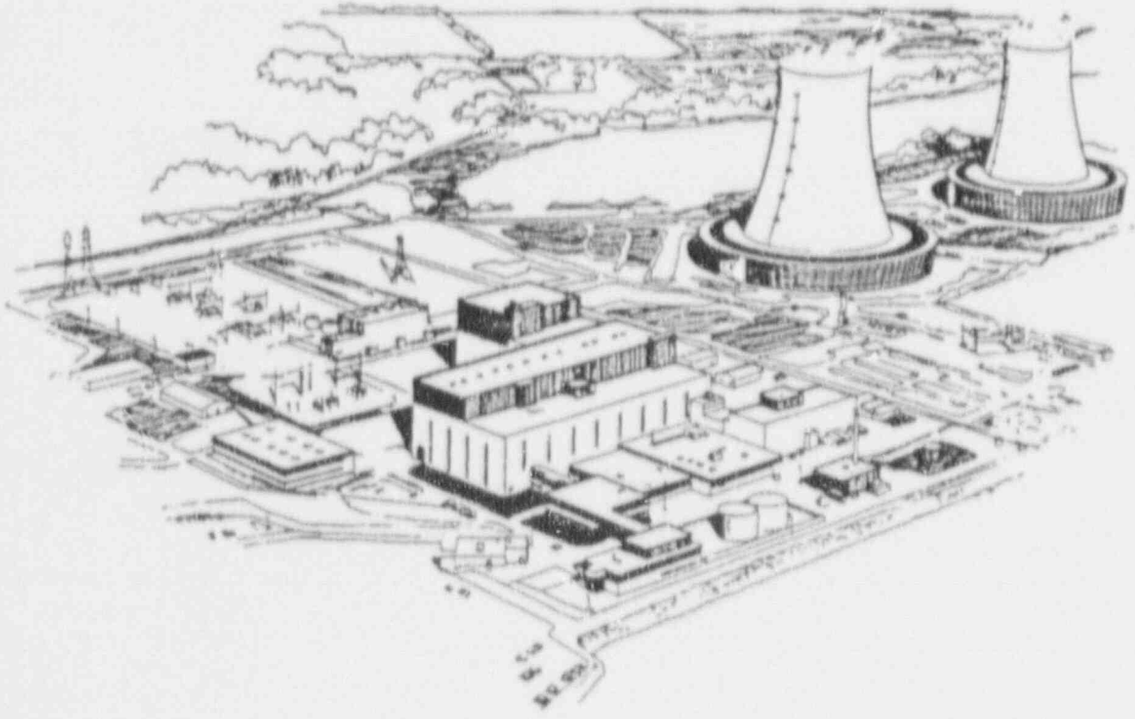
FERMI 2

1990 ANNUAL RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT



Detroit
Edison
Company

FERMI 2

1990 ANNUAL RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

PREPARED BY
ENVIRONMENTAL AND RISK ASSESSMENT
GROUP

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report was prepared by the Detroit Edison Company in compliance with the requirements of the U.S. Nuclear Regulatory Commission (NRC). This is a revised report and supersedes revision 0, due to incomplete sample results and program omissions from the initial report.

The Radiological Environmental Monitoring Program (REMP) at Fermi 2 was established by Detroit Edison in 1978. At that time the program was designed to establish a preoperational baseline. The program consisted of monitoring air, drinking water, surface water, lake sediments, milk, vegetables, fish, and direct radiation in the environment surrounding Fermi 2.

Fermi 2 became operational in 1985. The REMP has since been modified to assess any radiological impact upon the surrounding environment due to the operation of the plant. Sampling locations which are most likely to indicate any measurable radioactivity are called "indicator" locations. Data is also obtained from sampling locations which are distant from Fermi 2. These locations are areas that should not be affected by the operation of the plant and are called "control" locations.

Throughout the year, the Environmental Assessment staff at Fermi 2 compares the indicator data with the control data. This comparison is used to determine if there has been any measurable impact to the environment which is related to operating Fermi 2. Any significant difference between the indicator data and the control data is reported to the NRC.

In 1990, Detroit Edison collected more than 900 environmental indicator and control samples and contracted more than 1200 analyses as part of the REMP.

Initial analysis of two (2) sediment samples indicated trace levels of radioactivity just above the laboratory's lower limit of detection (LLD). The samples were reanalyzed with the result that only one of the samples indicated detectable radioactivity. The sample results were well below any regulatory reporting limits and were consistent with the activity released from the plant in liquid effluents.

None of the other sample analysis in the REMP indicated radioactivity attributable to Fermi 2 operations. Results showed that the radioactivity levels were similar to the preoperational levels.

Comparisons of 1990 operational data, pre-1990 operational data, and preoperational data showed that the operation of Fermi 2 had no impact of any significance upon the environment in 1990.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

REGULATIONS

Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix I, Section IV.B requires that Detroit Edison establish an appropriate surveillance and monitoring program to assure that radioactive products released to the environment are kept at extremely low levels. Section 20.201 of 10 CFR Part 20 further requires that a licensee conduct surveys of levels of radiation or concentrations of radioactive products as necessary to show compliance with Commission regulations.

PREOPERATIONAL PROGRAM

The preoperational environmental monitoring program was established seven years before operating the Fermi 2 reactor. This preoperational program determined the existing levels of radiation and radioactive products occurring naturally and from man-made sources in the environment around the Fermi 2 site. The program included continuous monitoring of direct radiation, radioactivity in air, lake sediments and water, drinking water, cow and goat milk, and local garden vegetables.

OPERATIONAL PROGRAM

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

QUALITY CONTROL

Detroit Edison participates in a Nuclear Regulatory Commission (NRC) approved interlaboratory comparison program. In this program, simulated environmental samples are prepared by the Quality Assurance Branch of the Environmental Protection Agency (EPA) and sent to the Fermi 2 REMP laboratory. The laboratory performs the required analysis and returns the results to the EPA. The EPA performs a statistical analysis and comparison to known values and returns the results to the laboratory.

If the results do not fall within allowable limits, the laboratory's methods and techniques are re-evaluated. The results of this program are reviewed by Detroit Edison and are reported to the NRC. The interlaboratory comparison program results for 1990 are provided in Appendix A.

TERRESTRIAL MONITORING PROGRAM

TERRESTRIAL MONITORING PROGRAM

INTRODUCTION

The terrestrial monitoring program provides continuous monitoring of the land environment surrounding Fermi 2. The program consists of monitoring the atmosphere, milk, grass, and vegetables for radioactivity due to the operation of the plant. Also, the program monitors direct radiation in the environment surrounding Fermi 2. The following sections discuss the type of sample, analysis performed, and a comparison to previous years' data including preoperational data.

DIRECT RADIATION

Gamma radiation is continuously monitored in the environment surrounding Fermi 2. Detroit Edison deploys thermoluminescent dosimeters (TLDs) to measure this radiation. The TLDs are thoroughly tested to assure accurate measurements under varying environmental conditions before being placed in the field. Environmental TLDs are exchanged and processed on a quarterly basis. While in the field, these TLDs are exposed to background radiation and, if measurable, gaseous effluents and direct radiation from Fermi 2. Indicator TLDs are located within a ten mile radius of the plant and control TLDs are located greater than ten miles.

The average exposure for indicator TLDs during the preoperational program was 17.3 mRem/Std Qtr and 17.5 mRem/Std Qtr for control TLDs. The annual means for indicator TLDs ranged from 13.6 mRem/Std Qtr to 21.0 mRem/Std Qtr. The annual means for control TLDs ranged from 15.5 mRem/Std Qtr to 21.9 mRem/Std Qtr.

From 1985 to 1989 the average exposure for indicator TLDs was 16.9 mRem/Std Qtr and 18.1 mRem/Std Qtr for control TLDs. The annual means for indicator TLDs ranged from 14.8 mRem/Std Qtr to 20.3 mRem/Std Qtr. The annual means for control TLDs ranged from 16.2 mRem/Std Qtr to 22.2 mRem/Std Qtr. As Figure 3-1 shows, the operational period from 1985 to 1989 was consistent with the preoperational program.

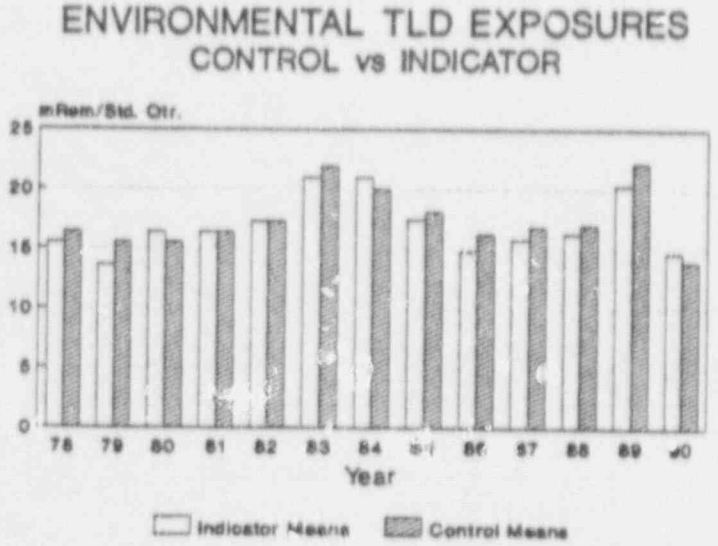


FIGURE 3-1

In 1990, the TLD monitoring program included forty-six (46) TLDs for the first three quarters, and sixty-three (63) TLDs in the fourth quarter. In the fourth quarter, an additional seventeen (17) TLDs were placed in the field to enhance the direct radiation monitoring program. Eight (8) TLDs were placed around the site boundary, six (6) were placed at schools within five miles of the plant and three (3) additional TLDs were placed at the ten mile radius.

In 1990, the TLDs nearest the plant indicated a mean value of 16.0 mRem/Std Qtr. The TLDs considered not to be affected by operating Fermi 2, (i.e., control TLDs) indicated a mean value of 13.9 mRem/Std Qtr. The indicator TLDs had a mean value of 14.7 mRem/Std Qtr and ranged from 6.7 to 36.8 mRem/Std Qtr. T-43 (the TLD with the highest mRem/Std Qtr value) read 36.8 mRem/Std Qtr because it is located onsite adjacent to the Condensate Storage Tank (CST). The control TLDs ranged from 9.5 to 18.2 mRem/Std Qtr. As Figure 3-1 shows, the average exposure for indicator and control TLDs was slightly lower than previous years, including preoperational years. Although the exposures were lower than previous years, they are still consistent with the long-term trend.

AIR SAMPLING

Detroit Edison continuously monitors the atmosphere surrounding Fermi 2 for radioactivity. This monitoring began in 1979, during the preoperational program. Air samples are changed out on a weekly basis and analyzed for gross beta and radioiodine. Particulate filters are composited and analyzed quarterly for strontium and gamma emitting isotopes. There are four indicator sampling sites which were selected based on an evaluation of the predominant wind directions. A fifth sampling site is located approximately 14 miles west of the plant and is considered to be unaffected by the operation of the plant.

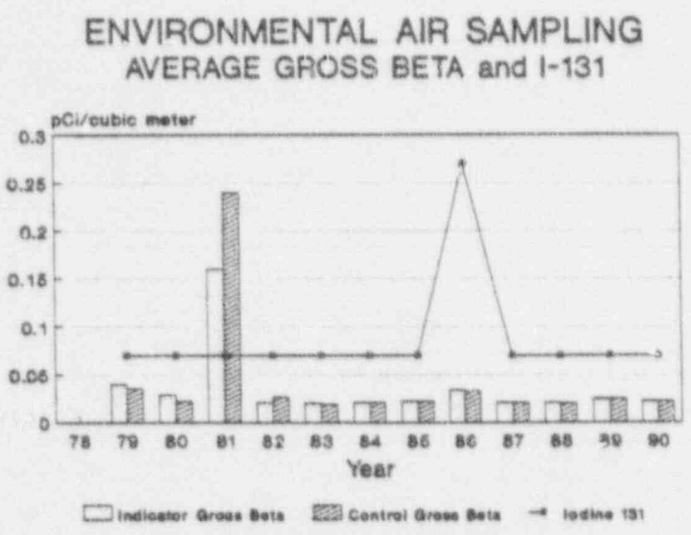


Figure 3-2

The average gross beta for indicator air samples, excluding 1981, during the preoperational program was .026 pCi/cubic meter and .025 pCi/cubic meter for control air samples. In 1981, as shown in Figure 3- 2, the average of the indicator samples was .16 pCi/cubic meter and the average of the control samples was .24 pCi/cubic meter. Also, in 1981, during the quarterly analyses Cs-137, Ce-141, Ce-144, Ru-103, Ru-106, Zr-95, Nb-95, Mn-54, and Sb-125 were detected in the atmosphere. These elevated activity levels have been attributed to an atmospheric weapon test by the Peoples Republic of China in late 1980.

From 1985 to 1989 the average gross beta for indicator samples was .025 pCi/cubic meter and .024 pCi/cubic meter for control samples. The annual mean gross beta for indicator samples ranged from .021 pCi/cubic meter to .034 pCi/cubic meter. The annual mean gross beta for control samples ranged from .020 pCi/cubic meter to .033 pCi/cubic meter. In 1986, as shown in Figure 3-2, there was a slight increase in gross beta activity and a .27 pCi/cubic meter "spike" in the Iodine-131 activity. These elevated activity levels have been attributed to the nuclear accident at Chernobyl (U.S.S.R.) on April 26, 1986. For the operational period from 1985 to 1989, excluding 1986, the air sampling data is consistent with the preoperational data.

During 1990, two hundred and fifty-nine (259) air particulate samples were collected and two hundred forty-nine (249) were counted for gross beta radioactivity. Five samples were lost at the laboratory while being transferred from one storage facility to another. Five were cross-contaminated at the laboratory by a liquid sample while in storage. The average gross beta activity was .025 pCi/cubic meter for indicator samples. The average gross beta activity for the control location was .024 pCi/cubic meter. The range of the indicating locations was .010 pCi/cubic meter to .060 pCi/cubic meter. The range of the control location was .012 pCi/cubic meter to .075 pCi/cubic meter.

At the same locations as the particulate filters, two hundred and fifty-nine (259) charcoal filters were collected and two hundred fifty- eight (258) were counted to determine the presence of iodine-131 in the atmosphere. One sample was lost at the laboratory while in storage. None of the filters showed detectable levels of iodine-131.

Twenty (20) quarterly composites of particulate filters from each sampling location were counted. Composite samples are prepared by combining the weekly samples which were obtained during the quarter at each of the air sample locations. One control sample showed detectable activity for Sr-89 and two indicator samples showed detectable activity for Sr-89 just above the lab's LLD. This activity is most likely due to statistical variation in sample counting. Nine indicator samples showed activity for Sr-90 and three out of four control samples showed activity for Sr-90. Also, one indicator sample showed activity for Cs-137. The Sr-90 and Cs-137 activity detected in these samples is mostly likely due to residual fallout from past weapons testing. All other gamma or beta emitting radioactivity that was detected was due to naturally occurring isotopes.

MILK AND GRASS SAMPLING

The milk and grass sampling portion of the REMP is the most important aspect of the program. This is because the major radiation exposure pathway to the public is due to the consumption of milk from grazing animals (dairy cows or goats).

Milk is collected from two indicator locations and one control location monthly or bi-monthly during the grazing season. The milk is analyzed for I-131, gamma emitting isotopes, and Sr-89/90.

Milk sampling did not begin until 1979 in the preoperational program. During the preoperational program only I-131 and gamma emitting isotopes were analyzed. From 1979 to 1984 Cs-137 and natural K-40 were the only isotopes detected in milk samples.

During the operational period between 1985 and 1987, the lab only analyzed for I-131 and gamma emitting isotopes. In 1988 the REMP lab began to analyze for Sr-89/90. In 1986, I-131 in activity concentrations ranging from .7 pCi/l to 37.5 pCi/l were detected in milk samples. Also in the same year, Cs-137 in activity concentrations ranging from 6.0 pCi/l to 7.3 pCi/l were detected in these samples. These activity concentrations have been attributed to the nuclear accident at Chernobyl (U.S.S.R) on April 26, 1986. For the operational period from 1985 to 1989, excluding 1986, the milk sampling data is consistent with the preoperational data.

During 1990, fifty-two (52) milk samples were collected from farms participating in the Fermi 2 environmental program. In May and June, six (6) samples, including the Quality Control sample, at all control and indicating locations were reported as having I-131 activity greater than the Fermi 2 Technical Specification LLD of 1.0 pCi/l. The range of these samples was 1.1 pCi/l to 17.8 pCi/l. After a detailed investigation, it was determined that the I-131 concentrations in milk for May and June were not due to operating Fermi 2. A summary of this evaluation is included as Appendix B.

The control sample for July showed detectable activity for I-131 which is believed to be related to the May and June activities. This sample is not discussed in the summary due to the sample not being reported at the time of the investigation. Some of the remaining samples showed detectable I-131 at such low concentrations in both indicator and control samples that the activity is most likely due to statistical variation in sample counting.

One sample showed a detectable activity of 5.5 pCi/l for Co-58. The range for the lab's LLDs was 3.5 pCi/l to 11.0 pCi/l. This activity falls within this range and is most likely due to statistical variation in sample counting.

Two samples showed detectable activity for Co-60. One sample was 14.7 pCi/l and the other was 10.2 pCi/l. The range for the lab's LLDs was 6.0 pCi/l to 17.0 pCi/l. This activity falls within this range and is also most likely due to statistical variation in sample counting.

Analyses of Sr-90 and Cs-137 showed activity in both control and indicator locations. Fermi 2 started sampling for Sr-90 in 1988 and the levels of activity reported for 1990 are consistent with previous years and are most likely due to residual fallout from weapons testing. Five samples were reported having detectable activity for Cs-137. The range of these samples was 3.52 pCi/l to 7.06 pCi/l. The range for the lab's LLDs was 4.3 pCi/l to 13.0 pCi/l. The sample results were within or below this range and are mostly likely due to statistical variation or fallout from past weapons testing.

During March 1990, the family at the milk sampling control location (7512 N. Custer Rd. Doty Farm) sold their dairy cattle and subsequently dropped out of the program. A new control location was identified in April at 9334 Finzel Rd. (Calder Farm). The Calder Farm location is 15.7 km distant from the reactor and at 287 degrees WNW, and is in approximately the sector with the least prevalent wind direction as determined by 1989 ten and sixty meter annual wind roses. The Calder Farm was sampled for the first time in May for milk and grass.

In addition to milk sampling, grass samples are collected at the control location during each sampling period. Also, grass samples are taken adjacent to the critical receptor location, instead of milk samples, since this residence declines to participate in the REMP program. In 1983, Cesium-137 was detected in grass samples which was attributed to past weapons testing. Also, in 1986 and 1987 Cesium-137 and Iodine-131 were detected in various concentrations which were attributed to the Chernobyl accident.

During 1990, twenty-nine (29) grass samples were taken with milk samples. All indicator location samples showed no detectable activity. One sample from the control location showed 42 pCi/kg for Cs-137 which was just above the lab's LLD but below Fermi 2 Technical Specification LLD. The range of the lab's LLD for Cs-137 was 14 to 85 pCi/kg. This activity falls within this range and is most likely due to statistical variation or fallout from weapons testing.

One control grass sample showed activity for Co-60 just above the lab's LLD and is most likely due to statistical variation in sample counting.

GARDEN SAMPLING PROGRAM

Fermi 2 collects samples of cabbage, lettuce, Swiss chard and other leafy vegetables from three indicator locations and one control location. Samples are collected once a month during the growing season (June through September) and analyzed for I-131 and gamma emitting isotopes.

Vegetable sampling started in 1982. During the preoperational program no detectable activity, other than naturally-occurring activity, was found. Also, from 1985 to 1989 no activity related to operating Fermi 2 was detected. During 1990, twenty-three (23) vegetable samples were collected. One indicator sample showed 36.6 pCi/kg Co-60 which was just above the lab's LLD. The range of the lab's LLD for Co-60 was 24 to 59 pCi/kg. This activity falls within this range and is most likely due to statistical variance in sample counting. All other sample results showed no detectable activity related to operating Fermi 2.

AQUATIC MONITORING PROGRAM

AQUATIC MONITORING PROGRAM

INTRODUCTION

The aquatic monitoring program [illegible] continuous monitoring of the aquatic environment surrounding Fermi 2. At Fermi [illegible] ant feature of the aquatic environment is Lake Erie, on which the plant site borders. [illegible] gram consists of monitoring municipal drinking water, surface water, groundwater, lake [illegible] iments, and fish for radioactivity due to the operation of the plant. The following sections discuss the type of sample, analysis performed, and a comparison to previous years' data including preoperational data.

DRINKING WATER SAMPLING

Detroit Edison continuously monitors drinking water at one control location and one indicator location using automatic compositing samplers. Indicator water samples are obtained at the Monroe water intake located approximately 1.1 miles south of the plant. Detroit municipal water is used for the control samples which are obtained at the Allen Park water intake located approximately 18.6 miles north of the plant. Drinking water samples are collected on a monthly basis and analyzed for gross beta, strontium, and gamma emitting isotopes. Also, quarterly composites of the monthly samples are analyzed for tritium. See Appendix E for a discussion on tritium in the environment.

