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April 30, 1992

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Annual Radiological Environmental Operating Report
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Sirs:

The enclosed information is being submitted in accordance with the requirements of Technical Specification Section 6.9.1.3.

This information is a summary of all analyses performed as part of the Radiological Environment Monitoring requirements of Section 3.16 of the R.E. Ginna Technical Specifications. Trend plots of gross beta data for air and selected water samples are included for the years of 1990 and 1991 and the years of 1968 to 1990 and gamma measurements from TLD's surrounding the R.E. Ginna site for 1990 and 1991.

From the data collected, there does not appear to be any measurable effect to the environment from the operation of the R.E. Ginna Plant.

Very truly yours,

Robert C. Mecredy

Enclosures

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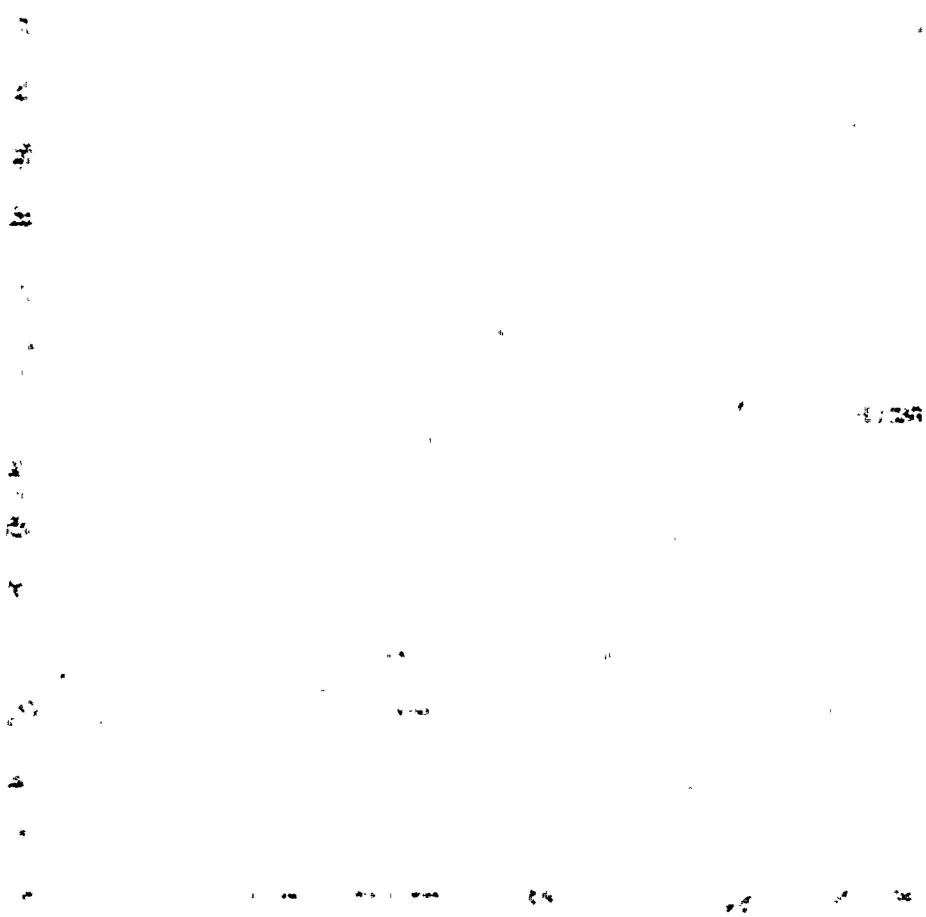
ANNUAL RADIOLOGICAL ENVIRONMENTAL
OPERATING REPORT

R.E. Ginna Nuclear Plant

Rochester Gas & Electric Corporation

Docket No. 50-244



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RADIOLOGICAL ENVIRONMENTAL SURVEY

January - December 1991

1.0 SUMMARY

During 1991, there were no measurable influences from radioactive effluent releases. Routine measurements are taken in the areas surrounding the R.E. Ginna Nuclear Power Plant to determine if man-made radioactivity is being released at a level that would cause an influence to the environs surrounding the plant. Samples are collected on an established schedule for regular testing to determine if measurable levels of activity exist that may be attributed to the operation of the plant. The information obtained from measurements of these environmental samples is compared to the calculated levels of potential activity at the sampling locations from normal plant releases as determined by monitors within the plant effluent streams.

Samples of water, air, fallout, fish, vegetation, milk and direct radiation are collected from locations near the plant that were determined to be at the point of highest concentration from releases through the plant and containment vents and from additional locations at distances ranging out to eighteen miles. Reference samples for background measurements are collected concurrently from locations calculated to have radioactivity concentrations less than 1% of those from the closer sampling locations. These background samples provide continuous background data which makes it possible to distinguish between significant radioactivity introduced into the environment from the operation of the plant and that introduced from other sources.

During 1991, 1670 samples were obtained and analyzed for beta and gamma emitters through gross activity counting techniques and gamma spectroscopy. These total 892 air samples, 488 water samples, 16 fish samples, 8 vegetation samples, 112 milk samples and 154 thermoluminescent dosimeter measurements. As part of a required quality control program, 12 EPA Interlaboratory Comparison Studies samples (comparable to normal samples taken by the environmental program) were analyzed and reported.

A summary of the data collected indicating the results of all data for indicator and control locations is given in Table 1-1.

