002	LT 0.02	10/11/95	0.008 ± 0.002	LT 0.03
04/20/95	0.012 ± 0.002	LT 0.02	10/19/95	0.022 ± 0.002	LT 0.02
04/27/95	0.010 ± 0.002	LT 0.02	10/26/95	0.008 ± 0.002	LT 0.03
05/04/95	0.005 ± 0.002	LT 0.03	11/02/95	0.010 ± 0.002	LT 0.03
05/11/95	0.014 ± 0.002	LT 0.02	11/09/95	0.018 ± 0.003	LT 0.03
05/18/95	0.012 ± 0.002	LT 0.02	11/15/95	0.014 ± 0.003	LT 0.03
05/25/95	0.009 ± 0.002	LT 0.02	11/22/95	0.015 ± 0.003	LT 0.04
06/01/95	0.011 ± 0.002	LT 0.03	11/30/95	0.015 ± 0.002	LT 0.02
06/08/95	0.014 ± 0.002	LT 0.03	12/07/95	0.019 ± 0.003	LT 0.03
06/15/95	0.010 ± 0.002	LT 0.02	12/14/95	0.011 ± 0.002	LT 0.02
06/22/95	0.021 ± 0.003	LT 0.02	12/20/95	0.023 ± 0.003	LT 0.04
06/29/95	0.014 ± 0.002	LT 0.03	12/27/95	0.011 ± 0.002	LT 0.03

LT - Less than

\* - Samples lost in transit to laboratory

Appendix A

Atmospheric Monitoring  
Palisades  
1995  
South Haven Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.027 ± 0.003	LT 0.02	07/04/95	0.013 ± 0.002	LT 0.02
01/10/95	0.040 ± 0.003	LT 0.02	07/11/95	0.012 ± 0.002	LT 0.02
01/17/95	0.032 ± 0.003	LT 0.02	07/18/95	0.035 ± 0.003	LT 0.02
01/24/95	0.016 ± 0.002	LT 0.02	07/25/95	0.020 ± 0.002	LT 0.02
01/31/95	0.028 ± 0.003	LT 0.02	08/01/95	0.035 ± 0.003	LT 0.02
02/07/95	0.030 ± 0.003	LT 0.02	08/08/95	0.022 ± 0.002	LT 0.03
02/14/95	0.028 ± 0.003	LT 0.02	08/15/95	0.034 ± 0.003	LT 0.03
02/21/95	0.033 ± 0.003	LT 0.02	08/22/95	0.020 ± 0.002	LT 0.02
02/28/95	0.024 ± 0.002	LT 0.03	08/29/95	0.015 ± 0.002	LT 0.02
03/07/95	0.016 ± 0.002	LT 0.02	09/05/95	0.045 ± 0.003	LT 0.02
03/14/95	0.037 ± 0.003	LT 0.02	09/12/95	0.052 ± 0.005	LT 0.04
03/21/95	0.024 ± 0.002	LT 0.02	09/19/95	0.003 ± 0.003	LT 0.05
03/28/95	0.016 ± 0.002	LT 0.02	09/26/95	0.016 ± 0.002	LT 0.02
04/04/95	0.024 ± 0.002	LT 0.03	10/03/95	0.052 ± 0.003	LT 0.02
04/11/95	0.030 ± 0.003	LT 0.03	10/10/95	0.014 ± 0.002	LT 0.02
04/18/95	0.022 ± 0.003	LT 0.02	10/17/95	0.035 ± 0.003	LT 0.02
04/25/95	0.005 ± 0.002	LT 0.02	10/24/95	0.018 ± 0.002	LT 0.02
05/02/95	0.016 ± 0.002	LT 0.02	10/31/95	0.020 ± 0.002	LT 0.02
05/09/95	0.021 ± 0.002	LT 0.03	11/07/95	0.025 ± 0.003	LT 0.02
05/16/95	0.017 ± 0.002	LT 0.02	11/14/95	0.020 ± 0.002	LT 0.02
05/23/95	0.015 ± 0.003	LT 0.02	11/21/95	0.023 ± 0.002	LT 0.03
05/30/95	0.013 ± 0.002	LT 0.02	11/28/95	0.017 ± 0.002	LT 0.02
06/06/95	0.022 ± 0.002	LT 0.02	12/05/95	0.040 ± 0.003	LT 0.03
06/13/95	0.017 ± 0.003	LT 0.02	12/12/95	0.019 ± 0.002	LT 0.02
06/20/95	0.029 ± 0.003	LT 0.02	12/19/95	0.029 ± 0.003	LT 0.03
06/27/95	0.027 ± 0.003	LT 0.02	12/26/95	0.041 ± 0.004	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
Palisades  
1995  
Covert Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	*	*	07/04/95	LT 0.003	LT 0.04
01/10/95	*	*	07/11/95	0.005 ± 0.003	LT 0.05
01/17/95	*	*	07/18/95	0.007 ± 0.003	LT 0.04
01/24/95	*	*	07/25/95	0.010 ± 0.002	LT 0.02
01/31/95	*	*	08/01/95	0.022 ± 0.002	LT 0.02
02/07/95	*	*	08/08/95	0.017 ± 0.002	LT 0.03
02/14/95	*	*	08/15/95	0.028 ± 0.003	LT 0.03
02/21/95	*	*	08/22/95	0.015 ± 0.002	LT 0.02
02/28/95	*	*	08/29/95	0.011 ± 0.002	LT 0.02
03/07/95	*	*	09/05/95	0.034 ± 0.003	LT 0.02
03/14/95	*	*	09/12/95	0.023 ± 0.002	LT 0.02
03/21/95	*	*	09/19/95	0.018 ± 0.002	LT 0.02
03/28/95	*	*	09/26/95	0.012 ± 0.002	LT 0.02
04/04/95	*	*	10/03/95	0.046 ± 0.003	LT 0.02
04/11/95	*	*	10/10/95	0.010 ± 0.002	LT 0.02
04/18/95	*	*	10/17/95	0.025 ± 0.003	LT 0.02
04/25/95	*	*	10/24/95	0.015 ± 0.002	LT 0.02
05/02/95	*	*	10/31/95	0.017 ± 0.002	LT 0.02
05/09/95	*	*	11/07/95	0.023 ± 0.003	LT 0.02
05/16/95	*	*	11/14/95	0.019 ± 0.002	LT 0.02
05/23/95	*	*	11/21/95	0.021 ± 0.002	LT 0.03
05/30/95	*	*	11/28/95	0.015 ± 0.002	LT 0.02
06/06/95	0.035 ± 0.003	LT 0.02	12/05/95	0.039 ± 0.003	LT 0.03
06/13/95	0.006 ± 0.002	LT 0.02	12/12/95	0.021 ± 0.002	LT 0.02
06/20/95	0.003 ± 0.003	LT 0.05	12/19/95	0.023 ± 0.002	LT 0.04
06/27/95	0.009 ± 0.002	LT 0.02	12/26/95	0.035 ± 0.003	LT 0.02

LT - Less than

\* - Station being relocated



Appendix A

Atmospheric Monitoring  
Palisades  
1995  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.022 ± 0.003	LT 0.02	07/04/95	0.021 ± 0.002	LT 0.02
01/10/95	0.039 ± 0.003	LT 0.02	07/11/95	0.011 ± 0.002	LT 0.02
01/17/95	0.026 ± 0.003	LT 0.02	07/18/95	0.029 ± 0.003	LT 0.02
01/24/95	0.017 ± 0.002	LT 0.02	07/25/95	0.019 ± 0.002	LT 0.02
01/31/95	0.025 ± 0.003	LT 0.02	08/01/95	0.032 ± 0.003	LT 0.02
02/07/95	0.028 ± 0.003	LT 0.02	08/08/95	0.016 ± 0.002	LT 0.03
02/14/95	0.026 ± 0.003	LT 0.02	08/15/95	0.027 ± 0.003	LT 0.03
02/21/95	0.028 ± 0.003	LT 0.02	08/22/95	0.013 ± 0.002	LT 0.02
02/28/95	0.021 ± 0.002	LT 0.03	08/29/95	0.011 ± 0.002	LT 0.02
03/07/95	0.016 ± 0.002	LT 0.02	09/05/95	0.041 ± 0.003	LT 0.02
03/14/95	0.033 ± 0.003	LT 0.02	09/12/95	0.027 ± 0.003	LT 0.02
03/21/95	0.020 ± 0.002	LT 0.02	09/19/95	0.022 ± 0.002	LT 0.02
03/28/95	0.015 ± 0.002	LT 0.02	09/26/95	0.013 ± 0.002	LT 0.02
04/04/95	0.027 ± 0.003	LT 0.03	10/03/95	0.054 ± 0.003	LT 0.02
04/11/95	0.023 ± 0.002	LT 0.03	10/10/95	0.013 ± 0.002	LT 0.02
04/18/95	0.018 ± 0.003	LT 0.02	10/17/95	0.031 ± 0.003	LT 0.02
04/25/95	0.010 ± 0.002	LT 0.02	10/24/95	0.016 ± 0.002	LT 0.02
05/02/95	0.015 ± 0.002	LT 0.02	10/31/95	0.019 ± 0.002	LT 0.02
05/09/95	0.019 ± 0.002	LT 0.03	11/07/95	0.026 ± 0.003	LT 0.02
05/16/95	0.015 ± 0.002	LT 0.02	11/14/95	0.022 ± 0.002	LT 0.02
05/23/95	0.012 ± 0.002	LT 0.02	11/21/95	0.022 ± 0.002	LT 0.03
05/30/95	0.012 ± 0.002	LT 0.02	11/28/95	0.016 ± 0.002	LT 0.02
06/06/95	0.018 ± 0.002	LT 0.02	12/05/95	0.040 ± 0.003	LT 0.03
06/13/95	0.013 ± 0.002	LT 0.02	12/12/95	0.016 ± 0.002	LT 0.02
06/20/95	0.025 ± 0.002	LT 0.02	12/19/95	LT 0.003	LT 0.07
06/27/95	0.022 ± 0.002	LT 0.02	12/26/95	0.021 ± 0.003	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1995  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.024 ± 0.002	LT 0.02	07/04/95	0.022 ± 0.002	LT 0.02
01/10/95	0.030 ± 0.003	LT 0.02	07/11/95	0.011 ± 0.002	LT 0.02
01/17/95	0.026 ± 0.003	LT 0.02	07/18/95	0.030 ± 0.003	LT 0.02
01/24/95	0.017 ± 0.002	LT 0.02	07/25/95	0.020 ± 0.002	LT 0.02
01/31/95	0.023 ± 0.002	LT 0.02	08/01/95	0.029 ± 0.003	LT 0.02
02/07/95	0.030 ± 0.003	LT 0.02	08/08/95	0.018 ± 0.002	LT 0.03
02/14/95	0.024 ± 0.002	LT 0.02	08/15/95	0.030 ± 0.003	LT 0.03
02/21/95	0.027 ± 0.003	LT 0.02	08/22/95	0.013 ± 0.002	LT 0.02
02/28/95	0.019 ± 0.002	LT 0.03	08/29/95	0.011 ± 0.002	LT 0.02
03/07/95	0.014 ± 0.002	LT 0.02	09/05/95	0.041 ± 0.003	LT 0.02
03/14/95	0.030 ± 0.003	LT 0.02	09/12/95	0.027 ± 0.003	LT 0.02
03/21/95	0.020 ± 0.002	LT 0.02	09/19/95	0.025 ± 0.002	LT 0.03
03/28/95	0.016 ± 0.002	LT 0.02	09/26/95	0.012 ± 0.002	LT 0.02
04/04/95	0.023 ± 0.002	LT 0.03	10/03/95	0.051 ± 0.003	LT 0.02
04/11/95	0.023 ± 0.002	LT 0.03	10/10/95	0.014 ± 0.002	LT 0.02
04/18/95	0.018 ± 0.003	LT 0.02	10/17/95	0.034 ± 0.003	LT 0.02
04/25/95	0.009 ± 0.002	LT 0.02	10/24/95	0.017 ± 0.002	LT 0.02
05/02/95	0.016 ± 0.002	LT 0.02	10/31/95	0.018 ± 0.002	LT 0.02
05/09/95	0.020 ± 0.002	LT 0.03	11/07/95	0.026 ± 0.003	LT 0.02
05/16/95	0.011 ± 0.002	LT 0.02	11/14/95	0.020 ± 0.002	LT 0.02
05/23/95	0.012 ± 0.002	LT 0.02	11/21/95	0.026 ± 0.003	LT 0.03
05/30/95	0.012 ± 0.002	LT 0.02	11/28/95	0.018 ± 0.002	LT 0.02
06/06/95	0.017 ± 0.002	LT 0.02	12/05/95	0.042 ± 0.003	LT 0.03
06/13/95	0.013 ± 0.002	LT 0.02	12/12/95	0.012 ± 0.002	LT 0.02
06/20/95	0.023 ± 0.002	LT 0.02	12/19/95	PF	PF
06/27/95	0.022 ± 0.002	LT 0.02	12/26/95	0.040 ± 0.004	LT 0.02

LT - Less than  
PF - Pump Failure

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1995  
Bridgman Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.025 ± 0.002	LT 0.02	07/04/95	0.024 ± 0.002	LT 0.02
01/10/95	0.036 ± 0.003	LT 0.02	07/11/95	0.012 ± 0.002	LT 0.02
01/17/95	0.024 ± 0.003	LT 0.02	07/18/95	0.033 ± 0.003	LT 0.02
01/24/95	0.016 ± 0.002	LT 0.02	07/25/95	0.020 ± 0.002	LT 0.02
01/31/95	0.027 ± 0.003	LT 0.02	08/01/95	0.031 ± 0.003	LT 0.02
02/07/95	0.030 ± 0.003	LT 0.02	08/08/95	0.018 ± 0.002	LT 0.03
02/14/95	0.025 ± 0.003	LT 0.02	08/15/95	0.028 ± 0.003	LT 0.03
02/21/95	0.031 ± 0.003	LT 0.02	08/22/95	0.015 ± 0.002	LT 0.02
02/28/95	0.019 ± 0.002	LT 0.03	08/29/95	0.012 ± 0.002	LT 0.02
03/07/95	0.017 ± 0.003	LT 0.02	09/05/95	0.043 ± 0.003	LT 0.02
03/14/95	0.032 ± 0.003	LT 0.02	09/12/95	0.027 ± 0.003	LT 0.02
03/21/95	0.020 ± 0.002	LT 0.02	09/19/95	0.022 ± 0.002	LT 0.03
03/28/95	0.016 ± 0.002	LT 0.02	09/26/95	0.014 ± 0.002	LT 0.02
04/04/95	0.020 ± 0.002	LT 0.03	10/03/95	0.054 ± 0.003	LT 0.02
04/11/95	0.023 ± 0.002	LT 0.03	10/10/95	0.013 ± 0.002	LT 0.02
04/18/95	0.013 ± 0.004	LT 0.05	10/17/95	0.033 ± 0.003	LT 0.02
04/25/95	0.006 ± 0.002	LT 0.02	10/24/95	0.018 ± 0.002	LT 0.02
05/02/95	0.016 ± 0.002	LT 0.02	10/31/95	0.024 ± 0.002	LT 0.02
05/09/95	0.019 ± 0.002	LT 0.03	11/07/95	0.027 ± 0.003	LT 0.02
05/16/95	0.013 ± 0.002	LT 0.02	11/14/95	0.020 ± 0.002	LT 0.02
05/23/95	0.012 ± 0.002	LT 0.02	11/21/95	0.024 ± 0.003	LT 0.03
05/30/95	0.012 ± 0.002	LT 0.02	11/28/95	0.019 ± 0.002	LT 0.02
06/06/95	0.016 ± 0.002	LT 0.02	12/05/95	0.040 ± 0.003	LT 0.03
06/13/95	0.013 ± 0.002	LT 0.02	12/12/95	0.021 ± 0.002	LT 0.02
06/20/95	0.025 ± 0.002	LT 0.02	12/19/95	0.025 ± 0.003	LT 0.03
06/27/95	0.024 ± 0.002	LT 0.02	12/26/95	0.037 ± 0.004	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
 D. C. Cook  
 1995  
 Stevensville Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.023 ± 0.002	LT 0.02	07/04/95	0.025 ± 0.003	LT 0.02
01/10/95	0.033 ± 0.003	LT 0.02	07/11/95	0.011 ± 0.002	LT 0.02
01/17/95	0.025 ± 0.003	LT 0.02	07/18/95	0.061 ± 0.005	LT 0.04
01/24/95	0.014 ± 0.002	LT 0.02	07/25/95	PF	PF
01/31/95	0.024 ± 0.002	LT 0.02	08/01/95	0.024 ± 0.002	LT 0.02
02/07/95	0.028 ± 0.003	LT 0.02	08/08/95	0.035 ± 0.004	LT 0.05
02/14/95	0.023 ± 0.002	LT 0.02	08/15/95	0.027 ± 0.003	LT 0.03
02/21/95	0.028 ± 0.003	LT 0.02	08/22/95	0.013 ± 0.002	LT 0.02
02/28/95	0.020 ± 0.002	LT 0.03	08/29/95	0.010 ± 0.002	LT 0.02
03/07/95	0.014 ± 0.002	LT 0.02	09/05/95	0.028 ± 0.003	LT 0.02
03/14/95	0.034 ± 0.003	LT 0.02	09/12/95	0.026 ± 0.002	LT 0.02
03/21/95	0.020 ± 0.002	LT 0.02	09/19/95	0.023 ± 0.002	LT 0.03
03/28/95	0.016 ± 0.002	LT 0.02	09/26/95	0.015 ± 0.002	LT 0.02
04/04/95	0.020 ± 0.002	LT 0.03	10/03/95	0.049 ± 0.003	LT 0.02
04/11/95	0.025 ± 0.002	LT 0.03	10/10/95	0.014 ± 0.002	LT 0.02
04/18/95	0.018 ± 0.003	LT 0.02	10/17/95	0.032 ± 0.003	LT 0.02
04/25/95	0.010 ± 0.002	LT 0.02	10/24/95	0.017 ± 0.002	LT 0.02
05/02/95	0.016 ± 0.002	LT 0.02	10/31/95	0.019 ± 0.002	LT 0.02
05/09/95	0.019 ± 0.002	LT 0.03	11/07/95	0.027 ± 0.003	LT 0.02
05/16/95	0.012 ± 0.002	LT 0.02	11/14/95	0.011 ± 0.002	LT 0.02
05/23/95	0.012 ± 0.002	LT 0.02	11/21/95	0.026 ± 0.003	LT 0.03
05/30/95	0.014 ± 0.002	LT 0.02	11/28/95	0.017 ± 0.002	LT 0.02
06/06/95	0.020 ± 0.002	LT 0.02	12/05/95	0.040 ± 0.003	LT 0.03
06/13/95	0.012 ± 0.002	LT 0.02	12/12/95	0.017 ± 0.002	LT 0.02
06/20/95	0.025 ± 0.002	LT 0.02	12/19/95	0.029 ± 0.003	LT 0.03
06/27/95	0.023 ± 0.002	LT 0.02	12/26/95	0.037 ± 0.004	LT 0.02