DRINKING WATER SAMPLES
AVERAGE GROSS BETA

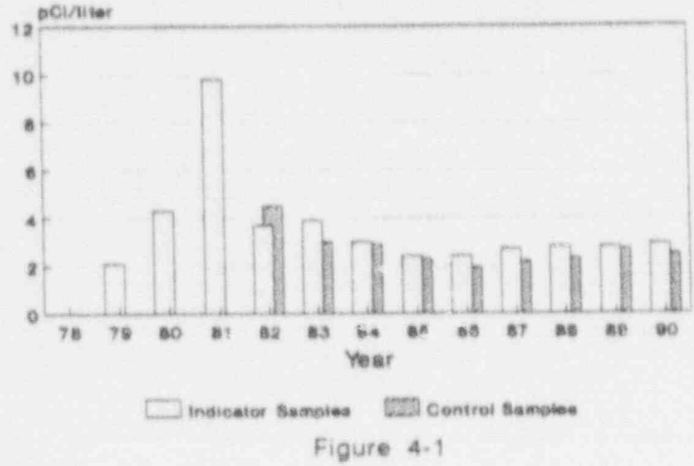


Figure 4-1

Drinking water sampling did not start until 1979 and did not include strontium analysis. The average gross beta for indicator drinking water samples, excluding 1981, during the preoperational program was 3.4 pCi/liter. In 1981, as shown in Figure 4-1, the average gross beta was 9.8 pCi/liter for indicator water samples. This elevated gross beta activity has been attributed to an atmospheric weapon test by the Peoples Republic of China in late 1980. In 1980 and 1983 Cs-137 was detected at levels ranging from 5.4 pCi/liter to 19 pCi/liter. Additionally, tritium was detected during preoperational years at concentrations ranging from 190 pCi/liter to 540 pCi/liter.

From 1985 to 1989 the average gross beta activity for drinking water indicator samples was 2.6 pCi/liter and 2.3 pCi/liter for control samples. In 1988 the REMP began to analyze for strontium and in that year Sr-90 was detected at a concentration of 1.2 pCi/liter. Also, in 1988 tritium was detected at a concentration of 338 pCi/liter. For the operational period from 1985 to 1989, the drinking water sampling data is consistent with the preoperational data.

For 1990, the average gross beta activity concentration for drinking water indicator samples was 2.9 pCi/liter and 2.5 pCi/liter for control samples. Indicator samples ranged from 1.9 pCi/liter to 4.5 pCi/liter and the control samples ranged from 1.7 pCi/liter to 3.1 pCi/liter. Two indicator samples were reported by the lab as having detectable activity for Co-60. One sample was 6.38 and the other was 5.79 pCi/l. The reported range of the lab's lower limit of detection (LLD) for Co-60, however, was 8.3 to 15.0 pCi/l. Since the reported activity falls below this range, it is most likely due to statistical variance in counting due to the random nature of radioactivity decay.

Strontium was detected in both indicator and control samples. The average Sr-90 activity concentration was .05 pCi/liter for indicator samples and .07 pCi/liter for control samples. Also, Sr-89 was detected in some samples just above the lab's LLD and is most likely due to statistical variance in sample counting.

Tritium was detected in three out of the four quarterly composite samples in both indicator and control samples. The average tritium activity concentration for indicator samples was 221 pCi/liter and 291 pCi/liter for control samples.

For 1990, the drinking water sampling data is consistent with prior operational data and preoperational data.

SURFACE WATER SAMPLING

Detroit Edison continuously monitors surface water at two locations surrounding Fermi 2. Indicator surface water samples are obtained at the Fermi 1 water intake which is approximately .3 miles south south east from Fermi 2. The control surface water samples are obtained from Trenton Channel Power Plant's cooling water intake on the Detroit River. This control location is approximately 11.7 miles north north east of Fermi 2. Surface water samples are collected on a monthly basis and analyzed for strontium and gamma emitting isotopes. Also, quarterly composites of the monthly samples are analyzed for tritium.

Surface water sampling started in 1979 and was analyzed for gamma emitting isotopes and tritium. During the preoperational program no gamma emitting isotopes, except for those naturally occurring, were detected. During this time period the average tritium concentration for indicator samples was 323 pCi/liter and 308 pCi/liter for control samples.

From 1985 to 1989 tritium was detected in surface water samples at an average concentration of 236 pCi/liter for indicator samples. For this period no tritium was detected greater than the LLD for control samples. In 1988 strontium analysis for surface water began and in 1989 Sr-90 was detected at a concentration of 2.4 pCi/liter in one indicator sample.

During 1990, twenty-three (23) surface water samples were collected and analyzed. No plant related gamma emitting isotopes were detected in these samples. The average tritium concentration for indicator samples was 219 pCi/liter and 239 pCi/liter for control samples. The average Sr-90 concentration was .08 pCi/liter for indicator samples and for control samples. Also, Sr-89 was detected in both indicator and control samples just above the lab's LLD and is most likely due to statistical variance in sample counting. Two indicator samples showed detectable activity for Cs-137 just above the lab's LLD which is most likely due to past weapons testing.

For 1990, the surface water sampling data is consistent with prior operational data and preoperational data.

GROUNDWATER SAMPLING

Groundwater is collected on a quarterly basis from four wells surrounding Fermi 2. The groundwater is analyzed for gamma emitting isotopes and tritium. The hydrology of the local area is such that groundwater flows towards Lake Erie. For this reason, sample location (GW-4) which is located approximately 0.6 miles west north west is least likely to be affected by the operation of the plant.

Groundwater sampling did not begin until 1987. From 1987 to 1989 no radioactivity was detected in groundwater samples.

In 1990, Cs-137 and tritium were detected in groundwater samples. Cs-137 was detected in one sample at location GW-4 at an activity concentration of 7.7 pCi/liter. Tritium was detected at two well locations. At location GW-4 the tritium concentration was 89 pCi/liter and at location GW-1, approximately .4 miles south of the plant, the concentration was 99 pCi/liter. The Cs-137 activity is most likely due to past weapons testing. The tritium activity detected is most likely due to past weapons testing and from naturally occurring tritium.

SEDIMENT SAMPLING

Shoreline and lake bottom sediments from five locations are collected on a semiannual basis. There is one control location and four indicator locations. These samples are analyzed for gamma emitting isotopes and strontium.

During the preoperational program there was not a control location and samples were not analyzed for strontium. Between the years 1978 and 1984, Cs-137 was detected every year except 1982. The average Cs-137 activity concentration for the preoperational program was 326 pCi/kg. No other, except naturally occurring, gamma emitting isotopes were detected during this time period.

From 1985 to 1989, the average Cs-137 activity concentration was 233 pCi/kg. In 1989, Sr-90 was detected in both indicator and control samples. The Sr-90 average activity concentration for indicator samples was 159 pCi/kg and 308 pCi/kg for control samples. The activity found during this time period can be attributed to past weapons testing.

In 1990, two lake sediment samples collected in May showed detectable activity for Mn-54, Co-60, Zn-65, and Cs-137. One sample was taken at the Fermi 2 discharge line (S-2) showed detectable activity for Mn-54, Co-60, Zn-65, and Cs-137. The other sample was taken at Indian Trails Beach (S-4) down stream of the discharge line and showed detectable activity for Mn-54 and Cs-137. The activity in these samples was just above the lower limit of detection and was well below reportable action limits. The two samples were retrieved from the laboratory and sent to a different laboratory for reanalysis.

A confirmatory sample was taken at S-4 on 4-17-91, and sent to the laboratory for analysis. The results of this sample showed no activity above the lower limit of detection.

On May 2, 1991, the data for the October 1990 sediment samples was received. These samples showed no detectable plant related activity.

On May 10, 1991, the results of the reanalyzed samples were received. The sample taken down stream, Indian Trails Beach, showed no activity above the lower limit of detection. The sample taken at the discharge line showed detectable activity for Mn-54 and Co-60 at comparable concentrations as originally reported.

Liquid effluent data for the 4th quarter of 1989 and the 1st quarter of 1990 was reviewed. The data indicated the total activity for Mn-54 was .02 Ci, Co-60 was .02 Ci, and Zn-65 was .02 Ci for this period. Liquid effluent data from 1986 to 1991 is included in Appendix C.

Based on the effluent data and the sample data, it has been determined that the Mn-54 and Co-60 activity in the sample taken at the discharge line (S-2) is due to liquid radwaste from Fermi 2. Also, it has been determined that activity indicated in the sample taken down stream (S-4) can not be confirmed nor denied due to the lower limit of detection on the second count being higher than the originally reported activity. In view of the extremely low activity levels found in these samples, they have negligible impact upon the environment.

Cs-137 and Sr-89/90 were detected in 1990 sediment samples. In May, Cs-137 was detected in both indicator and control samples at levels consistent with preoperational data and past operational data. In October, Cs-137 and Sr-90 were detected in both indicator and control samples at levels consistent with preoperational data and past operational data. Also, Sr-89 was detected in the October samples with high counting errors, in some cases the error was higher than the reported activity, and so the results are considered false positive.

FISH SAMPLING

Samples of fish are collected from Lake Erie at three locations on a semiannual basis. There are two control locations and one indicator location. Edible portions (fillets) of the fish are analyzed for gamma emitting isotopes and strontium.

During the preoperational program only naturally occurring isotopes and Cs-137 were detected. The average Cs-137 activity concentration for indicator samples was 35 pCi/kg and 42 pCi/kg for control samples. Preoperational samples were not analyzed for strontium.

From 1985 to 1989 Cs-137 was also detected in fish samples. The average Cs-137 activity concentration for indicator samples was 46 pCi/kg and 58 pCi/kg for control samples. This activity is due to past weapons testing and is consistent with preoperational data. In 1989, Fe-59 was detected in one out of eleven control samples. This activity is most likely due to statistical variance in sample counting. During this time period, fish samples were not analyzed for strontium.

During 1990, twenty-four (24) fish samples were collected and analyzed. Cs-137 was detected in both indicator and control samples. The average Cs-137 activity concentration for indicator samples was 72 pCi/kg and 39 pCi/kg for control samples. In 1990, the REMP first began to analyze for strontium in fish samples and Sr-90 was detected in both indicator and control samples. The average Sr-90 activity concentration for indicator samples was 129 pCi/kg and 77 pCi/kg for control samples. Also, Sr-89 was detected in some samples and is most likely due to statistical variance in sample counting.

For 1990, the fish sampling data is consistent with prior operational data and preoperational data.

LAND USE CENSUS

LAND USE CENSUS

1990 LAND USE CENSUS

As required by the U.S. Nuclear Regulatory Commission, Detroit Edison performs an Annual Land Use Census. The land use census is a formal, documented evaluation of the changes in the location of the nearest resident, dairy animals (goats and cows), and gardens. Locations were identified through Detroit Edison's continuing contact with neighbors of the Fermi 2 plant as company personnel performed routine environmental sampling and observation. Using cartography and meteorology, each identified location was evaluated.

RESULTS

During the 1990 Land Use Census dairy cows were identified at 3979 Dixie Highway. This location is approximately 2.8 miles from the plant in the WSW sector. As a result of this finding, the critical receptor was changed to this location (M-9). This change was based on the calculation of potential dose to the critical receptor using foliage consumption rates of cows vs. goats.

After a thorough evaluation, the critical receptor location was changed back to the original location at 4262 Post Road (M-7). This change was due to the fact that the iodine transfer factor is ten times greater for goats than cows. During this evaluation, two grass samples (i.e., one sample period) were collected at 3979 Dixie Highway and are included in this report.

TABLE 5-1 RESIDENCES

Year	Sector	Address	Distance (Miles)	Change (Miles)
1990	NE	6760 Lakeshore	1.1	NC
1989	NE	6760 Lakeshore	1.1	
1990	NNE	6500 Brancheau	1.0	NC
1989	NNE	6500 Brancheau	1.0	
1990	N	6200 Blanchett	1.1	NC
1989	N	6200 Blanchett	1.1	
1990	NNW	5701 Post	1.1	NC
1989	NNW	5701 Post	1.1	
1990	NW	6577 Leroux	1.1	NC
1989	NW	6577 Leroux	1.1	
1990	WNW	6200 Langton	0.7	NC
1989	WNW	6200 Langton	0.7	
1990	W	6001 Toll	1.1	NC
1989	W	6001 Toll	1.1	
1990	WSW	4771 Pte. Aux Peaux	1.6	0.1
1989	WSW	4771 Pte. Aux Peaux	1.5	
1990	SW	4981 Pte. Aux Peaux	1.1	0.1
1989	SW	4981 Pte. Aux Peaux	1.2	
1990	SSW	5820 Pte. Aux Peaux	1.0	0.1
1989	SSW	5820 Pte. Aux Peaux	1.1	
1990	S	4834 Long	1.0	0.1
1989	S	4834 Long	0.9	
	ESE – SSE	Lake Erie		

NC – No Change
Note: Differences in distance due to recalculation by DECo Cartography.

TABLE 5-2 GARDENS

Year	Sector	Address	Distance (Miles)	Change (Miles)
1990	NE	6940 Lakeshore	1.2	NC
1989	NE	6940 Lakeshore	1.2	
1990*	NNE	6441 Brancheau	1.1	NC
1989*	NNE	6441 Brancheau	1.1	
1990*	NNE	7806 Labo	4.4	NC
1989*	NNE	7806 Labo	4.4	
1990*	NNE	9501 Turnpike Hwy.	4.0	NC
1989*	NNE	9501 Turnpike Hwy.	4.0	
1990	N	6244 Brancheau	1.2	0.3
1989	N	6366 Trombley	1.5	
1990	NNW	5701 Post	1.1	0.5
1989	NNW	5283 Trombley	1.6	
1990	NW	5131 Post	1.5	0.4
1989	NW	6577 Leroux	1.1	
1990	WNW	6834 Dixie Hwy	1.7	0.1
1989	WNW	6834 Dixie Hwy	1.8	
1990 *	WNW	8200 Geirman	14.6	NC
1989 *	WNW	8200 Geirman	14.6	
1990	W	5909 Leroux	1.6	0.2
1989	W	5900 Leroux	1.4	
1990	WSW	5053 Spaulding	2.4	0.4
1989	WSW	3121 Lakeview	2.8	
1990	SW	4998 Elm	1.4	NC
1989	SW	4995 Elm	1.4	
1990	SSW	4326 C Street	1.6	0.2
1989	SSW	4375 5th	1.4	
1990	S	6233 Highland	1.2	0.1
1989	S	6255 Highland	1.1	
	ESE – SSE	Lake Erie		

NC – No Change
* Participants in REMP sampling program.
Note: Differences in distance due to recalculation by DECo Cartograghy.

TABLE 5-3 MILK LOCATIONS

Year	Sector	Address	Distance (Miles)	Findings
1990	NE	No Identified Locations		N.A.
1989	NE	No Identified Locations		N.A.
1990	NNE	No Identified Locations		N.A.
1989	NNE	No Identified Locations		N.A.
1990	N	No Identified Locations		N.A.
1989	N	No Identified Locations		N.A.
1990	NNW	No Identified Locations		N.A.
1989	NNW	No Identified Locations		N.A.
1990*	NW	3239 Newport Rd	4.3	Cows
1989*	NW	3239 Newport Rd	4.3	Cows
1990*	NW	2705 Labo	5.7	Cows
1989*	NW	2705 Labo	5.7	Cows
1990#	WNW	4262 Post	2.2	Goats
1989#	WNW	4262 Post	2.2	Goats
1990	W	5904 Mentel	4.5	Goats
1990	W	6551 N. Stonycreek	4.7	Goats
1990	W	1972 Nadeau	3.3	Goats
1990**	WSW	3979 Dixie Hwy	2.8	Cows
1989	WSW	No Identified Locations		N.A.
1990	SW	No Identified Locations		N.A.
1989	SW	No Identified Locations		N.A.
1990	SSW	No Identified Locations		N.A.
1989	SSW	No Identified Locations		N.A.
1990	S	No Identified Locations		N.A.
1989	S	No Identified Locations		N.A.

– Calculated critical receptor
* – Participated in Fermi 2 REMP
** – Calculated critical receptor for September 1990
N.A. = No Milk Animals

PROGRAM EXECUTION

PROGRAM EXECUTION

All phases of the terrestrial and aquatic monitoring were conducted in accordance with the Technical Specifications as implemented in the sampling schedule. If samples could not be obtained from a specific location, other samples were substituted where appropriate. The following includes the details of deviations and corrective actions from the normal sampling schedule for 1990.

THERMOLUMINESCENT DOSIMETRY

No TLDs were available for the following locations:

1st Quarter:
At location T-20 the TLD was missing during the mid-quarter inspection and was replaced on 02/27/90.

2nd Quarter:
At location T-17 the TLD was missing during the mid-quarter inspection and was replaced on 05/18/90.

3rd Quarter:
At location T-11 the TLD was missing during the mid- quarter inspection and was replaced on 07/24/90. Also, T-15 and T-20 were missing at the end of the quarter during TLD exchange.

4th Quarter:
Seventeen (17) new locations were added to the program during the quarterly exchange. These locations are T-47 through T-63.

All TLDs are placed in the field in inconspicuous locations to minimize the loss of TLDs due to vandalism.

AIR SAMPLING

On 01/02/90, samples for API-5 were not available due to sampler being inadvertently left off during the previous exchange. The technician responsible was counseled.

On 01/30/90, sample for API-1 had a low volume due to equipment failure. The fuse was replaced.

Air particulate filters for API-4 and API-5 were mislabeled as API-1 on 07/17/90. The lab was contacted and instructed to report the highest gross beta for these samples. The technician responsible was counseled.

The week of 12/05/90, all air samplers ran for eight days due to schedule change.

MILK AND GRASS SAMPLING

The following grass samples were not collected due to seasonal unavailability:
M-1 and M-7 on 01/17/90, 02/14/90, 03/13/90, and 04/11/90.

M-7 grass sample was not collected on 09/13/90 due to change in critical receptor.

On 03/13/90, milk sample for M-1 was not collected due to all milk producing animals being sold. M-1 was dropped from the program and M-8 was added.

In September milk location M-9 was added and location M-7 was dropped from the program for one sample period. See page 5-2 for explanation.

GARDEN SAMPLING

Vegetables collected on 07/30/90 contained edible and non-edible parts of the plants to provide the correct sample size.

WATER SAMPLING

DRINKING WATER:

On 01/25/90, 02/27/90, and 03/26/90 a grab sample was taken at DW-2 due to Detroit Water Company performing maintenance on equipment. This was a planned one-time major maintenance project and should not recur.

On 06/22/90 a grab sample was taken at DW-2 due to sample equipment malfunction. The equipment was immediately repaired.

On 07/25/90 a grab sample was taken at DW-1 due to sample equipment malfunction. The equipment was immediately repaired.

On 08/27/90 the sample for DW-1 was a partial sample due to sample equipment malfunction. The equipment was immediately repaired.

From 08/16/90 to 10/31/90 the City of Detroit was injecting carbon into the water plant systems to remove residual organics. This was a special maintenance project that should not recur in the near future. This carbon affected the performance of the sampling equipment. For this time period weekly grab samples were taken and composited for the following monthly DW-2 samples: 08/27/90, 09/24/90, 10/31/90

On 10/31/90 the sample for DW-1 was a partial sample due to sample equipment malfunction. The equipment was immediately repaired.

On 11/26/90 the sample for DW-1 was a partial sample due to sample equipment malfunction. The equipment was immediately repaired.

SURFACE WATER:

On 07/25/90 SW-2 was not collected due to equipment failure. The equipment was immediately repaired.

On 10/31/90 SW-2 was a partial sample due to sediment in sample line. The line was cleaned and sampler returned to service.

On 12/27/90 SW-2 was a partial sample due to ice in sample lines. This is a seasonal problem that has been evaluated and is unavoidable at very low temperatures.

LABORATORY DEVIATIONS

The laboratory has been contacted regarding the following problems. As of 01/01/91, all REMP samples are being sent to a different laboratory, which should alleviate these problems.

Iodine air samples collected on 07/31/90 did not meet Tech Spec LLD due to elapsed time between collection and counting.

Air particulate filters collected on 08/28/90 were lost by the lab after gross beta counting and were not included in quarterly composite.

Air particulate filters collected on 10/09/90 were contaminated by a leaking water sample at the lab.

Air particulate filters collected on 10/23/90 were lost by the lab.

Charcoal filter for API-3 collected on 11/27/90 was lost by the lab.

Drinking water sample DW-1 collected on 08/27/90 did not meet Tech Spec LLDs for Fe-59, Co-58, Zr/Nb-95, and Ba/La-140 due to elapsed time between collection and counting.

Milk samples M-2, M-3, and M-8 collected on 08/23/90 were prepared using an expired I-131 standard.

Milk sample M-8 collected on 09/13/90 was prepared using an expired I- 131 standard.

Milk sample M-2 collected on 08/23/90 was improperly prepped for Sr-89 with all the sample used.

Milk sample M-3 collected on 08/23/90 was improperly prepped for Sr-89 and Sr-90 with all the sample used.

Milk sample M-8 collected on 08/23/90 and 11/08/90 was improperly prepped for Sr-89 and Sr-90 with all the sample used.

Milk sample M-8 collected on 10/25/90 did not meet Tech Spec LLD for Cs-134.

Grass sample M-7 collected on 05/23/90 did not meet Tech Spec LLD for I-131, Cs-134, and Cs-137 due to insufficient sample size analyzed.

Grass sample M-8 collected on 05/23/90 and 07/26/90 did not meet Tech Spec LLD for I-131 due to insufficient sample size analyzed.

Ground Water samples collected on 09/14/90 did not meet Tech Spec LLD for Fe-59, Co-60, Co-56, Zr/Nb-95, and Ba/La-140 due to untimely processing.

Fish samples F-1, F-2 and F-3 collected in October, labels were lost during centrifuging for Sr-89/90 analysis.

Sediment samples collected on 05/01/90 at S-2 and S-4 were not counted the second time for Ba/La-140 due to half-life too short.

Sediment sample collected on 10/18/90 at S-4 was not counted for Ba/La- 140 due to half-life too short.