Table 1-1
ROCHESTER GAS AND ELECTRIC CORPORATION
ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY
R.E. GINNA NUCLEAR POWER PLANT DOCKET NO. 50-244
WAYNE, NEW YORK REPORTING PERIOD 1991

PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES	LLD	INDICATOR LOCATIONS MEAN (1) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: NAME DISTANCE AND DIRECTION	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (1) RANGE	CONTROL LOCATIONS MEAN (1) RANGE
AIR: PARTICULATE (pCi/Cu.M.)	GROSS BETA 632	0.003	0.018 (368/368) 0.006-0.034	ONSITE LOCATION #3 420 M 110	0.020 (53/53) 0.009-0.034	0.017 (264/264) 0.006-0.034
	GAMMA SCAN 48	(2)	<LLD	———	———	<LLD
IODINE	GAMMA SCAN 212	0.02- 0.08	<LLD	———	———	<LLD
DIRECT RADIATION: (3) TLD (mR/QUARTER)	GAMMA 154	5.0	11.4 (67/67) 7.3-17.0	ONSITE LOCATION #5 160 M 185	13.2 (4/4) 10.7-17.0	10.0 (84/84) 7.3-21.3
WATER: DRINKING (pCi/LITER)	GROSS BETA 77	1.2	2.52 (77/77) 0.87-8.10	WELL "B" 640 M 150	3.95 (12/12) 2.21-5.09	——— ———
	GAMMA SCAN 51	(2)	Ra-226 30 (12/51) 15-41	WELL "B" 640 M 150	Ra-226 30 (12/12) 15-41	<LLD
	IODINE 36	0.20	0.10 20/36 0.20-0.22	CWD 2200 M 70	0.11 (3/12) 0.02-0.22	<LLD)
SURFACE (pCi/LITER)	GROSS BETA 167	1.2	2.50 (118/118) 0.66-12.43	DEER CREEK 200 M 135	3.16 (12/12) 1.71-4.11	2.34 (50/50) 0.47-4.79
	GAMMA SCAN 51	(2)	Ra-266 22 (5/51) 16-29	DEER CREEK 200 M 135	Ra-226 22 (5/12) 16-29	<LLD
	IODINE 46	0.24	0.15 (21/35) 0.02-0.55	CIRC IN 420 M 0	0.18 (8/11) 0.02-0.55	0.16 (8/11) 0.02-0.37
RAINFALL (pCi/sq.M/day)	GROSS BETA 60	1.2	4.54 (24/24) 0.68-10.22	STATION #3 420 M 110	5.06 (12/12) 1.23-10.22	4.18 (36/36) 0.06-10.34
MILK: (pCi/LITER)	IODINE 56	0.24	0.142 (27/38) 0.011-0.930	FARM C 4400 M 156	0.195 (10/13) 0.018-0.930	0.123 (11/17) 0.017-0.183
	GAMMA SCAN 56	(2)	<LLD	———	———	<LLD
FISH: (pCi/Kg)	GAMMA SCAN 16	(2)	Cs-137 22 (8/8) 15-38	DISCHARGE PLUME	———	Cs-137 28 (6/8) 18-38
VEGETATION: (pCi/Kg)	GAMMA SCAN 8	(2)	Cs-137 26 (1/6)	STATION #3 420 M 110	——— ———	——— ———

(1) Mean and range based on detectable measurements only. Fraction of detectable measurements at specified locations in parentheses.
(2) Table of LLD values attached for gamma scan measurements.

2.0 SURVEILLANCE PROGRAM

2.1 Regulatory Limits

The Technical Specification requirements for the radiological environmental monitoring program are:

Monitoring Program

The radiological environmental monitoring program shall be conducted as specified in Table 3.16-1 at the locations given in the ODCM.

If the radiological environmental monitoring program is not conducted as specified in Table 3.16-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence. (Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal availability, or to malfunction of automatic sampling equipment. If the latter, efforts shall be made to complete corrective action prior to the end of the next sampling period.)

If milk or fresh leafy vegetable samples are unavailable for more than one sample period from one or more of the sampling locations indicated by the ODCM, a discussion shall be included in the Semiannual Radioactive Effluent Report which identifies the cause of the unavailability of samples and identifies locations for obtaining replacement samples. If a milk or leafy vegetable sample location becomes unavailable, the locations from which samples were unavailable may then be deleted from the ODCM, provided that comparable locations are added to the environmental monitoring program.

Land Use Census

A land use census shall be conducted and shall identify the location of the nearest milk animal and the nearest residence in each of the 16 meteorological sectors within a distance of five miles.

An onsite garden located in the meteorological sector having the highest historical D/Q may be used for broad leaf vegetation sampling in lieu of a garden census; otherwise the land use census shall also identify the location of the nearest garden of greater than 500 square feet in each of the 16 meteorological sectors within a distance of five miles. D/Q shall be determined in accordance with methods described in the ODCM.

Interlaboratory Comparison Program

Analyses shall be performed on applicable radioactive environmental samples supplied as part of an interlaboratory comparison program which has been approved by NRC, if such a program exists.

2.2 Regulatory Fulfillment

The fulfillment of the Technical Specification requirements shall be demonstrated when:

Specification

The radiological environmental monitoring samples shall be collected pursuant to Table 3.16-1. Acceptable locations are shown in the ODCM. Samples shall be analyzed pursuant to the requirements of Tables 3.16-1 and 4.10-1.

A land use census shall be conducted annually (between June 1 and October 1).

A summary of the results obtained as part of the required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operating Report.