LT - Less than  
 PF - Pump Failure

Appendix A

Atmospheric Monitoring  
 D. C. Cook  
 1995  
 Livingston Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.024 ± 0.002	LT 0.02	07/04/95	0.020 ± 0.002	LT 0.02
01/10/95	0.060 ± 0.005	LT 0.05	07/11/95	0.009 ± 0.002	LT 0.02
01/17/95	0.016 ± 0.002	LT 0.02	07/18/95	0.032 ± 0.003	LT 0.02
01/24/95	0.015 ± 0.002	LT 0.02	07/25/95	0.019 ± 0.002	LT 0.02
01/31/95	0.023 ± 0.002	LT 0.02	08/01/95	0.026 ± 0.002	LT 0.02
02/07/95	0.028 ± 0.003	LT 0.02	08/08/95	0.017 ± 0.002	LT 0.03
02/14/95	0.025 ± 0.003	LT 0.02	08/15/95	0.026 ± 0.003	LT 0.03
02/21/95	0.026 ± 0.003	LT 0.02	08/22/95	0.013 ± 0.002	LT 0.02
02/28/95	0.019 ± 0.002	LT 0.03	08/29/95	0.010 ± 0.002	LT 0.02
03/07/95	0.015 ± 0.002	LT 0.02	09/05/95	0.038 ± 0.003	LT 0.02
03/14/95	0.031 ± 0.003	LT 0.02	09/12/95	0.027 ± 0.002	LT 0.02
03/21/95	0.019 ± 0.002	LT 0.02	09/19/95	0.021 ± 0.002	LT 0.03
03/28/95	0.014 ± 0.002	LT 0.02	09/26/95	0.012 ± 0.002	LT 0.02
04/04/95	0.017 ± 0.002	LT 0.03	10/03/95	0.047 ± 0.003	LT 0.02
04/11/95	0.021 ± 0.002	LT 0.03	10/10/95	0.014 ± 0.002	LT 0.02
04/18/95	0.018 ± 0.003	LT 0.02	10/17/95	0.029 ± 0.003	LT 0.02
04/25/95	0.008 ± 0.002	LT 0.02	10/24/95	0.015 ± 0.002	LT 0.02
05/02/95	0.006 ± 0.003	LT 0.05	10/31/95	0.021 ± 0.002	LT 0.02
05/09/95	0.013 ± 0.002	LT 0.03	11/07/95	0.025 ± 0.003	LT 0.02
05/16/95	0.011 ± 0.002	LT 0.02	11/14/95	0.020 ± 0.002	LT 0.02
05/23/95	0.010 ± 0.002	LT 0.02	11/21/95	0.025 ± 0.003	LT 0.03
05/30/95	0.011 ± 0.002	LT 0.02	11/28/95	0.015 ± 0.002	LT 0.02
06/06/95	0.016 ± 0.002	LT 0.02	12/05/95	0.040 ± 0.003	LT 0.03
06/13/95	0.010 ± 0.002	LT 0.02	12/12/95	0.019 ± 0.002	LT 0.02
06/20/95	0.020 ± 0.002	LT 0.02	12/19/95	0.025 ± 0.002	LT 0.03
06/27/95	0.018 ± 0.002	LT 0.02	12/26/95	0.039 ± 0.004	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
 D. C. Cook  
 1995  
 Peddy Farm Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.018 ± 0.002	LT 0.02	07/04/95	0.018 ± 0.002	LT 0.02
01/10/95	0.031 ± 0.003	LT 0.02	07/11/95	0.008 ± 0.002	LT 0.02
01/17/95	0.020 ± 0.002	LT 0.02	07/18/95	0.024 ± 0.002	LT 0.02
01/24/95	0.016 ± 0.002	LT 0.02	07/25/95	0.016 ± 0.002	LT 0.02
01/31/95	0.022 ± 0.002	LT 0.02	08/01/95	0.024 ± 0.002	LT 0.02
02/07/95	0.025 ± 0.002	LT 0.02	08/08/95	0.013 ± 0.002	LT 0.03
02/14/95	0.021 ± 0.002	LT 0.02	08/15/95	0.018 ± 0.002	LT 0.03
02/21/95	0.025 ± 0.002	LT 0.02	08/22/95	0.011 ± 0.002	LT 0.02
02/28/95	0.017 ± 0.002	LT 0.03	08/29/95	0.009 ± 0.002	LT 0.02
03/07/95	0.014 ± 0.002	LT 0.02	09/05/95	0.029 ± 0.003	LT 0.02
03/14/95	0.027 ± 0.003	LT 0.02	09/12/95	0.015 ± 0.003	LT 0.04
03/21/95	0.018 ± 0.002	LT 0.02	09/19/95	PF	PF
03/28/95	0.012 ± 0.002	LT 0.02	09/26/95	0.011 ± 0.002	LT 0.02
04/04/95	0.017 ± 0.002	LT 0.03	10/03/95	0.045 ± 0.003	LT 0.02
04/11/95	0.020 ± 0.002	LT 0.03	10/10/95	0.013 ± 0.002	LT 0.02
04/18/95	0.013 ± 0.002	LT 0.02	10/17/95	0.028 ± 0.003	LT 0.02
04/25/95	0.009 ± 0.002	LT 0.02	10/24/95	0.016 ± 0.002	LT 0.02
05/02/95	0.014 ± 0.002	LT 0.02	10/31/95	0.016 ± 0.002	LT 0.02
05/09/95	0.015 ± 0.002	LT 0.03	11/07/95	0.024 ± 0.003	LT 0.02
05/16/95	0.012 ± 0.002	LT 0.02	11/14/95	0.019 ± 0.002	LT 0.02
05/23/95	0.009 ± 0.002	LT 0.02	11/21/95	0.022 ± 0.002	LT 0.03
05/30/95	0.012 ± 0.002	LT 0.02	11/28/95	0.014 ± 0.002	LT 0.02
06/06/95	0.013 ± 0.002	LT 0.02	12/05/95	0.036 ± 0.003	LT 0.03
06/13/95	0.011 ± 0.002	LT 0.02	12/12/95	0.019 ± 0.002	LT 0.02
06/20/95	0.024 ± 0.002	LT 0.02	12/19/95	0.040 ± 0.003	LT 0.03
06/27/95	0.019 ± 0.002	LT 0.02	12/26/95	0.031 ± 0.003	LT 0.02

LT - Less than  
 PF - Pump Failure

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Rockwood Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.028 ± 0.003	LT 0.02	07/03/95	0.023 ± 0.002	LT 0.02
01/09/95	0.028 ± 0.003	LT 0.02	07/10/95	0.024 ± 0.002	LT 0.03
01/15/95	0.029 ± 0.003	LT 0.03	07/17/95	0.031 ± 0.003	LT 0.02
01/23/95	0.010 ± 0.002	LT 0.02	07/24/95	0.024 ± 0.002	LT 0.02
01/30/95	0.020 ± 0.002	LT 0.02	07/31/95	0.031 ± 0.003	LT 0.02
02/08/95	0.028 ± 0.002	LT 0.02	08/07/95	0.022 ± 0.002	LT 0.02
02/13/95	0.026 ± 0.003	LT 0.03	08/13/95	0.021 ± 0.003	LT 0.02
02/21/95	0.028 ± 0.002	LT 0.02	08/21/95	0.029 ± 0.002	LT 0.02
02/28/95	0.018 ± 0.002	LT 0.02	08/28/95	0.019 ± 0.002	LT 0.03
03/06/95	0.022 ± 0.003	LT 0.03	09/04/95	0.040 ± 0.003	LT 0.02
03/14/95	0.026 ± 0.002	LT 0.02	09/11/95	0.035 ± 0.003	LT 0.02
03/20/95	0.030 ± 0.003	LT 0.03	09/18/95	0.023 ± 0.002	LT 0.02
03/27/95	0.014 ± 0.002	LT 0.02	09/25/95	0.024 ± 0.002	LT 0.02
04/03/95	0.021 ± 0.002	LT 0.02	10/02/95	0.046 ± 0.003	LT 0.02
04/11/95	0.022 ± 0.002	LT 0.02	10/09/95	0.015 ± 0.002	LT 0.02
04/17/95	0.018 ± 0.002	LT 0.03	10/16/95	0.034 ± 0.003	LT 0.02
04/24/95	0.013 ± 0.002	LT 0.02	10/23/95	0.027 ± 0.003	LT 0.03
05/01/95	0.013 ± 0.002	LT 0.03	10/30/95	0.022 ± 0.002	LT 0.07
05/08/95	0.016 ± 0.002	LT 0.02	11/05/95	0.019 ± 0.002	LT 0.03
05/15/95	0.016 ± 0.002	LT 0.03	11/13/95	0.025 ± 0.002	LT 0.02
05/22/95	0.017 ± 0.003	LT 0.02	11/20/95	0.018 ± 0.003	LT 0.02
05/29/95	0.015 ± 0.002	LT 0.02	11/27/95	0.035 ± 0.003	LT 0.02
06/05/95	0.019 ± 0.002	LT 0.03	12/04/95	0.027 ± 0.003	LT 0.03
06/12/95	0.017 ± 0.002	LT 0.02	12/11/95	0.028 ± 0.003	LT 0.02
06/19/95	0.024 ± 0.003	LT 0.02	12/18/95	0.032 ± 0.003	LT 0.02
06/26/95	0.028 ± 0.003	LT 0.03	12/26/95	0.015 ± 0.002	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.029 ± 0.003	LT 0.02	07/03/95	0.019 ± 0.002	LT 0.02
01/09/95	0.029 ± 0.003	LT 0.02	07/10/95	0.024 ± 0.002	LT 0.03
01/15/95	0.028 ± 0.003	LT 0.03	07/17/95	0.029 ± 0.003	LT 0.02
01/23/95	0.011 ± 0.002	LT 0.02	07/24/95	0.025 ± 0.002	LT 0.02
01/30/95	0.019 ± 0.002	LT 0.02	07/31/95	0.027 ± 0.003	LT 0.02
02/08/95	0.025 ± 0.002	LT 0.02	08/07/95	0.020 ± 0.002	LT 0.02
02/13/95	0.026 ± 0.003	LT 0.03	08/13/95	0.017 ± 0.003	LT 0.03
02/21/95	0.028 ± 0.002	LT 0.02	08/21/95	0.028 ± 0.002	LT 0.02
02/28/95	0.019 ± 0.002	LT 0.02	08/28/95	0.018 ± 0.002	LT 0.03
03/06/95	0.021 ± 0.003	LT 0.03	09/04/95	0.036 ± 0.003	LT 0.02
03/14/95	0.024 ± 0.002	LT 0.02	09/11/95	0.030 ± 0.003	LT 0.02
03/20/95	0.027 ± 0.004	LT 0.05	09/18/95	0.026 ± 0.003	LT 0.02
03/27/95	0.014 ± 0.002	LT 0.02	09/25/95	0.018 ± 0.002	LT 0.02
04/03/95	0.020 ± 0.002	LT 0.02	10/02/95	0.043 ± 0.003	LT 0.02
04/11/95	0.022 ± 0.002	LT 0.02	10/09/95	0.014 ± 0.002	LT 0.02
04/17/95	0.018 ± 0.003	LT 0.03	10/16/95	0.032 ± 0.003	LT 0.02
04/24/95	0.016 ± 0.004	LT 0.05	10/23/95	0.023 ± 0.002	LT 0.03
05/01/95	0.012 ± 0.002	LT 0.03	10/30/95	0.023 ± 0.002	LT 0.07
05/08/95	0.016 ± 0.002	LT 0.02	11/05/95	0.019 ± 0.002	LT 0.03
05/15/95	0.017 ± 0.002	LT 0.03	11/13/95	0.027 ± 0.002	LT 0.02
05/22/95	0.019 ± 0.003	LT 0.02	11/20/95	0.020 ± 0.003	LT 0.02
05/29/95	0.011 ± 0.002	LT 0.02	11/27/95	0.033 ± 0.003	LT 0.02
06/05/95	0.016 ± 0.002	LT 0.03	12/04/95	0.028 ± 0.003	LT 0.03
06/12/95	0.017 ± 0.002	LT 0.02	12/11/95	0.027 ± 0.003	LT 0.02
06/19/95	0.029 ± 0.003	LT 0.02	12/18/95	0.036 ± 0.003	LT 0.02
06/26/95	0.025 ± 0.003	LT 0.03	12/26/95	0.017 ± 0.002	LT 0.02

LT - Less than



Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Pointe Aux Peaux Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.028 ± 0.003	LT 0.02	07/03/95	0.019 ± 0.002	LT 0.02
01/09/95	0.030 ± 0.003	LT 0.02	07/10/95	0.022 ± 0.002	LT 0.03
01/15/95	0.027 ± 0.003	LT 0.03	07/17/95	0.030 ± 0.003	LT 0.02
01/23/95	0.014 ± 0.002	LT 0.02	07/24/95	0.023 ± 0.002	LT 0.02
01/30/95	0.034 ± 0.003	LT 0.02	07/31/95	0.027 ± 0.003	LT 0.02
02/08/95	0.029 ± 0.002	LT 0.02	08/07/95	0.022 ± 0.002	LT 0.02
02/13/95	0.025 ± 0.003	LT 0.03	08/13/95	0.018 ± 0.003	LT 0.02
02/21/95	0.025 ± 0.002	LT 0.02	08/21/95	0.027 ± 0.002	LT 0.02
02/28/95	0.019 ± 0.002	LT 0.02	08/28/95	0.018 ± 0.002	LT 0.03
03/06/95	0.019 ± 0.002	LT 0.03	09/04/95	0.033 ± 0.003	LT 0.02
03/14/95	0.028 ± 0.002	LT 0.02	09/11/95	0.032 ± 0.003	LT 0.02
03/20/95	0.030 ± 0.003	LT 0.03	09/18/95	0.025 ± 0.002	LT 0.02
03/27/95	0.015 ± 0.002	LT 0.02	09/25/95	0.016 ± 0.002	LT 0.02
04/03/95	0.022 ± 0.002	LT 0.02	10/02/95	0.042 ± 0.003	LT 0.02
04/11/95	0.022 ± 0.002	LT 0.02	10/09/95	0.012 ± 0.002	LT 0.02
04/17/95	0.021 ± 0.003	LT 0.03	10/16/95	0.035 ± 0.003	LT 0.02
04/24/95	0.013 ± 0.002	LT 0.02	10/23/95	0.025 ± 0.002	LT 0.03
05/01/95	0.012 ± 0.002	LT 0.03	10/30/95	0.023 ± 0.002	LT 0.07
05/08/95	0.016 ± 0.002	LT 0.02	11/05/95	0.021 ± 0.003	LT 0.03
05/15/95	0.016 ± 0.002	LT 0.03	11/13/95	0.026 ± 0.002	LT 0.02
05/22/95	0.017 ± 0.003	LT 0.02	11/20/95	0.023 ± 0.003	LT 0.02
05/29/95	0.014 ± 0.002	LT 0.02	11/27/95	0.033 ± 0.003	LT 0.02
06/05/95	0.017 ± 0.002	LT 0.03	12/04/95	0.026 ± 0.003	LT 0.03
06/12/95	0.017 ± 0.002	LT 0.02	12/11/95	0.023 ± 0.002	LT 0.02
06/19/95	0.025 ± 0.003	LT 0.02	12/18/95	0.033 ± 0.003	LT 0.02
06/26/95	0.025 ± 0.003	LT 0.03	12/26/95	0.017 ± 0.002	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Nadeau Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.027 ± 0.003	LT 0.02	07/03/95	0.024 ± 0.002	LT 0.02
01/09/95	0.033 ± 0.003	LT 0.02	07/10/95	0.026 ± 0.003	LT 0.03
01/15/95	0.028 ± 0.003	LT 0.03	07/17/95	0.031 ± 0.003	LT 0.02
01/23/95	*	LT 0.02	07/24/95	0.027 ± 0.003	LT 0.02
01/30/95	0.019 ± 0.002	LT 0.02	07/31/95	0.028 ± 0.003	LT 0.02
02/08/95	0.027 ± 0.002	LT 0.02	08/07/95	0.022 ± 0.002	LT 0.02
02/13/95	0.024 ± 0.003	LT 0.03	08/13/95	0.025 ± 0.003	LT 0.02
02/21/95	0.026 ± 0.002	LT 0.02	08/21/95	0.030 ± 0.002	LT 0.02
02/28/95	0.020 ± 0.002	LT 0.02	08/28/95	0.022 ± 0.002	LT 0.03
03/06/95	0.020 ± 0.002	LT 0.03	09/04/95	0.039 ± 0.003	LT 0.02
03/14/95	0.028 ± 0.002	LT 0.02	09/11/95	0.038 ± 0.003	LT 0.02
03/20/95	0.030 ± 0.003	LT 0.03	09/18/95	0.029 ± 0.003	LT 0.02
03/27/95	0.020 ± 0.002	LT 0.02	09/25/95	0.026 ± 0.003	LT 0.02
04/03/95	0.023 ± 0.002	LT 0.02	10/02/95	0.044 ± 0.003	LT 0.02
04/11/95	0.021 ± 0.002	LT 0.02	10/09/95	0.015 ± 0.002	LT 0.02
04/17/95	0.019 ± 0.003	LT 0.03	10/16/95	0.030 ± 0.004	LT 0.04
04/24/95	0.012 ± 0.002	LT 0.02	10/23/95	0.026 ± 0.003	LT 0.03
05/01/95	0.014 ± 0.002	LT 0.03	10/30/95	0.022 ± 0.002	LT 0.07
05/08/95	0.017 ± 0.002	LT 0.02	11/05/95	0.020 ± 0.002	LT 0.03
05/15/95	0.018 ± 0.002	LT 0.03	11/13/95	0.024 ± 0.002	LT 0.02
05/22/95	0.023 ± 0.003	LT 0.02	11/20/95	0.019 ± 0.003	LT 0.02
05/29/95	0.012 ± 0.002	LT 0.02	11/27/95	0.034 ± 0.003	LT 0.02
06/05/95	0.021 ± 0.002	LT 0.03	12/04/95	0.027 ± 0.003	LT 0.03
06/12/95	0.018 ± 0.002	LT 0.02	12/11/95	0.040 ± 0.005	LT 0.04
06/19/95	0.031 ± 0.003	LT 0.02	12/18/95	PF	PF
06/26/95	0.030 ± 0.003	LT 0.03	12/26/95	0.016 ± 0.002	LT 0.02

LT - Less than

PF - Pump Failure

\* - Sample Destroyed

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Dixie Highway Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.026 ± 0.003	LT 0.02	07/03/95	0.022 ± 0.002	LT 0.02
01/09/95	0.026 ± 0.003	LT 0.02	07/10/95	0.032 ± 0.003	LT 0.03
01/15/95	0.025 ± 0.003	LT 0.03	07/17/95	0.030 ± 0.003	LT 0.02
01/23/95	0.012 ± 0.002	LT 0.02	07/24/95	0.025 ± 0.002	LT 0.02
01/30/95	0.019 ± 0.002	LT 0.02	07/31/95	0.041 ± 0.003	LT 0.02
02/08/95	0.027 ± 0.002	LT 0.02	08/07/95	0.022 ± 0.002	LT 0.02
02/13/95	0.026 ± 0.003	LT 0.03	08/13/95	0.021 ± 0.003	LT 0.02
02/21/95	0.027 ± 0.002	LT 0.02	08/21/95	0.030 ± 0.002	LT 0.02
02/28/95	0.018 ± 0.002	LT 0.02	08/28/95	0.022 ± 0.002	LT 0.03
03/06/95	0.021 ± 0.003	LT 0.03	09/04/95	0.034 ± 0.003	LT 0.02
03/14/95	0.028 ± 0.002	LT 0.02	09/11/95	0.041 ± 0.003	LT 0.02
03/20/95	0.029 ± 0.003	LT 0.03	09/18/95	0.027 ± 0.003	LT 0.02
03/27/95	0.015 ± 0.002	LT 0.02	09/25/95	0.035 ± 0.003	LT 0.02
04/03/95	0.022 ± 0.002	LT 0.02	10/02/95	0.047 ± 0.003	LT 0.02
04/11/95	0.021 ± 0.002	LT 0.02	10/09/95	0.016 ± 0.002	LT 0.03
04/17/95	0.016 ± 0.002	LT 0.03	10/16/95	0.033 ± 0.003	LT 0.02
04/24/95	0.009 ± 0.002	LT 0.02	10/23/95	0.027 ± 0.003	LT 0.03
05/01/95	0.013 ± 0.002	LT 0.03	10/30/95	0.025 ± 0.002	LT 0.07
05/08/95	0.015 ± 0.002	LT 0.02	11/05/95	0.020 ± 0.002	LT 0.03
05/15/95	0.010 ± 0.003	LT 0.05	11/13/95	0.025 ± 0.002	LT 0.02
05/22/95	0.026 ± 0.003	LT 0.02	11/20/95	0.019 ± 0.003	LT 0.02
05/29/95	0.011 ± 0.002	LT 0.02	11/27/95	0.039 ± 0.003	LT 0.02
06/05/95	0.026 ± 0.003	LT 0.03	12/04/95	0.031 ± 0.003	LT 0.03
06/12/95	0.024 ± 0.002	LT 0.02	12/11/95	0.024 ± 0.002	LT 0.02
06/19/95	0.032 ± 0.003	LT 0.03	12/18/95	0.036 ± 0.003	LT 0.02
06/26/95	0.019 ± 0.004	LT 0.05	12/26/95	0.019 ± 0.002	LT 0.02