PROGRAM SUMMARY

Table 7.0-1 Radiological Environmental Monitoring Program Summary

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1990
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD	Indicator Locations Mean and Range	Location with Highest Annual Mean		Control Locations Mean and Range	Number of Non-routine Results
				Location	Mean Range		
Airborne Particulates (pCi/cu.m.)	GB 249		2.45E-2 (199/199) 1.03E-2 to 6.03E-2	API-1	2.50E-2 (50/50) 1.08E-2 to 5.44E-2	2.38E-2 (50/50) 1.20E-2 to 7.50E-2	None
	GS 20						
	Ce-134	5.00E-2	<LLD			<LLD	None
	Cs-137	6.00E-2	1.20E-3 (1/16)	API-5	1.20E-3 (1/16)	<LLD	None
	Sr-89	N/A	5.11E-4 (2/16) 3.88E-4 to 6.33E-4	API-4	1.30E-2 (1/4)	1.30E-2 (1/4)	None
	Sr-90	N/A	1.29E-4 (9/16) 1.28E-5 to 3.11E-4	API-5	1.90E-4 (2/4) 6.85E-5 to 3.11E-4	1.43E-4 (3/4) 9.35E-5 to 1.94E-4	None
	Be-7	N/A	8.93E-2 (6/16) 5.50E-2 to 1.25E-1	API-2	9.79E-2 (2/4) 7.08E-2 to 1.25E-1	7.52E-2 (1/4)	None
Airborne Iodine (pCi/cu.m.)	I-131 258	7.0E-2	<LLD			<LLD	
Gamma (TLDs) Background (mR/Qtr.)	Gamma Radiation 199	1.0E+0	14.7 (183/183) 6.7 to 36.8	T-43	24.1 (4/4) 12.0 to 36.8	13.9 (16/16) 9.5 to 18.2	None
Surface Water (pCi/l)	GS 23						
	Mn-54	1.5E+1	<LLD			<LLD	None
	Fe-59	3.0E+1	<LLD			<LLD	None
	Co-58	1.5E+1	<LLD			<LLD	None
	Co-60	1.5E+1	<LLD			<LLD	None
	Zn-65	3.0E+1	<LLD			<LLD	None
	Zr/Nb-95	1.5E+1	<LLD			<LLD	None

Table 7.0-1 Radiological Environmental Montoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January – December 1990
Location of Facility: 10 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean and Range	Location with Highest Annual Mean: Location	Location with Highest Annual Mean: Mean Range	Control Locations Mean and Range	Number of Non-routine Results
Surface Water (cont.) (pCi/l)	Ba/La-140	1.5E+1	<LLD			<LLD	None
	Cs-134	1.5E+1	<LLD			<LLD	None
	Cs-137	1.8E+1	1.24E+1 (2/12) 9.65E+0 to 1.52E+1	SW-1	1.24E+1 (2/12) 9.65E+0 to 1.52E+1	<LLD	None
	Sr-89	N/A	8.55E-1 (4/12) 1.02E-1 to 1.90E+0	SW-1	8.55E-1 (4/12) 1.02E-1 to 1.90E+0	4.91E-1 (4/11) 3.50E-2 to 9.77E-1	None
	Sr-90	N/A	8.34E-1 (11/12) 2.23E-1 to 2.81E+0	SW-1	8.34E-1 (11/12) 2.23E-1 to 2.81E+0	7.82E-1 (11/11) 1.42E-1 to 3.15E+0	None
	H-3	2.0E+3	2.19E+2 (4/4) 1.63E+1 to 4.02E+2	SW-2	2.39E+2 (3/4) 2.02E+2 to 2.76E+2	2.39E+2 (3/4) 2.02E+2 to 2.76E+2	None
Drinking Water (pCi/l)	GB 24	4.0E+0	2.93E+0 (12/12) 1.93E+0 to 4.48E+0	DW-1	2.93E+0 (12/12) 1.93E+0 to 4.48E+0	2.50E+0 (12/12) 1.72E+0 to 3.06E+0	None
	GS 24						
	Mn-54	1.5E+1	<LLD			<LLD	None
	Fe-59	3.0E+1	<LLD			<LLD	None
	Co-58	1.5E+1	<LLD			<LLD	None
	Co-60	1.5E+1	6.08E+0 (2/12) 5.79E+0 to 6.38E+0	DW-1	6.08E+0 (2/12) 5.79E+0 to 6.38E+0	<LLD	None
	Zn-65	3.0E+1	<LLD			<LLD	None
	Zr/Nb-95	1.5E+1	<LLD			<LLD	None
	Ba/La-140	1.5E+1	<LLD			<LLD	None
	Sr-89	N/A	1.43E+0 (6/12) 4.29E-2 to 2.21E+0	DW-2	2.41E+0 (3/12) 7.09E-1 to 5.46E+0	2.41E+0 (3/12) 7.09E-1 to 5.46E+0	None
	Sr-90	N/A	4.76E-1 (10/12) 1.33E-1 to 8.13E-1	DW-2	7.07E-1 (12/12) 2.24E-1 to 2.18E+0	7.07E-1 (12/12) 2.24E-1 to 2.18E+0	None

Table 7.0-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1990
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD	Indicator Locations Mean and Range	Location with Highest Annual Mean		Control Locations Mean and Range	Number of Non-routine Results
				Location	Mean Range		
Drinking Water (pCi/l) (cont.)	H-3	2.0E+3	2.21E+2 (3/4) 1.82E+2 to 2.42E+2	DW-2	2.91E+2 (3/4) 1.39E+2 to 3.92E+2	2.91E+2 (3/4) 1.39E+2 to 3.92E+2	None
Milk (pCi/l)	I-131 52	1.0E+0	1.57E+0 (21/36) 7.10E-2 to 1.70E+1	M-3	2.65E+0 (10/18) 7.10E-2 to 1.78E+1	6.75E-1 (11/16) 7.00E-3 to 2.93E+0	None
	GS 52						
	Cs-134	1.5E+1	<LLD			<LLD	None
	Cs-137	1.8E+1	6.57E+0 (2/36) 6.08E+0 to 7.06E+0	M-8	5.32E+0 (3/14) 3.52E+0 to 6.42E+0	5.32E+0 (3/16) 3.52E+0 to 6.42E+0	None
	Co-58	N/A	5.55E+0 (1/36)	M-2	5.55E+0 (1/36)	<LLD	None
	Co-60	N/A	1.25E+1 (2/36) 1.02E+1 to 1.47E+1	M-2	1.47E+1 (1/36)	<LLD	None
	Ba/La-140	1.5E+1	<LLD			<LLD	None
	K-40	5.0E+2	1.53E+3 (36/36) 1.27E+3 to 1.76E+3	M-3	1.58E+3 (18/18) 1.36E+3 to 1.76E+3	1.53E+3 (16/16) 8.02E+2 to 1.78E+3	None
	Sr-89	1.0E+1	2.14E+0 (13/34) 7.98E-2 to 1.05E+1	M-8	5.18E+0 (4/12) 3.96E-1 to 1.75E+1	5.18E+0 (4/14) 3.96E-1 to 1.75E+1	None
	Sr-90	2.0E+0	2.38E+0 (33/35) 4.23E-1 to 6.50E+0	M-3	2.41E+0 (17/17) 6.82E-1 to 6.50E+0	1.77E+0 (13/14) 2.11E-1 to 4.31E+0	None
Grass (pCi/kg wet)	I-131 29	6.0E+1	<LLD			<LLD	None
	GS 29						
	Cs-134	6.0E+1	<LLD			<LLD	None
	Cs-137	8.0E+1	<LLD	M-8	4.20E+1 (1/14)	4.20E+1 (1/14)	None
	Co-60	N/A	<LLD	M-8	1.63E+1 (1/14)	1.63E+1 (1/14)	None

Table 7.0-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January – December 1990
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD	Indicator Locations Mean and Range	Location with Highest Annual Mean		Control Locations Mean and Range	Number of Non-routine Results
				Location	Mean Range		
Food Products (pCi/kg wet)	I-131 23	6.0E+1	<LLD			<LLD	None
	GS 23						
	Cs-134	6.0E+1	<LLD			<LLD	None
	Cs-137	8.0E+1	<LLD			<LLD	None
	Co-60	N/A	3.68E+1 (1/17)	FP-1	3.68E+1 (1/5)	<LLD	None
	K-40	5.0E+2	3.79E+3 (17/17)	FP-1	4.94E+3 (5/5)	2.9[illegible]3 (6/6)	None
			1.50E+3 to 7.12E+3		3.26E+[illegible] to 7.12E+3	1.20E+3 to 3.46E+3	
Fish (pCi/kg wet)	GS 24						
	Mn-54	1.3E+2	<LLD			<LLD	None
	Fe-59	2.6E+2	<LLD			<LLD	None
	Co-58	1.3E+2	<LLD			<LLD	None
	Co-60	1.3E+2	<LLD			<LLD	None
	Zn-65	2.6E+2	<LLD			<LLD	None
	Cs-134	1.3E+2	<LLD			<LLD	None
	Cs-137	1.5E+2	7.21E+1 (5/11)	F-2	7.21E+1 (5/11)	3.92E+1 (4/13)	None
			1.23E+1 to 1.61E+2		1.23E+1 to 1.61E+2	3.11E+1 to 5.49E+1	
	Sr-89	N/A	6.81E+2 (1/9)	F-2	6.81E+2 (1/9)	1.03E+2 (5/11)	None
						6.40E+0 to 4.44E+2	
	Sr-90	N/A	1.29E+2 (9/9)	F-2	1.29E+2 (9/9)	7.70E+1 (11/11)	None
			8.82E+0 to 3.41E+2		8.82E+0 to 3.41E+2	1.44E+0 to 3.91E+2	
Sediment (pCi/kg dry)	GS 10						
	Mn-54	N/A	1.82E+1 (2/6)	S-2	2.67E+1 (1/2)	<LLD	None
			9.68E+0 to 2.67E+1				
	Co-60	N/A	2.33E+1 (1/6)	S-2	2.33E+1 (1/2)	<LLD	None
	Zn-65	N/A	2.00E+1 (1/6)	S-2	2.00E+1 (1/2)	<LLD	None
	Cs-134	1.5E+1	<LLD			<LLD	None

Table 7.0-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 1990
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD	Indicator Locations Mean and Range	Location with Highest Annual Mean		Control Locations Mean and Range	Number of Nor.-routine Results
				Location	Mean Range		
Sediment (cont.) (pCi/kg dry)	Cs-137	1.8E+2	2.58E+1 (6/8) 6.65E+0 to 7.99E+1	S-5	1.11E+2 (2/2) 6.37E+1 to 1.59E+2	1.11E+2 (2/2) 6.37E+1 to 1.59E+2	None
	Sr-89	N/A	7.61E+2 (3/8) 1.61E+2 to 1.63E+3	S-3	1.63E+3 (1/2)	<LLD	None
	Sr-90	N/A	1.02E+2 (4/8) 1.30E+1 to 1.81E+2	S-5	2.34E+3 (1/2)	2.34E+3 (1/2)	None
Ground Water (pCi/l)	GS 16						
	Mn-54	1.5E+1	<LLD			<LLD	None
	Fe-59	3.0E+1	<LLD			<LLD	None
	Co-58	1.5E+1	<LLD			<LLD	None
	Co-60	1.5E+1	<LLD			<LLD	None
	Zn-65	1.5E+1	<LLD			<LLD	None
	Zr/Nb-95	1.5E+1	<LLD			<LLD	None
	Ba/La-140	1.5E+1	<LLD			<LLD	None
	Cs-134	1.5E+1	<LLD			<LLD	None
	Cs-137	1.8E+1	<LLD	GW-4	7.71E+0 (1/4)	7.71E+0 (1/4)	None
	H-3 16	2.0E+3	9.9E+1 (1/12)	GW-1	9.9E+1 (1/12)	8.95E+1 (2/4) 6.30E+1 to 1.16E+2	None

GB = gross beta; GS = gamma scan
LLD = Fermi 2 Technical Specifications LLD: nominal lower limit of detection based on 4.66 sigma error for background sample.
<LLD = no detectable activity above the lab's LLD.
Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).
Locations are specified by Fermi 2 code and are described in section 8.0 Sampling Locations.
Non-routine results are those which are reportable according to Fermi 2 Technical Specifications.

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

SAMPLING LOCATIONS

Table 8-1 Direct Radiation

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T1	NE/38	1.3 mi	Pole on Lakeshore in Estral Beach. Twenty three poles S of Lakeview. (Special Area)
T2	NNE/22	1.2 mi	Tree at the termination of Brancho St. (Special Area)
T3	N/9	1.1 mi	Pole on NW corner of Swan Boat Club's fence. (Special Area)
T4	NNW/337	0.6 mi	On Site Boundary Fence by API #2 on Toll Rd.
T5	NW/313	0.6 mi	On Site Boundary Fence by API #3 on Toll Rd.
T6	WNW/293	0.6 mi	Pole on NE corner of Bridge over Toll Rd.
T7	W/270	14.2 mi	Pole behind Doty Farm at 7512 N Custer Rd. (Control)
T8	NW/305	1.9 mi	Pole on NE corner of Dixie Hwy. and Post Rd.
T9	NNW/334	1.5 mi	Pole on NW corner of Trombley and Swan View Rd.
T10	N/6	2.1 mi	Pole on S side of Massarant two poles W of Chinavarre.
T11	NNE/23	6.3 mi	Pole on SE corner of bridge over Silver Creek on US Turnpike S of Campau Rd.
T12	NNE/29	6.3 mi	Pole near tree in the N area of parking lot at Pointe Mouillee Game Area Field Office

Table 8-1 Direct Radiation (cont.)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T13	N/356	4.1 mi	Pole on SW corner of Labo and Dixie Hwy.
T14	NNW/337	4.4 mi	Pole on SE corner of Labo and Brandon near RR tracks.
T15	NW/315	3.9 mi	On pole behind Newport Post Office.
T16	WNW/283	4.9 mi	Pole on SE corner of War and Post Rds.
T17	W/271	4.9 mi	Pole on NE corner of Nadeau and Laplaid near mobile home park.
T18	WSW/247	4.8 mi	Pole on SE corner of Mentel and Hurd Rds.
T19	SW/236	5.2 mi	First pole E of Fermi siren on Waterworks Rd at the NE corner of Sterling State Park Rd and Waterworks (in Sterling State Park).
T20	WSW/257	2.7 mi	Pole on S side of Williams Rd, eight poles W of Dixie Hwy. (Special Area)
T21	WSW/239	2.8 mi	Pole on N side of Pearl at Parkview in Woodland Beach. (Special Area)
T22	S/172	1.2 mi	Pole on N side of Pointe Aux Peaux two poles W of Long. (Site Boundary)
T23	SSW/195	1.1 mi	Pole on S side of Pointe Aux Peaux, one pole W of Huron next to vent pipe. (Site Boundary)

Table 8-1 Direct Radiation (cont.)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T24	SW/225	1.2 mi	On fence post W of Fermi Gate along Pointe Aux Peaux Rd. (Site Boundary)
T25	WSW/251	1.5 mi	Pole on Toll Rd., thirteen poles S of Fermi Dr.
T26	WSW/259	1.1 mi	Pole on Toll Rd, six poles S of Fermi Dr.
T27	SW/225	6.8 mi	Pole on NE corner of McMillan and East Front St. (Special Area)
T28	SW/229	10.7 mi	Pole on SE corner of Mortar Creek and LaPlaisance. (Control)
T29	WSW/237	10.3 mi	Pole on E side of S Dixie, one pole S of Albain. (Control)
T30	WSW/247	7.8 mi	Pole on north side of St. Mary's Park parking lot at Elm and Monroe St. (Special Area)
T31	WSW/255	9.6 mi	1st pole W of entrance to Milton "Pat" Munson Recreational Reserve on North Custer Rd. (Control)
T32	WNW/295	10.3 mi	Pole on corner of Stony Creek and Finzel Rds.
T33	NW/317	9.2 mi	Pole on W side of Grafton Rd. First Pole N of Ash and Grafton intersection.
T34	NNW/338	9.7 mi	Pole on E side of Port Creek, first pole S of Will-Carleton Rd.

Table 8-1 Direct Radiation (cont.)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T35	N/359	6.9 mi	Pole on S Side of S Huron River Dr. across from Race St. (Special Area)
T36	N/358	9.1 mi	Pole on NE corner of Gibraltar and Cahill Rds.
T37	NNE/21	9.8 mi	Pole on S corner of Adams and Gibraltar across from Humbug Marina.
T38	WNW/294	1.7 mi	On pole at the residence on 6594 N. Dixie Highway
T39	S/176	0.3 mi	SE corner of Protected Area Fence (PAF).
T40	S/170	0.3 mi	Midway along OBA on PAF.
T41	SSE/161	0.2 mi	Midway between OBA and Shield Wall on PAF.
T42	SSE/149	0.2 mi	Midway along Shield Wall on PAF.
T43	SE/131	0.1 mi	Midway between Shield Wall and Aux Boilers on PAF.
T44	ESE/109	0.1 mi	Opposite OSSF door on PAF.
T45	E/86	0.1 mi	NE Corner of PAF.
T46	ENE/67	0.2 mi	NE side of barge slip on fence.
T47	S/185	0.1 mi	South of Turbine Bldg. rollup door on PAF.
T48	SW/235	0.2 mi	30 ft. from corner of AAP on PAF.

Table 8-1 Direct Radiation (cont.)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T49	WSW/251	1.1 mi	Corner of Site Boundary fence north of NOC along Critical Path Rd.
T50	W/270	0.9 mi	Site Boundary fence near main gate by the south Bullit Street sign.
T51	N/3	0.4 mi	Site Boundary fence north of north Cooling Tower.
T52	NNE/20	0.4 mi	Site Boundary fence at the corner of Arson and Tower.
T53	NE/55	0.2 mi	Site Boundary fence east of South Cooling Tower.
T54	S/189	0.3 mi	Pole next to Fermi 2 Visitors Center.
T55	WSW/251	3.3 mi	Pole on south side of Nadeau east of Sodt Elementary School. (Special Area)
T56	WSW/255	4.9 mi	Pole at entrance to Jefferson Middle School on Stony Creek Rd.
T57	W/260	2.7 mi	Pole on north side of William Rd. across from Jefferson High School entrance. (Special Area)
T58	WSW/249	4.9 mi	Pole west of Hurd Elementary School sign. (Special Area)
T59	NW/325	2.6 mi	Pole north of St. Charles Church entrance on Dixie Hwy. (Special Area)

Table 8-1 Direct Radiation (cont.)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx)	Description
T60	NNW/341	2.5 mi	1st pole north of North Elementary School's entrance on Dixie Hwy (Special Area)
T61	W/268	10.1 mi	Pole at SW corner of Stewart and Raisnville Rds.
T62	SW/232	9.7 mi	Pole at NE corner of Albain and Hull Rds.
T63	WSW/245	9.6 mi	Pole at NE corner of Dunbar and Telegraph Rds.