2.3 Deviations from the Sampling Schedule

Deviations from the sampling schedule are allowed when samples are unavailable due to hazardous conditions, seasonal variations or malfunction of automatic sampling equipment. There were deviations from the sampling schedule during 1991, but, the minimum number of samples required in Tech Spec Table 3.16-1 were collected for all.

These deviations were:

a. A major ice storm struck the area March 3 and 4 which blacked out large portions of the service area. Some of the samplers were not returned to service for periods up to eight days. The environmental laboratory was without power for four days.

b. Iodine in water samples for composites were omitted when the lab was without power and separations could not be counted.

TECHNICAL SPECIFICATION TABLE 3-16.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples & Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
1. AIRBORNE			
a. Radioiodine	2 indicator 2 control	Continuous operation of sampler with sample collection at least once per 10 days.	Radioiodine canister. Analyze within 7 days of collection of I-131.
b. Particulate	7 indicator 5 control	Same as above	Particulate sampler. Analyze for gross beta radioactivity $\geq$ 24 hours following filter change. Perform gamma isotopic analysis on each sample for which gross beta activity is > 10 times the mean of offsite samples. Perform gamma isotopic analysis on composite (by location) sample at least once per 92 days.
2. DIRECT RADIATION	18 indicator 10 control 11 placed greater than 5 miles from plant site	TLDs at least quarterly.	Gamma dose quarterly.

TECHNICAL SPECIFICATION TABLE 3-16.1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples & Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
3. WATERBORNE			
a. Surface	1 control (Russell Station) 1 indicator (Condenser Water Discharge)	Composite* sample collected over a period of ≤ 31 days.	Gross beta and gamma isotopic analysis of each composite sample. Tritium analysis of one composite sample at least once per 92 days.
b. Drinking	1 indicator (Ontario Water District Intake)	Same as above	Same as above

*Composite sample to be collected by collecting an aliquot at intervals not exceeding 2 hours.

TECHNICAL SPECIFICATION TABLE 3-16.1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples & Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
4. INGESTION			
a. Milk	1 control 3 indicator June thru October each of 3 farms	At least once per 15 days.	Gamma isotopic and I-131 analysis of each sample.
	1 control 1 indicator November thru May one of the farms	At least once per 31 days.	Gamma isotopic and I-131 analysis of each sample.
b. Fish	4 control 4 indicator (Off shore at Ginna)	Twice during fishing season including at least four species.	Gamma isotopic analysis on edible portions of each sample.
c. Food Products	1 control 2 indicator (On site)	Annual at time of harvest. Sample from two of the following: 1. apples 2. cherries 3. grapes	Gamma isotopic analysis on edible portion of sample.
	1 control 2 indicator (On site garden or nearest offsite garden within 5 miles in the highest D/Q meteorological sector)	At time of harvest. One sample of: 1. broad leaf vegetation 2. other vegetable	Gamma isotopic analysis on edible portions of each sample.

The maximum LLD values as defined by Tech Specs Table 4.10-1 are:

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Food Particulate (pCi/kg, wet)
gross beta	4[a]	1×10^{-2}			
^{3}H	2000(1000[a])				
^{54}Mn	15		130		
^{59}Fe	30		260		
$^{58,60}Co$	15		130		
^{65}Zn	30		260		
^{95}Zr-Nb	15[b]				
^{131}I	1	7×10^{-2}		1	60
$^{134,137}Cs$	15(10[a]),18	1×10^{-2}	130	15	60
^{140}Ba-La	15[b]			15[b]	

a. LLD for drinking water

b. Total for parent and daughter

LLD TABLE NOTATION

The LLD is the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66\ Sb}{E\ V\ 2.22\ Y\ \exp[(-\Delta t)\lambda]}$$

where

LLD is the lower limit of detection as defined above (as pCi per unit mass or volume)

Sb is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)

E is the counting efficiency (as counts per disintegration)

V is the sample size (in units of mass or volume)

2.22 is the number of disintegrations per minute per picocurie

Y is the fractional radiochemical yield (when applicable) .

λ is the radioactive decay constant for the particular radionuclide

Δt is the elapsed time between sample collection and counting

The value of Sb used in the calculation of the LLD for a particular measurement system shall be based on the actual observed variance of the background counting rate or the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contribution of other radionuclides normally present in the samples (e.g., potassium-40 in milk samples).

Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally, background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable.

Table 2-1

LOWER LIMIT OF DETECTION (LLD)

	Air Filters(a)	Water		Milk	Fish	Vegetation(a)
	pCi/M³	pCi/liter		pCi/liter	pCi/kg	pCi/kg
Sample Size	3500 M³/Qtr.	3.5 liters		3.5 liters	2 kg	2 kg
Ave. Decay(c)	55 days	0.5 d	8 days	0.5 d	6 days	0.5 days
Be-7	0.025	28	31			
K-40	0.031					
Cr-51	0.035	30	35		220	95
Mn-54	0.002	3	3		10	10
Fe-59	0.005	6	6		30	20
Co-58	0.002	3	3		10	10
Co-60	0.002	4	4	4	10	13
Zn-65	0.003	6	6		25	22
Zr-95	0.004	6	6		24	17
Nb-95	0.003	3	3		18	10
Ru-103	0.003	3	3		18	12
Ru-106	0.012	28	28		95	100
I-131	0.03 (b)	4 Gamma 0.20 Beta		10 Gamma 0.20 Beta	15	12
Cs-134	0.002	3	3		10	10
Cs-137	0.002	4	5	4	11	12
BaLa-140	0.064	12	17	4	12	10
Ce-141	0.05	7	8		40	25
Ce-144	0.09	30	30		100	100
Ra-226		7	7		20	20
Beta	0.004	1.2 (1 liter)				

(a) LLD value will vary due to different sample sizes. Data based on 1991 background sample spectra.