LT - Less than  
 PF - Pump Failure

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1995  
 Fix Farm Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/95	0.024 ± 0.003	LT 0.02	07/03/95	0.031 ± 0.003	LT 0.02
01/09/95	0.031 ± 0.003	LT 0.02	07/10/95	0.033 ± 0.003	LT 0.03
01/15/95	0.029 ± 0.003	LT 0.03	07/17/95	0.026 ± 0.003	LT 0.02
01/23/95	0.011 ± 0.002	LT 0.02	07/24/95	0.027 ± 0.003	LT 0.02
01/30/95	0.020 ± 0.002	LT 0.02	07/31/95	0.040 ± 0.003	LT 0.02
02/08/95	0.027 ± 0.002	LT 0.02	08/07/95	0.022 ± 0.002	LT 0.02
02/13/95	0.025 ± 0.003	LT 0.03	08/13/95	0.021 ± 0.003	LT 0.02
02/21/95	0.025 ± 0.002	LT 0.02	08/21/95	0.032 ± 0.003	LT 0.02
02/28/95	0.020 ± 0.002	LT 0.02	08/28/95	0.023 ± 0.002	LT 0.03
03/06/95	0.021 ± 0.002	LT 0.03	09/04/95	0.041 ± 0.003	LT 0.02
03/14/95	0.026 ± 0.002	LT 0.02	09/11/95	0.034 ± 0.003	LT 0.02
03/20/95	0.029 ± 0.003	LT 0.03	09/18/95	0.026 ± 0.003	LT 0.02
03/27/95	0.015 ± 0.002	LT 0.02	09/25/95	0.026 ± 0.003	LT 0.02
04/03/95	0.024 ± 0.002	LT 0.02	10/02/95	0.047 ± 0.003	LT 0.02
04/11/95	0.023 ± 0.002	LT 0.02	10/09/95	0.019 ± 0.002	LT 0.02
04/17/95	0.018 ± 0.002	LT 0.03	10/16/95	0.035 ± 0.003	LT 0.02
04/24/95	0.013 ± 0.002	LT 0.02	10/23/95	0.027 ± 0.003	LT 0.03
05/01/95	0.012 ± 0.002	LT 0.03	10/30/95	0.022 ± 0.002	LT 0.07
05/08/95	0.015 ± 0.002	LT 0.02	11/05/95	0.021 ± 0.003	LT 0.03
05/15/95	0.018 ± 0.002	LT 0.03	11/13/95	0.025 ± 0.002	LT 0.02
05/22/95	0.028 ± 0.003	LT 0.02	11/20/95	0.018 ± 0.003	LT 0.02
05/29/95	0.013 ± 0.002	LT 0.02	11/27/95	0.033 ± 0.003	LT 0.02
06/05/95	0.026 ± 0.003	LT 0.03	12/04/95	0.029 ± 0.003	LT 0.03
06/12/95	0.020 ± 0.002	LT 0.02	12/11/95	0.024 ± 0.002	LT 0.02
06/19/95	0.032 ± 0.003	LT 0.02	12/18/95	0.032 ± 0.003	LT 0.02
06/26/95	0.026 ± 0.003	LT 0.03	12/26/95	0.014 ± 0.004	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
1995  
Lansing Background Reference Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/03/95	0.027 ± 0.002	LT 0.02	07/03/95	0.017 ± 0.001	LT 0.02
01/09/95	0.025 ± 0.003	LT 0.02	07/10/95	0.022 ± 0.002	LT 0.03
01/17/95	0.053 ± 0.005	LT 0.04	07/17/95	0.029 ± 0.002	LT 0.02
01/23/95	0.009 ± 0.002	LT 0.02	07/24/95	0.021 ± 0.002	LT 0.02
01/30/95	0.016 ± 0.002	LT 0.02	07/31/95	0.024 ± 0.002	LT 0.02
02/06/95	0.025 ± 0.002	LT 0.02	08/07/95	0.020 ± 0.002	LT 0.02
02/13/95	0.025 ± 0.002	LT 0.02	08/14/95	0.026 ± 0.003	LT 0.02
02/21/95	0.026 ± 0.002	LT 0.02	08/21/95	0.027 ± 0.003	LT 0.02
02/27/95	0.021 ± 0.003	LT 0.02	08/28/95	0.021 ± 0.002	LT 0.02
03/06/95	0.020 ± 0.002	LT 0.02	09/04/95	0.052 ± 0.003	LT 0.02
03/13/95	0.027 ± 0.003	LT 0.02	09/11/95	0.032 ± 0.003	LT 0.03
03/20/95	0.024 ± 0.003	LT 0.02	09/18/95	0.025 ± 0.002	LT 0.02
03/27/95	0.014 ± 0.002	LT 0.02	09/25/95	0.017 ± 0.002	LT 0.02
04/03/95	0.019 ± 0.002	LT 0.02	10/02/95	0.044 ± 0.003	LT 0.02
04/10/95	0.020 ± 0.002	LT 0.02	10/09/95	0.017 ± 0.002	LT 0.02
04/17/95	0.016 ± 0.002	LT 0.02	10/16/95	0.035 ± 0.003	LT 0.02
04/24/95	0.013 ± 0.002	LT 0.02	10/23/95	0.016 ± 0.002	LT 0.02
05/01/95	0.012 ± 0.002	LT 0.02	10/30/95	0.020 ± 0.002	LT 0.02
05/08/95	0.014 ± 0.002	LT 0.02	11/06/95	0.020 ± 0.002	LT 0.02
05/15/95	0.017 ± 0.002	LT 0.02	11/13/95	0.022 ± 0.002	LT 0.02
05/22/95	0.019 ± 0.003	LT 0.02	11/20/95	0.020 ± 0.003	LT 0.02
05/30/95	0.011 ± 0.002	LT 0.01	11/27/95	0.031 ± 0.003	LT 0.02
06/05/95	0.022 ± 0.003	LT 0.02	12/04/95	0.023 ± 0.002	LT 0.02
06/12/95	0.018 ± 0.002	LT 0.02	12/11/95	0.022 ± 0.002	LT 0.02
06/19/95	0.025 ± 0.003	LT 0.02	12/18/95	0.034 ± 0.003	LT 0.02
06/26/95	0.028 ± 0.003	LT 0.02	12/26/95	0.015 ± 0.002	LT 0.02

LT - Less than

Appendix A

Atmospheric Monitoring  
Big Rock Point  
1996  
Charlevoix Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/04/96	0.027 ± 0.003	LT 0.03
01/11/96	0.024 ± 0.003	LT 0.03
01/18/96	0.020 ± 0.003	LT 0.03
01/25/96	0.017 ± 0.003	LT 0.02
02/01/96	0.016 ± 0.003	LT 0.02
02/08/96	0.023 ± 0.003	LT 0.03
02/15/96	0.015 ± 0.003	LT 0.03
02/22/96	0.015 ± 0.003	LT 0.02
02/29/96	0.015 ± 0.003	LT 0.03
03/07/96	0.021 ± 0.003	LT 0.02
03/14/96	0.021 ± 0.003	LT 0.03
03/21/96	0.013 ± 0.002	LT 0.03
03/28/96	0.016 ± 0.002	LT 0.03
04/04/96	0.020 ± 0.003	LT 0.03
04/11/96	0.014 ± 0.002	LT 0.03
04/18/96	0.014 ± 0.002	LT 0.03
04/25/96	0.011 ± 0.002	LT 0.02
05/02/96	0.010 ± 0.002	LT 0.03
05/09/96	0.013 ± 0.002	LT 0.03
05/16/96	0.013 ± 0.002	LT 0.03
05/23/96	0.011 ± 0.002	LT 0.03
05/30/96	0.011 ± 0.002	LT 0.03
06/06/96	0.011 ± 0.002	LT 0.03
06/13/96	0.010 ± 0.002	LT 0.03
06/19/96	0.016 ± 0.003	LT 0.04
06/27/96	0.008 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/04/96	0.014 ± 0.002	LT 0.03
07/11/96	0.014 ± 0.002	LT 0.03
07/17/96	0.015 ± 0.003	LT 0.03
07/24/96	0.012 ± 0.002	LT 0.03
07/31/96	0.010 ± 0.002	LT 0.04
08/07/96	0.012 ± 0.002	LT 0.03
08/14/96	0.013 ± 0.002	LT 0.03
08/21/96	0.012 ± 0.002	LT 0.03
08/28/96	0.013 ± 0.002	LT 0.03
09/04/96	0.021 ± 0.003	LT 0.03
09/11/96	0.027 ± 0.003	LT 0.03
09/18/96	0.007 ± 0.002	LT 0.03
09/25/96	0.021 ± 0.003	LT 0.03
10/02/96	0.013 ± 0.002	LT 0.03
10/09/96	0.013 ± 0.002	LT 0.03
10/16/96	0.012 ± 0.002	LT 0.03
10/23/96	0.015 ± 0.002	LT 0.03
10/30/96	0.014 ± 0.002	LT 0.03
11/06/96	0.013 ± 0.002	LT 0.03
11/13/96	0.011 ± 0.002	LT 0.02
11/20/96	0.013 ± 0.003	LT 0.03
11/26/96	0.012 ± 0.003	LT 0.03
12/04/96	0.021 ± 0.003	LT 0.03
12/11/96	0.014 ± 0.002	LT 0.03
12/18/96	0.013 ± 0.002	LT 0.03
12/25/96	0.020 ± 0.003	LT 0.03
12/31/96	0.020 ± 0.003	LT 0.04

LT - Less than

Appendix A

Atmospheric Monitoring  
Big Rock Point  
1996  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/04/96	0.031 ± 0.003	LT 0.03
01/11/96	0.030 ± 0.003	LT 0.03
01/18/96	0.018 ± 0.003	LT 0.03
01/25/96	0.018 ± 0.003	LT 0.02
02/01/96	0.015 ± 0.002	LT 0.02
02/08/96	0.028 ± 0.003	LT 0.03
02/15/96	0.017 ± 0.003	LT 0.03
02/22/96	0.017 ± 0.003	LT 0.02
02/29/96	0.016 ± 0.002	LT 0.03
03/07/96	0.023 ± 0.003	LT 0.02
03/14/96	0.022 ± 0.003	LT 0.03
03/21/96	0.020 ± 0.003	LT 0.03
03/28/96	0.019 ± 0.003	LT 0.03
04/04/96	0.017 ± 0.003	LT 0.03
04/11/96	0.016 ± 0.003	LT 0.03
04/18/96	0.015 ± 0.002	LT 0.03
04/25/96	0.012 ± 0.002	LT 0.02
05/02/96	0.012 ± 0.002	LT 0.03
05/09/96	0.014 ± 0.002	LT 0.03
05/16/96	0.017 ± 0.003	LT 0.03
05/23/96	0.011 ± 0.002	LT 0.03
05/30/96	0.011 ± 0.002	LT 0.03
06/06/96	0.012 ± 0.002	LT 0.03
06/13/96	0.010 ± 0.002	LT 0.03
06/19/96	0.017 ± 0.003	LT 0.04
06/27/96	0.011 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/04/96	0.020 ± 0.003	LT 0.03
07/11/96	0.015 ± 0.002	LT 0.03
07/17/96	0.017 ± 0.003	LT 0.03
07/24/96	0.016 ± 0.003	LT 0.03
07/31/96	0.009 ± 0.002	LT 0.03
08/07/96	0.012 ± 0.002	LT 0.03
08/14/96	0.010 ± 0.002	LT 0.03
08/21/96	0.015 ± 0.002	LT 0.03
08/28/96	0.015 ± 0.002	LT 0.03
09/04/96	0.028 ± 0.003	LT 0.03
09/11/96	0.028 ± 0.003	LT 0.03
09/18/96	0.009 ± 0.002	LT 0.03
09/25/96	0.020 ± 0.003	LT 0.03
10/02/96	0.016 ± 0.003	LT 0.03
10/09/96	0.015 ± 0.003	LT 0.03
10/16/96	0.015 ± 0.003	LT 0.03
10/23/96	0.014 ± 0.002	LT 0.03
10/30/96	0.016 ± 0.002	LT 0.02
11/06/96	0.020 ± 0.003	LT 0.03
11/13/96	PF	PF
11/20/96	0.013 ± 0.002	LT 0.03
11/26/96	0.012 ± 0.003	LT 0.04
12/04/96	0.022 ± 0.003	LT 0.03
12/11/96	0.014 ± 0.002	LT 0.03
12/18/96	0.016 ± 0.002	LT 0.03
12/25/96	0.020 ± 0.003	LT 0.03
12/31/96	0.024 ± 0.003	LT 0.04

LT - Less than  
PF - Pump Failure

Appendix A

Atmospheric Monitoring  
 Big Rock Point  
 1996  
 Burgess Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/04/96	0.028 ± 0.003	LT 0.03
01/11/96	0.026 ± 0.003	LT 0.03
01/18/96	0.021 ± 0.003	LT 0.03
01/25/96	0.016 ± 0.002	LT 0.02
02/01/96	0.016 ± 0.003	LT 0.02
02/08/96	0.024 ± 0.003	LT 0.03
02/15/96	0.014 ± 0.002	LT 0.03
02/22/96	0.017 ± 0.003	LT 0.02
02/29/96	0.013 ± 0.002	LT 0.03
03/07/96	0.025 ± 0.003	LT 0.02
03/14/96	0.019 ± 0.003	LT 0.03
03/21/96	0.012 ± 0.002	LT 0.03
03/28/96	0.016 ± 0.003	LT 0.03
04/04/96	0.018 ± 0.003	LT 0.03
04/11/96	0.013 ± 0.002	LT 0.03
04/18/96	0.013 ± 0.002	LT 0.03
04/25/96	0.010 ± 0.002	LT 0.02
05/02/96	0.008 ± 0.002	LT 0.03
05/09/96	0.013 ± 0.002	LT 0.03
05/16/96	0.013 ± 0.002	LT 0.03
05/23/96	0.011 ± 0.002	LT 0.03
05/30/96	0.009 ± 0.002	LT 0.03
06/06/96	0.011 ± 0.002	LT 0.03
06/13/96	0.011 ± 0.002	LT 0.03
06/19/96	0.014 ± 0.003	LT 0.04
06/27/96	0.009 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/04/96	0.017 ± 0.003	LT 0.03
07/11/96	0.014 ± 0.002	LT 0.03
07/17/96	0.005 ± 0.002	LT 0.03
07/24/96	0.011 ± 0.002	LT 0.03
07/31/96	0.010 ± 0.002	LT 0.03
08/07/96	0.012 ± 0.002	LT 0.03
08/14/96	0.011 ± 0.002	LT 0.03
08/21/96	0.011 ± 0.002	LT 0.03
08/28/96	0.014 ± 0.002	LT 0.03
09/04/96	0.023 ± 0.003	LT 0.03
09/11/96	0.028 ± 0.003	LT 0.03
09/18/96	0.006 ± 0.002	LT 0.03
09/25/96	0.018 ± 0.003	LT 0.03
10/02/96	0.015 ± 0.002	LT 0.03
10/09/96	0.013 ± 0.002	LT 0.03
10/16/96	0.015 ± 0.003	LT 0.03
10/23/96	0.014 ± 0.002	LT 0.03
10/30/96	0.013 ± 0.002	LT 0.02
11/06/96	0.016 ± 0.002	LT 0.03
11/13/96	0.010 ± 0.002	LT 0.03
11/20/96	0.012 ± 0.002	LT 0.03
11/26/96	0.013 ± 0.003	LT 0.04
12/04/96	0.020 ± 0.002	LT 0.03
12/11/96	0.010 ± 0.002	LT 0.03
12/18/96	0.013 ± 0.002	LT 0.03
12/25/96	0.018 ± 0.003	LT 0.03
12/31/96	0.016 ± 0.003	LT 0.04

LT - Less than



Appendix A

Atmospheric Monitoring  
Palisades  
1996  
South Haven Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.018 ± 0.002	LT 0.02
01/09/96	0.041 ± 0.003	LT 0.02
01/16/96	0.032 ± 0.003	LT 0.02
01/23/96	0.026 ± 0.002	LT 0.02
01/30/96	0.022 ± 0.002	LT 0.02
02/06/96	0.026 ± 0.003	LT 0.03
02/13/96	0.022 ± 0.002	LT 0.02
02/20/96	0.025 ± 0.002	LT 0.02
02/27/96	0.012 ± 0.002	LT 0.02
03/05/96	0.029 ± 0.003	LT 0.02
03/12/96	0.027 ± 0.003	LT 0.02
03/19/96	0.022 ± 0.002	LT 0.02
03/26/96	0.024 ± 0.003	LT 0.02
04/02/96	0.020 ± 0.003	LT 0.02
04/09/96	0.023 ± 0.002	LT 0.02
04/16/96	0.018 ± 0.002	LT 0.02
04/23/96	0.014 ± 0.002	LT 0.02
04/30/96	0.018 ± 0.002	LT 0.02
05/07/96	0.016 ± 0.002	LT 0.02
05/14/96	0.019 ± 0.002	LT 0.02
05/21/96	0.014 ± 0.002	LT 0.02
05/28/96	0.019 ± 0.002	LT 0.02
06/04/96	0.015 ± 0.002	LT 0.03
06/11/96	0.013 ± 0.002	LT 0.02
06/18/96	0.023 ± 0.002	LT 0.02
06/25/96	0.013 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.023 ± 0.002	LT 0.03
07/09/96	0.020 ± 0.002	LT 0.02
07/16/96	0.012 ± 0.002	LT 0.02
07/23/96	0.022 ± 0.002	LT 0.02
07/30/96	0.024 ± 0.002	LT 0.04
08/06/96	0.021 ± 0.002	LT 0.02
08/13/96	0.028 ± 0.003	LT 0.02
08/20/96	0.025 ± 0.003	LT 0.02
08/27/96	0.030 ± 0.003	LT 0.02
09/03/96	0.021 ± 0.002	LT 0.02
09/10/96	0.039 ± 0.003	LT 0.02
09/17/96	0.015 ± 0.002	LT 0.02
09/24/96	0.021 ± 0.002	LT 0.03
10/01/96	0.021 ± 0.002	LT 0.02
10/08/96	0.024 ± 0.002	LT 0.02
10/15/96	0.025 ± 0.002	LT 0.02
10/22/96	0.025 ± 0.002	LT 0.02
10/29/96	0.019 ± 0.002	LT 0.02
11/05/96	0.028 ± 0.003	LT 0.02
11/12/96	0.017 ± 0.002	LT 0.02
11/19/96	0.022 ± 0.002	LT 0.03
11/26/96	0.013 ± 0.002	LT 0.03
12/03/96	0.033 ± 0.003	LT 0.02
12/10/96	0.022 ± 0.002	LT 0.02
12/17/96	0.023 ± 0.003	LT 0.02
12/24/96	0.021 ± 0.002	LT 0.02
12/31/96	0.028 ± 0.003	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
Palisades  
1996  
Covert Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.015 ± 0.002	LT 0.02
01/09/96	0.030 ± 0.003	LT 0.02
01/16/96	0.027 ± 0.003	LT 0.02
01/23/96	0.022 ± 0.002	LT 0.02
01/30/96	0.019 ± 0.002	LT 0.02
02/06/96	0.029 ± 0.003	LT 0.03
02/13/96	0.019 ± 0.002	LT 0.02
02/20/96	0.020 ± 0.002	LT 0.02
02/27/96	0.012 ± 0.002	LT 0.02
03/05/96	0.025 ± 0.003	LT 0.02
03/12/96	0.021 ± 0.002	LT 0.02
03/19/96	0.020 ± 0.002	LT 0.02
03/26/96	0.017 ± 0.002	LT 0.02
04/02/96	0.017 ± 0.003	LT 0.02
04/09/96	0.018 ± 0.002	LT 0.02
04/16/96	0.016 ± 0.002	LT 0.02
04/23/96	0.010 ± 0.002	LT 0.02
04/30/96	0.016 ± 0.002	LT 0.02
05/07/96	0.013 ± 0.002	LT 0.02
05/14/96	0.017 ± 0.002	LT 0.02
05/21/96	0.011 ± 0.002	LT 0.02
05/28/96	0.015 ± 0.002	LT 0.02
06/04/96	0.010 ± 0.002	LT 0.03
06/11/96	0.009 ± 0.002	LT 0.02
06/18/96	0.019 ± 0.002	LT 0.02
06/25/96	0.012 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.022 ± 0.002	LT 0.03
07/09/96	0.018 ± 0.002	LT 0.02
07/16/96	0.016 ± 0.002	LT 0.02
07/23/96	0.021 ± 0.002	LT 0.02
07/30/96	0.017 ± 0.002	LT 0.04
08/06/96	0.029 ± 0.004	LT 0.04
08/13/96	0.050 ± 0.005	LT 0.05
08/20/96	0.010 ± 0.003	LT 0.04
08/27/96	0.013 ± 0.003	LT 0.05
09/03/96	0.035 ± 0.004	LT 0.04
09/10/96	0.035 ± 0.003	LT 0.02
09/17/96	0.012 ± 0.002	LT 0.02
09/24/96	0.018 ± 0.002	LT 0.03
10/01/96	0.015 ± 0.002	LT 0.02
10/08/96	0.019 ± 0.002	LT 0.02
10/15/96	0.022 ± 0.002	LT 0.02
10/22/96	0.023 ± 0.002	LT 0.02
10/29/96	0.016 ± 0.002	LT 0.02
11/05/96	0.023 ± 0.002	LT 0.02
11/12/96	0.015 ± 0.002	LT 0.02
11/19/96	0.018 ± 0.002	LT 0.03
11/26/96	0.012 ± 0.002	LT 0.03
12/03/96	0.026 ± 0.003	LT 0.02
12/10/96	0.022 ± 0.002	LT 0.02
12/17/96	0.019 ± 0.003	LT 0.02
12/24/96	0.017 ± 0.002	LT 0.02
12/31/96	0.024 ± 0.003	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
Palisades  
1996  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.013 ± 0.002	LT 0.02
01/09/96	0.031 ± 0.003	LT 0.02
01/16/96	0.030 ± 0.003	LT 0.02
01/23/96	0.024 ± 0.002	LT 0.02
01/30/96	0.021 ± 0.002	LT 0.02
02/06/96	0.017 ± 0.004	LT 0.06
02/13/96	PF	PF
02/20/96	0.022 ± 0.002	LT 0.02
02/27/96	0.011 ± 0.002	LT 0.02
03/05/96	0.032 ± 0.003	LT 0.02
03/12/96	0.024 ± 0.002	LT 0.02
03/19/96	0.021 ± 0.002	LT 0.02
03/26/96	0.022 ± 0.002	LT 0.02
04/02/96	0.019 ± 0.003	LT 0.02
04/09/96	0.020 ± 0.002	LT 0.02
04/16/96	0.017 ± 0.002	LT 0.02
04/23/96	0.014 ± 0.002	LT 0.02
04/30/96	0.017 ± 0.002	LT 0.02
05/07/96	0.029 ± 0.003	LT 0.02
05/14/96	0.018 ± 0.002	LT 0.02
05/21/96	0.014 ± 0.002	LT 0.02
05/28/96	0.017 ± 0.002	LT 0.02
06/04/96	0.016 ± 0.003	LT 0.03
06/11/96	0.007 ± 0.002	LT 0.02
06/18/96	0.018 ± 0.002	LT 0.02
06/25/96	0.012 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.022 ± 0.002	LT 0.03
07/09/96	0.020 ± 0.002	LT 0.02
07/16/96	0.014 ± 0.002	LT 0.02
07/23/96	0.018 ± 0.002	LT 0.02
07/30/96	0.022 ± 0.002	LT 0.04
08/06/96	0.018 ± 0.002	LT 0.02
08/13/96	0.020 ± 0.002	LT 0.02
08/20/96	0.024 ± 0.002	LT 0.02
08/27/96	0.028 ± 0.003	LT 0.02
09/03/96	0.020 ± 0.002	LT 0.02
09/10/96	0.037 ± 0.003	LT 0.02
09/17/96	0.016 ± 0.002	LT 0.02
09/24/96	0.022 ± 0.002	LT 0.03
10/01/96	0.021 ± 0.002	LT 0.02
10/08/96	0.022 ± 0.002	LT 0.02
10/15/96	0.023 ± 0.002	LT 0.02
10/22/96	0.025 ± 0.003	LT 0.02
10/29/96	0.018 ± 0.002	LT 0.02
11/05/96	0.026 ± 0.003	LT 0.02
11/12/96	0.017 ± 0.002	LT 0.02
11/19/96	0.019 ± 0.002	LT 0.03
11/26/96	0.016 ± 0.002	LT 0.03
12/03/96	0.028 ± 0.003	LT 0.02
12/10/96	0.025 ± 0.002	LT 0.02
12/17/96	0.019 ± 0.003	LT 0.02
12/24/96	0.021 ± 0.002	LT 0.02
12/31/96	0.027 ± 0.003	LT 0.03