Table 8-2 Fish and Sediment Locations

Station Number	Meteorological Sector/Azimuth Degrees	Distance from Reactor (Approx)	Description	Media	Frequency
SEDIMENTS					
S-1	SSE/165	0.9 mi	Pointe Aux Peaux, Shoreline to 500 ft offshore sighting directly to Land Base Water Tower	Sediment	SA
S-2	E/81	0.2 mi	Fermi 2 Discharge, approx 200 ft offshore	Sediment	SA
S-3	NE/39	1.1 mi	Estral Beach, approx 200 ft offshore, off North shoreline where Swan Creek and Lake Erie meet	Sediment	SA
S-4	WSW/241	3.0 mi	Indian Trails Community Beach	Sediment	SA
S-5	NNE/20	11.7 mi	DECo's Trenton Channel Power Plant intake area (Control)	Sediment	SA
FISH					
F-1	NNE/31	9.5 mi	Celeron Island (Control)	Fish	SA
F-2	E/86	0.4 mi	Fermi 2 Discharge (approx 1200 ft offshore)	Fish	SA
F-3	WSW/238	4.8 mi	Brest Bay Marina Area (Control)	Fish	SA

Table 8–3 Milk/Grass Sample Locations

Station Number	Meteorological Sector/Azimuth Degrees	Distance from Reactor (Approx)	Description	Media	Frequency
M–1	W/270	14.2 mi	Doty Farm – 7512 N Custer Rd (Control)	Milk/Grass	M–SM
M–2	NW/319	5.4 mi	Reaume Farm – 2705 E Labo	Milk	M–SM
M–3	NW/317	4.2 mi	Yoas Farm – 3239 Newport Rd	Milk	M–SM
M–7	WNW/301	2.1 mi	Webb Farm – 4362 Post Rd	Milk/Grass	M–SM
M–8	WNW/289	9.9 mi	Calder Dairy – 9334 Finzel Rd (New Control)	Milk/Grass	M–SM
M–9	WSW	2.8 mi	3979 Dixie Highway	Grass	M–SM

Table 8–4 Water Sample Locations

Station Number	Meteorological Sector/Azimuth Degrees	Distance from Reactor (Approx)	Description	Media	Frequency
DRINKING WATER					
DW–1	S/174	1.1 mi	Monroe Water Station N Side of Pointe Aux Peaux 1/2 Block W of Long Rd	Drinking Water	M
DW–2	N/8	18.6 mi	Detroit Water Station 14700 Moran Rd, Allen Park (Control)	Drinking Water	M
SURFACE WATER					
SW–1	SSE/160	0.3 mi	Fermi 1 Raw Lake Water Intake Structure	Surface Water	M
SW–2	NNE/20	11.7 mi	DECo's Trenton Channel Power Plant Intake Structure (Screenhouse #1) (Control)	Surface Water	M
SITE WELLS					
GW–1	S/175	0.4 mi	Approx 100 ft W of Lake Erie, EF–1 Parking lot near gas fired peakers	Groundwater	Q
GW–2	SSW/208	1.0 mi	4 ft S of Pointe Aux Peaux (PAP) Rd Fence 427 ft W of where PAP crosses over Stoney Point's Western Dike	Groundwater	Q
GW–3	SW/226	1.0 mi	143 ft W of PAP Rd Gate, 62 ft N of PAP Rd Fence	Groundwater	Q
GW–4	WNW/299	0.6 mi	42 ft S of Langton Rd, 8 ft E of Toll Rd Fence	Groundwater	Q

Table 8–5 Air Particulate/Air Iodine Sample Locations

Station Number	Meteorological Sector/Azimuth Degrees	Distance from Reactor (Approx)	Description	Media	Frequency
API–1	NE/39	1.4 mi	Estral Beach Pole on Lakeshore, 18 Poles S of Lakeview (Nearest Community with highest X/Q)	Radioiodine Particulates	W W
API–2	NNW/337	0.6 mi	Site Boundry and Toll Road, on Site Fence by T–4	Radioiodine Particulates	W W
API–3	NW/313	0.6 mi	Site Boundry and Toll Road, on Site Fence by T–5	Radioiodine Particulates	W W
API–4	W/270	14.1 mi	Pole, behind Doty Farm – 7512 N Custer Road (Control)	Radioiodine Particulates	W W
API–5	S/191	1.2 mi	Corner of Erie St and Pointe Aux Peaux Rds	Radioiodine Particulates	W W

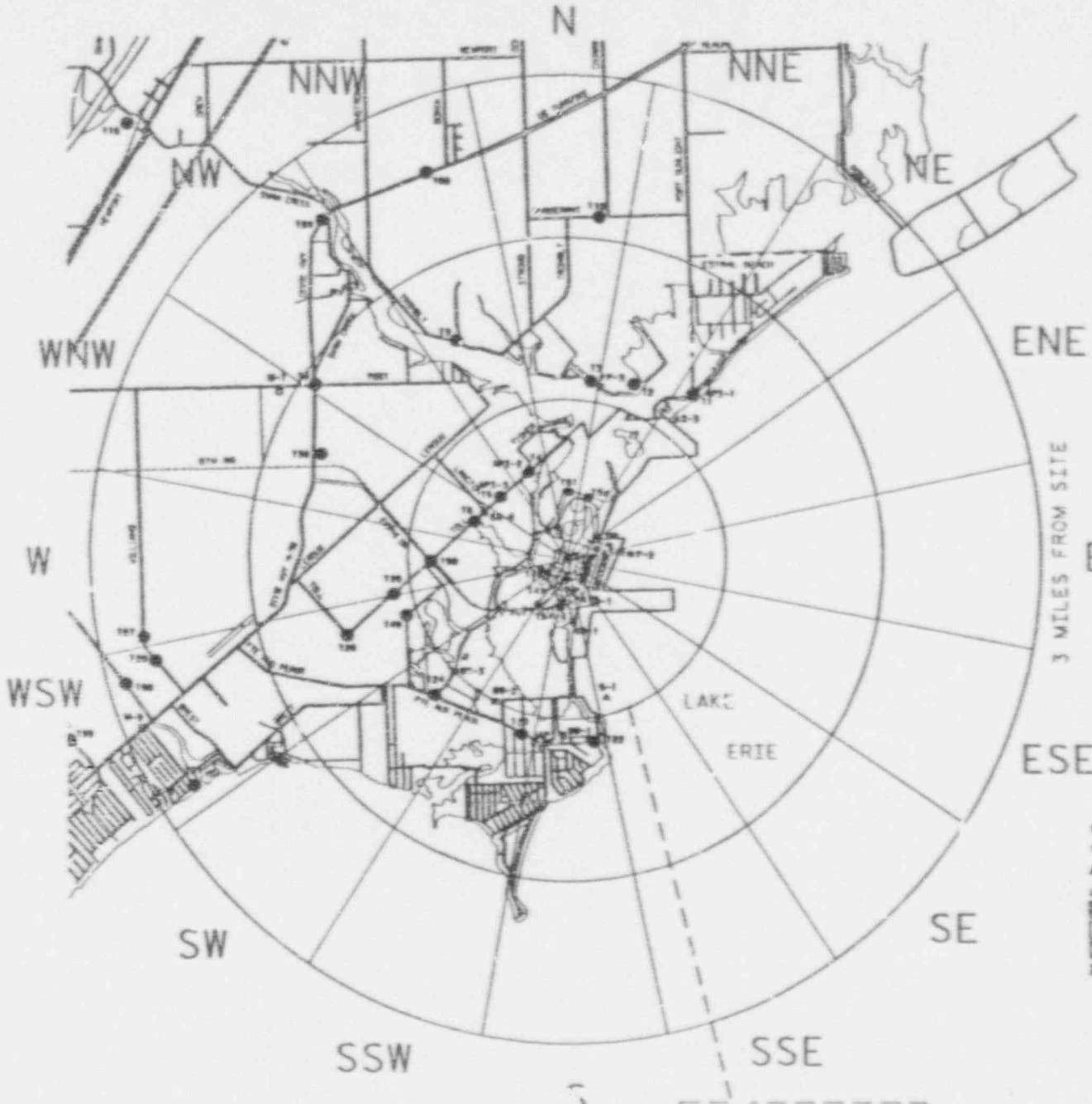
Table 8-6 Vegetable Garden Sample Locations

Station Number	Meteorological Sector/Azimuth Degress	Distance from Reactor (Approx)	Description	Media	Frequency
FP-1	NNE/21	3.9 mi	9501 Turnpike Highway	Leafy Vegetables	M (when available)
FP-3	NNE/12	1.1 mi	6441 Brancheau	Leafy Vegetables	M (when available)
FP-5	NNE/19	4.4 mi	7806 Labo	Leafy Vegetables	M (when available)
FP-6	WNW/290	14.5 mi	8200 Geirman (Control)	Leafy Vegetables	M (when available)

Table 8–7 Land Use Census

Meterological Sector	Distance from Reactor (Approx)	Description
NE	1.1 mi	6760 Lakeshore
NNE	1.0 mi	6500 Brancho
N	1.1 mi	6200 Blanchett
NNW	1.1 mi	5701 Post
NW	1.1 mi	6577 Leroux
WNW	0.7 mi	6200 Langton
W	1.1 mi	6001 Toll
WSW	1.5 mi	4771 Pointe Aux Peaux
SW	1.2 mi	4981 Pointe Aux Peaux
SSW	1.1 mi	5820 Pointe Aux Peaux
S	0.9 mi	4834 Long
ESE–SSE		Lake Erie

NOTE: These locations have been identified as the closest residences in the 1990 Land Use Census.



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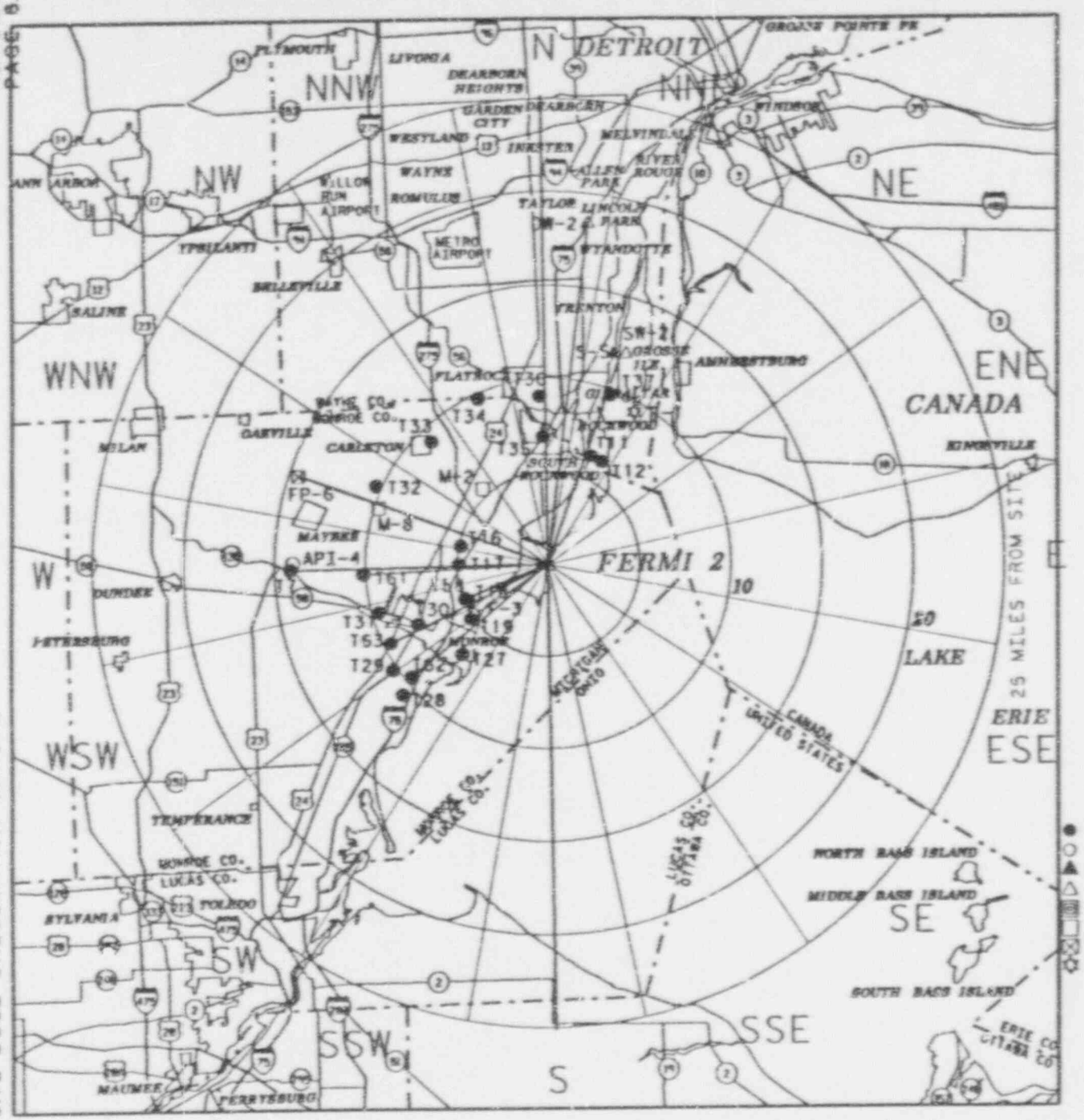
SCALE IN MILES

LEGEND

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

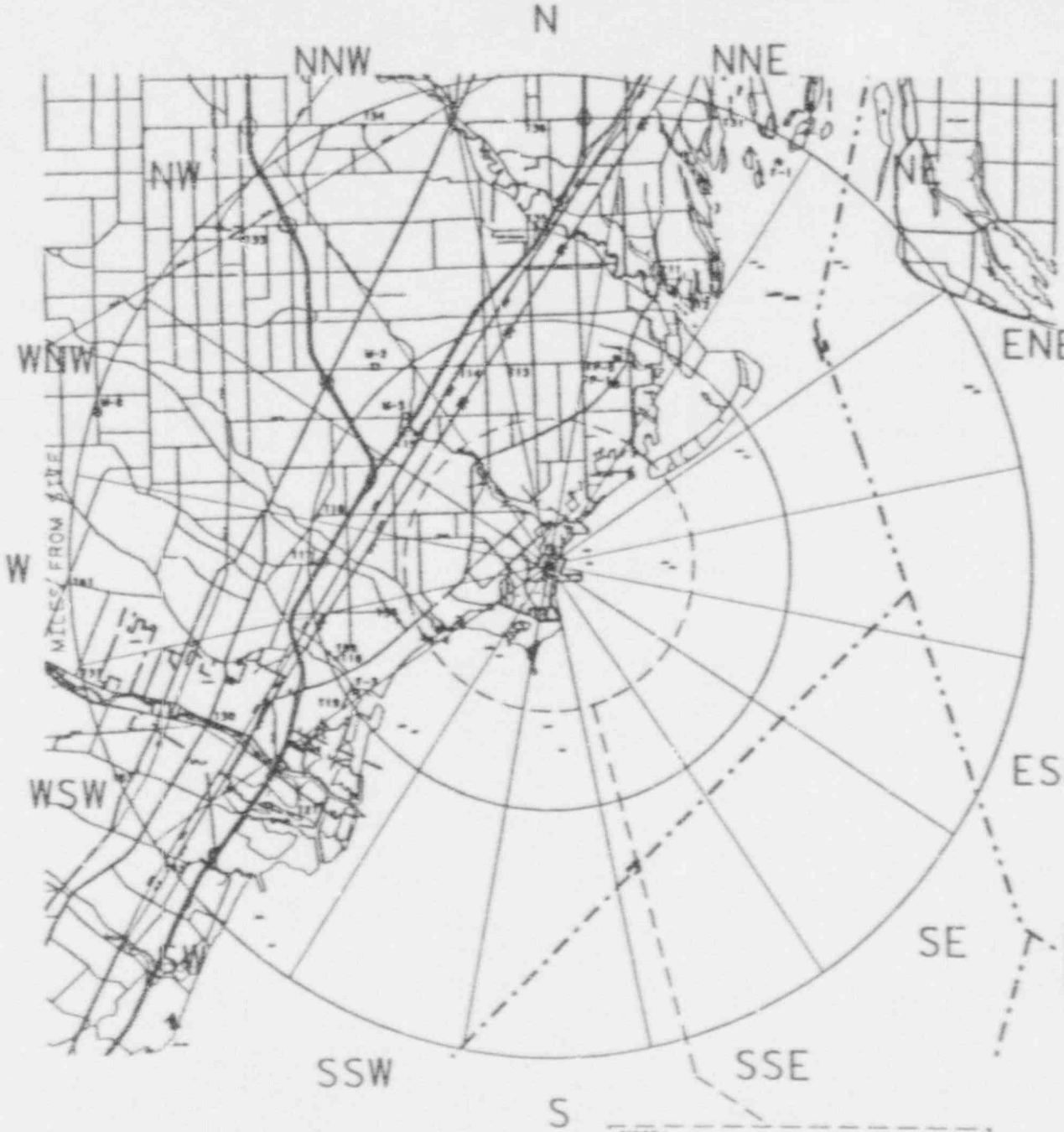
FIGURE 1
SAMPLING LOCATIONS
BY STATION NUMBER
(SITE AREA)



LEGEND

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

FIGURE 2
SAMPLING LOCATIONS
BY STATION NUMBER
(GREATER THAN 10 MILES)



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SCALE IN MILES

LEGEND

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

NOTE:
FOR SITE AREA, SEE FIG.1.
FOR GREATER THAN 5 MILES, SEE FIG.2.
FOR LESS THAN 10 MILES, SEE FIG.3.

FIGURE 3
SAMPLING LOCATIONS
BY STATION NUMBER
(LESS THAN 10 MILES)

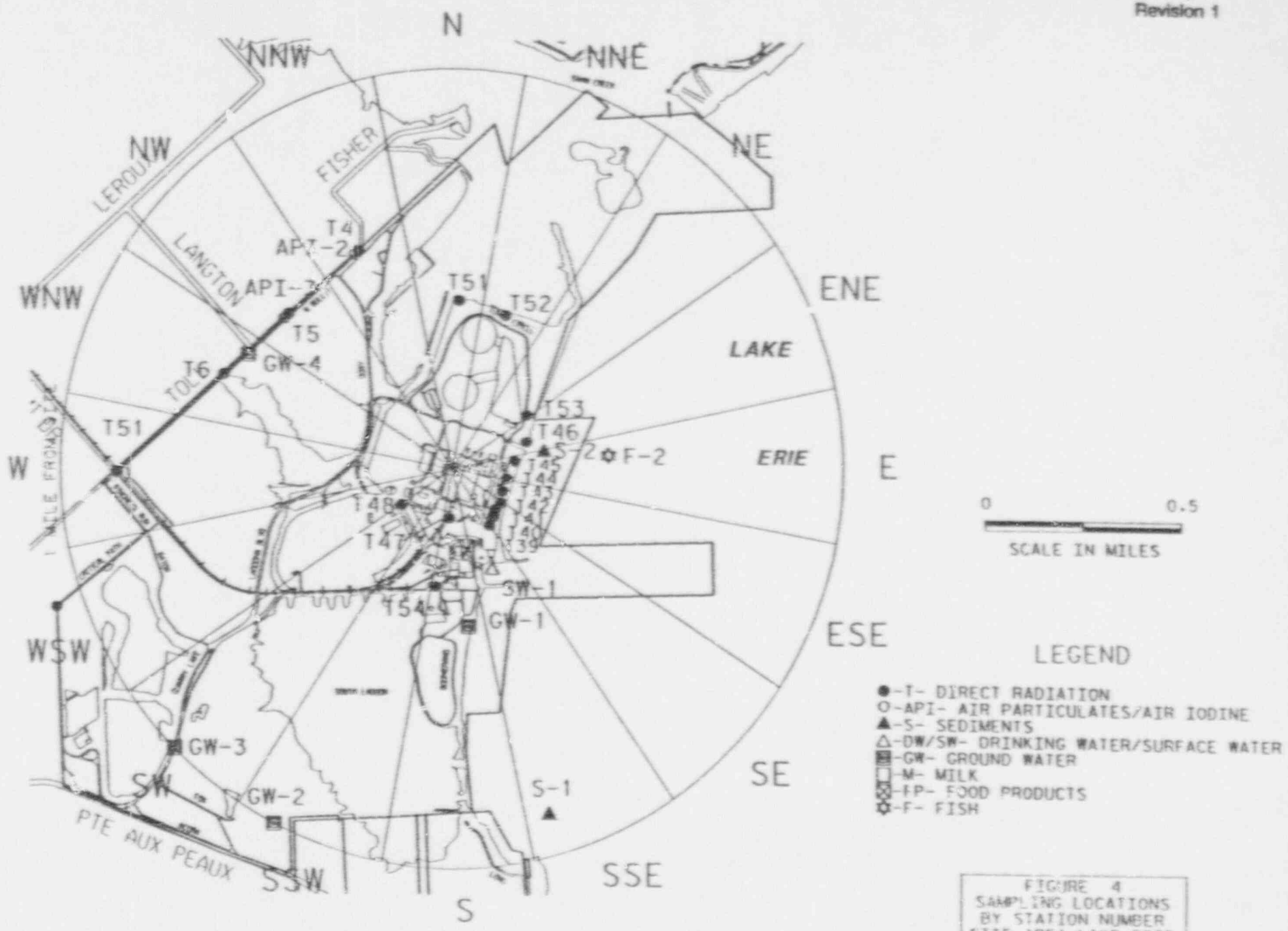


FIGURE 4
SAMPLING LOCATIONS
BY STATION NUMBER
SITE AREA-LAKE ERIE

DATA TABLES

FERMI 2

TLD ANALYSIS

Station	mR/Std. Qtr. 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Mean
T-1	12.9	10.4	11.1	8.8	10.8
T-2	17.3	11.7	11.7	9.4	12.5
T-3	17.0	9.3	11.0	7.3	11.2
T-4	17.4	10.8	13.8	9.0	12.8
T-5	19.9	12.9	15.0	8.8	14.2
T-6	16.0	13.2	16.8	9.4	13.9
T-7	16.5	14.6	15.4	10.4	14.2
T-8	16.0	14.6	15.9	11.6	14.5
T-9	16.6	12.4	16.6	10.8	14.1
T-10	20.1	16.1	18.1	11.1	16.4
T-11	19.4	9.9	9.7**	9.5	12.1
T-12	15.5	11.1	13.7	9.1	12.4
T-13	24.4	14.5	18.5	12.3	17.4
T-14	22.2	12.2	15.2	11.5	15.3
T-15	18.0	9.7	*	11.3	13.0
T-16	19.1	22.6	13.8	10.9	16.6
T-17	17.1	13.7**	11.2	10.2	13.1
T-18	16.1	15.3	13.1	10.2	13.7
T-19	20.9	16.5	18.0	12.4	17.0
T-20	17.7**	21.2	*	13.3	17.4
T-21	16.5	11.8	14.0	9.9	13.1
T-22	18.1	15.6	16.9	10.6	15.3
T-23	17.2	15.8	17.8	11.5	15.6
T-24	16.1	14.5	14.1	7.0	12.9
T-25	23.4	17.8	17.7	13.1	18.0
T-26	21.1	21.8	15.0	13.3	17.8
T-27	12.7	11.4	11.8	8.6	11.1
T-28	16.4	12.4	14.3	9.7	13.2
T-29	18.2	17.4	9.5	10.2	13.8
T-30	16.1	10.5	9.8	9.6	11.5
T-31	16.5	16.1	13.4	10.6	14.2
T-32	15.4	16.7	13.5	12.4	14.8
T-33	18.5	14.2	13.8	9.9	14.1
T-34	16.7	15.4	13.9	10.2	14.1
T-35	16.5	12.6	10.6	10.3	12.5
T-36	19.1	16.2	14.6	11.6	15.4
T-37	16.7	13.2	14.0	10.4	13.6
T-38	19.2	19.4	15.3	12.0	16.5
T-39	19.5	20.5	18.1	9.2	16.8
T-40	18.6	25.2	17.1	11.1	18.0
T-41	26.5	24.9	15.7	11.6	19.7

FERMI 2

TLD ANALYSIS

Station	mR/Std. Qtr. 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Mean
T-42	34.0	24.2	19.6	10.7	22.1
T-43	36.8	28.8	18.7	12.0	24.1
T-44	35.0	20.3	19.9	10.7	21.5
T-45	23.2	22.6	15.8	9.0	17.7
T-46	18.3	16.2	15.8	9.4	14.9
T-47				10.1	10.1
T-48				9.0	9.0
T-49				11.6	11.6
T-50				8.7	8.7
T-51				7.1	7.1
T-52				8.1	8.1
T-53				8.4	8.4
T-54				6.7	6.7
T-55				10.4	10.4
T-56				8.7	8.7
T-57				9.7	9.7
T-58				8.3	8.3
T-59				9.0	9.0
T-60				14.5	14.5
T-61				9.9	9.9
T-62				12.9	12.9
T-63				9.5	9.5

* TLD lost in the field
** T-20 was replaced on 02/27/90. T-17 was replaced on 05/18/90. T-11 was replaced on 07/24/90

Note: T-47 through T-63 were placed in the field at the beginning of the fourth quarter.