(b) Charcoal Cartridge

(c) Ave. decay-normal period from midpoint of sampling period to counting time.

[illegible]

Table 2-2

DIRECTION AND DISTANCE TO SAMPLE POINTS
All directions given in degrees and all distances given in meters

Air Sample Stations

	Direction	Distance
# 2	87	320
# 3	110	420
# 4	140	250
# 5	185	160
# 6	232	225
# 7	257	220
# 8	258	19200
# 9	235	11400
#10	185	13100
#11	123	11500
#12	93	25100
#13	194	690

Water Sample Locations

	Direct	Dist.
Russell Station	270	25600
Ontario Water District Intake	70	2200
Circ Water Intake	0	420
Circ Water Discharge	15	130
Deer Creek	105	260
Well B	150	640
Tap	Onsite	Sink
Rainfall # 3	110	420
Rainfall # 5	185	160
Rainfall # 8	258	19200
Rainfall #10	185	13100
Rainfall #12	93	25100

Milk Sample Locations

	Direct	Dist.
Farm A	113	9500
Farm B	242	4400
Farm C	156	4400
Farm D	132	21600

Fish Samples

Indicator Samples	Lake Ontario Discharge Plume
Background Samples	Russell Station

Produce Samples

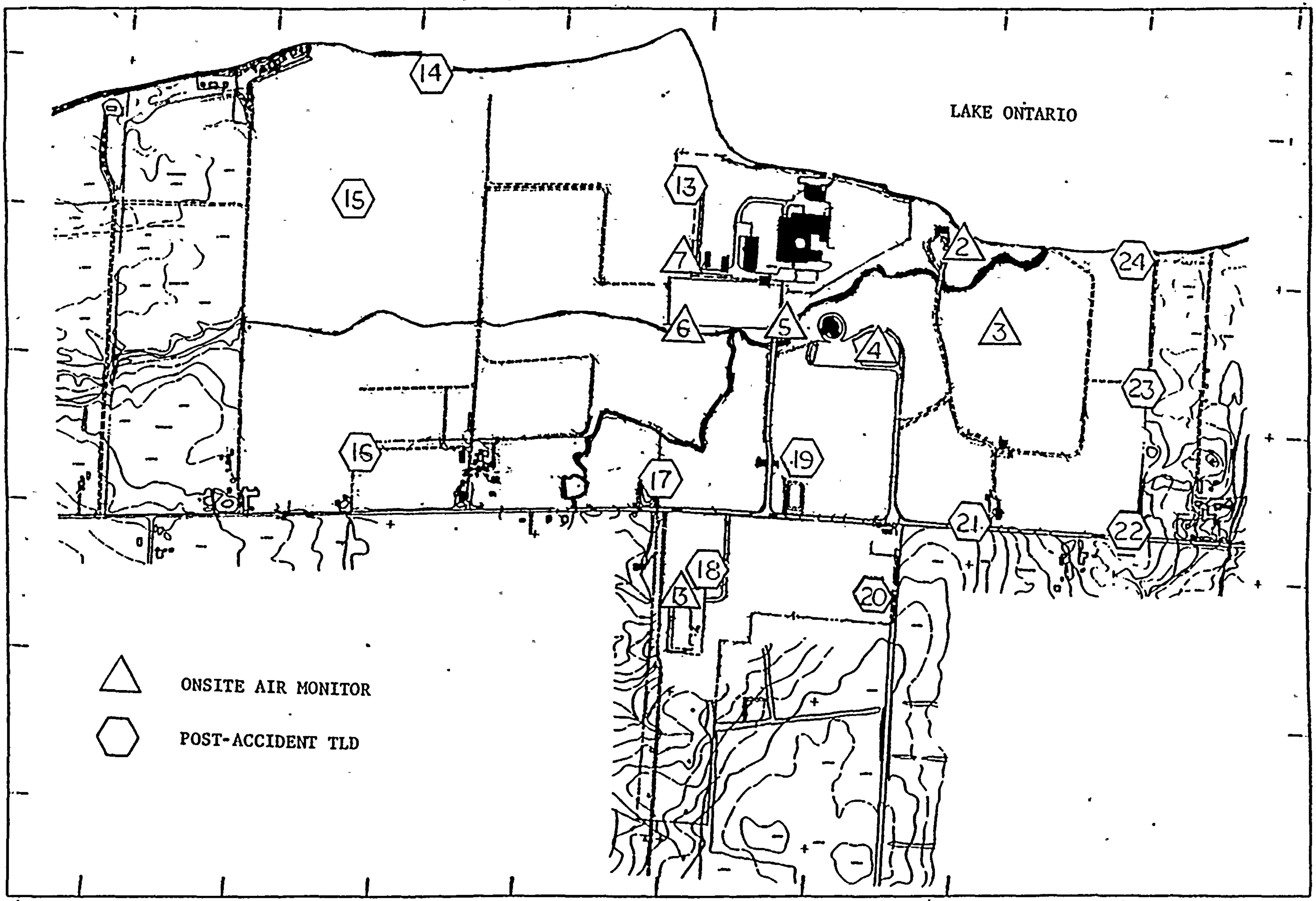
Indicator Samples	Grown on property surrounding Plant
Background Samples	Purchased from farms > 10 miles