LT - Less than  
PF - Pump Failure

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1996  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.018 ± 0.002	LT 0.02
01/09/96	0.043 ± 0.003	LT 0.02
01/16/96	0.038 ± 0.003	LT 0.02
01/23/96	0.030 ± 0.003	LT 0.02
01/30/96	0.022 ± 0.002	LT 0.02
02/06/96	0.045 ± 0.003	LT 0.03
02/13/96	0.025 ± 0.002	LT 0.02
02/20/96	0.028 ± 0.003	LT 0.02
02/27/96	0.015 ± 0.002	LT 0.02
03/05/96	0.033 ± 0.003	LT 0.02
03/12/96	0.027 ± 0.003	LT 0.02
03/19/96	0.027 ± 0.003	LT 0.02
03/26/96	0.023 ± 0.002	LT 0.02
04/02/96	0.022 ± 0.003	LT 0.02
04/09/96	0.027 ± 0.003	LT 0.02
04/16/96	0.019 ± 0.002	LT 0.02
04/23/96	0.015 ± 0.002	LT 0.02
04/30/96	0.020 ± 0.002	LT 0.02
05/07/96	0.018 ± 0.002	LT 0.02
05/14/96	0.023 ± 0.002	LT 0.02
05/21/96	0.015 ± 0.003	LT 0.02
05/28/96	0.023 ± 0.002	LT 0.02
06/04/96	0.015 ± 0.003	LT 0.03
06/11/96	0.008 ± 0.002	LT 0.02
06/18/96	0.024 ± 0.002	LT 0.02
06/25/96	0.016 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.026 ± 0.003	LT 0.03
07/09/96	0.023 ± 0.002	LT 0.02
07/16/96	0.021 ± 0.002	LT 0.02
07/23/96	0.020 ± 0.002	LT 0.03
07/30/96	0.023 ± 0.002	LT 0.04
08/06/96	0.024 ± 0.002	LT 0.02
08/13/96	0.023 ± 0.002	LT 0.02
08/20/96	0.029 ± 0.003	LT 0.02
08/27/96	0.031 ± 0.003	LT 0.02
09/03/96	0.026 ± 0.003	LT 0.02
09/10/96	0.038 ± 0.003	LT 0.02
09/17/96	0.017 ± 0.002	LT 0.02
09/24/96	0.025 ± 0.002	LT 0.03
10/01/96	0.025 ± 0.002	LT 0.02
10/08/96	0.024 ± 0.002	LT 0.02
10/15/96	0.025 ± 0.002	LT 0.02
10/22/96	0.020 ± 0.002	LT 0.02
10/29/96	0.029 ± 0.003	LT 0.02
11/05/96	0.032 ± 0.003	LT 0.02
11/12/96	0.020 ± 0.002	LT 0.02
11/19/96	0.023 ± 0.002	LT 0.03
11/26/96	0.018 ± 0.002	LT 0.03
12/03/96	0.032 ± 0.003	LT 0.02
12/10/96	0.027 ± 0.003	LT 0.02
12/17/96	0.027 ± 0.003	LT 0.02
12/24/96	0.023 ± 0.002	LT 0.02
12/31/96	0.032 ± 0.003	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
 D. C. Cook  
 1996  
 Bridgman Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.018 ± 0.002	LT 0.02
01/09/96	0.036 ± 0.003	LT 0.02
01/16/96	0.034 ± 0.003	LT 0.02
01/23/96	0.025 ± 0.002	LT 0.02
01/30/96	0.020 ± 0.002	LT 0.02
02/06/96	0.039 ± 0.003	LT 0.03
02/13/96	0.019 ± 0.002	LT 0.02
02/20/96	0.024 ± 0.002	LT 0.02
02/27/96	0.012 ± 0.002	LT 0.02
03/05/96	0.030 ± 0.003	LT 0.02
03/12/96	0.023 ± 0.002	LT 0.02
03/19/96	0.022 ± 0.002	LT 0.02
03/26/96	0.023 ± 0.002	LT 0.02
04/02/96	0.022 ± 0.003	LT 0.02
04/09/96	0.021 ± 0.002	LT 0.02
04/16/96	0.015 ± 0.002	LT 0.02
04/23/96	0.012 ± 0.002	LT 0.02
04/30/96	0.015 ± 0.002	LT 0.02
05/07/96	0.012 ± 0.002	LT 0.02
05/14/96	0.019 ± 0.002	LT 0.02
05/21/96	0.014 ± 0.003	LT 0.02
05/28/96	0.017 ± 0.002	LT 0.02
06/04/96	0.014 ± 0.002	LT 0.03
06/11/96	0.009 ± 0.002	LT 0.02
06/18/96	0.021 ± 0.002	LT 0.02
06/25/96	0.012 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.027 ± 0.003	LT 0.03
07/09/96	0.020 ± 0.002	LT 0.02
07/16/96	0.017 ± 0.002	LT 0.02
07/23/96	0.017 ± 0.002	LT 0.03
07/30/96	0.019 ± 0.002	LT 0.04
08/06/96	0.023 ± 0.002	LT 0.02
08/13/96	0.026 ± 0.002	LT 0.02
08/20/96	0.030 ± 0.003	LT 0.02
08/27/96	0.026 ± 0.003	LT 0.02
09/03/96	0.026 ± 0.003	LT 0.02
09/10/96	0.037 ± 0.003	LT 0.02
09/17/96	0.014 ± 0.002	LT 0.02
09/24/96	0.032 ± 0.003	LT 0.03
10/01/96	0.020 ± 0.002	LT 0.02
10/08/96	0.024 ± 0.002	LT 0.02
10/15/96	0.025 ± 0.002	LT 0.02
10/22/96	0.016 ± 0.002	LT 0.02
10/29/96	0.026 ± 0.002	LT 0.02
11/05/96	0.028 ± 0.003	LT 0.02
11/12/96	0.018 ± 0.002	LT 0.02
11/19/96	0.021 ± 0.002	LT 0.03
11/26/96	0.015 ± 0.002	LT 0.03
12/03/96	0.028 ± 0.003	LT 0.02
12/10/96	0.021 ± 0.002	LT 0.02
12/17/96	0.025 ± 0.003	LT 0.02
12/24/96	0.021 ± 0.002	LT 0.02
12/31/96	0.030 ± 0.003	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1996  
Stevensville Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.016 ± 0.002	LT 0.02
01/09/96	0.039 ± 0.003	LT 0.02
01/16/96	0.033 ± 0.003	LT 0.02
01/23/96	0.025 ± 0.002	LT 0.02
01/30/96	0.016 ± 0.002	LT 0.02
02/06/96	0.036 ± 0.003	LT 0.03
02/13/96	0.021 ± 0.002	LT 0.02
02/20/96	0.026 ± 0.002	LT 0.02
02/27/96	0.013 ± 0.002	LT 0.02
03/05/96	0.032 ± 0.003	LT 0.02
03/12/96	0.026 ± 0.003	LT 0.02
03/19/96	0.022 ± 0.002	LT 0.02
03/26/96	0.020 ± 0.002	LT 0.02
04/02/96	0.023 ± 0.003	LT 0.02
04/09/96	0.022 ± 0.002	LT 0.02
04/16/96	0.019 ± 0.002	LT 0.02
04/23/96	0.012 ± 0.002	LT 0.02
04/30/96	0.016 ± 0.002	LT 0.02
05/07/96	0.017 ± 0.002	LT 0.02
05/14/96	0.018 ± 0.002	LT 0.02
05/21/96	0.015 ± 0.003	LT 0.02
05/28/96	0.017 ± 0.002	LT 0.02
06/04/96	0.016 ± 0.003	LT 0.03
06/11/96	0.010 ± 0.002	LT 0.02
06/18/96	0.019 ± 0.002	LT 0.02
06/25/96	0.015 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.029 ± 0.003	LT 0.03
07/09/96	0.014 ± 0.002	LT 0.02
07/16/96	PF	PF
07/23/96	PF	PF
07/30/96	PF	PF
08/06/96	PF	PF
08/13/96	0.023 ± 0.002	LT 0.02
08/20/96	0.028 ± 0.003	LT 0.02
08/27/96	0.029 ± 0.003	LT 0.02
09/03/96	0.025 ± 0.003	LT 0.02
09/10/96	0.038 ± 0.003	LT 0.02
09/17/96	0.017 ± 0.002	LT 0.02
09/24/96	0.023 ± 0.002	LT 0.03
10/01/96	0.019 ± 0.002	LT 0.02
10/08/96	0.024 ± 0.002	LT 0.02
10/15/96	0.023 ± 0.002	LT 0.02
10/22/96	0.016 ± 0.002	LT 0.02
10/29/96	0.022 ± 0.002	LT 0.02
11/05/96	0.029 ± 0.003	LT 0.02
11/12/96	0.020 ± 0.002	LT 0.02
11/19/96	0.022 ± 0.002	LT 0.03
11/26/96	0.018 ± 0.002	LT 0.03
12/03/96	0.030 ± 0.003	LT 0.02
12/10/96	0.024 ± 0.002	LT 0.02
12/17/96	0.023 ± 0.003	LT 0.02
12/24/96	0.021 ± 0.002	LT 0.02
12/31/96	0.029 ± 0.003	LT 0.03

LT - Less than  
PF - Pump Failure

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1996  
Livingston Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.015 ± 0.002	LT 0.02
01/09/96	0.035 ± 0.003	LT 0.02
01/16/96	0.033 ± 0.003	LT 0.02
01/23/96	0.026 ± 0.002	LT 0.02
01/30/96	0.019 ± 0.002	LT 0.02
02/06/96	0.035 ± 0.003	LT 0.03
02/13/96	0.020 ± 0.002	LT 0.02
02/20/96	0.023 ± 0.002	LT 0.02
02/27/96	0.012 ± 0.002	LT 0.02
03/05/96	0.037 ± 0.005	LT 0.05
03/12/96	0.016 ± 0.002	LT 0.02
03/19/96	0.021 ± 0.002	LT 0.02
03/26/96	0.016 ± 0.002	LT 0.02
04/02/96	0.017 ± 0.003	LT 0.02
04/09/96	0.019 ± 0.002	LT 0.02
04/16/96	0.017 ± 0.002	LT 0.02
04/23/96	0.012 ± 0.002	LT 0.02
04/30/96	0.016 ± 0.002	LT 0.02
05/07/96	0.015 ± 0.002	LT 0.02
05/14/96	0.017 ± 0.002	LT 0.02
05/21/96	0.013 ± 0.002	LT 0.02
05/28/96	0.020 ± 0.002	LT 0.02
06/04/96	0.013 ± 0.002	LT 0.03
06/11/96	0.007 ± 0.002	LT 0.02
06/18/96	0.018 ± 0.002	LT 0.02
06/25/96	0.012 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.021 ± 0.002	LT 0.03
07/09/96	0.017 ± 0.002	LT 0.02
07/16/96	0.015 ± 0.002	LT 0.02
07/23/96	0.019 ± 0.002	LT 0.03
07/30/96	0.018 ± 0.002	LT 0.04
08/06/96	0.020 ± 0.002	LT 0.02
08/13/96	0.021 ± 0.002	LT 0.02
08/20/96	0.026 ± 0.003	LT 0.02
08/27/96	0.026 ± 0.003	LT 0.02
09/03/96	0.019 ± 0.002	LT 0.02
09/10/96	0.035 ± 0.003	LT 0.02
09/17/96	0.015 ± 0.002	LT 0.02
09/24/96	0.023 ± 0.002	LT 0.03
10/01/96	0.018 ± 0.002	LT 0.02
10/08/96	0.019 ± 0.002	LT 0.02
10/15/96	0.021 ± 0.002	LT 0.02
10/22/96	0.015 ± 0.002	LT 0.02
10/29/96	0.021 ± 0.002	LT 0.02
11/05/96	0.026 ± 0.003	LT 0.02
11/12/96	0.026 ± 0.004	LT 0.04
11/19/96	0.016 ± 0.002	LT 0.03
11/26/96	0.014 ± 0.002	LT 0.03
12/03/96	0.027 ± 0.003	LT 0.02
12/10/96	0.025 ± 0.002	LT 0.02
12/17/96	0.023 ± 0.003	LT 0.02
12/24/96	0.021 ± 0.002	LT 0.02
12/31/96	0.025 ± 0.002	LT 0.03

LT - Less than

Appendix A

Atmospheric Monitoring  
D. C. Cook  
1996  
Peddy Farm Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.014 ± 0.002	LT 0.02
01/09/96	0.033 ± 0.003	LT 0.02
01/16/96	NS	NS
01/23/96	0.022 ± 0.002	LT 0.02
01/30/96	0.017 ± 0.002	LT 0.02
02/06/96	0.029 ± 0.003	LT 0.03
02/13/96	0.017 ± 0.002	LT 0.02
02/20/96	0.018 ± 0.002	LT 0.02
02/27/96	0.010 ± 0.002	LT 0.02
03/05/96	0.029 ± 0.003	LT 0.02
03/12/96	0.024 ± 0.002	LT 0.02
03/19/96	0.022 ± 0.002	LT 0.02
03/26/96	0.018 ± 0.002	LT 0.02
04/02/96	0.016 ± 0.003	LT 0.02
04/09/96	0.017 ± 0.002	LT 0.02
04/16/96	0.015 ± 0.002	LT 0.02
04/23/96	0.012 ± 0.002	LT 0.02
04/30/96	0.013 ± 0.002	LT 0.02
05/07/96	0.016 ± 0.002	LT 0.02
05/14/96	0.018 ± 0.002	LT 0.02
05/21/96	0.012 ± 0.002	LT 0.02
05/28/96	0.017 ± 0.002	LT 0.02
06/04/96	0.012 ± 0.002	LT 0.03
06/11/96	0.008 ± 0.002	LT 0.02
06/18/96	0.017 ± 0.002	LT 0.02
06/25/96	0.012 ± 0.002	LT 0.02

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/02/96	0.021 ± 0.002	LT 0.03
07/09/96	0.017 ± 0.002	LT 0.02
07/16/96	0.015 ± 0.002	LT 0.02
07/23/96	0.015 ± 0.002	LT 0.03
07/30/96	0.018 ± 0.002	LT 0.04
08/06/96	0.018 ± 0.002	LT 0.02
08/13/96	0.023 ± 0.002	LT 0.02
08/20/96	0.023 ± 0.002	LT 0.02
08/27/96	0.025 ± 0.002	LT 0.02
09/03/96	0.019 ± 0.002	LT 0.02
09/10/96	0.031 ± 0.003	LT 0.02
09/17/96	0.013 ± 0.002	LT 0.02
09/24/96	0.028 ± 0.004	LT 0.05
10/01/96	0.011 ± 0.002	LT 0.02
10/08/96	0.019 ± 0.002	LT 0.02
10/15/96	0.020 ± 0.002	LT 0.02
10/22/96	0.013 ± 0.002	LT 0.02
10/29/96	0.021 ± 0.002	LT 0.02
11/05/96	0.018 ± 0.002	LT 0.02
11/12/96	0.026 ± 0.004	LT 0.04
11/19/96	PF	PF
11/26/96	PF	PF
12/03/96	0.028 ± 0.003	LT 0.02
12/10/96	0.022 ± 0.002	LT 0.02
12/17/96	0.018 ± 0.003	LT 0.02
12/24/96	0.017 ± 0.002	LT 0.02
12/31/96	0.025 ± 0.002	LT 0.03

LT - Less than  
NS - No Sample  
PF - Pump Failure



Appendix A

Atmospheric Monitoring  
Fermi 2  
1996  
Rockwood Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.032 ± 0.003	LT 0.03
01/07/96	0.036 ± 0.003	LT 0.03
01/15/96	0.036 ± 0.003	LT 0.02
01/22/96	0.021 ± 0.002	LT 0.02
01/29/96	0.025 ± 0.002	LT 0.02
02/05/96	0.025 ± 0.002	LT 0.02
02/12/96	0.024 ± 0.002	LT 0.03
02/19/96	0.016 ± 0.002	LT 0.02
02/26/96	0.018 ± 0.002	LT 0.02
03/04/96	0.022 ± 0.002	LT 0.02
03/11/96	0.026 ± 0.003	LT 0.02
03/19/96	0.025 ± 0.002	LT 0.02
03/25/96	0.022 ± 0.003	LT 0.03
04/01/96	0.020 ± 0.002	LT 0.02
04/08/96	0.023 ± 0.002	LT 0.02
04/15/96	0.016 ± 0.002	LT 0.02
04/22/96	0.017 ± 0.002	LT 0.02
04/29/96	0.017 ± 0.002	LT 0.02
05/06/96	0.020 ± 0.002	LT 0.02
05/13/96	0.013 ± 0.002	LT 0.02
05/19/96	0.014 ± 0.002	LT 0.03
05/27/96	0.021 ± 0.002	LT 0.02
06/03/96	0.018 ± 0.002	LT 0.02
06/10/96	0.014 ± 0.002	LT 0.02
06/17/96	0.032 ± 0.003	LT 0.02
06/23/96	0.023 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.022 ± 0.003	LT 0.02
07/08/96	0.030 ± 0.003	LT 0.02
07/15/96	0.022 ± 0.002	LT 0.02
07/22/96	0.028 ± 0.003	LT 0.02
07/29/96	0.018 ± 0.002	LT 0.03
08/05/96	0.019 ± 0.002	LT 0.02
08/12/96	0.033 ± 0.003	LT 0.02
08/18/96	0.040 ± 0.003	LT 0.03
08/26/96	0.031 ± 0.002	LT 0.04
09/02/96	0.046 ± 0.003	LT 0.02
09/09/96	0.033 ± 0.003	LT 0.03
09/16/96	0.020 ± 0.002	LT 0.02
09/23/96	0.025 ± 0.002	LT 0.02
09/30/96	0.026 ± 0.003	LT 0.02
10/07/96	0.038 ± 0.003	NS
10/14/96	PF	PF
10/21/96	0.020 ± 0.002	LT 0.02
10/28/96	0.021 ± 0.002	LT 0.02
11/04/96	0.026 ± 0.003	LT 0.02
11/11/96	0.022 ± 0.002	LT 0.02
11/18/96	0.017 ± 0.002	LT 0.02
11/25/96	0.017 ± 0.003	LT 0.02
12/02/96	0.022 ± 0.002	LT 0.02
12/09/96	0.025 ± 0.002	LT 0.03
12/16/96	0.020 ± 0.002	LT 0.02
12/23/96	0.026 ± 0.003	LT 0.03
12/30/96	0.024 ± 0.002	LT 0.03