FIELD DATES

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Deployed	01/03/90	04/02/90	07/02/90	10/03/90
Collected	04/02/90	07/02/90	10/03/90	01/03/91
Total Days	90	91	93	92

TLD ANALYSIS
BY METEOROLOGICAL SECTORS

Sector	mR/Std. Qtr. 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Mean	Stations
N	19.4	13.7	14.6	10.0	14.4	T-3,T-10 T-13,T-35 T-36,T-51
NNE	17.2	11.5	12.3	9.3	12.6	T-2,T-11 T-12,T-37 T-52
NE	12.9	10.4	11.1	8.8	10.8	T-1,T-53
ENE	18.3	16.2	15.8	9.4	14.9	T-46
E	23.2	22.6	15.8	9.0	17.7	T-45
ESE	35.0	20.3	19.9	10.7	21.5	T-44
SE	36.8	28.8	18.7	12.0	24.1	T-43
SSE	30.3	24.6	17.7	11.2	21.0	T-41,T-42
S	18.7	20.4	17.4	9.5	16.5	T-22,T-39 T-40,T-47 T-54
SSW	17.2	15.8	17.8	11.5	15.6	T-23
SW	16.5	13.7	14.5	9.9	13.7	T-19,T-24 T-27,T-28 T-48,T-62
W	16.8	14.2	13.3	9.8	13.5	T-7,T-17 T-50,T-57 T-61
WSW	18.2	16.5	13.2	10.7	14.7	T-18,T-20 T-21,T-25 T-26,T-29 T-30,T-31 T-49,T-55 T-56,T-58 T-63

TLD ANALYSIS
BY METEOROLOGICAL SECTORS (cont.)

Sector	mR/Std. Qtr. 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Mean	Stations
WNW	17.7	18.0	14.9	11.2	15.5	T-6,T-16 T-32,T-38
NW	18.1	12.9	14.9	10.1	14.0	T-5,T-8 T-15,T-33 T-59
NNW	18.2	12.7	14.9	11.2	14.3	T-4,T-9 T-14,T-34 T-60

TLD ANALYSIS
BY DISTANCE FROM FERMI 2

Distance in Miles	mR/Std. Qtr. 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Mean	Stations
< 2	20.9	17.4	15.9	9.7	16.0	T-1,T-2 T-3,T-4 T-5,T-6 T-8,T-9 T-22,T-23 T-24,T-25 T-26,T-38 T-39,T-40 T-41,T-42 T-43,T-44 T-45,T-46 T-47,T-48 T-49,T-50 T-51,T-52 T-53,T-54
2 – 5	19.0	15.2	14.8	10.8	15.0	T-10,T-13 T-14,T-15 T-16,T-17 T-18,T-20 T-21,T-55 T-56,T-57 T-58,T-59 T-60
> 5	17.1	13.4	13.0	10.5	13.5	T-11,T-12 T-19,T-27 T-30,T-32 T-33,T-34 T-35,T-36 T-37,T-61 T-62,T-63
Control TLDs	16.9	15.1	13.2	10.2	13.9	T-7,T-28 T-29,T-31

FERMI 2

AIR PARTICULATE ANALYSIS

FIRST QUARTER

Date Collected	Gross Beta (pCi/cu.m.) API-1	API-2	API-3	API-4	API-5
01/02/91	3.02E-2	2.54E-2	2.89E-2	2.54E-2	**
01/09/90	3.63E-2	3.69E-2	3.32E-2	3.64E-2	4.21E-2
01/16/90	2.23E-2	2.70E-2	2.40E-2	2.27E-2	2.56E-2
01/23/90	2.39E-2	2.39E-2	2.40E-2	2.47E-2	2.49E-2
01/30/90	*4.14E-2	2.18E-2	1.89E-2	2.14E-2	2.16E-2
02/06/90	2.39E-2	2.42E-2	2.32E-2	2.14E-2	2.41E-2
02/13/90	2.57E-2	2.53E-2	2.06E-2	2.48E-2	2.55E-2
02/20/90	2.79E-2	3.06E-2	2.54E-2	2.50E-2	2.75E-2
02/27/90	2.79E-2	2.33E-2	2.72E-2	2.54E-2	2.80E-2
03/06/90	2.97E-2	2.62E-2	2.87E-2	2.95E-2	2.72E-2
03/13/90	2.23E-2	2.41E-2	2.23E-2	2.28E-2	2.21E-2
03/20/90	1.95E-2	2.09E-2	2.03E-2	1.61E-2	2.30E-2
03/27/90	2.58E-2	2.55E-2	2.66E-2	1.90E-2	1.90E-2
Quarterly Mean	2.74E-2	2.58E-2	2.49E-2	2.42E-2	2.59E-2

* Low sample volume due to equipment failure.
** No sample due to sampler being inadvertently turned off.
Iodine 131 concentrations are <0.7 pCi/cu.m. unless noted.

Note: API-4 is the control location.

FERMI 2

AIR PARTICULATE ANALYSIS

SECOND QUARTER

Date Collected	Gross Beta (pCi/cu.m.) API-1	API-2	API-3	API-4	API-5
04/03/90	2.53E-2	1.98E-2	1.75E-2	1.63E-2	1.55E-2
04/10/90	2.32E-2	2.09E-2	2.33E-2	[illegible]E-2	2.26E-2
04/17/90	2.44E-2	2.66E-2	2.13E-2	2.21E-2	2.75E-2
04/24/90	2.91E-2	2.52E-2	2.51E-2	2.63E-2	2.55E-2
05/01/90	2.22E-2	2.36E-2	2.52E-2	2.20E-2	2.49E-2
05/08/90	2.23E-2	2.38E-2	2.32E-2	2.27E-2	2.20E-2
05/15/90	1.84E-2	1.83E-2	1.77E-2	1.84E-2	1.86E-2
05/22/90	1.08E-2	1.03E-2	1.29E-2	1.20E-2	1.26E-2
05/29/90	1.47E-2	1.66E-2	2.17E-2	1.88E-2	1.43E-2
06/05/90	1.48E-2	1.58E-2	1.32E-2	1.48E-2	1.64E-2
06/12/90	1.54E-2	1.93E-2	1.59E-2	1.75E-2	1.76E-2
06/19/90	1.91E-2	1.86E-2	1.96E-2	1.96E-2	2.14E-2
06/26/90	1.33E-2	1.31E-2	1.40E-2	1.30E-2	1.46E-2
Quarterly Mean	1.95E-2	1.94E-2	1.93E-2	1.88E-2	1.95E-2

Iodine 131 concentrations are <0.7 pCi/cu.m. unless noted.

Note: API-4 is the control location.

FERMI 2

AIR PARTICULATE ANALYSIS

THIRD QUARTER

Date Collected	Gross Beta (pCi/cu.m.) API-1	API-2	API-3	API-4	API-5
07/03/90	1.98E-2	1.71E-2	1.81E-2	1.75E-2	1.77E-2
07/10/90	2.15E-2	2.11E-2	2.10E-2	1.83E-2	1.81E-2
07/17/90	1.99E-2	1.64E-2	1.95E-2	*1.83E-2	*1.83E-2
07/24/90	2.25E-2	2.48E-2	2.23E-2	2.01E-2	2.03E-2
07/31/90	**2.29E-2	**2.34E-2	**2.28E-2	**2.52E-2	**2.30E-2
08/07/90	1.78E-2	1.88E-2	1.76E-2	1.87E-2	1.80E-2
08/14/90	2.12E-2	2.66E-2	2.35E-2	2.65E-2	2.41E-2
08/21/90	2.75E-2	2.49E-2	2.49E-2	2.31E-2	2.50E-2
08/28/90	2.35E-2	2.17E-2	2.22E-2	2.52E-2	2.21E-2
09/04/90	2.83E-2	2.77E-2	2.95E-2	2.83E-2	3.04E-2
09/11/90	3.05E-2	2.37E-2	2.75E-2	2.50E-2	2.50E-2
09/18/90	2.09E-2	2.10E-2	1.93E-2	1.95E-2	2.24E-2
09/25/90	1.64E-2	1.86E-2	1.78E-2	1.83E-2	1.74E-2
Quarterly Mean	2.25E-2	2.20E-2	2.20E-2	2.18E-2	2.17E-2

* Particulate filters 4 & 5 were inadvertantly marked API-1
** LLD not met for I-131 due to untimely processing.
Iodine 131 concentrations are <0.7 pCi/cu.m. unless noted.

Note: API-4 is the control location.

FERMI 2

AIR PARTICULATE ANALYSIS

FOURTH QUARTER

Date Collected	Gross Beta (pCi/cu.m.) API-1	API-2	API-3	API-4	API-5
10/02/90	5.44E-2	5.54E-2	6.03E-2	7.50E-2	5.90E-2
10/09/90	*	*	*	*	*
10/16/90	1.62E-2	1.42E-2	1.44E-2	1.30E-2	1.53E-2
10/23/90	**	**	**	**	**
10/30/90	2.10E-2	1.92E-2	2.08E-2	2.13E-2	2.36E-2
11/06/90	3.59E-2	3.62E-2	3.54E-2	3.56E-2	3.61E-2
11/13/90	2.78E-2	2.68E-2	2.76E-2	2.73E-2	2.72E-2
11/20/90	2.92E-2	3.01E-2	3.21E-2	3.22E-2	3.12E-2
11/27/90	3.17E-2	3.57E-2	@3.24E-2	3.33E-2	3.32E-2
12/05/90 #	2.42E-2	2.27E-2	2.14E-2	2.35E-2	2.44E-2
12/12/90	3.44E-2	3.22E-2	3.36E-2	3.35E-2	3.57E-2
12/19/90	2.31E-2	2.11E-2	2.28E-2	2.15E-2	2.21E-2
12/26/90	3.59E-2	3.70E-2	3.53E-2	3.67E-2	3.65E-2
Quarterly Mean	3.05E-2	3.01E-2	3.06E-2	3.20E-2	3.13E-2

* Samples were cross-contaminated at lab.
** Samples were lost by lab.
@ Charcoal filter lost by lab.
# All samplers ran for eight days due to schedule change.
Iodine 131 concentrations are <0.7 pCi/cu.m. unless noted.

Note: API-4 is the control location.

FERMI 2

AIR PARTICULATE ANALYSIS

MONTHLY MEANS

Month	Gross Beta (pCi/cu.m.) API-1	API-2	API-3	API-4	API-5
January	3.08E-2	2.70E-2	2.58E-2	2.61E-2	2.86E-2
February	2.64E-2	2.59E-2	2.41E-2	2.42E-2	2.63E-2
March	2.43E-2	2.42E-2	2.45E-2	2.19E-2	2.28E-2
April	2.55E-2	2.31E-2	2.18E-2	2.14E-2	2.28E-2
May	1.77E-2	1.85E-2	2.01E-2	1.88E-2	1.85E-2
June	1.57E-2	1.67E-2	.57E-2	1.62E-2	1.75E-2
July	2.13E-2	2.06E-2	2.[illegible]E-2	1.99E-2	1.95E-2
August	2.25E-2	2.30E-2	2.21E-2	2.34E-2	2.23E-2
September	2.40E-2	2.28E-2	2.35E-2	2.28E-2	2.38E-2
October	3.05E-2	2.96E-2	3.19E-2	3.64E-2	3.26E-2
November	3.17E-2	3.22E-2	3.19E-2	3.18E-2	3.19E-2
December	2.94E-2	2.83E-2	2.83E-2	2.86E-2	2.97E-2
Annual Mean	2.50E-2	2.43E-2	2.42E-2	2.43E-2	2.47E-2

Note: API-4 is the control location.

FERMI 2

AIR PARTICULATE ANALYSIS

Quarterly Composite of Particulate Filters

Station	(pCi/cu.m.) Sr-89	Sr-90	Be-7	Cs-134	Cs-137	Other
1st Qtr.						
API-1	<5.0E-3	5.23E-5	1.07E-1	<6.3E-4	<1.1E-3	NA
API-2	<5.0E-3	<1.0E-3	1.25E-1	<1.2E-3	<1.1E-3	NA
API-3	<5.0E-3	1.01E-4	<1.3E-1	<9.9E-4	<1.2E-3	NA
API-4	1.30E-2	9.35E-5	<1.0E-1	<7.1E-4	<6.6E-4	NA
API-5	<5.0E-3	3.11E-4	<1.1E-1	<6.8E-4	1.2E-3	NA
2nd Qtr.						
API-1	<2.0E-2	<2.0E-4	<2.0E-1	<8.0E-4	<7.0E-4	NA
API-2	<2.0E-2	<2.0E-4	<3.0E-1	<1.0E-3	<8.0E-4	NA
API-3	<2.0E-2	<1.0E-4	<2.0E-1	<1.0E-3	<9.0E-4	NA
API-4	<2.0E-2	<1.0E-4	<2.0E-1	<1.0E-3	<8.0E-4	NA
API-5	<2.0E-2	<1.0E-4	<3.0E-1	<1.0E-3	<9.0E-4	NA
3rd Qtr.						
API-1*	<5.0E-3	1.94E-4	<2.0E-1	<9.3E-4	<8.5E-4	NA
API-2*	<5.0E-3	2.27E-4	<1.7E-1	<8.7E-4	<9.3E-4	NA
API-3*	<5.0E-3	1.32E-4	<1.3E-1	<6.5E-4	<5.3E-4	NA
API-4*	<5.0E-3	1.94E-4	<1.3E-1	<6.0E-4	<6.6E-4	NA
API-5*	<5.0E-3	6.85E-5	<1.7E-1	<8.7E-4	<7.0E-4	NA
4th Qtr.						
API-1**	<5.0E-3	<1.0E-3	7.91E-2	<6.1E-4	<4.6E-4	NA
API-2**	<5.0E-3	1.27E-5	7.08E-2	<7.5E-4	<7.2E-4	NA
API-3**	3.88E-4	6.35E-5	5.50E-2	<4.0E-4	<5.0E-4	NA
API-4**	<5.0E-3	1.42E-4	7.52E-2	<6.0E-4	<5.1E-4	NA
API-5**	6.33E-4	<1.0E-3	9.88E-2	<4.6E-4	<6.0E-4	NA

* Composited without sample collected on 08/28/90, lost at the lab after gross beta count.
** Composited without samples collected on 10/09/90 and 10/23/90, see page 9-10.

Note: API-4 is the control location.

FERMI 2

SURFACE WATER ANALYSIS

SW-1

Date Collected	(pCi/l) 01/25/90	02/27/90	03/26/90	04/25/90	05/25/90
Sr-89	<1.0E+1	<1.0E+1	9.44E-1	<1.0E+1	<1.0E+1
Sr-90	5.64E-1	3.14E-1	2.23E-1	1.07E+0	7.33E-1
Mn-54	<4.7E+0	<1.0E+1	<8.2E+0	<5.0E+0	<7.2E+0
Fe-59	<1.0E+1	<1.7E+1	<1.8E+1	<1.0E+1	<1.4E+1
Co-58	<4.6E+0	<9.9E+0	<7.1E+0	<5.2E+0	<7.5E+0
Co-60	<8.5E+0	<1.4E+1	<1.0E+1	<5.2E+0	<1.4E+1
Zn-65	<9.6E+0	<2.1E+1	<2.1E+1	<1.1E+1	<1.7E+1
Zr/Nb-95	<4.7E+0	<1.0E+1	<6.8E+0	<5.3E+0	<7.5E+0
Cs-134	<4.5E+0	<8.2E+0	<8.3E+0	<5.3E+0	<6.9E+0
Cs-137	<4.8E+0	<9.8E+0	<9.8E+0	<6.0E+0	<9.7E+0
Ba/La-140	<6.5E+0	<1.5E+1	<1.0E+1	<8.8E+0	<1.4E+1

SW-1

Date Collected	(pCi/l) 06/22/90	07/25/90	08/27/90	09/24/90	10/31/90
Sr-89	<1.0E+1	4.76E-1	1.02E-1	1.90E+0	<1.0E+1
Sr-90	9.22E-1	<2.0E+0	9.10E-1	2.50E-1	6.89E-1
Mn-54	<7.2E+0	<8.5E+0	<8.4E+0	<5.4E+0	<1.0E+1
Fe-59	<1.6E+1	<1.6E+1	<1.4E+1	<1.1E+1	<2.3E+1
Co-58	<8.0E+0	<6.9E+0	<6.4E+0	<3.8E+0	<1.1E+1
Co-60	<7.8E+0	<1.0E+1	<1.0E+1	<6.7E+0	<1.1E+1
Zn-65	<1.7E+1	<1.4E+1	<1.6E+1	<9.0E+0	<2.3E+1
Zr/Nb-95	<8.5E+0	<7.3E+0	<7.9E+0	<4.8E+0	<1.1E+1
Cs-134	<7.9E+0	<5.3E+0	<7.3E+0	<4.7E+0	<9.0E+0
Cs-137	<7.3E+0	<8.9E+0	<7.7E+0	9.65E+0	1.52E+1
Ba/La-140	<1.1E+1	<1.1E+1	<1.2E+1	<8.0E+0	<1.2E+1

FERMI 2

SURFACE WATER ANALYSIS

SW-1

Date Collected	11/26/90	12/27/90	(pCi/l)		
Sr-89	<1.0E+1	<1.0E+1			
Sr-90	6.91E-1	2.81E+0			
Mn-54	<1.2E+1	<4.5E+0			
Fe-59	<2.3E+1	<9.2E+0			
Co-58	<1.0E+1	<3.5E+0			
Co-60	<1.2E+1	<7.0E+0			
Zn-65	<1.6E+1	<1.1E+1			
Zr/Nb-95	<1.8E+1	<8.1E+0			
Cs-134	<9.0E+0	<4.5E+0			
Cs-137	<1.2E+1	<5.5E+0			
Ba/La-140	<1.3E+1	<5.3E+0			

FERMI 2

SURFACE WATER ANALYSIS

SW-2 (Control)

Date Collected	(pCi/l) 01/25/90	02/27/90	03/26/90	04/25/90	05/25/90
Sr-89	8.11E-1	<1.0E+1	9.77E-1	<1.0E+1	<1.0E+1
Sr-90	1.42E-1	5.41E-1	1.61E-1	1.04E+0	5.50E-1
Mn-54	<4.5E+0	<6.8E+0	<7.7E+0	<5.1E+0	<7.7E+0
Fe-59	<8.8E+0	<1.3E+1	<1.4E+0	<8.4E+0	<1.6E+0
Co-58	<5.4E+0	<6.2E+0	<7.5E+0	<4.4E+0	<6.2E+0
Co-60	<9.6E+0	<9.8E+0	<1.2E+1	<6.4E+0	<8.6E+0
Zn-65	<8.8E+0	<1.8E+1	<1.5E+1	<1.1E+1	<1.4E+1
Zr/Nb-95	<5.8E+0	<6.9E+0	<8.1E+0	<4.8E+0	<9.0E+0
Cs-134	<4.9E+0	<5.9E+0	<8.3E+0	<4.2E+0	<6.0E+0
Cs-137	<5.3E+0	<7.4E+0	<9.6E+0	<5.5E+0	<7.9E+0
Ba/La-140	<6.0E+0	<1.1E+1	<5.7E+0	<7.6E+0	<1.3E+1

SW-2 (Control)

Date Collected	(pCi/l) 06/22/90	07/25/90	08/27/90	09/24/90	10/31/90
					**
Sr-89	<1.0E+1	*	1.41E-1	<1.0E+1	3.50E-2
Sr-90	7.18E-1	*	4.87E-1	4.10E-1	5.76E-1
Mn-54	<3.9E+0	*	<1.2E+1	<5.8E+0	<5.1E+0
Fe-59	<1.1E+1	*	<2.0E+1	<1.3E+1	<1.5E+1
Co-58	<4.9E+0	*	<8.3E+0	<6.3E+0	<5.8E+0
Co-60	<6.3E+0	*	<1.5E+1	<7.4E+0	<1.0E+1
Zn-65	<1.1E+1	*	<2.6E+1	<1.5E+1	<1.3E+1
Zr/Nb-95	<5.1E+0	*	<1.0E+1	<9.0E+0	<9.8E+0
Cs-134	<4.6E+0	*	<8.2E+0	<5.1E+0	<6.2E+0
Cs-137	<6.1E+0	*	<1.2E+1	<6.8E+0	<6.4E+0
Ba/La-140	<6.1E+0	*	<9.8E+1	<8.4E+0	<1.1E+1

* No sample collected due to equipment failure.
** Partial sample due to sediment in sample line.