TLD Locations

	Direction	Distance
# 2	87	320
# 3	110	420
# 4	140	250
# 5	185	160
# 6	232	125
# 7	257	220
# 8	258	19200
# 9	235	11400
#10	185	13100
#11	123	11500
#12	93	25100
#13	292	230
#14	292	770
#15	272	850
#16	242	900
#17	208	500
#18	193	650
#19	177	400
#20	165	680
#21	145	600
#22	128	810
#23	107	680
#24	90	630
#25	247	14350
#26	223	14800
#27	202	14700
#28	145	17700
#29	104	13800
#30	103	20500
#31	263	7280
#32	246	6850
#33	220	7950
#34	205	6850
#35	193	7600
#36	174	5650
#37	158	6000
#38	137	7070
#39	115	6630
#40	87	6630

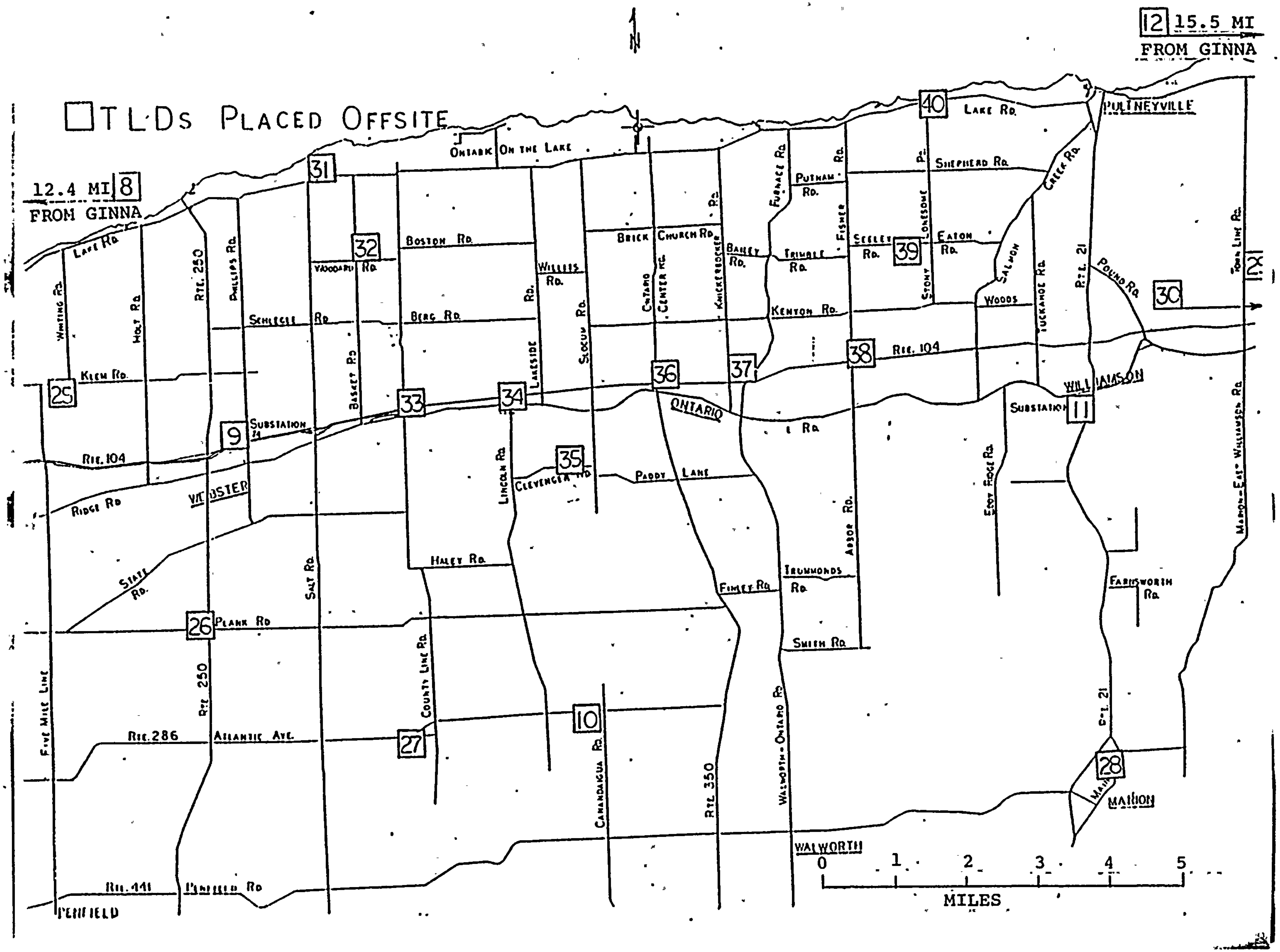
Map 2-1

Onsite Sample Locations



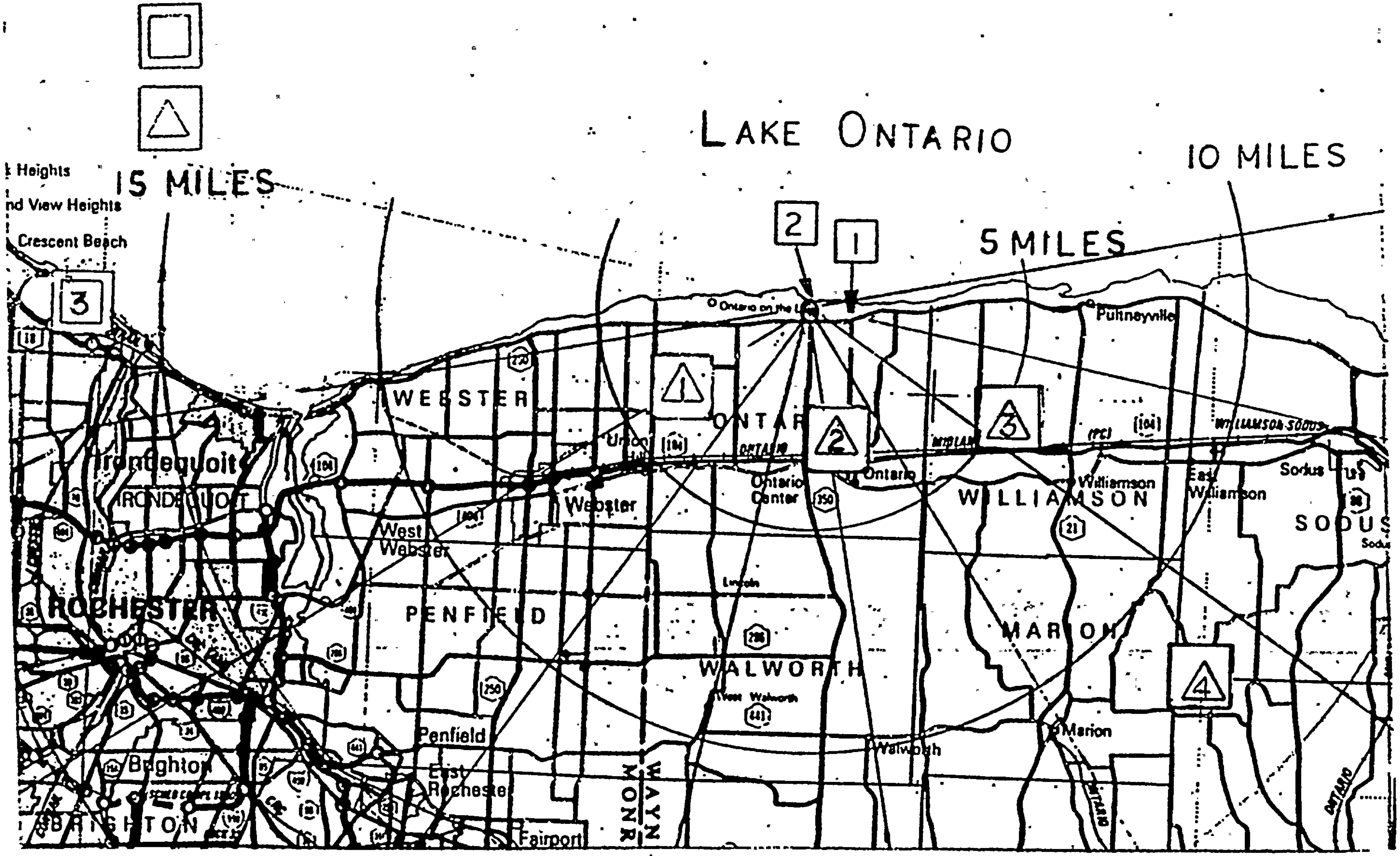
Map 2-2

Offsite Sample Locations



Map 2-3

Water Sample and Milk Farm Locations



3.0 DATA SUMMARY

3.1 Analytical Results

The values listed on the following tables include the uncertainties stated as 2 standard deviations (95% confidence level).

Key Definitions

Curie (Ci):	The quantity of any radionuclide in which the number of disintegrations per second is 37 billion.
Picocurie (pCi):	One millionth of a millionth of a curie or 0.037 disintegrations per second.
Cubic Meter (M^3):	Approximately 35.3 cubic feet.
Liter (L):	Approximately 1.06 quarts.

Lower Limit of Detection