LT - Less than  
NS - No Sample  
PF - Pump Failure

Appendix A

Atmospheric Monitoring  
Fermi 2  
1996  
Reactor Site Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.030 ± 0.003	LT 0.03
01/07/96	0.034 ± 0.003	LT 0.03
01/15/96	0.035 ± 0.003	LT 0.02
01/22/96	0.023 ± 0.002	LT 0.02
01/29/96	0.026 ± 0.003	LT 0.02
02/05/96	0.028 ± 0.003	LT 0.02
02/12/96	0.022 ± 0.002	LT 0.03
02/19/96	0.015 ± 0.002	LT 0.02
02/26/96	0.019 ± 0.002	LT 0.02
03/04/96	0.023 ± 0.002	LT 0.02
03/11/96	0.024 ± 0.002	LT 0.02
03/19/96	0.024 ± 0.002	LT 0.02
03/25/96	0.022 ± 0.003	LT 0.03
04/01/96	0.020 ± 0.002	LT 0.02
04/08/96	0.025 ± 0.003	LT 0.02
04/15/96	0.014 ± 0.002	LT 0.02
04/22/96	0.016 ± 0.002	LT 0.02
04/29/96	0.017 ± 0.002	LT 0.02
05/06/96	0.017 ± 0.002	LT 0.02
05/13/96	0.015 ± 0.002	LT 0.02
05/19/96	0.011 ± 0.002	LT 0.03
05/27/96	0.019 ± 0.002	LT 0.02
06/03/96	0.017 ± 0.002	LT 0.02
06/10/96	0.012 ± 0.002	LT 0.02
06/17/96	0.024 ± 0.003	LT 0.02
06/23/96	0.021 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.022 ± 0.003	LT 0.02
07/08/96	0.028 ± 0.003	LT 0.02
07/15/96	0.021 ± 0.002	LT 0.02
07/22/96	0.026 ± 0.003	LT 0.02
07/29/96	0.016 ± 0.002	LT 0.03
08/05/96	0.016 ± 0.002	LT 0.02
08/12/96	0.031 ± 0.004	LT 0.05
08/18/96	0.020 ± 0.003	LT 0.03
08/26/96	0.030 ± 0.002	LT 0.04
09/02/96	0.062 ± 0.004	LT 0.02
09/09/96	0.031 ± 0.003	LT 0.03
09/16/96	0.019 ± 0.002	LT 0.02
09/23/96	0.026 ± 0.003	LT 0.02
09/30/96	0.024 ± 0.002	LT 0.02
10/07/96	0.035 ± 0.003	NS
10/14/96	0.021 ± 0.002	LT 0.01
10/21/96	0.024 ± 0.002	LT 0.02
10/28/96	0.021 ± 0.002	LT 0.02
11/04/96	0.024 ± 0.002	LT 0.02
11/11/96	0.023 ± 0.002	LT 0.02
11/18/96	0.018 ± 0.002	LT 0.02
11/25/96	0.016 ± 0.003	LT 0.02
12/02/96	0.026 ± 0.003	LT 0.02
12/09/96	0.024 ± 0.002	LT 0.03
12/16/96	0.020 ± 0.002	LT 0.02
12/23/96	0.030 ± 0.003	LT 0.03
12/30/96	0.025 ± 0.002	LT 0.03

LT - Less than  
NS - No Sample

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1996  
 Pointe Aux Peaux Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.027 ± 0.003	LT 0.03
01/07/96	0.034 ± 0.003	LT 0.03
01/15/96	NS	NS
01/22/96	0.029 ± 0.002	LT 0.01
01/29/96	0.024 ± 0.002	LT 0.02
02/05/96	0.025 ± 0.002	LT 0.02
02/12/96	0.024 ± 0.002	LT 0.03
02/19/96	0.015 ± 0.002	LT 0.02
02/26/96	0.018 ± 0.002	LT 0.02
03/04/96	NS	NS
03/11/96	0.022 ± 0.002	LT 0.01
03/19/96	0.037 ± 0.004	LT 0.03
03/25/96	0.017 ± 0.002	LT 0.03
04/01/96	0.022 ± 0.002	LT 0.02
04/08/96	0.023 ± 0.002	LT 0.02
04/15/96	0.018 ± 0.002	LT 0.02
04/22/96	0.016 ± 0.002	LT 0.02
04/29/96	0.016 ± 0.002	LT 0.02
05/06/96	0.019 ± 0.002	LT 0.02
05/13/96	0.014 ± 0.002	LT 0.02
05/19/96	0.013 ± 0.002	LT 0.03
05/27/96	0.020 ± 0.002	LT 0.02
06/03/96	0.020 ± 0.002	LT 0.02
06/10/96	0.010 ± 0.002	LT 0.02
06/17/96	0.025 ± 0.003	LT 0.02
06/23/96	0.021 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.023 ± 0.003	LT 0.02
07/08/96	0.028 ± 0.003	LT 0.02
07/15/96	0.022 ± 0.002	LT 0.02
07/22/96	0.025 ± 0.003	LT 0.02
07/29/96	0.017 ± 0.002	LT 0.03
08/05/96	0.018 ± 0.002	LT 0.02
08/12/96	0.029 ± 0.003	LT 0.02
08/18/96	0.030 ± 0.003	LT 0.03
08/26/96	0.027 ± 0.002	LT 0.04
09/02/96	0.039 ± 0.003	LT 0.02
09/09/96	0.033 ± 0.003	LT 0.03
09/16/96	0.018 ± 0.002	LT 0.02
09/23/96	0.024 ± 0.002	LT 0.02
09/30/96	0.023 ± 0.002	LT 0.02
10/07/96	0.037 ± 0.003	NS
10/14/96	0.020 ± 0.002	LT 0.01
10/21/96	0.023 ± 0.002	LT 0.02
10/28/96	0.018 ± 0.002	LT 0.02
11/04/96	0.024 ± 0.002	LT 0.02
11/11/96	0.019 ± 0.002	LT 0.02
11/18/96	0.018 ± 0.002	LT 0.02
11/25/96	0.017 ± 0.003	LT 0.02
12/02/96	0.022 ± 0.002	LT 0.02
12/09/96	0.023 ± 0.002	LT 0.03
12/16/96	0.019 ± 0.002	LT 0.02
12/23/96	0.027 ± 0.003	LT 0.03
12/30/96	0.025 ± 0.002	LT 0.03

LT - Less than  
 NS - No Sample

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1996  
 Nadeau Road Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.031 ± 0.003	LT 0.03
01/07/96	0.034 ± 0.003	LT 0.03
01/15/96	NS	NS
01/22/96	0.030 ± 0.002	LT 0.009
01/29/96	0.027 ± 0.003	LT 0.02
02/05/96	0.027 ± 0.003	LT 0.02
02/12/96	0.024 ± 0.002	LT 0.03
02/19/96	0.016 ± 0.002	LT 0.02
02/26/96	0.020 ± 0.002	LT 0.02
03/04/96	NS	NS
03/11/96	0.023 ± 0.002	LT 0.01
03/19/96	0.023 ± 0.002	LT 0.02
03/25/96	0.021 ± 0.003	LT 0.03
04/01/96	0.023 ± 0.002	LT 0.02
04/08/96	0.025 ± 0.003	LT 0.02
04/15/96	0.016 ± 0.002	LT 0.02
04/22/96	0.017 ± 0.002	LT 0.02
04/29/96	0.018 ± 0.002	LT 0.02
05/06/96	0.017 ± 0.002	LT 0.02
05/13/96	0.015 ± 0.002	LT 0.02
05/19/96	0.012 ± 0.002	LT 0.03
05/27/96	0.020 ± 0.002	LT 0.02
06/03/96	0.021 ± 0.002	LT 0.02
06/10/96	0.009 ± 0.002	LT 0.02
06/17/96	0.030 ± 0.003	LT 0.02
06/23/96	0.019 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.025 ± 0.003	LT 0.02
07/08/96	0.034 ± 0.003	LT 0.02
07/15/96	0.023 ± 0.002	LT 0.02
07/22/96	0.033 ± 0.003	LT 0.02
07/29/96	0.016 ± 0.002	LT 0.03
08/05/96	0.018 ± 0.002	LT 0.02
08/12/96	0.034 ± 0.003	LT 0.03
08/18/96	0.050 ± 0.004	LT 0.03
08/26/96	0.031 ± 0.002	LT 0.04
09/02/96	0.037 ± 0.003	LT 0.03
09/09/96	0.032 ± 0.003	LT 0.03
09/16/96	0.021 ± 0.002	LT 0.02
09/23/96	0.028 ± 0.003	LT 0.02
09/30/96	0.026 ± 0.002	LT 0.02
10/07/96	0.036 ± 0.003	NS
10/14/96	0.025 ± 0.002	LT 0.01
10/21/96	0.023 ± 0.002	LT 0.02
10/28/96	0.022 ± 0.002	LT 0.02
11/04/96	0.023 ± 0.002	LT 0.02
11/11/96	0.024 ± 0.002	LT 0.02
11/18/96	0.017 ± 0.002	LT 0.02
11/25/96	0.016 ± 0.002	LT 0.02
12/02/96	0.022 ± 0.002	LT 0.02
12/09/96	0.025 ± 0.002	LT 0.03
12/16/96	0.019 ± 0.002	LT 0.02
12/23/96	0.029 ± 0.003	LT 0.03
12/30/96	0.027 ± 0.003	LT 0.03

LT - Less than  
 NS - No Sample

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1996  
 Dixie Highway Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.032 ± 0.003	LT 0.03
01/07/96	0.033 ± 0.003	LT 0.03
01/15/96	0.036 ± 0.003	LT 0.02
01/22/96	0.022 ± 0.002	LT 0.02
01/29/96	0.025 ± 0.002	LT 0.02
02/05/96	0.026 ± 0.003	LT 0.02
02/12/96	0.022 ± 0.002	LT 0.03
02/19/96	0.017 ± 0.002	LT 0.02
02/26/96	0.020 ± 0.002	LT 0.02
03/04/96	0.023 ± 0.002	LT 0.02
03/11/96	0.023 ± 0.002	LT 0.02
03/19/96	0.024 ± 0.002	LT 0.02
03/25/96	0.024 ± 0.003	LT 0.03
04/01/96	0.021 ± 0.002	LT 0.02
04/08/96	0.042 ± 0.003	LT 0.02
04/15/96	0.016 ± 0.002	LT 0.02
04/22/96	0.016 ± 0.002	LT 0.02
04/29/96	0.016 ± 0.002	LT 0.02
05/06/96	0.019 ± 0.002	LT 0.02
05/13/96	0.015 ± 0.002	LT 0.02
05/19/96	0.013 ± 0.002	LT 0.02
05/27/96	0.021 ± 0.002	LT 0.02
06/03/96	0.022 ± 0.002	LT 0.02
06/10/96	0.013 ± 0.002	LT 0.02
06/17/96	0.026 ± 0.003	LT 0.02
06/23/96	0.018 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.028 ± 0.003	LT 0.02
07/08/96	0.040 ± 0.003	LT 0.02
07/15/96	0.024 ± 0.002	LT 0.02
07/22/96	0.035 ± 0.003	LT 0.02
07/29/96	0.017 ± 0.002	LT 0.03
08/05/96	0.020 ± 0.002	LT 0.02
08/12/96	0.041 ± 0.003	LT 0.02
08/18/96	0.067 ± 0.004	LT 0.03
08/26/96	0.029 ± 0.002	LT 0.04
09/02/96	0.049 ± 0.003	LT 0.02
09/09/96	0.032 ± 0.003	LT 0.03
09/16/96	0.018 ± 0.002	LT 0.02
09/23/96	0.017 ± 0.004	LT 0.04
09/30/96	0.024 ± 0.002	LT 0.02
10/07/96	0.035 ± 0.003	NS
10/14/96	0.021 ± 0.002	LT 0.01
10/21/96	0.028 ± 0.003	LT 0.02
10/28/96	0.028 ± 0.004	LT 0.04
11/04/96	0.021 ± 0.002	LT 0.02
11/11/96	0.022 ± 0.002	LT 0.02
11/18/96	0.018 ± 0.002	LT 0.02
11/25/96	0.016 ± 0.003	LT 0.02
12/02/96	0.019 ± 0.002	LT 0.02
12/09/96	0.027 ± 0.003	LT 0.03
12/16/96	0.018 ± 0.002	LT 0.02
12/23/96	0.037 ± 0.003	LT 0.03
12/30/96	0.022 ± 0.002	LT 0.03

LT - Less than  
 NS - No Sample

Appendix A

Atmospheric Monitoring  
 Fermi 2  
 1996  
 Fix Farm Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/01/96	0.023 ± 0.003	LT 0.03
01/07/96	0.031 ± 0.003	LT 0.03
01/15/96	0.033 ± 0.003	LT 0.02
01/22/96	0.025 ± 0.003	LT 0.02
01/29/96	0.025 ± 0.002	LT 0.02
02/05/96	0.026 ± 0.003	LT 0.02
02/12/96	0.021 ± 0.002	LT 0.03
02/19/96	0.017 ± 0.002	LT 0.02
02/26/96	0.019 ± 0.002	LT 0.02
03/04/96	0.022 ± 0.002	LT 0.02
03/11/96	0.022 ± 0.002	LT 0.02
03/19/96	0.025 ± 0.002	LT 0.02
03/25/96	0.023 ± 0.003	LT 0.03
04/01/96	0.022 ± 0.002	LT 0.02
04/08/96	0.023 ± 0.002	LT 0.02
04/15/96	0.017 ± 0.002	LT 0.02
04/22/96	0.017 ± 0.002	LT 0.02
04/29/96	0.017 ± 0.002	LT 0.02
05/06/96	0.016 ± 0.002	LT 0.02
05/13/96	0.015 ± 0.002	LT 0.02
05/19/96	0.013 ± 0.002	LT 0.03
05/27/96	0.020 ± 0.002	LT 0.02
06/03/96	0.019 ± 0.002	LT 0.02
06/10/96	0.012 ± 0.002	LT 0.02
06/17/96	0.022 ± 0.002	LT 0.02
06/23/96	0.020 ± 0.003	LT 0.03

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
07/01/96	0.025 ± 0.003	LT 0.02
07/08/96	0.040 ± 0.003	LT 0.02
07/15/96	0.024 ± 0.002	LT 0.02
07/22/96	0.036 ± 0.003	LT 0.02
07/29/96	0.017 ± 0.002	LT 0.03
08/05/96	0.018 ± 0.002	LT 0.02
08/12/96	0.031 ± 0.003	LT 0.02
08/18/96	0.076 ± 0.004	LT 0.03
08/26/96	0.032 ± 0.002	LT 0.04
09/02/96	0.061 ± 0.004	LT 0.03
09/09/96	0.032 ± 0.003	LT 0.03
09/16/96	0.020 ± 0.002	LT 0.02
09/23/96	0.025 ± 0.002	LT 0.02
09/30/96	0.025 ± 0.002	LT 0.02
10/07/96	0.035 ± 0.003	NS
10/14/96	0.021 ± 0.002	LT 0.01
10/21/96	0.024 ± 0.002	LT 0.02
10/28/96	0.020 ± 0.002	LT 0.02
11/04/96	0.020 ± 0.002	LT 0.02
11/11/96	0.020 ± 0.002	LT 0.02
11/18/96	0.016 ± 0.002	LT 0.02
11/25/96	0.016 ± 0.002	LT 0.02
12/02/96	0.021 ± 0.002	LT 0.02
12/09/96	0.022 ± 0.002	LT 0.02
12/16/96	0.021 ± 0.002	LT 0.02
12/23/96	0.027 ± 0.003	LT 0.03
12/30/96	0.025 ± 0.002	LT 0.03

LT - Less than  
 NS - No Sample

Appendix A

Atmospheric Monitoring  
1996  
Lansing Background Reference Air Station

Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )	Collection Date	Gross Beta (pCi/m <sup>3</sup> )	<sup>131</sup> I (pCi/m <sup>3</sup> )
01/02/96	0.028 ± 0.003	LT 0.02	07/01/96	0.024 ± 0.003	LT 0.02
01/08/96	0.035 ± 0.003	LT 0.02	07/08/96	0.025 ± 0.002	LT 0.02
01/16/96	0.035 ± 0.003	LT 0.02	07/15/96	0.020 ± 0.002	LT 0.02
01/22/96	0.023 ± 0.003	LT 0.02	07/22/96	0.030 ± 0.003	LT 0.02
01/29/96	0.022 ± 0.002	LT 0.02	07/29/96	0.019 ± 0.002	LT 0.02
02/05/96	0.026 ± 0.003	LT 0.02	08/05/96	0.017 ± 0.002	LT 0.02
02/12/96	0.028 ± 0.003	LT 0.02	08/12/96	0.024 ± 0.003	LT 0.02
02/20/96	0.020 ± 0.002	LT 0.02	08/19/96	0.027 ± 0.003	LT 0.02
02/26/96	0.017 ± 0.002	LT 0.02	08/26/96	0.029 ± 0.003	LT 0.02
03/04/96	0.022 ± 0.002	LT 0.02	09/03/96	0.030 ± 0.003	LT 0.02
03/11/96	0.026 ± 0.003	LT 0.02	09/09/96	0.040 ± 0.003	LT 0.02
03/18/96	0.025 ± 0.002	LT 0.02	09/16/96	0.020 ± 0.002	LT 0.02
03/25/96	0.020 ± 0.002	LT 0.02	09/23/96	0.028 ± 0.003	LT 0.02
04/01/96	0.022 ± 0.002	LT 0.02	09/30/96	0.021 ± 0.002	LT 0.02
04/08/96	0.022 ± 0.002	LT 0.02	10/07/96	0.031 ± 0.003	LT 0.02
04/15/96	0.017 ± 0.002	LT 0.02	10/14/96	0.019 ± 0.002	LT 0.02
04/22/96	0.016 ± 0.002	LT 0.02	10/21/96	0.023 ± 0.002	LT 0.02
04/29/96	0.016 ± 0.002	LT 0.02	10/28/96	0.021 ± 0.002	LT 0.02
05/06/96	0.017 ± 0.002	LT 0.02	11/04/96	0.022 ± 0.002	LT 0.02
05/13/96	0.017 ± 0.002	LT 0.02	11/12/96	0.020 ± 0.002	LT 0.02
05/20/96	0.020 ± 0.002	LT 0.02	11/18/96	0.017 ± 0.002	LT 0.02
05/28/96	0.018 ± 0.002	LT 0.02	11/25/96	0.017 ± 0.003	LT 0.02
06/03/96	0.020 ± 0.003	LT 0.02	12/02/96	0.026 ± 0.003	LT 0.02
06/10/96	0.012 ± 0.002	LT 0.02	12/09/96	0.027 ± 0.003	LT 0.02
06/17/96	0.021 ± 0.002	LT 0.02	12/16/96	0.019 ± 0.002	LT 0.02
06/24/96	0.016 ± 0.002	LT 0.02	12/23/96	0.028 ± 0.003	LT 0.02
			12/30/96	0.023 ± 0.002	LT 0.02

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Charlevoix Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/05/95	LT 7	LT 5	1330 ± 70	LT 3
01/12/95	LT 7	LT 5	1410 ± 70	
01/18/95	LT 7	LT 5	1350 ± 70	
01/25/95	LT 7	LT 5	1350 ± 70	
02/01/95	LT 8	LT 5	1320 ± 70	LT 3
02/08/95	LT 10	LT 5	1330 ± 70	
02/16/95	LT 7	LT 5	1310 ± 70	
02/22/95	LT 7	LT 5	1310 ± 70	
03/01/95	LT 7	LT 5	1350 ± 70	LT 2
03/08/95	LT 7	LT 5	1320 ± 70	
03/16/95	LT 7	LT 5	1380 ± 70	
03/22/95	LT 7	LT 5	1410 ± 70	
03/29/95	LT 8	LT 5	1390 ± 70	
04/05/95	LT 7	LT 5	1350 ± 70	LT 1
04/12/95	LT 7	LT 5	1230 ± 70	
04/19/95	LT 7	LT 5	1460 ± 70	
04/26/95	LT 7	LT 5	1580 ± 70	
05/03/95	LT 7	LT 5	1400 ± 70	LT 1
05/10/95	LT 7	LT 5	1450 ± 70	
05/17/95	LT 7	LT 5	1400 ± 70	
05/24/95	LT 8	LT 5	1370 ± 70	
06/01/95	LT 6	LT 5	1360 ± 70	LT 0.8
06/07/95	LT 7	LT 5	1420 ± 70	
06/14/95	LT 8	LT 5	1320 ± 70	
06/21/95	LT 7	LT 5	1400 ± 70	
06/29/95	LT 8	LT 5	1400 ± 70	