FERMI 2

SURFACE WATER ANALYSIS

SW-2 (Control)

Date Collected	11/26/90	12/27/90 *			
		(pCi/l)			
Sr-89	<1.0E+1	<1.0E+1			
Sr-90	6.07E-1	3.15E+0			
Mn-54	<1.0E+1	<6.1E+0			
Fe-59	<2.3E+1	<1.1E+1			
Co-58	<1.0E+1	<5.3E+0			
Co-60	<9.2E+0	<8.0E+0			
Zn-65	<2.6E+1	<1.4E+1			
Zr/Nb-95	<9.3E+0	<9.8E+0			
Cs-134	<1.1E+1	<5.0E+0			
Cs-137	<1.2E+1	<6.0E+0			
Ba/La-140	<1.7E+1	<9.1E+0			

* Partial sample due to ice in sample line.

FERMI 2

DRINKING WATER ANALYSIS

DW-1

Date Collected	01/25/90	02/27/90	(pCi/l) 03/26/90	04/25/90	05/25/90
Sr-89	8.10E-1	<1.0E+1	9.50E-1	<1.0E+1	<1.0E+1
Sr-90	1.36E-1	2.67E-1	1.33E-1	8.13E-1	5.87E-1
Mn-54	<5.5E+0	<9.1E+0	<8.0E+0	<4.7E+0	<1.1E+1
Fe-59	<1.1E+1	<1.9E+1	<1.1E+1	<1.1E+1	<2.3E+1
Co-58	<4.1E+0	<8.5E+0	<7.7E+0	<5.6E+0	<7.5E+0
Co-60	<8.3E+0	<9.4E+0	<1.2E+1	<7.8E+0	<1.2E+1
Zn-65	<1.1E+1	<2.1E+1	<1.5E+1	<1.0E+1	<1.8E+1
Zr/Nb-95	<4.2E+0	<8.7E+0	<8.9E+0	<5.4E+0	<5.2E+0
Cs-134	<4.2E+0	<6.0E+0	<6.8E+0	<5.1E+0	<8.2E+0
Cs-137	<5.8E+0	<8.9E+0	<6.9E+0	<6.4E+0	<9.0E+0
Ba/La-140	<3.9E+0	<1.1E+1	<9.3E+0	<8.1E+0	<9.9E+0
Gross Beta	2.77E+0	2.18E+0	3.30E+0	4.48E+0	3.04E+0

DW-1

Date Collected	06/22/90	07/25/90	(pCi/l) 08/27/90	09/24/90	10/31/90
		(GS)	(P)		(P)
Sr-89	<1.0E+1	2.21E+0	<1.0E+1	3.80E-1	<1.0E+1
Sr-90	7.07E-1	<2.0E+0	7.44E-1	4.80E-1	6.82E-1
Mn-54	<5.7E+0	<1.2E+1	<9.9E+0	<5.3E+0	<1.2E+1
Fe-59	<1.1E+1	<2.4E+1	*<1.4E+2	<9.8E+0	<2.0E+1
Co-58	<4.7E+0	<8.8E+0	*<2.3E+1	<5.6E+0	<1.1E+1
Co-60	6.38E+0	<1.5E+1	<1.3E+1	5.79E+0	<1.3E+1
Zn-65	<1.3E+1	<2.7E+1	<1.5E+1	<1.2E+1	<1.8E+1
Zr/Nb-95	<5.3E+0	<1.1E+1	*<6.3E+1	<5.1E+0	<1.1E+1
Cs-134	<5.4E+0	<9.3E+0	<5.0E+0	<4.1E+0	<9.8E+0
Cs-137	<5.9E+0	<1.2E+1	<5.5E+0	4.36E+0	<1.3E+1
Ba/La-140	<6.1E+0	<1.2E+1	**	<7.6E+0	<1.4E+1
Gross Beta	2.19E+0	3.76E+0	3.29E+0	2.68E+0	1.93E+0

* LLD not met due to untimely processing by lab.
** Not analyzed by lab due to short half-life.
(GS) Grab sample
(P) Partial sample due to equipment malfunction.

FERMI 2

DRINKING WATER ANALYSIS

DW-1

Date Collected	11/26/90 (P)	12/27/90			
			(pCi/l)		
Sr-89	4.29E-2	7.58E-1			
Sr-90	8.07E-1	3.48E-1			
Mn-54	<7.3E+0	<4.4E+0			
Fe-59	<2.1E+1	<1.3E+1			
Co-58	<7.6E+0	<6.3E+0			
Co-60	<1.2E+1	<5.0E+0			
Zn-65	<1.9E+1	<1.1E+1			
Zr/Nb-95	<8.2E+0	<9.7E+0			
Cs-134	<7.0E+0	<4.3E+0			
Cs-137	<8.7E+0	<5.2E+0			
Ba/La-140	<7.3E+0	<1.4E+1			
Gross Beta	2.56E+0	2.92E+0			

(P) Partial sample due to equipment malfunction.

FERMI 2

DRINKING WATER ANALYSIS

DW-2 (Control)

Date Collected	01/25/90	02/27/90	(pCi/l) 03/26/90	04/25/90	05/25/90
	(GS)	(GS)	(GS)		
Sr-89	<1.0E+1	<1.0E+1	1.06E+0	<1.0E+1	<1.0E+1
Sr-90	6.26E-1	2.24E-1	3.17E-1	2.18E+0	7.55E-1
Mn-54	<7.5E+0	<5.8E+0	<6.4E+0	<5.7E+0	<9.0E+0
Fe-59	<1.7E+1	<1.3E+1	<2.1E+1	<1.1E+1	<2.0E+1
Co-58	<1.1E+1	<5.1E+0	<5.3E+0	<4.8E+0	<9.3E+0
Co-60	<1.2E+1	<8.4E+0	<7.8E+0	<9.1E+0	<1.4E+1
Zn-65	<2.4E+1	<1.0E+1	<1.3E+1	<1.1E+1	<1.9E+1
Zr/Nb-95	<8.4E+0	<6.1E+0	<6.8E+0	<5.4E+0	<9.0E+0
Cs-134	<9.7E+0	<5.9E+0	<7.3E+0	<5.1E+0	<8.4E+0
Cs-137	<8.4E+0	<5.9E+0	<9.6E+0	<5.9E+0	<1.3E+1
Ba/La-140	<9.6E+0	<7.4E+0	<8.3E+0	<1.1E+1	<1.3E+1
Gross Beta	2.63E+0	2.91E+0	2.49E+0	3.06E+0	2.27E+0

DW-2 (Control)

Date Collected	06/22/90	07/25/90	(pCi/l) 08/27/90	09/24/90	10/31/90
	(GS)		(GS)	(GS)	(GS)
Sr-89	<1.0E+1	7.09E-1	<1.0E+1	<1.0E+1	5.46E+0
Sr-90	8.68E-1	3.77E-1	6.20E-1	5.40E-1	3.83E-1
Mn-54	<8.3E+0	<6.3E+0	<1.2E+1	<5.5E+0	<5.3E+0
Fe-59	<1.8E+1	<1.3E+1	<2.2E+1	<1.0E+1	<1.6E+1
Co-58	<7.4E+0	<4.4E+0	<1.1E+1	<4.5E+0	<5.4E+0
Co-60	<1.1E+1	<9.5E+0	<1.5E+1	<6.6E+0	<9.6E+0
Zn-65	<2.0E+1	<1.4E+1	<2.5E+1	<1.1E+1	<1.4E+1
Zr/Nb-95	<1.0E+1	<5.6E+0	<1.1E+1	<4.9E+0	<5.9E+0
Cs-134	<7.4E+0	<6.8E+0	<8.5E+0	<4.8E+0	<4.3E+0
Cs-137	<9.2E+0	<7.8E+0	<1.2E+1	1.27E+1	<7.1E+0
Ba/La-140	<1.0E+1	<7.3E+0	<1.8E+1a	<7.8E+0	<6.7E+0
Gross Beta	2.26E+0	1.87E+0	2.90E+0	3.01E+0	1.72E+0

(GS) Grab sample

FERMI 2

DRINKING WATER ANALYSIS

DW-2 (Control)

Date Collected	11/26/90	12/27/90	(pCi/l)		
Sr-89	<1.0E+1	<1.0E+1			
Sr-90	6.24E-1	9.66E-1			
Mn-54	<9.5E+0	<4.9E+0			
Fe-59	<2.2E+1	<1.6E+1			
Co-58	<1.1E+1	<6.0E+0			
Co-60	<1.5E+1	<7.7E+0			
Zn-65	<2.0E+1	<1.3E+1			
Zr/Nb-95	<1.1E+1	<1.1E+1			
Cs-134	<8.9E+0	<4.8E+0			
Cs-137	<1.2E+1	<5.2E+0			
Ba/La-140	<1.4E+1	<1.6E+1			
Gross Beta	2.67E+0	2.25E+0			

FERMI 2

SURFACE AND DRINKING WATER ANALYSIS

Quarterly Composite of Monthly Samples

Station	Quarter	H-3 (pCi/l)
SW-1	1st Quarter	1.63E+1
	2nd Quarter	4.02E+2
	3rd Quarter	1.92E+2
	4th Quarter	2.65E+2
SW-2	1st Quarter	<2.0E+3
	2nd Quarter	2.76E+2
	3rd Quarter	2.02E+2
	4th Quarter	2.41E+2
DW-1	1st Quarter	<2.0E+3
	2nd Quarter	2.38E+2
	3rd Quarter	1.82E+2
	4th Quarter	2.42E+2
DW-2	1st Quarter	<2.0E+3
	2nd Quarter	3.92E+2
	3rd Quarter	1.39E+2
	4th Quarter	3.42E+2

FERMI 2

QUARTERLY GROUND WATER ANALYSIS

GW-1

Date Collected	(pCi/l) 03/16/90	06/15/90	09/14/90	12/14/90
Mn-54	<7.3E+0	<8.0E+0	<5.0E+0	<3.7E+0
Fe-59	<1.4E+1	<1.6E+1	*<7.0E+1	<9.2E+0
Co-58	<8.6E+0	<7.4E+0	<1.0E+1	<3.2E+0
Co-60	<1.1E+1	<9.5E+0	<4.0E+0	<7.8E+0
Zn-65	<2.2E+1	<1.3E+1	<9.0E+0	<1.1E+1
Zr/Nb-95	<7.5E+0	<7.7E+0	*<2.0E+1	<3.8E+0
Cs-134	<9.3E+0	<6.7E+0	<4.0E+0	<4.7E+0
Cs-137	<9.8E+0	<7.6E+0	<4.0E+0	<4.9E+0
Ba/La-140	<9.8E+0	<9.0E+0	<3.0E+4	<7.0E+0
H-3	<2.0E+3	9.9E+2	6.0E+2	<2.0E+3

GW-2

Date Collected	(pCi/l) 03/16/90	06/15/90	09/14/90	12/14/90
Mn-54	<8.9E+0	<6.1E+0	<4.0E+0	<5.8E+0
Fe-59	<2.1E+1	<1.0E+1	*<9.0E+1	<1.3E+1
Co-58	<8.2E+0	<6.0E+0	*<2.0E+1	<6.5E+0
Co-60	<1.1E+1	<8.0E+0	<4.0E+0	<8.3E+0
Zn-65	<1.8E+1	<1.1E+1	<1.0E+1	<1.3E+1
Zr/Nb-95	<9.1E+0	<4.7E+0	*<2.0E+1	<5.1E+0
Cs-134	<6.9E+0	<5.3E+0	<5.0E+0	<5.3E+0
Cs-137	<9.0E+0	<7.8E+0	<1.0E+0	<6.5E+0
Ba/La-140	<1.5E+1	<7.3E+0	*<2.0E+4	<9.6E+0
H-3	<2.0E+3	<2.0E+3	<6.0E+2	<2.0E+3

* LLD not met due to untimely processing.

FERMI 2

QUARTERLY GROUND WATER ANALYSIS

GW-3

Date Collected	(pCi/l) 03/16/90	06/15/90	09/14/90	12/14/90
Mn-54	<7.9E+0	<6.9E+0	<4.0E+0	<6.8E+0
Fe-59	<1.7E+1	<1.6E+1	*<8.0E+1	<1.3E+1
Co-58	<8.9E+0	<6.5E+0	<1.0E+1	<6.5E+0
Co-60	<1.3E+1	<7.1E+0	<4.0E+0	<8.5E+0
Zn-65	<1.8E+1	<1.4E+1	<1.0E+1	<1.3E+1
Zr/Nb-95	<8.2E+0	<7.7E+0	*<2.0E+1	<6.6E+0
Cs-134	<6.5E+0	<6.3E+0	<4.0E+0	<5.3E+0
Cs-137	<1.1E+1	<8.0E+0	<5.0E+0	<6.6E+0
Ba/La-140	<1.1E+1	<9.1E+0	*<3.0E+4	<9.4E+0
H-3	<2.0E+3	<2.0E+3	<6.0E+2	<2.0E+3

GW-4

Date Collected	(pCi/l) 03/16/90	06/15/90	09/14/90	12/14/90
Mn-54	<7.9E+0	<6.8E+0	<6.0E+0	<4.1E+0
Fe-59	<1.7E+1	<1.4E+1	*<1.0E+2	<9.1E+0
Co-58	<9.2E+0	<6.4E+0	<2.0E+1	<3.7E+0
Co-60	<9.9E+0	<8.6E+0	*<4.0E+0	<4.0E+0
Zn-65	<1.3E+1	<1.4E+1	<1.0E+1	<7.3E+0
Zr/Nb-95	<8.4E+0	<6.6E+0	*<2.0E+1	<4.1E+0
Cs-134	<7.9E+0	<4.8E+0	<5.0E+0	<3.8E+0
Cs-137	<1.1E+1	7.71E+0	<5.0E+0	<3.4E+0
Ba/La-140	<1.1E+1	<9.6E+0	*<3.0E+4	<3.8E+0
H-3	6.30E+1	1.16E+2	<6.0E+2	<2.0E+3

* LLD not met due to untimely processing.

FERMI 2

LAKE ERIE SEDIMENTS ANALYSIS

S-1

Date Collected	(pCi/kg dry) 05/01/90	10/11/90
Mn-54	<9.0E+0	<2.6E+1
Fe-59	<5.8E+1	<1.1E+2
Co-58	<1.6E+1	<3.4E+1
Co-60	<1.0E+1	<4.0E+1
Zn-65	<2.3E+1	<6.6E+1
Zr/Nb-95	<3.1E+1	<6.5E+1
Cs-134	<6.3E+0	<2.5E+1
Cs-137	6.88E+0	<3.3E+1
Ba/La-140	<6.2E+2	<1.4E+2
Sr-89	<LLD	4.12E+2
Sr-90	<LLD	7.95E+1

S-2

Date Collected	(pCi/kg dry) 05/01/90 1st	05/01/90 2nd	10/11/90
Mn-54	2.67E+1	7.36E+1	<3.9E+1
Fe-59	<5.4E+1	<2.0E+4	<1.2E+2
Co-58	<1.3E+1	<8.0E+2	<3.8E+1
Co-60	2.33E+1	4.89E+1	<5.6E+1
Zn-65	2.00E+1	<2.0E+2	<9.2E+1
Zr/Nb-95	<2.8E+1	<1.0E+3	<5.5E+1
Cs-134	<4.6E+0	<4.0E+1	<2.7E+1
Cs-137	6.85E+0	<3.0E+1	2.42E+1
Ba/La-140	<6.6E+2	*	<1.2E+2
Sr-89	<LLD	<6.0E+1	<LLD
Sr-90	<LLD	<3.0E+1	1.81E+2

* Half-life too short to analyze

FERMI 2

LAKE ERIE SEDIMENTS ANALYSIS

S-3

Date Collected	(pCi/kg dry) 05/01/90	10/11/90
Mn-54	<1.3E+1	<3.7E+1
Fe-59	<8.5E+1	<1.2E+2
Co-58	<2.3E+1	<3.5E+1
Co-60	<1.6E+1	<4.7E+1
Zn-65	<3.3E+1	<9.1E+1
Zr/Nb-95	<4.4E+1	<6.9E+1
Cs-134	<8.5E+0	<2.0E+2
Cs-137	<1.1E+1	7.99E+1
Ba/La-140	<1.2E+3	<1.3E+2
Sr-89	<LLD	<LLD
Sr-90	<LLD	<LLD

S-4

Date Collected	(pCi/kg dry) 05/02/90 1st	05/02/90 2nd	10/18/90
Mn-54	9.68E+0	<6.0E+1	<3.7E+1
Fe-59	<8.4E+1	<2.0E+4	<1.0E+3
Co-58	<2.0E+1	<8.0E+2	<1.2E+2
Co-60	<1.4E+1	<3.0E+1	<4.2E+1
Zn-65	<3.0E+1	<2.0E+2	<8.9E+1
Zr/Nb-95	<3.7E+1	<1.0E+3	<3.1E+2
Cs-134	<7.5E+0	<4.0E+1	<2.5E+2
Cs-137	1.28E+1	<3.0E+1	2.42E+1
Ba/La-140	<9.2E+2	*	*
Sr-89	<LLD	<6.0E+1	2.40E+2
Sr-90	<LLD	<2.0E+1	1.30E+1

* Half-life too short to analyze

FERMI 2

LAKE ERIE SEDIMENTS ANALYSIS

S-5 (Control)

Date Collected	(pCi/kg dry) 05/22/90	10/24/90
Mn-54	<2.1E+1	<3.1E+1
Fe-59	<1.0E+2	<8.2E+1
Co-58	<3.2E+1	<2.9E+1
Co-60	<3.0E+1	<5.2E+1
Zn-65	<4.9E+1	<8.1E+1
Zr/Nb-95	<6.4E+1	<6.4E+1
Cs-134	<1.7E+1	<2.6E+1
Cs-137	6.07E+1	1.59E+2
Ba/La-140	<7.8E+2	<7.4E+1
Sr-89	<LLD	<LLD
Sr-90	<LLD	1.87E+2

FERMI 2

MILK SAMPLE ANALYSIS

M-1 (Control)

Collection Date	I-131	Cs-134	Cs-137	Ba/La-140	(pCi/l) Co-58	Co-60	Sr-89	Sr-90	K-40
01/07/90	7.00E-3	<5.0E+0	<6.7E+0	<5.3E+0	<4.9E+0	<7.4E+0	<1.0E+1	2.11E+0	1.29E+3
02/14/90	6.70E-2	<6.4E+0	<9.2E+0	<1.1E+1	<9.0E+0	<1.1E+1	<1.0E+1	2.37E+0	1.49E+3
03/13/90*									
04/11/90*									

* No sample available

FERMI 2

MILK SAMPLE ANALYSIS

M-2

Collection Date	I-131	Cs-134	Cs-137	Ba/La-140	(pCi/l) Co-58	Co-60	Sr-89	Sr-90	K-40
01/17/90	8.10E-2	<4.9E+0	<6.4E+0	<2.0E+0	<5.5E+0	<1.0E+1	3.18E-1	9.69E-1	1.59E+3
02/14/90	<1.0E+0	<6.5E+0	<7.5E+0	<8.1E+0	<6.0E+0	<1.1E+1	2.06E-1	<1.0E+1	1.42E+3
03/13/90	5.32E-1	<7.3E+0	<8.2E+0	<1.0E+0	<8.2E+0	<1.1E+1	7.98E-2	1.44E+0	1.47E+3
04/11/90	<1.0E+0	<6.5E+0	<8.0E+0	<9.3E+0	<7.5E+0	<1.0E+1	<1.0E+1	2.23E+0	1.72E+3
05/09/90	1.98E+0	<7.2E+0	<9.7E+0	<1.0E+1	<8.0E+0	<1.2E+1	<1.0E+1	4.27E+0	1.44E+3
05/23/90	1.09E+0	<5.7E+0	<7.9E+0	<1.1E+1	<5.9E+0	<1.0E+1	<1.0E+1	3.02E+0	1.48E+3
06/14/90	<1.0E+0	<7.1E+0	<8.6E+0	<1.1E+1	<8.3E+0	<9.7E+0	<1.0E+1	5.15E+0	1.28E+3
06/28/90	8.79E-1	<1.0E+1	<1.3E+1	<1.4E+1	<1.1E+1	<1.3E+1	<1.0E+1	2.35E+0	1.27E+3
07/12/90	6.24E-1	<7.1E+0	<8.6E+0	<9.9E+0	<7.7E+0	<1.1E+1	<1.0E+1	2.33E+0	1.51E+3
07/26/90	1.52E-1	<5.7E+0	6.08E+0	<6.9E+0	5.55E+0	<1.1E+1	<1.0E+1	2.87E+0	1.41E+3
08/09/90	1.93E-1	<5.8E+0	7.06E+0	<7.5E+0	<8.2E+0	1.47E+1	<1.3E+1	<1.0E+1	1.66E+3
08/23/90	<1.0E+0**	<4.0E+0	<5.0E+0	<5.5E+0	<4.5E+0	<6.9E+0	*	1.63E+0	1.40E+3
09/13/90	.55E-1	<3.6E+0	<4.3E+0	<4.4E+0	<3.7E+0	<6.0E+0	9.50E-1	2.21E+0	1.37E+3
09/27/90	3.25E-1	<5.5E+0	<7.9E+0	<8.7E+0	<7.7E+0	<1.1E+1	<1.0E+1	4.23E-1	1.52E+3
10/11/90	<1.0E+0	<4.0E+0	<6.2E+0	<5.9E+0	<5.5E+0	<7.0E+0	<1.0E+1	2.06E+0	1.54E+3
10/25/90	9.50E-2	<3.9E+0	<5.9E+0	<4.8E+0	<5.2E+0	<6.4E+0	<1.0E+1	3.67E+0	1.62E+3
11/08/90	<1.0E+0	<5.5E+0	<6.3E+0	<9.1E+0	<7.5E+0	<1.0E+1	2.49E+0	1.50E+0	1.64E+3
12/06/90	4.19E-2	<8.0E+0	<1.0E+1	<1.3E+1	<1.1E+1	<1.4E+1	2.60E-1	1.67E+0	1.39E+3

* Sample was improperly prepped with all sample used.
** Sample prepped using expired I-131 standard.