The Nuclear Regulatory Commission has requested that reported values be compared to the Lower Limit of Detection (LLD) for each piece of equipment. Table 2-1 is a listing of the LLD values for gamma isotopes using our Ge(Li) multichannel pulse height detector system. These values are before the correction for decay. An explanation of the calculation of the LLD is included before Table 2-1. Gross detection limits are as follows:

Beta:

Air	0.003 pCi/M^3 gross beta for 400 m^3 sample.
Water	1.2 pCi/L gross beta for 1 liter sample.
Milk	0.20 pCi/L iodine 131 for 4 liter sample.
Fallout	1.1 pCi/m^2/day for 0.092 M^2 collection area.

Gamma:

Air	0.03 pCi/m^3 iodine 131 on charcoal cartridge for 400 M^3 sample.

Radiation: 5 millirem/quarter for one quarter exposure (TLD).

[illegible]

3.2 Air Samples

Radioactive particles in air are collected by drawing approximately one cfm through a two inch diameter particulate filter. The volume of air sampled is measured by a dry gas meter and corrected for the pressure drop across the filter. The filters are changed weekly and allowed to decay for three days prior to counting to eliminate most of the natural radioactivity such as the short half-life daughter products of radon and thoron. The decay period is used to give a more sensitive measurement of long-lived man-made radioactivity.

A ring of 6 sampling stations is located on the plant site from 150 to 300 meters from the reactor near the point of the maximum annual average ground level concentration. In addition, there is a ring of 5 sampling stations located approximately 7 to 17 miles from the site that serve as background stations.