LT - Less than



Appendix B

Terrestrial Monitoring  
1995  
Charlevoix Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
07/05/95	LT 8	LT 5	1450 ± 70	LT 1
07/12/95	LT 7	LT 5	1360 ± 70	
07/19/95	LT 7	LT 5	1350 ± 70	
07/26/95	LT 7	LT 5	1350 ± 70	
08/02/95	LT 7	LT 5	1360 ± 70	LT 2
08/09/95	LT 7	LT 5	1430 ± 70	
08/16/95	LT 7	LT 5	1270 ± 70	
08/23/95	LT 7	LT 5	1370 ± 70	
08/30/95	LT 8	6 ± 5	1390 ± 70	
09/06/95	LT 7	LT 5	1410 ± 70	LT 2
09/13/95	LT 7	LT 5	1210 ± 70	
09/20/95	LT 7	LT 5	1440 ± 70	
09/27/95	LT 8	LT 5	1290 ± 70	
10/04/95	LT 7	LT 5	1310 ± 70	LT 2
10/11/95	LT 7	LT 5	1360 ± 70	
10/18/95	LT 7	LT 5	1410 ± 70	
10/25/95	LT 7	LT 5	1290 ± 70	
11/01/95	LT 7	LT 5	1350 ± 70	LT 3
11/08/95	LT 8	LT 5	1220 ± 70	
11/15/95	LT 7	LT 5	1300 ± 70	
11/22/95	LT 9	LT 5	1510 ± 70	
11/29/95	LT 8	LT 5	1350 ± 70	
12/06/95	LT 7	LT 5	1380 ± 70	LT 3
12/13/95	LT 7	LT 5	1330 ± 70	
12/20/95	LT 8	LT 5	1330 ± 70	
12/27/95	LT 8	LT 5	1360 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Detroit Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/12/95	LT 7	LT 5	1370 ± 70	LT 3
02/09/95	LT 6	LT 5	1350 ± 70	LT 1
03/15/95	LT 5	LT 5	1400 ± 70	LT 1
04/13/95	LT 6	LT 5	1330 ± 70	LT 2
05/10/95	LT 5	LT 5	1360 ± 70	LT 2
06/08/95	LT 6	LT 5	1410 ± 70	LT 2
07/14/95	LT 6	LT 5	1380 ± 70	LT 2
08/11/95	LT 7	LT 5	1420 ± 70	LT 2
09/08/95	LT 6	LT 5	1440 ± 70	LT 2
10/13/95	LT 6	LT 5	1330 ± 70	LT 3
11/15/95	LT 7	LT 5	1370 ± 70	LT 3
12/07/95	LT 6	LT 5	1380 ± 70	LT 3

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Grand Rapids Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/03/95	LT 5	LT 5	1380 ± 70	LT 3
02/06/95	LT 6	LT 5	1340 ± 70	LT 3
03/06/95	LT 5	LT 5	1360 ± 70	LT 1
04/03/95	LT 5	LT 5	1380 ± 70	LT 2
05/08/95	LT 6	LT 5	1340 ± 70	LT 2
06/05/95	LT 6	LT 5	1340 ± 70	LT 2
07/03/95	LT 6	LT 5	1370 ± 70	LT 1
08/10/95	LT 6	LT 5	1350 ± 70	LT 0.7
09/05/95	LT 8	LT 5	1390 ± 70	LT 2
10/02/95	LT 5	LT 5	1420 ± 70	LT 3
11/06/95	LT 5	LT 5	1350 ± 70	LT 3
12/04/95	LT 5	LT 5	1400 ± 70	LT 3

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Lansing Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/03/95	LT 5	LT 5	1390 ± 70	LT 3
01/17/95	LT 4	LT 5	1300 ± 70	
01/30/95	LT 4	LT 5	1300 ± 70	
02/13/95	LT 4	LT 5	1360 ± 70	LT 2
02/27/95	LT 5	LT 5	1290 ± 70	
03/13/95	LT 4	LT 5	1390 ± 70	LT 2
03/28/95	LT 4	LT 5	1370 ± 70	
04/10/95	LT 4	LT 5	1420 ± 70	LT 1
04/24/95	LT 4	LT 5	1380 ± 70	
05/08/95	LT 4	LT 5	1410 ± 70	LT 2
05/22/95	LT 5	LT 5	1410 ± 70	
06/08/95	LT 4	LT 5	1310 ± 70	LT 2
06/19/95	LT 5	LT 5	1370 ± 70	
07/05/95	LT 5	LT 5	1340 ± 70	LT 2
07/17/95	LT 4	LT 5	1410 ± 70	
07/31/95	LT 5	LT 5	1400 ± 70	
08/07/95	LT 4	LT 5	1390 ± 70	LT 0.6
08/28/95	LT 4	LT 5	1450 ± 70	
09/11/95	LT 5	LT 5	1450 ± 70	LT 3
09/25/95	LT 4	LT 5	1380 ± 70	
10/10/95	LT 4	LT 5	1290 ± 70	LT 2
10/23/95	LT 5	LT 5	1390 ± 70	
11/06/95	LT 5	LT 5	1280 ± 70	LT 3
11/20/95	LT 5	LT 5	1360 ± 70	
12/04/95	LT 4	LT 5	1400 ± 70	LT 4
12/18/95	LT 4	LT 5	1470 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Marquette Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/03/95	LT 6	LT 5	1390 ± 70	LT 4
01/23/95	LT 6	LT 5	1410 ± 70	
02/02/95	LT 6	LT 5	1390 ± 70	LT 3
02/23/95	LT 6	LT 5	1390 ± 70	
03/06/95	LT 6	LT 5	1370 ± 70	LT 2
03/31/95	LT 7	LT 5	1370 ± 70	
04/11/95	LT 7	LT 5	1380 ± 70	LT 1
04/25/95	LT 6	LT 5	1360 ± 70	
05/02/95	LT 6	LT 5	1350 ± 70	LT 2
05/30/95	LT 5	LT 5	1390 ± 70	
06/08/95	LT 6	LT 5	1370 ± 70	LT 2
06/15/95	LT 6	LT 5	1330 ± 70	
07/06/95	LT 8	LT 5	1390 ± 70	LT 2
07/26/95	LT 7	LT 5	1400 ± 70	
08/01/95	LT 6	LT 5	1330 ± 70	LT 2
08/21/95	LT 6	LT 5	1400 ± 70	
09/07/95	LT 10	LT 5	1380 ± 70	LT 2
09/21/95	LT 6	LT 5	1330 ± 70	
10/02/95	LT 6	LT 5	1290 ± 70	LT 4
10/18/95	LT 7	LT 5	1350 ± 70	
11/06/95	LT 6	LT 5	1430 ± 70	LT 3
11/30/95	LT 7	LT 5	1390 ± 70	
12/04/95	LT 6	LT 5	1330 ± 70	LT 4
12/18/95	LT 6	LT 5	1370 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
Monroe Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/09/95	LT 5	LT 5	1260 ± 70	LT 3
01/23/95	LT 5	LT 5	1270 ± 70	
02/06/95	LT 5	LT 5	1130 ± 70	LT 3
02/20/95	LT 5	LT 5	1220 ± 70	
03/06/95	LT 5	LT 5	1260 ± 70	LT 1
03/30/95	LT 5	LT 5	1270 ± 70	
04/03/95	LT 5	LT 5	1210 ± 70	LT 1
04/17/95	LT 5	LT 5	1230 ± 70	
05/01/95	LT 5	LT 5	1270 ± 70	LT 2
05/15/95	LT 5	LT 5	1300 ± 70	
05/29/95	LT 5	LT 5	1270 ± 70	
06/12/95	LT 5	LT 5	1230 ± 70	2 ± 2
06/26/95	LT 5	LT 5	1290 ± 70	
07/10/95	LT 5	LT 5	1230 ± 70	1 ± 1
07/24/95	LT 5	LT 5	1270 ± 70	
08/07/95	LT 5	LT 5	1210 ± 70	LT 0.5
08/21/95	LT 5	LT 5	1270 ± 70	
09/04/95	LT 5	LT 5	1300 ± 70	LT 2
09/18/95	LT 5	LT 5	1290 ± 70	
10/02/95	LT 5	LT 5	1280 ± 70	LT 4
10/16/95	LT 5	LT 5	1180 ± 70	
10/30/95	LT 5	LT 5	1200 ± 70	
11/14/95	LT 5	LT 5	1270 ± 70	4 ± 3
11/27/95	LT 6	LT 5	1240 ± 70	
12/11/95	LT 5	LT 5	1220 ± 70	LT 3
12/25/95	LT 5	LT 5	1190 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
South Haven Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/03/95	LT 5	LT 5	1290 ± 70	LT 4
01/10/95	LT 5	LT 5	1300 ± 70	
01/17/95	LT 5	LT 5	1340 ± 70	
01/24/95	LT 5	LT 5	1360 ± 70	
01/31/95	LT 5	LT 5	1380 ± 70	
02/07/95	LT 5	LT 5	1410 ± 80	LT 2
02/14/95	LT 5	LT 5	1480 ± 70	
02/21/95	LT 5	LT 5	1300 ± 70	
02/28/95	LT 5	LT 5	1330 ± 70	
03/07/95	LT 5	LT 5	1250 ± 70	LT 2
03/14/95	LT 5	LT 5	1230 ± 70	
03/21/95	LT 5	LT 5	1220 ± 70	
03/28/95	LT 5	LT 5	1250 ± 70	
04/04/95	LT 5	LT 5	1220 ± 70	LT 1
04/11/95	LT 5	LT 5	1180 ± 70	
04/18/95	LT 5	LT 5	1270 ± 70	
04/25/95	LT 5	LT 5	1190 ± 70	
05/02/95	LT 5	LT 5	1260 ± 70	LT 2
05/09/95	LT 5	LT 5	1210 ± 70	
05/16/95	LT 5	LT 5	1340 ± 70	
05/23/95	LT 5	LT 5	1380 ± 70	
05/30/95	LT 5	LT 5	1340 ± 70	
06/06/95	LT 5	LT 5	1300 ± 70	LT 2
06/13/95	LT 6	LT 5	1260 ± 70	
06/20/95	LT 5	6 ± 5	1260 ± 70	
06/27/95	LT 5	6 ± 5	1100 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1995  
South Haven Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
07/04/95	LT 5	LT 5	1310 ± 70	LT 1
07/11/95	LT 5	LT 5	1350 ± 70	
07/18/95	LT 5	LT 5	1390 ± 70	
07/25/95	LT 5	LT 5	1370 ± 70	
07/31/95	LT 5	LT 5	1370 ± 70	
08/08/95	LT 5	LT 5	1390 ± 70	LT 0.7
08/15/95	LT 5	LT 5	1380 ± 70	
08/22/95	LT 5	LT 5	1410 ± 70	
08/29/95	LT 5	LT 5	1390 ± 70	
09/05/95	LT 5	LT 5	1310 ± 70	LT 3
09/12/95	LT 5	LT 5	1300 ± 70	
09/19/95	LT 5	LT 5	1330 ± 70	
09/26/95	LT 5	LT 5	1260 ± 70	
10/03/95	LT 5	LT 5	1250 ± 70	LT 4
10/10/95	LT 5	LT 5	1270 ± 70	
10/17/95	LT 5	LT 5	1290 ± 70	
10/24/95	LT 5	LT 5	1250 ± 70	
10/31/95	LT 5	LT 5	1250 ± 70	
11/07/95	LT 5	LT 5	1280 ± 70	LT 3
11/14/95	LT 5	LT 5	1280 ± 70	
11/21/95	LT 7	LT 5	1230 ± 70	
11/28/95	LT 6	LT 5	1270 ± 70	
12/05/95	LT 5	LT 5	1210 ± 70	LT 3
12/12/95	LT 5	LT 5	1210 ± 70	
12/19/95	LT 8	6 ± 5	1360 ± 70	
12/26/95	LT 5	6 ± 5	1200 ± 70	

LT - Less than



Appendix B

Terrestrial Monitoring  
1996  
Charlevoix Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/03/96	LT 7	LT 5	1270 ± 70	LT 2
01/10/96	LT 8	LT 5	1270 ± 70	
01/17/96	LT 7	LT 5	1360 ± 70	
01/24/96	LT 7	LT 5	1380 ± 70	
01/31/96	LT 7	LT 5	1360 ± 70	
02/07/96	LT 7	LT 5	1330 ± 70	LT 2
02/14/96	LT 8	LT 5	1280 ± 70	
02/21/96	LT 7	LT 5	1370 ± 70	
02/28/96	LT 7	LT 5	1320 ± 70	
03/06/96	LT 7	LT 5	1420 ± 70	LT 2
03/13/96	LT 7	LT 5	1350 ± 70	
03/20/96	LT 7	LT 5	1360 ± 70	
03/27/96	LT 7	LT 5	1370 ± 70	
04/03/96	LT 7	LT 5	1350 ± 70	LT 2
04/10/96	LT 7	LT 5	1380 ± 80	
04/17/96	LT 7	LT 5	1350 ± 70	
04/24/96	LT 7	LT 5	1460 ± 70	
05/01/96	LT 8	LT 5	1380 ± 70	LT 4
05/08/96	LT 8	LT 5	1390 ± 80	
05/15/96	LT 7	LT 5	1370 ± 70	
05/22/96	LT 8	LT 5	1380 ± 70	
05/29/96	LT 7	LT 5	1370 ± 70	
06/05/96	LT 7	LT 5	1410 ± 70	LT 2
06/12/96	LT 7	LT 5	1370 ± 70	
06/19/96	LT 7	LT 5	1650 ± 80	
06/26/96	LT 7	LT 5	1260 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Charlevoix Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
07/03/96	LT 8	LT 5	1370 ± 70	
07/10/96	LT 7	LT 5	1330 ± 70	LT 2
07/17/96	LT 7	LT 5	1390 ± 70	
07/24/96	LT 7	LT 5	1410 ± 70	
07/31/96	LT 7	LT 5	1350 ± 70	
08/07/96	LT 7	LT 5	1380 ± 70	LT 1
08/14/96	LT 7	LT 5	1330 ± 70	
08/21/96	LT 7	LT 5	1410 ± 70	
08/28/96	LT 8	6 ± 5	1250 ± 70	
09/04/96	LT 7	LT 5	1420 ± 70	LT 2
09/11/96	LT 4	LT 3	1440 ± 70	
09/18/96	LT 4	LT 3	1360 ± 70	
09/25/96	LT 4	LT 3	1370 ± 70	
10/02/96	LT 4	LT 3	1480 ± 70	LT 3
10/09/96	LT 4	LT 3	1330 ± 70	
10/16/96	LT 4	LT 3	1460 ± 70	
10/23/96	LT 4	LT 3	1430 ± 70	
10/30/96	LT 4	LT 3	1320 ± 70	
11/06/96	LT 4	LT 3	1260 ± 70	LT 2
11/14/96	LT 4	LT 3	1350 ± 70	
11/20/96	LT 4	LT 3	1380 ± 70	
11/29/96	LT 5	4 ± 3	1350 ± 70	
12/04/96	LT 4	LT 3	1360 ± 70	LT 3
12/11/96	LT 4	LT 3	1430 ± 70	
12/18/96	LT 4	LT 3	1370 ± 70	
12/25/96	LT 4	LT 3	1420 ± 70	
12/31/96	LT 5	LT 3	1410 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Detroit Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/17/96	LT 7	LT 5	1370 ± 70	LT 3
02/13/96	LT 8	LT 5	1360 ± 70	LT 2
03/13/96	LT 7	LT 5	1290 ± 70	LT 2
04/18/96	LT 8	LT 5	1360 ± 70	LT 4
05/16/96	LT 7	LT 5	1360 ± 70	LT 3
06/12/96	LT 8	LT 5	1380 ± 70	LT 3
08/06/96	LT 6	LT 5	1380 ± 70	LT 2
09/17/96	LT 3	LT 3	1410 ± 70	LT 3
10/01/96	LT 6	LT 3	1420 ± 70	LT 3
11/05/96	LT 3	LT 3	1320 ± 70	LT 2
12/17/96	LT 3	LT 3	1380 ± 70	LT 2

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Grand Rapids Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/08/96	LT 6	LT 5	1350 ± 70	LT 2
02/05/96	LT 5	LT 5	1360 ± 70	LT 3
03/04/96	LT 5	LT 5	1290 ± 70	LT 2
04/08/96	LT 6	LT 5	1390 ± 70	LT 2
05/06/96	LT 5	LT 5	1370 ± 70	LT 5
06/03/96	LT 6	LT 5	1380 ± 70	LT 2
07/08/96	LT 5	LT 5	1410 ± 70	LT 2
08/05/96	LT 6	LT 5	1320 ± 70	LT 2
09/04/96	LT 7	LT 5	1400 ± 70	LT 3
10/07/96	LT 3	LT 3	1380 ± 70	LT 3
11/04/96	LT 3	LT 3	1370 ± 70	LT 2
12/05/96	LT 3	LT 3	1450 ± 70	LT 2

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Lansing Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/02/96	LT 5	LT 5	1370 ± 70	LT 2
01/16/96	LT 5	LT 5	1390 ± 70	
01/29/96	LT 5	LT 5	1390 ± 70	
02/12/96	LT 5	LT 5	1420 ± 70	LT 2
02/26/96	LT 5	LT 5	1320 ± 70	
03/11/96	LT 5	LT 5	1380 ± 70	4 ± 3
03/25/96	LT 5	LT 5	1400 ± 70	
04/08/96	LT 5	LT 5	1370 ± 70	LT 2
04/22/96	LT 5	LT 5	1410 ± 70	
05/06/96	LT 5	LT 5	1350 ± 70	LT 6
05/20/96	LT 5	LT 5	1350 ± 70	
06/03/96	LT 5	LT 5	1360 ± 70	LT 3
06/17/96	LT 5	LT 5	1340 ± 70	
07/01/96	LT 5	LT 5	1370 ± 70	LT 3
07/15/96	LT 5	LT 5	1350 ± 70	
07/29/96	LT 5	LT 5	1410 ± 70	
08/12/96	LT 5	LT 5	1380 ± 70	LT 2
08/26/96	LT 5	LT 5	1420 ± 70	
09/09/96	LT 5	LT 5	1330 ± 70	LT 3
09/23/96	LT 2	LT 3	1310 ± 70	
10/07/96	LT 3	LT 3	1380 ± 70	LT 3
10/21/96	LT 3	LT 3	1370 ± 70	
11/04/96	LT 2	LT 3	1350 ± 70	LT 2
11/18/96	LT 3	LT 3	1390 ± 70	
12/02/96	LT 3	LT 3	1400 ± 70	LT 2
12/16/96	LT 2	LT 3	1410 ± 70	
12/30/96	LT 3	LT 3	1390 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Marquette Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/08/96	LT 6	LT 5	1340 ± 70	LT 2
01/22/96	LT 6	LT 5	1350 ± 70	
02/05/96	LT 8	LT 5	1430 ± 70	LT 2
02/26/96	LT 6	LT 5	1420 ± 70	
03/04/96	LT 6	LT 5	1430 ± 70	LT 3
03/28/96	LT 6	LT 5	1320 ± 70	
04/09/96	LT 7	LT 5	1320 ± 70	LT 2
04/25/96	LT 6	LT 5	1490 ± 70	
05/07/96	LT 7	LT 5	1410 ± 70	LT 2
05/30/96	LT 8	LT 5	1330 ± 70	
06/11/96	LT 6	LT 5	1380 ± 70	LT 3
06/24/96	LT 6	LT 5	1420 ± 70	
07/10/96	LT 7	LT 5	1420 ± 70	LT 3
07/29/96	LT 9	LT 5	1300 ± 70	
08/12/96	LT 6	LT 5	1360 ± 70	LT 3
08/28/96	LT 8	LT 5	1350 ± 70	
09/04/96	LT 7	LT 5	1350 ± 70	LT 2
09/26/96	LT 4	LT 3	1480 ± 70	
10/17/96	LT 4	LT 3	1370 ± 70	LT 2
10/25/96	LT 4	LT 3	1410 ± 70	
11/08/96	LT 6	LT 3	1410 ± 70	LT 2
11/21/96	LT 4	LT 3	1350 ± 70	
12/16/96	LT 10	LT 3	1310 ± 70	LT 2
12/19/96	LT 20	LT 3	1420 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
Monroe Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/07/96	LT 5	LT 5	1290 ± 80	LT 2
02/05/96	LT 5	LT 5	1230 ± 70	LT 2
02/19/96	LT 6	LT 5	1250 ± 80	
03/04/96	LT 5	LT 5	1230 ± 70	LT 2
03/18/96	LT 5	LT 5	1210 ± 70	
04/01/96	LT 5	LT 5	1250 ± 70	LT 3
04/15/96	LT 5	LT 5	1280 ± 70	
04/29/96	LT 5	LT 5	1270 ± 70	
05/13/96	LT 5	LT 5	1300 ± 70	LT 2
05/27/96	LT 5	LT 5	1270 ± 70	
06/10/96	LT 5	LT 5	1310 ± 70	LT 2
06/23/96	LT 5	LT 5	1230 ± 70	
07/08/96	LT 5	LT 5	1250 ± 70	LT 2
07/23/96	LT 7	LT 5	1310 ± 70	
08/05/96	LT 6	LT 5	1290 ± 80	LT 2
08/18/96	LT 5	LT 5	1280 ± 70	
09/02/96	LT 5	LT 5	1310 ± 70	LT 3
09/16/96	LT 3	LT 3	1280 ± 70	
09/30/96	LT 3	LT 3	1220 ± 70	
10/14/96	LT 3	LT 3	1250 ± 70	
10/28/96	LT 3	LT 3	1270 ± 70	LT 2
11/11/96	LT 3	LT 3	1300 ± 70	LT 3
11/25/96	LT 3	LT 2	1240 ± 70	
12/09/96	LT 3	LT 3	1290 ± 70	LT 2
12/23/96	LT 4	LT 2	1360 ± 70	