FERMI 2

MILK SAMPLE ANALYSIS

M-3

Collection Date	I-131	Cs-134	Cs-137	Ba/La-140	(pCi/l) Co-58	Co-60	Sr-89	Sr-90	K-40
01/17/90	1.25E-1	<5.1E+0	<5.5E+0	<8.3E+0	<4.6E+0	<7.4E+0	8.38E-1	2.24E+0	1.51E+3
02/14/90	<1.0E+0	<6.8E+0	<8.9E+0	<9.1E+0	<7.0E+0	<1.3E+1	5.18E-1	3.12E+0	1.69E+3
03/13/90	5.40E-2	<5.2E+0	<6.3E+0	<6.0E+0	<6.0E+0	<9.0E+0	<1.0E+1	2.52E+0	1.72E+3
04/11/90	<1.0E+0	<4.7E+0	<6.8E+0	<6.9E+0	<5.8E+0	1.02E+1	1.95E-1	1.06E+0	1.68E+3
05/09/90	1.78E+1	<5.7E+0	<6.4E+0	<8.6E+0	<7.0E+0	<1.2E+1	<1.0E+1	6.50E+0	1.44E+3
05/23/90	6.22E+0	<4.9E+0	<8.1E+0	<1.0E+1	<6.3E+0	<8.2E+0	<1.0E+1	3.09E+0	1.59E+3
06/14/90	1.97E-1	<8.5E+0	<1.0E+1	<1.4E+1	<1.0E+1	<1.1E+1	<1.0E+1	2.62E+0	1.55E+3
06/28/90	<1.0E+0	<7.9E+0	<1.2E+1	<1.5E+1	<9.7E+0	<1.5E+1	<1.0E+1	1.91E+0	1.66E+3
07/12/90	4.99E-1	<6.5E+0	<7.8E+0	<9.4E+0	<7.8E+0	<1.2E+1	<1.0E+1	3.70E+0	1.64E+3
07/26/90	6.25E-1	<7.0E+0	<9.9E+0	<1.1E+1	<8.0E+0	<1.4E+1	2.41E-1	1.38E+0	1.68E+3
08/09/90	<1.0E+0	<6.9E+0	<8.3E+0	<1.1E+1	<8.2E+0	<1.1E+1	<1.0E+1	1.09E+0	1.55E+3
08/23/90	<1.0E+0**	<4.2E+0	<5.0E+0	<5.6E+0	<4.9E+0	<5.1E+0	*	*	1.36E+3
09/13/90	7.60E-1	<4.6E+0	<5.8E+0	<6.7E+0	<4.5E+0	<6.7E+0	7.07E+0	6.82E-1	1.76E+3
09/27/90	<1.0E+0	<5.0E+0	<7.2E+0	<8.3E+0	<5.5E+0	<8.6E+0	<1.0E+1	1.95E+0	1.53E+3
10/11/90	<1.0E+0	<3.6E+0	<4.1E+0	<4.1E+0	<3.9E+0	<6.9E+0	1.05E+1	1.80E+0	1.58E+3
10/25/90	1.02E-1	<2.6E+0	<3.6E+0	<3.4E+0	<3.5E+0	<5.1E+0	<1.0E+1	3.26E+0	1.44E+3
11/08/90	7.10E-2	<4.6E+0	<5.4E+0	<7.7E+0	<4.7E+0	<7.6E+0	4.17E+0	1.52E+0	1.62E+3
12/06/90	<1.0E+0	<5.6E+0	<7.1E+0	<9.5E+0	<7.2E+0	<9.9E+0	<1.0E+1	2.46E+0	1.47E+3

* Sample was improperly prepped with all sample used.
** Sample prepped using expired I-131 standard.

FERMI 2

MILK SAMPLE ANALYSIS

M-8 (Control)

Collection Date	I-131	Cs-134	Cs-137	Ba/La-140	(pCi/l) Co-58	Co-60	Sr-89	Sr-90	K-40
05/10/90	7.77E-1	<7.5E+0	<1.2E+1	<1.3E+1	<9.0E+0	<1.4E+1	<1.0E+1	<2.0E+0	1.70E+3
05/24/90	2.93E+0	<6.7E+0	<8.3E+0	<1.4E+1	<8.0E+0	<1.0E+1	<1.0E+1	4.31E+0	1.47E+3
06/14/90	<1.0E+0	<5.9E+0	<8.0E+0	<1.3E+1	<8.9E+0	<9.9E+0	<1.0E+1	1.75E+0	1.78E+3
06/28/90	<1.0E+0	<1.0E+1	<1.2E+1	<1.2E+1	<1.2E+0	<1.7E+1	<1.0E+1	9.85E-1	1.31E+3
07/12/90	2.17E+0	<7.0E+0	<8.1E+0	<1.1E+1	<7.9E+0	<9.7E+0	<1.0E+1	1.19E+0	1.76E+3
07/26/90	6.95E-2	<5.9E+	<7.3E+0	<8.3E+0	<6.9E+0	<9.8E+0	<1.0E+1	2.11E+0	1.54E+3
08/09/90	8.41E-1	<7.4E+0	<9.7E+0	<1.2E+1	<8.9E+0	<1.4E+1	1.82E+0	1.39E+0	1.70E+3
08/23/90	<1.0E+0**	<4.9E+0	<7.0E+0	<7.5E+0	<5.7E+0	<8.3E+0	*	*	1.53E+3
09/13/90	<1.0E+0**	<4.9E+0	3.52E+0	<5.7E+0	<5.9E+0	<7.8E+0	3.96E-1	5.42E-1	1.51E+3
09/27/90	3.76E-1	<5.5E+0	6.04E+0	<7.8E+0	<6.8E+0	<1.1E+1	1.02E+0	7.56E-1	1.31E+3
10/11/90	<1.0E+0	<3.1E+0	6.42E+0	<4.2E+0	<3.4E+0	<5.2E+0	<1.0E+1	1.84E+0	8.02E+2
10/25/90	2.10E-2	<1.8E+1@	<3.3E+0	<4.2E+0	<3.1E+0	<5.1E+0	1.75E+1	2.11E-1	1.68E+3
11/08/90	1.64E-1	<3.2E+0	<3.8E+0	<4.2E+0	<3.5E+0	<6.1E+0	*	*	1.63E+3
12/06/90	5.14E-3	<6.3E+0	<8.8E+0	<8.7E+0	<7.9E+0	<1.3E+1	<1.0E+1	3.40E+0	1.56E+3

* Sample was improperly prepped with all sample used.
** Sample prepped using expired I-131 standard.
@ Did not meet T.S. LLD, no explanation by lab.

FERMI 2

GRASS SAMPLE ANALYSIS

M-7 (Critical Receptor)

Collection Date	(pCi/kg wet) I-131	Cs-134	Cs-137
01/17/90	**	**	**
02/14/90	**	**	**
03/13/90	**	**	**
04/11/90	**	**	**
05/09/90	<3.3E+1	<2.9E+1	<2.5E+1
05/23/90	*<1.2E+2	*<6.1E+1	*<8.5E+1
06/14/90	<4.1E+1	<3.2E+1	<3.3E+1
06/28/90	<3.9E+1	<3.5E+1	<4.6E+1
07/12/90	<4.8E+1	<4.7E+1	<4.8E+1
07/26/90	<3.4E+1	<2.5E+1	<3.2E+1
08/09/90	<3.0E+1	<3.5E+1	<4.1E+1
08/23/90	<5.7E+1	<4.5E+1	<5.3E+1
09/13/90	@	@	@
09/27/90	<2.1E+1	<1.9E+1	<2.0E+1
10/11/90	<4.1E+0	<5.1E+0	<5.9E+0
10/25/90	<3.1E+1	<2.5E+1	<3.1E+1
11/08/90	<3.7E+1	<4.0E+1	<4.7E+1
12/06/90	<3.4E+1	<2.7E+1	<3.3E+1

* Insufficient sample size to meet LLD
** No sample taken due to seasonal unavailability.
@ No sample taken due to change in critical receptor

FERMI 2

GRASS SAMPLE ANALYSIS

M-8 (Control)

Collection Date	(pCi/kg wet) I-131	Cs-134	Cs-137	Co-60
01/17/90	**	**	**	**
02/14/90	**	**	**	**
03/13/90	**	**	**	**
04/11/90	**	**	**	**
05/09/90	<3.7E+1	<3.3E+1	<4.0E+1	<5.3E+1
05/23/90	*<8.1E+1	<4.7E+1	<4.8E+1	<7.8E+1
06/14/90	<4.4E+1	<2.9E+1	<4.4E+1	<4.7E+1
06/28/90	<3.2E+1	<3.5E+1	<5.8E+1	<7.2E+1
07/12/90	<4.7E+1	<5.1E+1	<6.8E+1	<8.8E+1
07/26/90	*<6.7E+1	<3.8E+1	<4.1E+1	<5.4E+1
08/09/90	<5.[illegible]1	<5.7E+1	<8.0E+1	<1.2E+1
08/23/90	<4.2E+1	<3.2E+1	4.20E+1	<5.0E+1
09/13/90	<1.1E+1	<1.1E+1	<1.4E+1	1.33E+1
09/27/90	<2.3E+1	<2.0E+1	<2.5E+1	<3.5E+1
10/11/90	<3.0E+1	<2.7E+1	<2.9E+1	<4.4E+1
10/25/90	<3.7E+1	<3.3E+1	<4.3E+1	<5.7E+1
11/08/90	<2.8E+1	<2.7E+1	<3.3E+1	<4.3E+1
12/06/90	<2.8E+1	<2.8E+1	<2.7E+1	<4.2E+1

* Insufficient sample size to meet LLD
** No samples taken at this station until 05/09/90

FERMI 2

GRASS SAMPLE ANALYSIS

M-9 (Critical Receptor)

Collection Date	(pCi/kg wet) I-131	Cs-134	Cs-137
09/13/90	<1.5E+1	<1.6E+1	<2.3E+1
09/27/90	<2.1E+1	<1.7E+1	<2.3E+1

Note: M-9 added and then dropped from program.

M-1 (Control)

Collection Date	(pCi/kg wet) I-131	Cs-134	Cs-137
01/17/90	**	**	**
02/14/90	**	**	**
03/13/90	**	**	**
04/11/90	**	**	**

** No sample taken due to seasonal unavailability.

Note: M-1 dropped from program.

FERMI-2

VEGETABLE ANALYSIS

FP-1

Date Collected	Sample Type	(pCi/kg wet) I-131	Cs-134	Cs-137	K-40	Co-60
07/30/90	Broccoli*	<2.3E+1	<1.1E+1	<1.7E+1	3.26E+3	3.68E+1
07/30/90	Cabbage*	<3.3E+1	<1.8E+1	<2.1E+1	3.55E+3	<2.4E+1
08/16/90	Cabbage	<3.4E+1	<2.5E+1	<3.0E+1	3.78E+3	<4.6E+1
08/16/90	Swiss Chard	<4.3E+1	<2.3E+1	<3.6E+1	7.00E+3	<4.3E+1
08/16/90	Lettuce	<3.1E+1	<2.8E+1	<4.2E+1	7.12E+3	<5.8E+1

FP-3

Date Collected	Sample Type	(pCi/kg wet) I-131	Cs-134	Cs-137	K-40	Co-60
07/30/90	Lettuce*	<5.0E+1	<2.5E+1	<3.4E+1	1.55E+3	<5.7E+1
07/30/90	Swiss Chard*	<4.0E+1	<1.9E+1	<2.8E+1	3.12E+3	<3.5E+1
07/30/90	Cabbage*	<4.0E+1	<2.2E+1	<3.3E+1	2.00E+3	<5.1E+1
08/16/90	Cabbage	<3.9E+1	<2.6E+1	<3.8E+1	1.50E+3	<4.1E+1
08/16/90	Swiss Chard	<2.5E+1	<2.5E+1	<3.5E+1	3.41E+3	<4.8E+1
08/16/90	Lettuce	<2.9E+1	<3.0E+1	<4.1E+1	2.60E+3	<4.4E+1

* Sample included edible and non-edible parts of the plant.

FERMI–2

VEGETABLE ANALYSIS

FP 5

Date Collected	Sample Type	(pCi/kg wet) I–131	Cs–134	Cs–137	K–40	Co–60
07/30/90	Broccoli*	<3.3E+1	<1.4E+1	<1.8E+1	3.71E+3	<3.2E+1
07/30/90	Swiss Chard*	<4.3E+1	<2.4E+1	<3.2E+1	3.83E+3	<4.6E+1
07/30/90	Lettuce*	<5.5E+1	<2.8E+1	<3.4E+1	4.40E+3	<5.8E+1
08/16/90	Broccoli	<2.8E+1	<2.5E+1	<2.3E+1	4.43E+3	<4.3E+1
08/16/90	Swiss Chard	<2.3E+1	<2.4E+1	<3.8E+1	3.90E+3	<4.7E+1
08/16/90	Lettuce	<4.0E+1	<3.2E+1	<4.4E+1	5.33E+3	<4.5E+1

FP–6 (Control)

Date Collected	Sample Type	(pCi/kg wet) I–131	Cs–134	Cs–137	K–40	Co–60
07/30/90	Broccoli*	<4.0E+1	<1.9E+1	<3.2E+1	3.17E+3	<3.8E+1
07/30/90	Cabbage*	<5.9E+1	<3.2E+1	<4.0E+1	2.52E+3	<6.6E+1
07/30/90	Lettuce*	<4.5E+1	<1.8E+1	<2.9E+1	3.17E+3	<3.0E+1
08/16/90	Cauliflower	<3.6E+1	<3.9E+1	<4.1E+1	3.49E+3	<5.9E+1
08/16/90	Broccoli	<3.2E+1	<2.6E+1	<2.5E+1	4.21E+3	<4.1E+1
08/16/90	Cabbage	<2.5E+1	<1.7E+1	<2.2E+1	1.20E+3	<2.7E+1

* Sample included edible and non–edible parts of the plant.

FERMI 2

FISH SAMPLES ANALYSIS

F-1 (Control)

Collection Date	Fish Type	(pCi/kg wet) Sr-89	Sr-90	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Cs-134	Cs-137
05/22/90	Perch	2.90E+1	3.19E+1	<3.8+1	<1.5E+2	<7.1E+1	<4.3E+1	<8.3E+1	<2.1E+1	<4.7E+1
05/22/90	Walleye	1.14E+1	4.77E+1	<1.5E+1	<8.4E+1	<2.9E+1	<2.5E+1	<5.0E+1	<1.5E+1	5.49E+1
10/24/90	Walleye	<1.0E+1	1.44E+0	<3.2E+1	<5.8E+1	<5.3E+1	<5.9E+1	<7.9E+1	<4.1E+1	<6.0E+1
10/24/90	Crappie	*	*	<8.4E+1	<1.7E+2	<8.2E+1	<1.2E+2	<2.3E+2	<6.6E+1	<8.8E+1
10/24/90	Carp	8.40E+0	3.24E+1	<5.5E+1	<1.3E+2	<5.5E+1	<7.9E+1	<1.3E+2	<4.6E+1	<6.1E+1
10/24/90	Sucker	<1.0E+1	8.58E+0	<3.8E+1	<5.8E+1	<4.3E+1	<1.3E+2	<6.9E+1	<3.5E+1	<3.5E+1

* Sample table lost during centrifuging.

FERMI 2

FISH SAMPLES ANALYSIS

F-2

Collection Date	Fish Type	(pCi/kg wet) Sr-89	Sr-90	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Cs-134	Cs-137
05/08/90	Perch	6.81E+2	2.48E+2	<2.2E+1	<1.7E+2	<5.7E+1	<4.6E+1	<6.1E+1	<2.3E+1	<3.8E+1
05/08/90	Sucker	<1.0E+1	5.87E+1	<1.6E+1	<2.3E+2	<6.2E+1	<3.4E+1	<6.6E+1	<2.8E+1	<3.1E+1
05/08/90	Walleye	<1.0E+1	7.42E+1	<2.6E+1	<1.5E+2	<4.4E+1	<2.8E+1	<7.8E+1	<2.0E+1	5.07E+1
05/08/90	Catfish	<1.0E+1	7.70E+1	<2.6E+1	<1.4E+2	<4.3E+1	<3.2E+1	<4.6E+1	<2.[illegible]E+1	<3.3E+1
05/08/90	Carp	<1.0E+1	1.72E+2	<1.7E+1	<1.2E+2	<2.3E+1	<2.4E+1	<3.2E+1	<1.2E+1	<1.5E+1
05/08/90	White Bass	<1.0E+1	3.19E+1	<4.5E+1	<2.9E+2	<8.8E+1	<5.8E+1	<1.2E+2	<3.3E+1	7.32E+1
10/12/90	Walleye	<1.0E+1	8.82E+0	<1.1E+1	<2.7E+1	<1.2E+1	<1.5E+1	<2.6E+1	<8.2E+0	1.23E+1
10/12/90	Yellow Perch	*	*	<5.8E+1	<1.7E+2	<8.3E+1	<9.0E+1	<1.9E+2	<6.4E+1	<8.8E+1
10/12/90	White Perch	<1.0E+1	1.51E+2	<5.7E+1	<1.4E+2	<4.3E+1	<9.4E+1	<1.6E+2	<4.6E+1	1.61E+2
10/12/90	Carp	<1.0E+1	3.41E+2	<1.2E+1	<3.3E+1	<1.2E+1	<1.4E+1	<4.0E+1	<9.2E+0	6.34E+1
10/12/90	Silver Bass	*	*	<5.3E+1	<1.0E+2	<5.6E+1	<9.5E+1	<1.2E+2	<4.4E+1	<5.2E+1

* Sample lable lost during centrifuging.

FERMI 2

FISH SAMPLES ANALYSIS

F-3 (Control)

Collection Date	Fish Type	(pCi/kg wet) Sr-89	Sr-90	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Cs-134	Cs-137
05/01/90	Catfish	2.32E+1	2.30E+1	<5.0E+1	<3.3E+2	<6.9E+1	<6.1E+1	<1.1E+2	<3.6E+1	3.35E+1
05/01/90	Walleye	<1.0E+1	2.15E+2	<2.6E+1	<2.0E+2	<5.3E+1	<3.6E+1	<5.3E+1	<2.2E+1	3.11E+1
05/01/90	White Bass	4.44E+2	6.22E+1	<3.5E+1	<1.2E+2	<7.0E+1	<2.9E+1	<9.5E+1	<2.7E+1	<3.9E+1
10/16/90	Crappie	<1.0E+1	1.63E+1	<9.4E+1	<2.3E+2	<1.3E+2	<1.4E+2	<2.4E+2	<8.1E+1	<1.1E+2
10/16/90	Walleye	*	*	<1.3E+1	<3.7E+1	<1.2E+1	<2.0E+1	<3.8E+1	<9.6E+0	3.75E+1
10/16/90	Carp	<1.0E+1	3.91E+2	<8.3E+1	<1.8E+2	<8.9E+1	<9.5E+1	<2.1E+2	<6.5E+1	<9.0E+1
10/16/90	Sucker	<1.0E+1	1.79E+1	<6.4E+1	<1.2E+2	<6.1E+1	<8.1E+1	<1.2E+2	<5.1E+1	<4.9E+1

* Sample lable lost during centrifuging.

Appendix A

Interlaboratory Comparison Program Results

International Technology Corporation participates in the Environmental Protection Agency (EPA) interlaboratory comparison (crosscheck) program to provide an independent check on the laboratory's analytical procedures.

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

The results in Appendix A were obtained through participation in the environmental sample crosscheck program for air filters, milk, and water during the period January through September, 1990.

INTERNATIONAL TECHNOLOGY CORPORATION
EPA INTERLABORATORY COMPARISON

All results pCi/l except K-40 (mg/l)
and Air Filter samples (pCi/filter)

Analysis Type	Date	ITC Result	EPA Result	Normalized Deviation
Air Filter				
GB-	03/30/90	31	31	0.00
	08/31/90	65	62	1.04
Sr-90	03/30/90	13.33	10	3.85a
	08/31/90	21	20	0.35
Cs-137	03/30/90	10	10	0
	08/31/90	21.67	20	0.58
Milk				
Sr-89	09/28/90	16	16	0
Sr-90	09/28/90	16.3	20	-1.27
I-131	09/28/90	52	58	-1.73
Cs-137	09/28/90	23	20	1.04
Water				
GA	01/26/90	15.33	12	1.15
	05/11/90	20.33	22	-0.48
	09/21/90	6.67	10	-1.15
GB-	01/26/90	11	12	-0.35
	05/11/90	7.33	15	-2.66
Co-60	02/09/90	17	15	0.69
	06/08/90	27.67	24	1.27
Zn-65	02/09/90	140	139	0.12
	06/08/90	149.67	148	0.19
Ru-106	02/09/90	129.33	139	-1.2
	06/08/90	207	209	-0.25
Cs-134	02/09/90	15.67	18	-0.81
	06/08/90	22.67	24	-0.46
Cs-137	02/09/90	20.33	18	0.81
	06/08/90	26	25	0.35
Ba-133	02/09/90	71.33	74	-0.66
	06/08/90	96.33	99	-0.46
I-131	08/10/90	43	39	1.15
Pu-239	08/24/90	7.67	9.1	-2.76
Ra-226	07/13/90	14.8	10.3	2.6
Ra-228	07/13/90	10.3	5.1	6.88

APPENDICES

INTERNATIONAL TECHNOLOGY CORPORATION
EPA INTERLABORATORY COMPARISON

All results pCi/l except K–40 (mg/l)
and Air Filter samples (pCi/filter)

Analysis Type	Date	ITC Result	EPA Result	Normalized Deviation
Water (cont)				
Sr–89	01/12/90	19	25	–2.08
	05/04/90	6	7	–0.35
	09/14/90	9.67	10	–0.12
Sr–90	01/12/90	16.67	20	–3.85b
	05/04/90	8.83	7	0.46
	09/14/90	8.67	9	–0.12
H–3	02/23/90	5144.67	4976	0.59
	06/22/90	2553.33	2933	–1.84

GB– = Gross Beta, GA = Gross Alpha
a = Normalized Deviation above Upper Control Limit (UCL)
b = Normalized Deviation below Lower Control Limit (LCL)

Note: ITC was contacted regrading corrective action on cross–checks outside control limits.