Based on weekly comparisons, there was no statistical difference between the on-site and the background radioactive particulate concentrations. The average concentrations for the on-site and background samples were 0.018 and 0.017 pCi/m^3 respectively for the period of January to December, 1991. Maximum weekly concentrations for each station were less than 0.034 pCi/m^3.

The major airborne activities released from the plant are noble gases, tritium, radioiodines and carbon-14. Most of this activity is released in a gaseous form, however, some radioiodine is released as airborne particulate. For airborne particulates, the average calculated concentration of particulate at the site boundary due to measurable plant releases would be 8.0E-5 pCi/m^3 or 0.019% of the average release concentration of 0.447 pCi/m^3. The survey cannot detect such a concentration which is <3% of the LLD of 0.003 pCi/m^3.

Tables 3-1A, 3-1B are a list of values for the on-site samplers. Tables 3-2A, 3-2B are a list of values for the off-site samplers.

The particulate filters from each sampling location were saved and a 13 week composite was made. A gamma isotopic analysis was done for each sampling location and corrected for decay. The results of these analyses are listed in Tables 3-3 A to D.

Iodine cartridges are placed at four locations. These cartridges are changed and counted each week. A list of values for these cartridges is given in Table 3-4. During late 1990 and 1991, a sampler placed at location #9 had a low sample flow rate and the calculated LLD exceeded the required LLD of 0.07 pCi/cu meter. The calculated LLD was normally $\leq$ 0.085 pCi/cu meter. The sampler was replaced during normal annual maintenance in December 1991. Station #11 exceeded the required LLD for 3 weeks during and after the March ice storm when the sampler operated for short intermittent periods until the breaker could be repaired.

Trend plots of the 1991 air filter data with a comparison to the 1990 air filter data are included for both onsite and offsite air monitors. Additionally, a trend plot of the annual averages measured since 1968 is included to show the variation of data during the years that the R.E. Ginna Nuclear Power Plant has been operational. The peak activities measured correspond to the years when atmospheric tests of nuclear weapons were being conducted.

Table 3-1 A
On-Site Samplers
Results in pCi/m3

Week Ending	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta #13A	Average
4-Jan	0.016 ± 0.001	0.020 ± 0.002	0.018 ± 0.002	0.019 ± 0.002	0.034 ± 0.003	0.019 ± 0.002	0.017 ± 0.002	0.020
11-Jan	0.018 ± 0.002	0.022 ± 0.002	0.020 ± 0.002	0.020 ± 0.002	0.020 ± 0.002	0.016 ± 0.001	0.021 ± 0.002	0.020
18-Jan	0.018 ± 0.001	0.022 ± 0.002	0.021 ± 0.002	0.020 ± 0.002	0.020 ± 0.002	0.010 ± 0.001	0.021 ± 0.002	0.019
25-Jan	0.021 ± 0.002	0.027 ± 0.002	0.023 ± 0.002	0.023 ± 0.002	0.022 ± 0.017	0.024 ± 0.002	0.022 ± 0.002	0.023
1-Feb	0.015 ± 0.001	0.019 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	(A)	0.018 ± 0.002	0.017 ± 0.002	0.017
8-Feb	0.021 ± 0.002	0.027 ± 0.002	0.021 ± 0.002	0.025 ± 0.002	0.022 ± 0.002	0.023 ± 0.002	0.025 ± 0.002	0.023
15-Feb	0.014 ± 0.001	0.018 ± 0.002	0.016 ± 0.002	0.016 ± 0.002	0.016 ± 0.002	0.015 ± 0.001	0.015 ± 0.002	0.016
22-Feb	0.013 ± 0.001	0.016 ± 0.002	0.013 ± 0.002	0.015 ± 0.002	0.019 ± 0.002	0.015 ± 0.001	0.014 ± 0.002	0.015
1-Mar	0.014 ± 0.001	0.018 ± 0.002	0.014 ± 0.001	0.018 ± 0.001	0.016 ± 0.001	0.014 ± 0.001	0.017 ± 0.001	0.016
8-Mar	0.012 ± 0.002	0.015 ± 0.002	0.013 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.013 ± 0.002	0.014 ± 0.001	0.013
15-Mar	0.020 ± 0.001	0.023 ± 0.002	0.021 ± 0.002	0.021 ± 0.002	0.020 ± 0.001	0.021 ± 0.001	0.021 ± 0.002	0.021
22-Mar	0.014 ± 0.001	0.011 ± 0.001	0.015 ± 0.001	0.017 ± 0.001	0.017 ± 0.001	0.017 ± 0.001	0.018 ± 0.001	0.016
29-Mar	0.010 ± 0.001	0.012 ± 0.001	0.012 ± 0.001	0.011 ± 0.001	0.012 ± 0.001	0.012 ± 0.001	0.011 ± 0.001	0.011
5-Apr	0.022 ± 0.001	0.027 ± 0.002	0.021 ± 0.002	0.022 ± 0.002	0.022 ± 0.002	0.022 ± 0.001	0.020 ± 0.002	0.022
12-Apr	0.019 ± 0.001	0.022 ± 0.002	0.019 ± 0.002	0.020 ± 0.002	(A)	0.020 ± 0.001	0.018 ± 0.001	0.020
19-Apr	0.014 ± 0.001	0.017 ± 0.002	0.013 ± 0.001	0.014 ± 0.001	0.009 ± 0.003	0.016 ± 0.001	0.014 ± 0.001	0.014
26-Apr	0.014 ± 0.001	0.018 ± 0.002	0.014 ± 0.001	0.017 ± 0.002	0.015 ± 0.001	0.015 ± 0.001	0.016 ± 0.001	0.016
3-May	0.015 ± 0.001	0.019 ± 0.002	0.017 ± 0.002	0.017 ± 0.001	0.016 ± 0.001	0.015 ± 0.001	0.018 ± 0.001	0.017
10-May	0.007 ± 0.001	0.009 ± 0.001	0.007 ± 0.001	0.008 ± 0.001	0.007 ± 0.001	0.008 ± 0.002	0.007 ± 0.001	0.008
17-May	0.023 ± 0.001	0.028 ± 0.002	0.023 ± 0.002	0.025 ± 0.002	0.023 ± 0.002	0.023 ± 0.002	0.023 ± 0.002	0.024
24-May	0.020 ± 0.001	0.022 ± 0.002	0.019 ± 0.002	0.019 ± 0.002	0.019 ± 0.001	0.021 ± 0.002	0.021 ± 0.002	0.020
31-May	0.016 ± 0.001	0.018 ± 0.002	0.019 ± 0.002	(B)	0.016 ± 0.001	0.017 ± 0.001	0.016 ± 0.001	0.017
7-Jun	0.013 ± 0.001	0.017 ± 0.002	0.012 ± 0.001	0.011 ± 0.001	0.012 ± 0.001	0.013 ± 0.001	0.011 ± 0.001	0.013
14-Jun	0.015 ± 0.002	0.019 ± 0.002	0.016 ± 0.002	0.016 ± 0.001	0.014 ± 0.002	0.017 ± 0.001	0.014 ± 0.001	0.016
21-Jun	0.014 ± 0.001	0.018 ± 0.002	0.012 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.014
28-Jun	0.015 ± 0.001	0.021 ± 0.002	0.016 ± 0.001	0.019 ± 0.002	0.018 ± 0.001	0.020 ± 0.001	0.019 ± 0.001	0.018
Maximum	0.023	0.028	0.023	0.025	0.034	0.024	0.025	
Average	0.016	0.019	0.017	0.017	0.017	0.017	0.017	
Minimum	0.007	0.009	0.007	0.008	0.007	0.008	0.007	