LT - Less than

Appendix B

Terrestrial Monitoring  
1996  
South Haven Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
01/02/96	LT 5	LT 5	1240 ± 70	LT 3
01/09/96	LT 5	LT 5	1290 ± 70	
01/18/96	LT 5	LT 5	1270 ± 70	
01/23/96	LT 5	LT 5	1170 ± 70	
01/30/96	LT 5	LT 5	1400 ± 70	
02/06/96	LT 5	LT 5	1250 ± 70	LT 2
02/13/96	LT 5	LT 5	1320 ± 70	
02/20/96	LT 5	LT 5	1310 ± 70	
02/25/96	LT 6	LT 5	1320 ± 70	
03/05/96	LT 5	LT 5	1360 ± 70	LT 3
03/12/96	LT 5	LT 5	1330 ± 70	
03/19/96	LT 5	LT 5	1280 ± 70	
03/26/96	LT 5	LT 5	1310 ± 70	
04/02/96	LT 5	LT 5	1230 ± 70	LT 2
04/09/96	LT 5	LT 5	1340 ± 70	
04/16/96	LT 6	LT 5	1430 ± 70	
04/23/96	LT 5	LT 5	1270 ± 70	
04/30/96	LT 5	LT 5	1300 ± 70	
05/07/96	LT 5	LT 5	1290 ± 70	LT 2
05/14/96	LT 5	LT 5	1390 ± 70	
05/21/96	LT 5	LT 5	1280 ± 70	
05/28/96	LT 5	LT 5	1260 ± 70	
06/04/96	LT 5	LT 5	1380 ± 70	LT 3
06/11/96	LT 5	LT 5	1330 ± 70	
06/18/96	LT 5	LT 5	1450 ± 70	
06/25/96	LT 5	LT 5	1280 ± 70	

LT - Less than



Appendix B

Terrestrial Monitoring  
1996  
South Haven Milk Station

Collection Date	<sup>131</sup> I (pCi/l)	<sup>137</sup> Cs (pCi/l)	<sup>40</sup> K (pCi/l)	<sup>90</sup> Sr (pCi/l)
07/02/96	LT 6	LT 5	1470 ± 70	LT 1
07/09/96	LT 5	LT 5	1310 ± 70	
07/16/96	LT 6	LT 5	1320 ± 70	
07/23/96	LT 5	LT 5	1220 ± 70	
07/30/96	LT 5	LT 5	1360 ± 70	
08/06/96	LT 5	LT 5	1360 ± 70	LT 3
08/13/96	LT 5	LT 5	1260 ± 70	
08/20/96	LT 5	LT 5	1230 ± 70	
08/27/96	LT 5	LT 5	1280 ± 70	
09/03/96	LT 5	LT 5	1270 ± 70	LT 3
09/10/96	LT 3	LT 3	1200 ± 70	
09/17/96	LT 3	LT 3	1270 ± 70	
09/24/96	LT 3	LT 3	1420 ± 70	
10/01/96	LT 3	LT 3	1300 ± 70	LT 2
10/08/96	LT 3	LT 3	1350 ± 70	
10/15/96	LT 3	3 ± 3	1310 ± 70	
10/22/96	LT 3	LT 3	1310 ± 70	
10/29/96	LT 3	LT 3	1380 ± 70	
11/05/96	LT 3	LT 3	1220 ± 70	LT 2
11/12/96	LT 3	3 ± 3	1270 ± 70	
11/19/96	LT 3	LT 3	1320 ± 70	
11/26/96	LT 4	LT 3	1420 ± 70	
12/03/96	LT 3	LT 3	1370 ± 70	LT 2
12/10/96	LT 3	LT 3	1320 ± 70	
12/17/96	LT 3	LT 3	1370 ± 70	
12/23/96	LT 3	LT 3	1280 ± 70	
12/31/96	LT 4	LT 3	1220 ± 70	

LT - Less than

Appendix C

Aquatic Monitoring  
Big Rock Point  
1995  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/05/95	2 ± 1	200 ± 100
02/02/95	3 ± 1	100 ± 100
03/03/95	2 ± 1	LT 100
04/06/95	LT 1	200 ± 100
05/04/95	2 ± 1	LT 100
06/08/95	2 ± 1	LT 100
07/13/95	LT 1	LT 100
08/17/95	4 ± 2	LT 100
09/14/95	2 ± 1	LT 100
10/11/95	2 ± 1	LT 100
11/09/95	2 ± 1	LT 100
12/07/95	1 ± 1	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Palisades  
1995  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/15/95	2 ± 1	200 ± 100
02/25/95	3 ± 2	LT 100
03/25/95	3 ± 2	LT 100
04/22/95	3 ± 2	LT 100
05/06/95	2 ± 1	LT 100
06/11/95	2 ± 1	LT 100
07/29/95	2 ± 2	LT 100
08/27/95	2 ± 1	LT 100
09/17/95	3 ± 2	200 ± 100
10/07/95	2 ± 1	LT 100
11/18/95	LT 1	200 ± 100
12/10/95	4 ± 2	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
D. C. Cook Unit 1  
1995  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/15/95	LT 1	LT 100
02/25/95	3 ± 1	LT 100
03/25/95	LT 1	LT 100
04/22/95	3 ± 2	LT 100
05/06/95	3 ± 2	LT 100
06/11/95	3 ± 2	LT 100
07/23/95	3 ± 2	LT 100
10/07/95	2 ± 1	LT 100
11/18/95	2 ± 1	200 ± 100
12/10/95	2 ± 1	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
D. C. Cook Unit 2  
1995  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/15/95	2 ± 1	LT 100
02/25/95	2 ± 1	LT 100
03/25/95	2 ± 1	LT 100
04/22/95	3 ± 2	LT 100
05/06/95	2 ± 1	200 ± 100
06/11/95	2 ± 2	LT 100
07/23/95	4 ± 2	200 ± 100
08/27/95	2 ± 2	LT 100
09/17/95	3 ± 2	LT 100
10/07/95	2 ± 1	200 ± 100
11/18/95	2 ± 1	LT 100
12/10/95	3 ± 1	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1995  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/02/95	5 ± 2	300 ± 100
01/30/95	3 ± 2	200 ± 100
02/28/95	2 ± 1	LT 100
04/03/95	4 ± 2	200 ± 100
05/08/95	3 ± 2	LT 100
05/29/95	LT 1	200 ± 100
07/03/95	2 ± 2	200 ± 100
07/31/95	2 ± 2	200 ± 100
09/04/95	2 ± 1	100 ± 100
10/02/95	2 ± 1	200 ± 100
10/30/95	3 ± 2	LT 100
12/04/95	2 ± 2	200 ± 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1995  
Monroe Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/30/95	2 ± 1	200 ± 100
02/28/95	2 ± 1	LT 100
03/28/95	2 ± 1	100 ± 100
04/25/95	2 ± 1	200 ± 100
05/30/95	LT 1	200 ± 100
06/27/95	2 ± 2	LT 100
07/25/95	2 ± 2	200 ± 100
08/29/95	3 ± 2	200 ± 100
09/26/95	3 ± 2	200 ± 100
10/31/95	2 ± 1	LT 100
11/28/95	2 ± 1	200 ± 100
12/29/95	2 ± 1	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1995  
Trenton Channel Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/30/95	2 ± 1	200 ± 100
02/28/95	2 ± 1	LT 100
03/28/95	2 ± 1	LT 100
04/25/95	2 ± 1	200 ± 100
05/30/95	2 ± 1	200 ± 100
06/27/95	2 ± 1	200 ± 100
07/25/95	2 ± 1	200 ± 100
08/29/95	2 ± 1	200 ± 100
09/26/95	3 ± 2	300 ± 100
10/31/95	2 ± 1	100 ± 100
11/28/95	3 ± 2	200 ± 100
12/29/95	2 ± 1	LT 100

LT - Less than



Appendix C

Aquatic Monitoring  
Fermi 2  
1995  
Allen Park Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/30/95	2 ± 1	300 ± 100
02/28/95	3 ± 1	LT 100
03/28/95	2 ± 1	200 ± 100
04/25/95	3 ± 1	200 ± 100
05/30/95	2 ± 1	200 ± 100
06/27/95	2 ± 1	200 ± 100
07/25/95	1 ± 1	300 ± 100
08/29/95	2 ± 1	LT 100
09/26/95	LT 1	200 ± 100
10/31/95	1 ± 1	200 ± 100
11/28/95	LT 1	200 ± 100
12/29/95	LT 1	200 ± 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1995  
Fermi 2 Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/30/95	2 ± 1	300 ± 100
02/28/95	4 ± 2	LT 100
03/28/95	3 ± 1	LT 100
04/25/95	3 ± 2	200 ± 100
05/30/95	2 ± 1	LT 100
06/27/95	LT 2	LT 100
07/25/95	4 ± 2	LT 100
08/29/95	3 ± 2	200 ± 100
09/27/95	2 ± 1	400 ± 100
10/31/95	3 ± 2	100 ± 100
11/28/95	LT 1	200 ± 100
12/29/95	4 ± 2	200 ± 100

LT - Less than

Appendix C

Aquatic Monitoring  
Big Rock Point  
1996  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/11/96	2 ± 1	LT 100
04/11/96	2 ± 2	LT 100
05/09/96	2 ± 1	LT 100
06/06/96	LT 1	LT 100
07/11/96	2 ± 2	LT 100
08/07/96	2 ± 1	LT 100
09/04/96	2 ± 1	LT 100
10/09/96	LT 1	100 ± 100
11/13/96	2 ± 1	LT 100
12/11/96	LT 2	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Palisades  
1996  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/06/96	2 ± 1	LT 100
02/24/96	2 ± 2	LT 100
03/17/96	3 ± 2	LT 100
04/21/96	3 ± 2	LT 100
05/20/96	3 ± 2	LT 100
06/30/96	3 ± 2	LT 100
07/23/96	2 ± 1	LT 100
08/13/96	2 ± 1	LT 100
09/29/96	2 ± 2	LT 100
10/26/96	LT 1	LT 100
11/24/96	2 ± 1	LT 100
12/21/96	2 ± 2	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
D. C. Cook Unit 1  
1996  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/06/96	2 ± 1	LT 100
02/24/96	2 ± 2	LT 100
03/17/96	2 ± 2	LT 100
04/22/96	LT 1	LT 100
05/20/96	3 ± 3	LT 100
06/30/96	2 ± 2	LT 100
07/23/96	2 ± 1	LT 100
08/13/96	3 ± 1	LT 100
09/29/96	LT 2	LT 100
10/26/96	3 ± 2	LT 100
11/24/96	2 ± 2	100 ± 100
12/21/96	2 ± 2	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
D. C. Cook Unit 2  
1996  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/06/96	2 ± 1	LT 100
02/24/96	3 ± 2	LT 100
03/17/96	3 ± 2	LT 100
05/20/96	2 ± 2	LT 100
06/30/96	3 ± 2	LT 100
07/23/96	2 ± 2	LT 100
08/13/96	3 ± 1	LT 100
09/29/96	2 ± 2	LT 100
10/26/96	3 ± 2	LT 100
11/24/96	2 ± 1	LT 100
12/21/96	LT 1	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1996  
Reactor Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/09/96	3 ± 1	200 ± 100
01/29/96	1 ± 1	100 ± 100
03/11/96	2 ± 2	LT 100
04/01/96	3 ± 2	LT 100
05/06/96	3 ± 2	LT 100
06/03/96	3 ± 2	LT 100
07/01/96	LT 1	100 ± 100
08/05/96	2 ± 1	300 ± 100
09/02/96	3 ± 1	LT 100
09/30/96	LT 2	200 ± 100
11/04/96	2 ± 1	LT 100
12/02/96	2 ± 1	LT 100
12/30/96	LT 2	200 ± 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1996  
Monroe Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/31/96	2 ± 1	200 ± 100
02/29/96	2 ± 2	100 ± 100
03/25/96	2 ± 1	200 ± 100
04/29/96	2 ± 1	LT 100
05/29/96	2 ± 1	LT 100
06/25/96	2 ± 2	100 ± 100
07/31/96	2 ± 1	100 ± 100
08/26/96	3 ± 1	200 ± 100
09/23/96	LT 2	LT 100
10/28/96	LT 1	LT 100
11/26/96	1 ± 1	100 ± 100
12/30/96	LT 2	200 ± 100

LT - Less than



Appendix C

Aquatic Monitoring  
Fermi 2  
1996  
Trenton Channel Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/31/96	2 ± 1	200 ± 100
02/29/96	2 ± 2	200 ± 100
03/25/96	2 ± 2	200 ± 100
04/29/96	2 ± 1	LT 100
05/29/96	2 ± 1	LT 100
06/25/96	2 ± 2	200 ± 100
07/31/96	LT 1	200 ± 100
08/26/96	2 ± 1	200 ± 100
09/23/96	LT 2	LT 100
10/28/96	1 ± 1	LT 100
11/26/96	LT 1	LT 100
12/30/96	4 ± 2	LT 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1996  
Allen Park Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/31/96	2 ± 1	LT 100
02/29/96	LT 1	LT 100
03/25/96	3 ± 2	LT 100
04/29/96	2 ± 1	LT 100
05/29/96	2 ± 1	200 ± 100
06/25/96	LT 1	200 ± 100
07/31/96	2 ± 1	200 ± 100
08/26/96	2 ± 1	200 ± 100
09/23/96	LT 2	100 ± 100
10/28/96	2 ± 1	LT 100
11/26/96	2 ± 1	LT 100
12/30/96	LT 1	200 ± 100

LT - Less than

Appendix C

Aquatic Monitoring  
Fermi 2  
1996  
Fermi 2 Intake Site

<b>Collection Date</b>	<b>Gross Beta (pCi/l)</b>	<b>Tritium (pCi/l)</b>
01/31/96	2 ± 1	100 ± 100
02/29/96	2 ± 2	200 ± 100
03/25/96	LT 2	200 ± 100
04/29/96	3 ± 2	LT 100
05/29/96	4 ± 2	LT 100
06/25/96	2 ± 2	LT 100
07/31/96	3 ± 2	LT 100
08/26/96	4 ± 1	LT 100
09/23/96	2 ± 2	200 ± 100
10/28/96	2 ± 1	LT 100
11/26/96	2 ± 1	LT 100
12/30/96	2 ± 2	100 ± 100

LT - Less than

Appendix D

Direct Radiation Monitoring  
1995  
Big Rock Point Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	13.1 ± 0.6	12.8 ± 0.7	13.1 ± 0.6	13.3 ± 0.7
2	12.5 ± 0.6	11.9 ± 0.7	12.3 ± 0.6	13.6 ± 0.7
3	12.6 ± 0.6	11.8 ± 0.7	12.7 ± 0.6	13.3 ± 0.7
4	12.8 ± 0.6	12.3 ± 0.7	13.8 ± 0.7	12.4 ± 0.7
5	13.0 ± 0.6	12.0 ± 0.7	13.2 ± 0.6	12.6 ± 0.7
6	13.5 ± 0.6	14.7 ± 0.7	15.0 ± 0.7	15.9 ± 0.7
7	13.6 ± 0.6	15.0 ± 0.8	13.8 ± 0.7	15.5 ± 0.7
8	12.9 ± 0.6	15.1 ± 0.8	13.8 ± 0.7	15.0 ± 0.7
9	12.0 ± 0.6	12.5 ± 0.7	12.7 ± 0.6	13.5 ± 0.7
10	12.5 ± 0.6	12.1 ± 0.7	12.6 ± 0.6	12.4 ± 0.7
11	12.3 ± 0.6	10.7 ± 0.6	12.7 ± 0.6	11.4 ± 0.6
12	12.6 ± 0.6	10.4 ± 0.6	12.1 ± 0.6	11.3 ± 0.6
13	12.7 ± 0.6	11.8 ± 0.7	12.8 ± 0.6	12.2 ± 0.7
14	11.7 ± 0.6	11.4 ± 0.7	11.9 ± 0.6	12.3 ± 0.7
15	12.4 ± 0.6	13.4 ± 0.7	13.1 ± 0.6	13.1 ± 0.7
16	12.4 ± 0.6	14.5 ± 0.7	13.2 ± 0.6	13.9 ± 0.7
17	13.4 ± 0.6	13.8 ± 0.7	14.1 ± 0.7	12.9 ± 0.7
18	13.6 ± 0.6	10.1 ± 0.6	14.3 ± 0.7	10.4 ± 0.6
19	13.9 ± 0.7	14.1 ± 0.7	14.6 ± 0.7	15.6 ± 0.7
20	12.9 ± 0.6	12.3 ± 0.7	13.4 ± 0.6	13.5 ± 0.7
21	12.5 ± 0.6	11.3 ± 0.7	12.7 ± 0.6	11.9 ± 0.6

Appendix D

Direct Radiation Monitoring  
1995  
Palisades Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	12.8 ± 0.8	12.9 ± 0.6	12.0 ± 0.6	DM
2	13.9 ± 0.9	11.7 ± 0.6	14.7 ± 0.6	12.8 ± 0.7
3	15.4 ± 0.9	12.4 ± 0.6	14.4 ± 0.6	15.2 ± 0.7
4	13.8 ± 0.9	13.3 ± 0.7	13.8 ± 0.6	15.2 ± 0.7
5	14.5 ± 0.9	14.5 ± 0.7	14.2 ± 0.6	DM
6	13.5 ± 0.9	12.2 ± 0.6	14.1 ± 0.6	13.5 ± 0.7
7	13.0 ± 0.8	DM	13.9 ± 0.6	13.9 ± 0.7
8	13.1 ± 0.8	12.1 ± 0.6	13.8 ± 0.6	13.8 ± 0.7
9	13.6 ± 0.9	13.4 ± 0.7	13.4 ± 0.6	14.2 ± 0.7
10	14.2 ± 0.9	11.7 ± 0.6	13.9 ± 0.6	14.2 ± 0.7
11	13.5 ± 0.9	14.6 ± 0.7	14.1 ± 0.6	15.8 ± 0.8
12	14.5 ± 0.9	12.2 ± 0.6	13.8 ± 0.6	13.0 ± 0.7
13	13.4 ± 0.9	14.3 ± 0.7	12.8 ± 0.6	14.9 ± 0.7
14	DM	11.6 ± 0.6	13.5 ± 0.6	DM
15	15.4 ± 0.9	11.5 ± 0.6	13.0 ± 0.6	DM
16	13.1 ± 0.8	11.1 ± 0.6	12.0 ± 0.6	12.8 ± 0.7
17	15.1 ± 0.9	13.7 ± 0.7	14.8 ± 0.6	16.3 ± 0.8
18	14.6 ± 0.9	15.6 ± 0.7	16.3 ± 0.7	16.4 ± 0.8
19	16.1 ± 0.9	11.4 ± 0.6	14.3 ± 0.6	12.4 ± 0.7
20	14.9 ± 0.9	14.5 ± 0.7	15.7 ± 0.6	16.0 ± 0.8
21	13.5 ± 0.9	13.6 ± 0.7	13.0 ± 0.6	DM
22	15.0 ± 0.9	14.2 ± 0.7	15.3 ± 0.6	16.6 ± 0.8
23	15.2 ± 0.9	14.7 ± 0.7	14.4 ± 0.6	16.4 ± 0.8
24	13.2 ± 0.9	14.6 ± 0.7	14.2 ± 0.6	15.3 ± 0.7