APPENDIX B

Summary of Higher Than Expected I – 131 in Environmental Milk Samples

Detroit Edison Fermi 2
Summary of Higher Than Expected I-131 in Environmental Milk Samples Evaluation

On October 29, 1990, while reviewing the latest environmental data results, elevated levels of iodine (I-131) were noticed in the May milk sample results:

Location	April Dates	I-131 pCi/l	May Dates	I-131 pCi/l	June Dates	I-131 pCi/l
M-2	4/11/90	0.00	5/9/90	1.98	6/14/90	0.00
			5/23/90	1.09	6/28/90	0.88
M-3	4/11/90	0.00	5/9/90	17.80	6/14/90	0.20
			5/23/90	6.22	6/28/90	0.00
M-3 (QC)	4/11/90	0.05	5/9/90	1.24	6/14/90	0.05
			5/23/90	0.47	6/28/90	0.00
M-8	None		5/10/90	0.78	6/14/90	0.00
			5/24/90	2.93	6/28/90	0.00

Notes: Location M-2 is at 2705 E. Labo, M-3 is at 3239 Newport Rd, and M-8 (control location) is at 9344 Finzel Rd. The M-3 (QC) samples are duplicate quality control samples taken from the same allotment of milk.

The Fermi 2 Technical Specification Lower Limit of Detection (LLD) for I-131 is 1.0 pCi/l. Anything equal to or above that is considered a detectable quantity. A detected quantity of from 1 to 3 pCi/l seen occasionally would not be unusual due to the counting statistics at that low level.

Two factors triggered the evaluation: two sample results that were well above the statistical variation limits, and the frequency of the detectable results; six samples above LLD in one month.

The first step was to determine reportability with one key point in mind; were the elevated results due to plant effluents? A preliminary problem solving session was held on October 29. It was agreed in this session to explore all possibilities of I-131 sources. A reactor scram on April 10, 1990 appeared to be the most likely source of an I-131 release of sufficient magnitude to result in the concentrations seen in the May milk samples. Subsequently appropriate data was acquired to perform an evaluation, focusing on the 4/10/90 scram time period.

Data acquired and evaluated included:

- Meteorological data for 4/10/90
- Reactor coolant chemistry data
- Effluent data for the Reactor Building

- All 1990 milk sample data
- Reactor and Turbine Building noble gas monitor data
- Vendor analysis sheets for the samples in question
- Vendor quality control data
- I-131 sources received on site in April and May 1990
- 1990 TLD and air sample results

TLD Results

TLD	Location	mRem Qtr 1	Qtr 2	Qtr 3
T-5	NW/0.6 mi	19.9	12.9	15.0
T-6	WNW/0.6 mi	16.0	13.2	16.8
T-8	NW/1.9 mi	16.0	14.6	15.9
T-15	NW/3.9 mi	18.0	9.7	Missing
T-16	WNW/4.9 mi	19.1	22.6	13.8
T-32	WNW/10.3 mi	16.4	16.7	13.5
T-33	NW/9.2 mi	18.5	14.2	13.8
T-38	WNW/1.7 mi	19.2	19.4	15.3
Controls				
T-7	W/14.2 mi	16.5	14.6	15.4
T-28	SW/10.7 mi	16.4	12.4	14.3
T-29	WSW/10.3 mi	18.2	17.4	9.5

Air Iodine Results

Date Collected	API3 I-131 pCi/m^3	API4 I-131 pCi/m^3
4/3/90	<0.018	<0.022
4/10/90	<0.032	<0.020
4/17/90	<0.011	<0.015
4/24/90	<0.030	<0.029
5/1/90	<0.019	<0.016
5/8/90	<0.023	<0.020
5/15/90	<0.020	<0.015
5/22/90	<0.022	<0.021
5/29/90	<0.023	<0.016
6/5/90	<0.032	<0.025
6/12/90	<0.017	<0.023
6/19/90	<0.035	<0.028
6/26/90	<0.016	<0.018

Notes: API3 is located NW 0.6 mi on the site fence; API4 (control) is located W 14.2 mi at 7412 N. Custer Rd. Detectable quantities are those equal to or greater than the Tech Spec LLD of 0.07 pCi/m^3 for Iodine in air.

Additionally, calculations were performed to determine the amount of I-131 that would have to have been released in order to see the levels reported in the milk samples, and the concentration in cows' milk following a deposition on grass.

Based on an evaluation of the above information, it is concluded that the I-131 did not come from Fermi 2 plant effluents. There is no conclusive evidence pointing to where it did come from. At this time, the best assumption is that either:

1. The milk samples were cross contaminated at the vendor laboratory

2. The instrumentation used at the laboratory was out of tolerance "high", which would provide false positive results.

As discussed earlier in this report, a new vendor laboratory has been contracted to perform REMP sample analysis.

APPENDIX C

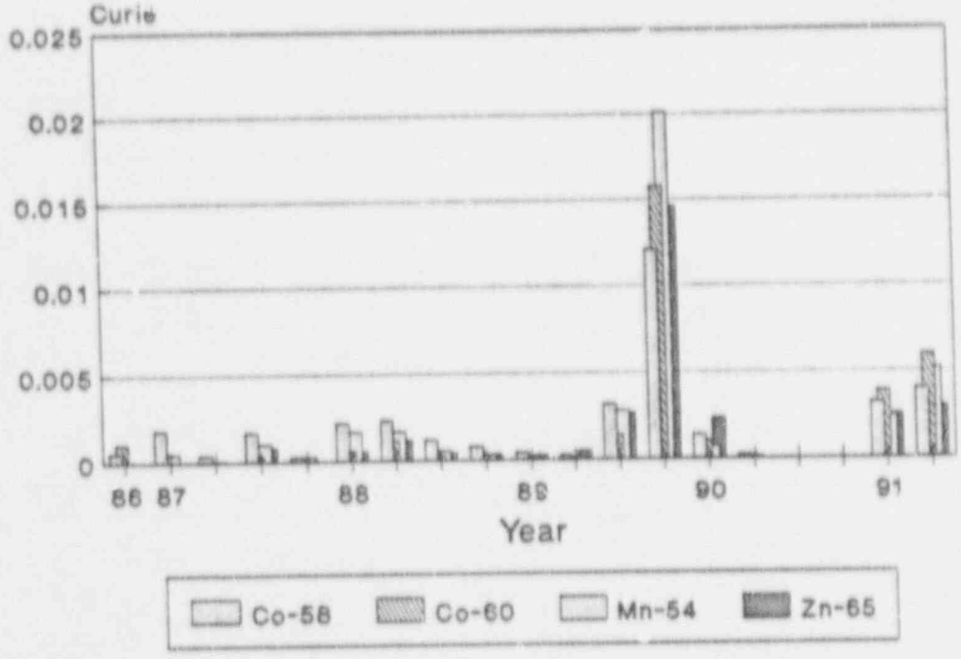
Liquid Radwaste Effluent Data

Fermi 2 Liquid Effluent Data
Activity Released Per Quarter (Ci)

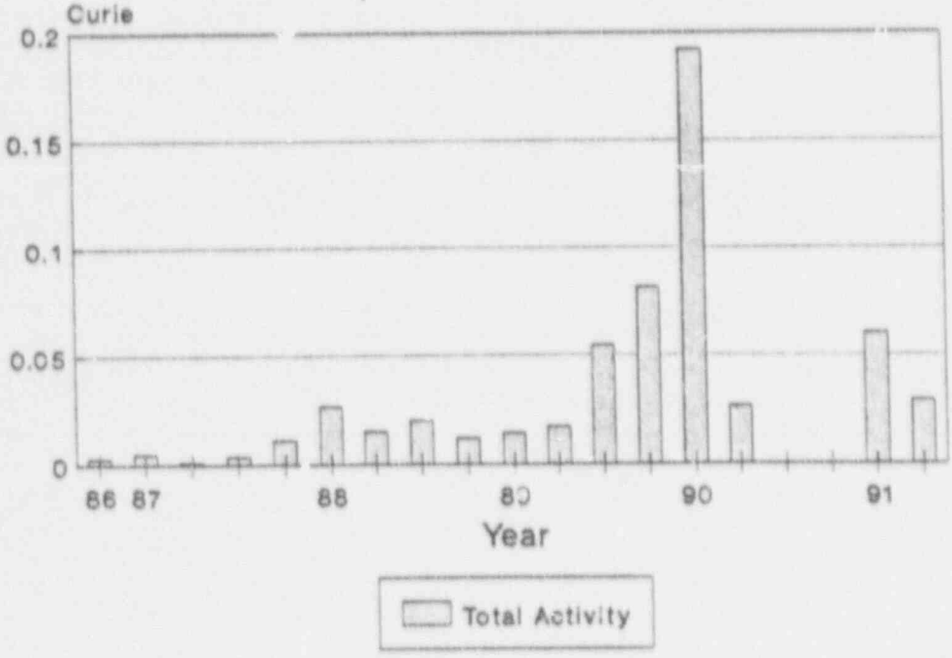
Year	Quarter	Co-58	Co-60	Mn-54	Zn-65	Total * Activity
1986	4th	5.18E-04	1.05E-03	5.86E-06	0.00E+00	2.86E-03
1987	1st	1.82E-03	1.45E-05	4.54E-04	0.00E+00	4.92E-03
	2nd	3.67E-04	1.53E-05	6.06E-05	0.00E+00	1.04E-03
	3rd	1.67E-03	3.05E-04	9.85E-04	7.94E-04	3.96E-03
	4th	2.39E-04	3.16E-05	2.34E-04	0.00E+00	1.11E-02
1988	1st	2.20E-03	5.60E-04	1.67E-03	5.20E-04	2.67E-02
	2nd	2.33E-03	1.13E-03	1.70E-03	1.16E-03	1.51E-02
	3rd	1.19E-03	2.84E-04	5.36E-04	4.23E-04	2.02E-02
	4th	7.96E-04	2.37E-04	2.90E-04	3.07E-04	1.21E-02
1989	1st	4.05E-04	1.81E-04	1.52E-04	2.47E-04	1.44E-02
	2nd	2.44E-04	1.05E-04	6.82E-05	4.76E-04	1.73E-02
	3rd	3.17E-03	1.41E-03	2.80E-03	2.67E-03	5.43E-02
	4th	1.21E-02	1.58E-02	2.01E-02	1.46E-02	8.16E-02
1990	1st	1.38E-03	1.03E-03	7.09E-04	2.34E-03	1.92E-01
	2nd	1.93E-04	1.51E-04	8.62E-05	0.00E+00	2.65E-02
	3rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4th	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1991	1st	3.20E-03	3.85E-03	2.44E-03	2.50E-03	6.01E-02
	2nd	4.00E-03	5.95E-03	5.19E-03	2.95E-03	2.90E-02

* All activity, including Co-58, Co-60, Mn-54, Zn-65 and other isotopes, released except for tritium, alpha, and gases.

Fermi 2 Liquid Effluent Releases



Fermi 2 Total Activity Released



APPENDIX D

Glossary of Terms

GLOSSARY OF TERMS

activation products	Radioactive material that is created when stable substances are bombarded by neutron radiation.
ALARA	Acronym for "As Low As Reasonably Achievable," a basic concept of radiation protection that specifies radioactive discharges from nuclear plants and radiation exposure to personnel be kept as far below regulatory limits as possible.
alpha particle	A positively charged particle ejected from the nuclei of some radioactive elements. It is identical to a helium nucleus, and has a mass number 4 and a charge of +2. It has low penetrating power and short range. Alpha particles are easily stopped by a thin layer of paper or fabric, or the dead outer layer of skin cells.
atom	The smallest portion of an element that shares the general characteristics of that element and cannot be divided or broken up by chemical means. An atom has a nucleus, composed of positively charged protons and electrically neutral neutrons, around which orbit negatively charged electrons.
background radiation	The radiation in man's environment, including cosmic rays from space and radiation that exists everywhere--in the air, in the earth, and in man-made materials that surround us. In the United States, most

	people receive 100 to 250 millirem of background radiation per year. Common sources of man-made background radiation include consumer products such as color televisions, radium dials on watches or clocks, smoke detectors, coast-to-coast jet flights, construction materials, and certain foods.
beta particle	A charged particle emitted from a nucleus during radioactive decay, with a mass equal to 1/1837 that of a proton. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron. Beta particles are easily stopped by a thin sheet of metal, plastic or wood.
composite sample	A sample made of grab or continuous samples combined to represent a particular location or a set period of time (e.g., four weekly water samples combined to make one monthly composite sample).
continuous sample	A continuous sample is one that collects samples non-stop and is used to evaluate conditions over a specific period of time. The typical continuous samples collected at Fermi 2 include TLDs and air samples.
control location	A sample collection location generally more than 5 miles away from Fermi 2. Analyses of samples collected at control locations provide information on normally-occurring background radiation and radioactivity.
coolant	A fluid, usually water, used to cool the nuclear reactor core by transferring the heat energy emitted during the fission process into the fluid medium.

cosmic radiation	Penetrating ionizing radiation, both particulate and electromagnetic, that originates in space.
critical receptor	The segment of the population that could receive the greatest radiation dose.
curie (Ci)	The basic unit used to describe the intensity of radioactivity in a sample or material. One curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of one gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second.
dose	A quantity (total or accumulated) of ionizing radiation received.
dose rate	The radiation dose delivered per unit of time. Measured, for example, in rem per hour.
effluent	In general, a waste material, such as smoke, liquid, industrial refuse, or sewage discharged into the environment. Effluents discharged from the Fermi 2 Nuclear Power Plant include liquid and gaseous media containing extremely small concentrations of radionuclides. The concentrations released are well below the limits established by the NRC.
electron	An elementary particle with a negative charge and a mass 1/1837 that of the proton. Electrons orbit around the positively charged nucleus. In an electrically neutral atom, the negative charges of the electrons are balanced by the positive charges of the protons.

exposure	The absorption of radiation or ingestion of a radionuclide. Acute exposure is generally accepted to be a large exposure received over a short period of time. Chronic exposure is low level exposure received during a lifetime or over a long period of time.
external radiation	Exposure to ionizing radiation when the radiation source is located outside of the body.
fission	The splitting or breaking apart of a heavy atom into two or more fragments. When a heavy atom such as uranium is split, large amounts of energy in the form of heat, radiation, and one or more neutrons are released.
fission gases	Those fission products that exist in the gaseous state. Primarily the noble gasses (krypton, xenon,etc.).
fission products	The fragments formed by the fission of heavy elements, plus the nuclides formed by the fragments' radioactive decay.
gamma ray	High energy, short wavelength electromagnetic radiation emitted from the nucleus of a radioactive atom. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating but may be shielded by dense materials, such as lead or concrete. Gamma rays are similar to X-rays, but are usually more energetic.
grab samples	A grab sample represents a single sample collected in a finite period of time.

half-life	The time in which half of the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years.
indicator location	A sample collection location generally within 5 miles of Fermi 2. Analyses from samples collected at indicator locations provide information on the radiological impact, if any, Fermi 2 has on the surrounding environment.
internal radiation	Nuclear radiation resulting from radioactive substances in the body. Some examples are iodine-131 deposited in the thyroid gland and strontium-90 and plutonium-239 deposited in bone tissue.
ionizing radiation	Any radiation capable of displacing electrons from atoms or molecules, thereby producing ions. For example, alpha and beta particles, gamma and X-rays, neutrons, and ultraviolet light.
isotope	One of two or more atoms with the same number of protons, but different numbers of neutrons in their nuclei. Thus, carbon-12, carbon-13, and carbon-14 are isotopes of the element carbon; the numbers denoting their approximate atomic weights. Isotopes have the same chemical properties, but often different physical properties (for example, carbon-12 and carbon-13 are stable, while carbon-14 is radioactive).
lower limit of detection (LLD)	The smallest amount of sample activity that will give a net count, for which there is a confidence at a predetermined level, that the activity is present. The LLD is actually a measure of the ability of an individual analysis to detect extremely minute amounts of radioactivity in a sample.

mean	Arithmetic average. In a series of 3 or more numbers, the mean is calculated by the equation: $X = (x1 + x2 + ...xn)/n$ Where n is the number of observations in a data set, and x1, x2, ...xn are the various observations.
microcurie	One-millionth of a curie.
millirem	One-thousandth of a rem.
neutron	An uncharged elementary particle with a mass slightly greater than that of a proton, and found in the nucleus of every atom heavier than hydrogen-1.
noble gas	A gaseous chemical element that does not readily enter into chemical combination with other elements. An inert gas such as krypton, xenon, neon or argon.
nuclide	A general term referring to all known isotopes, both stable (279) and unstable (about 5000), of the chemical elements.
picocurie	One-trillionth of a curie.
quality control (QC)	The field check or verification of work while it is being performed to assure that the task is properly done.
radiation	The conveyance of energy through space, for example, the radiation of heat from a stove. Ionizing radiation is the emission of particles or gamma rays from the nucleus of an unstable (radioactive) atom as a result of radioactive decay.

radioactive decay	The decrease in the amount of radioactivity with the passage of time due to the spontaneous emission of particulate or gamma radiation from the atomic nuclei.
radioactivity	The spontaneous emission of radiation from the nucleus of an unstable isotope. Radioactivity is a process and radiation is the product.
radioiodine	A radioactive isotope of iodine. The radioisotopes of iodine are among the most abundant of the fission products. All told, 27 isotopes of iodine are known to exist, but only the naturally-occurring iodine-127 is stable. Of the remaining 26 radioisotopes, 12 are produced during fission and these have half-lives ranging from 1.5 seconds to 16 million years.
radioisotope	The term "radioisotope" is used to specifically describe the relationship between an element and a radioactive isotope of that element. For instance, in describing Cs-137, one could state that Cs-137 is a radioisotope of cesium (stable).
rem	Acronym for "roentgen equivalent man". The unit of dose of any ionizing radiation that produces the same biological effect as a unit of absorbed dose of X-rays.
Technical Specifications (Tech Specs)	A part of the operating license for any nuclear facility issued by the Nuclear Regulatory Commission (NRC), the Tech Specs delineate the requirements the facility must meet in order to maintain its operating license. For example, the Tech Specs for Fermi 2 provide detailed information on the types, collection sites, frequencies, and analyses to be performed on samples collected as part of the Radiological Environmental Monitoring Program.

terrestrial radiation	The portion of natural radiation (background) that is emitted by naturally occurring radioactive materials in the earth.
tritium	A radioactive isotope of hydrogen (one proton, two neutrons). Because it is chemically identical to natural hydrogen, tritium can easily be taken into the body by any ingestion path. Tritium decays by beta emission. Its radioactive half-life is about 12-1/2 years.

APPENDIX E

Tritium In The Environment

Tritium In The Environment

Ever since the earth has had an atmosphere containing oxygen and nitrogen, there has been tritium present in nature. It is produced continuously by the interaction of cosmic rays with the nuclei of oxygen and nitrogen atoms. It also decays continuously so that a steady state has been reached for natural tritium. There is some uncertainty concerning the amount of tritium arising from cosmic rays, but an average of the best estimates of the world inventory is about 50 megacuries (MCi) (1 MCi = 1 million Ci).

About 90 percent of the tritium from cosmic rays is in the hydrosphere (i.e., in the ocean and other terrestrial waters). Nearly all of the remainder is in the stratosphere, where the tritium is actually produced by the cosmic-ray reactions. From the stratosphere, the tritium gradually descends into the lower part of the atmosphere by natural diffusion. It is then brought down as tritiated water by rain or snow to the earth's surface, and accumulates in the hydrosphere. As a result of natural circulation - namely, evaporation of water, cloud formation, and precipitation -tritium is fairly uniformly distributed wherever water is present, including plants and animals.

The testing of thermonuclear weapons in the atmosphere, particularly between 1954 and 1963, brought about an increase in the amount of tritium on the earth. The total quantity introduced in this manner before the Nuclear Test Ban Treaty was signed, in 1963, has been estimated to be approximately 1700 MCi. Smaller quantities of tritium have been added since 1963 from the atmospheric testing of nuclear explosives by China and France, but, on the whole, there has been a general decline due to radioactive decay. Nevertheless, by the year 2000 there will still remain at least 300 MCi of tritium from this source.

The amounts of tritium that will be produced by the generation of electric power from worldwide nuclear reactor plants up to the year 2000 have been estimated by the Environmental Protection Agency (EPA). According to this estimate, the world inventory of tritium in the year 2000 from nuclear power operations will be approximately 450 MCi.

In 1990, the amount of tritium released to the environment by Fermi 2 effluents was 0.75 Ci. This is an extremely small fraction of the amount of tritium, when compared to 50 million Ci that are naturally occurring and 1700 million Ci from weapons testing, that already exist in the environment. Because this is such a small fraction of the total amount of tritium in the environment surrounding Fermi 2, it is highly unlikely that an increase in tritium concentrations from Fermi 2 effluents could be detected in environmental samples.

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