DM - Dosimeter Missing

Appendix D

Direct Radiation Monitoring

1995

D. C. Cook Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	13.4 ± 0.8	12.9 ± 0.6	13.9 ± 0.6	13.7 ± 0.7
2	14.5 ± 0.8	16.4 ± 0.7	14.7 ± 0.6	17.7 ± 0.8
3	12.2 ± 0.8	12.1 ± 0.6	12.8 ± 0.6	12.6 ± 0.7
4	12.5 ± 0.8	12.5 ± 0.6	12.9 ± 0.6	12.7 ± 0.7
5	13.8 ± 0.8	13.7 ± 0.6	14.1 ± 0.6	13.9 ± 0.7
6	13.7 ± 0.8	DM	15.1 ± 0.6	14.3 ± 0.7
7	12.9 ± 0.8	12.8 ± 0.6	13.1 ± 0.6	13.9 ± 0.7
8	13.3 ± 0.8	17.1 ± 0.7	13.9 ± 0.6	18.0 ± 0.8
9	12.1 ± 0.7	12.9 ± 0.6	13.1 ± 0.6	13.6 ± 0.7
10	13.5 ± 0.8	13.5 ± 0.6	13.9 ± 0.6	14.0 ± 0.7
11	13.0 ± 0.8	12.6 ± 0.6	13.6 ± 0.6	13.0 ± 0.7
12	13.4 ± 0.8	12.7 ± 0.6	13.0 ± 0.6	13.9 ± 0.7
13	16.9 ± 0.9	16.7 ± 0.7	15.5 ± 0.7	17.3 ± 0.8
14	18.6 ± 0.9	16.1 ± 0.7	17.9 ± 0.7	17.3 ± 0.8
15	16.6 ± 0.9	18.4 ± 0.7	17.6 ± 0.7	18.0 ± 0.8
16	16.3 ± 0.9	15.8 ± 0.7	16.5 ± 0.6	15.9 ± 0.7
17	13.8 ± 0.8	13.9 ± 0.6	13.9 ± 0.6	13.9 ± 0.7
18	DM	14.7 ± 0.6	14.1 ± 0.6	15.5 ± 0.7
19	13.2 ± 0.8	11.8 ± 0.6	13.9 ± 0.6	12.6 ± 0.7
20	15.0 ± 0.8	15.8 ± 0.7	16.2 ± 0.6	16.6 ± 0.8
21	17.0 ± 0.9	18.0 ± 0.7	15.8 ± 0.6	18.7 ± 0.8
22	14.5 ± 0.8	14.8 ± 0.6	14.2 ± 0.6	14.9 ± 0.7
23	15.7 ± 0.8	14.9 ± 0.6	15.4 ± 0.6	15.5 ± 0.7
24	14.2 ± 0.8	13.6 ± 0.6	15.3 ± 0.6	14.4 ± 0.7

Dosimeter Missing

Appendix D

Direct Radiation Monitoring  
1995  
Fermi 2 Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	11.7 ± 0.6	10.8 ± 0.7	11.2 ± 0.6	10.7 ± 0.7
2	14.6 ± 0.7	DM	15.5 ± 0.7	14.2 ± 0.8
3	20.3 ± 0.8	21.5 ± 0.9	19.2 ± 0.8	21.2 ± 0.9
4	16.6 ± 0.7	15.7 ± 0.8	16.3 ± 0.8	16.0 ± 0.8
5	16.1 ± 0.7	15.3 ± 0.8	16.0 ± 0.8	15.3 ± 0.8
6	16.2 ± 0.7	16.4 ± 0.8	16.3 ± 0.8	17.5 ± 0.8
7	15.8 ± 0.7	16.6 ± 0.8	18.0 ± 0.8	16.9 ± 0.8
8	17.0 ± 0.8	17.2 ± 0.8	14.9 ± 0.7	17.0 ± 0.8
9	13.5 ± 0.7	14.9 ± 0.8	13.4 ± 0.7	14.8 ± 0.8
10	14.6 ± 0.7	14.8 ± 0.8	13.8 ± 0.7	14.8 ± 0.8
11	15.9 ± 0.7	15.9 ± 0.8	15.9 ± 0.8	15.7 ± 0.8
12	18.0 ± 0.8	16.3 ± 0.8	17.5 ± 0.8	17.1 ± 0.8
13	16.2 ± 0.7	16.0 ± 0.8	15.9 ± 0.8	14.9 ± 0.8
14	19.1 ± 0.8	18.8 ± 0.9	DM	18.4 ± 0.8
15	15.2 ± 0.7	14.3 ± 0.7	14.8 ± 0.7	14.9 ± 0.8
16	18.1 ± 0.8	17.3 ± 0.8	18.3 ± 0.8	17.4 ± 0.8
17	14.0 ± 0.7	12.1 ± 0.7	14.4 ± 0.7	12.0 ± 0.7
18	14.2 ± 0.7	12.7 ± 0.7	12.5 ± 0.7	12.9 ± 0.7
19	12.4 ± 0.6	13.2 ± 0.7	12.7 ± 0.7	13.7 ± 0.7
20	15.5 ± 0.7	14.1 ± 0.7	15.0 ± 0.7	14.6 ± 0.8
21	15.9 ± 0.7	16.0 ± 0.8	15.7 ± 0.8	DM

Dosimeter Missing

Appendix D

Direct Radiation Monitoring  
1995  
Fermi 2 Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
22	17.7 ± 0.8	17.1 ± 0.8	18.4 ± 0.8	16.0 ± 0.8
23	18.4 ± 0.8	16.2 ± 0.8	19.3 ± 0.8	16.9 ± 0.8
24	18.5 ± 0.8	18.2 ± 0.8	18.8 ± 0.8	18.3 ± 0.9
25	13.7 ± 0.7	11.2 ± 0.7	14.7 ± 0.7	12.9 ± 0.7
26	14.5 ± 0.7	13.4 ± 0.7	15.0 ± 0.7	13.1 ± 0.7
27	17.1 ± 0.8	16.5 ± 0.8	16.2 ± 0.8	16.2 ± 0.8
28	14.8 ± 0.7	13.6 ± 0.7	15.9 ± 0.8	13.3 ± 0.7
29	15.5 ± 0.7	14.7 ± 0.8	15.5 ± 0.7	15.4 ± 0.8
30	16.5 ± 0.7	19.0 ± 0.9	17.2 ± 0.8	18.1 ± 0.9
31	13.9 ± 0.7	15.8 ± 0.8	14.5 ± 0.7	16.0 ± 0.8
32	15.1 ± 0.7	DM	16.2 ± 0.8	15.2 ± 0.8
33	14.2 ± 0.7	13.3 ± 0.7	13.9 ± 0.7	13.8 ± 0.8
34	14.4 ± 0.7	13.6 ± 0.7	14.6 ± 0.7	14.0 ± 0.8
35	16.5 ± 0.7	14.3 ± 0.7	16.5 ± 0.8	15.5 ± 0.8
36	13.2 ± 0.7	12.5 ± 0.7	13.8 ± 0.7	12.6 ± 0.7
37	15.5 ± 0.7	14.9 ± 0.8	15.2 ± 0.7	15.8 ± 0.8
38	17.8 ± 0.8	13.7 ± 0.7	16.4 ± 0.8	15.6 ± 0.8
39	15.0 ± 0.7	DM	14.4 ± 0.7	14.6 ± 0.8
40	16.4 ± 0.7	18.9 ± 0.9	16.5 ± 0.8	19.3 ± 0.9
41	13.6 ± 0.7	13.7 ± 0.7	12.8 ± 0.7	14.9 ± 0.8

Dosimeter Missing



Appendix D

Direct Radiation Monitoring  
1996  
Big Rock Point Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	11.5 ± 0.6	12.6 ± 0.6	12.5 ± 0.7	13.4 ± 0.8
2	11.4 ± 0.6	12.0 ± 0.6	12.3 ± 0.7	12.4 ± 0.7
3	12.6 ± 0.6	12.0 ± 0.6	12.3 ± 0.7	12.3 ± 0.7
4	11.9 ± 0.6	12.4 ± 0.6	12.7 ± 0.7	12.7 ± 0.8
5	10.2 ± 0.6	13.5 ± 0.7	12.3 ± 0.7	12.6 ± 0.8
6	12.3 ± 0.6	14.4 ± 0.7	13.7 ± 0.7	14.4 ± 0.8
7	12.8 ± 0.6	14.9 ± 0.7	13.7 ± 0.7	15.6 ± 0.8
8	12.4 ± 0.6	15.4 ± 0.7	13.0 ± 0.7	15.8 ± 0.8
9	12.0 ± 0.6	12.9 ± 0.6	13.0 ± 0.7	12.6 ± 0.8
10	11.2 ± 0.6	12.5 ± 0.6	11.5 ± 0.6	13.2 ± 0.8
11	11.5 ± 0.6	11.2 ± 0.6	11.5 ± 0.6	10.4 ± 0.7
12	11.3 ± 0.6	11.6 ± 0.6	12.7 ± 0.7	11.0 ± 0.7
13	11.5 ± 0.6	11.6 ± 0.6	DM	12.2 ± 0.7
14	11.2 ± 0.6	11.6 ± 0.6	11.4 ± 0.6	12.5 ± 0.8
15	11.8 ± 0.6	13.6 ± 0.7	15.2 ± 0.7	13.1 ± 0.8
16	12.0 ± 0.6	13.3 ± 0.6	12.4 ± 0.7	13.1 ± 0.8
17	11.9 ± 0.6	13.4 ± 0.6	13.7 ± 0.7	12.9 ± 0.8
18	12.1 ± 0.6	11.2 ± 0.6	11.7 ± 0.6	10.9 ± 0.7
19	11.9 ± 0.6	15.0 ± 0.7	13.6 ± 0.7	15.7 ± 0.8
20	11.3 ± 0.6	12.6 ± 0.6	11.7 ± 0.6	13.6 ± 0.8
21	11.8 ± 0.6	11.4 ± 0.6	12.1 ± 0.7	10.8 ± 0.7

DM - Dosimeter Missing

Appendix D

Direct Radiation Monitoring  
1996  
Palisades Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	11.2 ± 0.6	12.8 ± 0.6	11.4 ± 0.5	12.9 ± 1.0
2	12.7 ± 0.6	12.4 ± 0.6	13.7 ± 0.5	10.9 ± 0.9
3	13.2 ± 0.6	13.9 ± 0.6	13.9 ± 0.5	14.1 ± 1.0
4	12.6 ± 0.6	14.2 ± 0.6	13.6 ± 0.5	13.6 ± 1.0
5	14.3 ± 0.6	12.6 ± 0.6	15.7 ± 0.6	13.8 ± 1.0
6	12.4 ± 0.6	DM	13.6 ± 0.5	11.4 ± 0.9
7	12.9 ± 0.6	12.2 ± 0.6	13.1 ± 0.5	12.7 ± 1.0
8	12.2 ± 0.6	12.6 ± 0.6	12.6 ± 0.5	10.5 ± 0.9
9	12.8 ± 0.6	14.2 ± 0.6	12.4 ± 0.5	DM
10	13.4 ± 0.6	11.5 ± 0.6	13.7 ± 0.5	10.6 ± 0.9
11	13.4 ± 0.6	15.3 ± 0.7	13.7 ± 0.5	14.3 ± 1.0
12	13.1 ± 0.6	11.9 ± 0.6	13.3 ± 0.5	11.1 ± 0.9
13	12.1 ± 0.6	14.5 ± 0.7	12.4 ± 0.5	13.4 ± 1.0
14	DM	DM	13.5 ± 0.5	11.2 ± 0.9
15	12.7 ± 0.6	11.6 ± 0.6	12.6 ± 0.5	11.6 ± 0.9
16	11.9 ± 0.6	11.6 ± 0.6	DM	10.5 ± 0.9
17	13.8 ± 0.6	14.6 ± 0.7	14.6 ± 0.5	14.6 ± 1.0
18	14.7 ± 0.6	14.5 ± 0.7	15.7 ± 0.6	14.6 ± 1.0
19	13.4 ± 0.6	11.4 ± 0.6	12.9 ± 0.5	11.2 ± 0.9
20	14.9 ± 0.6	15.1 ± 0.7	15.4 ± 0.6	14.2 ± 1.0
21	12.7 ± 0.6	13.0 ± 0.6	13.5 ± 0.5	13.6 ± 1.0
22	13.7 ± 0.6	14.8 ± 0.7	14.5 ± 0.5	14.9 ± 1.0
23	14.0 ± 0.6	14.9 ± 0.7	15.0 ± 0.6	15.1 ± 1.0
24	13.9 ± 0.6	14.3 ± 0.7	14.1 ± 0.5	13.7 ± 1.0

DM - Dosimeter Missing

Appendix D

Direct Radiation Monitoring

1996

D. C. Cook Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	12.6 ± 0.6	13.3 ± 0.6	13.9 ± 0.5	12.7 ± 0.8
2	13.4 ± 0.6	17.8 ± 0.7	14.8 ± 0.5	18.3 ± 1.0
3	11.2 ± 0.6	12.2 ± 0.6	13.2 ± 0.5	12.0 ± 0.8
4	11.5 ± 0.6	12.4 ± 0.6	12.8 ± 0.5	11.5 ± 0.8
5	12.5 ± 0.6	13.8 ± 0.6	13.5 ± 0.5	12.0 ± 0.8
6	14.4 ± 0.6	13.9 ± 0.6	15.0 ± 0.5	13.6 ± 0.8
7	11.9 ± 0.6	13.8 ± 0.6	13.1 ± 0.5	13.0 ± 0.8
8	12.7 ± 0.6	16.9 ± 0.7	13.7 ± 0.5	17.0 ± 0.9
9	11.6 ± 0.6	13.5 ± 0.6	12.9 ± 0.5	12.7 ± 0.8
10	11.8 ± 0.6	13.8 ± 0.6	12.4 ± 0.5	12.4 ± 0.8
11	11.7 ± 0.6	13.2 ± 0.6	12.9 ± 0.5	11.5 ± 0.8
12	11.7 ± 0.6	13.1 ± 0.6	12.7 ± 0.5	12.4 ± 0.8
13	13.9 ± 0.6	16.4 ± 0.7	15.2 ± 0.6	16.6 ± 0.9
14	15.4 ± 0.7	16.3 ± 0.7	17.9 ± 0.6	15.3 ± 0.9
15	15.6 ± 0.7	17.6 ± 0.7	17.3 ± 0.6	16.6 ± 0.9
16	14.5 ± 0.6	16.2 ± 0.7	16.5 ± 0.6	15.1 ± 0.9
17	12.9 ± 0.6	13.7 ± 0.6	13.4 ± 0.5	14.0 ± 0.9
18	12.7 ± 0.6	14.7 ± 0.6	13.9 ± 0.5	13.5 ± 0.8
19	11.7 ± 0.6	12.3 ± 0.6	12.4 ± 0.5	11.7 ± 0.8
20	14.5 ± 0.6	15.5 ± 0.6	15.0 ± 0.5	13.6 ± 0.8
21	DM	18.8 ± 0.7	16.4 ± 0.6	16.7 ± 0.9
22	13.1 ± 0.6	14.4 ± 0.6	14.0 ± 0.5	14.1 ± 0.9
23	14.0 ± 0.6	15.1 ± 0.6	15.0 ± 0.5	14.2 ± 0.9
24	13.5 ± 0.6	14.4 ± 0.6	15.1 ± 0.5	13.0 ± 0.8

DM - Dosimeter Missing

Appendix D

Direct Radiation Monitoring  
1996  
Fermi 2 Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
1	12.9 ± 0.6	11.4 ± 0.6	11.6 ± 0.7	12.5 ± 0.8
2	14.1 ± 0.6	13.9 ± 0.7	15.5 ± 0.8	DM
3	18.6 ± 0.8	20.3 ± 0.8	18.7 ± 0.9	19.8 ± 0.9
4	14.6 ± 0.7	15.6 ± 0.7	14.7 ± 0.8	15.4 ± 0.8
5	15.4 ± 0.7	15.5 ± 0.7	15.9 ± 0.8	15.2 ± 0.8
6	16.3 ± 0.7	16.5 ± 0.7	16.5 ± 0.8	17.1 ± 0.9
7	16.2 ± 0.7	16.0 ± 0.7	15.2 ± 0.8	16.7 ± 0.9
8	16.6 ± 0.7	16.9 ± 0.7	17.2 ± 0.8	17.8 ± 0.9
9	13.1 ± 0.6	14.5 ± 0.7	12.7 ± 0.7	14.6 ± 0.8
10	14.3 ± 0.6	14.1 ± 0.7	14.2 ± 0.8	14.6 ± 0.8
11	14.9 ± 0.7	15.3 ± 0.7	14.1 ± 0.8	15.3 ± 0.8
12	16.4 ± 0.7	15.9 ± 0.7	16.5 ± 0.8	17.0 ± 0.9
13	15.9 ± 0.7	15.8 ± 0.7	15.9 ± 0.8	16.4 ± 0.9
14	18.1 ± 0.7	18.8 ± 0.8	19.2 ± 0.9	18.7 ± 0.9
15	15.3 ± 0.7	13.9 ± 0.7	14.7 ± 0.8	14.4 ± 0.8
16	17.6 ± 0.7	17.4 ± 0.8	19.0 ± 0.9	17.6 ± 0.9
17	13.7 ± 0.6	DM	14.2 ± 0.8	12.5 ± 0.8
18	13.1 ± 0.6	DM	15.8 ± 0.8	15.3 ± 0.8
19	12.3 ± 0.6	13.1 ± 0.6	12.2 ± 0.7	13.4 ± 0.8
20	14.7 ± 0.7	14.9 ± 0.7	15.2 ± 0.8	14.4 ± 0.8
21	14.1 ± 0.6	13.0 ± 0.6	13.7 ± 0.7	13.5 ± 0.8

DM - Dosimeter Missing

Appendix D

Direct Radiation Monitoring  
1996  
Fermi 2 Plant

<b>NRC Station Number</b>	<b>First Quarter (mR/90 days)</b>	<b>Second Quarter (mR/90 Days)</b>	<b>Third Quarter (mR/90 Days)</b>	<b>Fourth Quarter (mR/90 Days)</b>
22	16.5 ± 0.7	16.3 ± 0.7	17.5 ± 0.8	16.5 ± 0.9
23	18.6 ± 0.8	16.7 ± 0.7	19.0 ± 0.9	16.7 ± 0.9
24	17.9 ± 0.7	17.2 ± 0.7	18.8 ± 0.9	19.0 ± 0.9
25	14.4 ± 0.7	12.0 ± 0.6	14.1 ± 0.8	12.8 ± 0.8
26	14.5 ± 0.7	14.0 ± 0.7	13.6 ± 0.7	13.8 ± 0.8
27	15.4 ± 0.7	15.1 ± 0.7	16.0 ± 0.8	15.6 ± 0.8
28	13.6 ± 0.6	13.7 ± 0.7	14.1 ± 0.8	13.8 ± 0.8
29	14.7 ± 0.7	15.6 ± 0.7	14.4 ± 0.8	16.0 ± 0.8
30	15.7 ± 0.7	18.0 ± 0.8	16.9 ± 0.8	18.3 ± 0.9
31	DM	15.5 ± 0.7	13.5 ± 0.7	15.4 ± 0.8
32	15.7 ± 0.7	14.2 ± 0.7	15.4 ± 0.8	15.1 ± 0.8
33	13.7 ± 0.6	14.2 ± 0.7	15.3 ± 0.8	14.5 ± 0.8
34	14.3 ± 0.6	14.6 ± 0.7	14.3 ± 0.8	14.0 ± 0.8
35	15.9 ± 0.7	14.9 ± 0.7	16.6 ± 0.8	16.1 ± 0.8
36	12.5 ± 0.6	12.7 ± 0.6	12.9 ± 0.7	12.3 ± 0.8
37	15.1 ± 0.7	14.6 ± 0.7	16.1 ± 0.8	15.1 ± 0.8
38	15.1 ± 0.7	14.9 ± 0.7	16.0 ± 0.8	14.4 ± 0.8
39	13.7 ± 0.6	13.9 ± 0.7	14.5 ± 0.8	13.6 ± 0.8
40	15.4 ± 0.7	19.0 ± 0.8	15.5 ± 0.8	18.6 ± 0.9
41	14.9 ± 0.7	13.8 ± 0.7	12.5 ± 0.7	13.9 ± 0.8

DM - Dosimeter Missing