(A) Unit out of service

(B) Filter torn or off center

Table 3-1 B
On-Site Samplers
Results in pCi/m3

Week Ending	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta. #13A	Average
3-Jul	0.014 ± 0.002	0.018 ± 0.002	0.015 ± 0.002	0.015 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	0.022 ± 0.003	0.016
12-Jul	0.018 ± 0.001	0.020 ± 0.001	0.017 ± 0.001	0.016 ± 0.001	0.016 ± 0.001	0.017 ± 0.001	0.017 ± 0.001	0.017
19-Jul	0.024 ± 0.001	0.029 ± 0.002	0.023 ± 0.002	0.023 ± 0.002	0.021 ± 0.001	0.021 ± 0.002	0.022 ± 0.002	0.023
26-Jul	0.031 ± 0.002	0.034 ± 0.002	0.032 ± 0.002	0.032 ± 0.002	0.029 ± 0.002	0.029 ± 0.002	0.031 ± 0.002	0.031
2-Aug	0.014 ± 0.001	0.017 ± 0.002	0.013 ± 0.001	0.015 ± 0.001	0.013 ± 0.001	0.015 ± 0.001	0.014 ± 0.001	0.014
9-Aug	0.012 ± 0.001	0.014 ± 0.001	0.011 ± 0.001	0.010 ± 0.001	0.010 ± 0.001	0.011 ± 0.001	0.011 ± 0.001	0.011
16-Aug	0.016 ± 0.001	0.018 ± 0.002	0.014 ± 0.001	0.015 ± 0.001	0.016 ± 0.001	0.015 ± 0.001	0.019 ± 0.002	0.016
23-Aug	0.018 ± 0.001	0.021 ± 0.002	0.017 ± 0.001	0.018 ± 0.001	0.018 ± 0.001	0.021 ± 0.002	0.018 ± 0.001	0.019
30-Aug	0.025 ± 0.002	0.028 ± 0.002	0.022 ± 0.001	0.025 ± 0.002	0.025 ± 0.002	0.028 ± 0.002	0.023 ± 0.002	0.025
6-Sep	0.017 ± 0.001	0.019 ± 0.001	0.015 ± 0.001	0.018 ± 0.001	0.017 ± 0.001	0.017 ± 0.001	0.016 ± 0.001	0.017
13-Sep	0.018 ± 0.002	0.022 ± 0.002	0.017 ± 0.001	0.021 ± 0.002	0.020 ± 0.002	0.022 ± 0.002	0.019 ± 0.001	0.020
20-Sep	0.016 ± 0.001	0.019 ± 0.002	0.015 ± 0.001	0.016 ± 0.001	0.016 ± 0.001	0.019 ± 0.002	0.014 ± 0.001	0.016
27-Sep	0.008 ± 0.001	0.010 ± 0.001	0.006 ± 0.001	0.008 ± 0.001	0.008 ± 0.001	0.009 ± 0.001	0.008 ± 0.001	0.008
4-Oct	0.019 ± 0.002	0.022 ± 0.002	0.017 ± 0.001	0.020 ± 0.002	0.019 ± 0.002	0.021 ± 0.002	0.019 ± 0.001	0.020
11-Oct	0.019 ± 0.002	0.019 ± 0.002	0.016 ± 0.001	0.019 ± 0.002	0.018 ± 0.002	0.021 ± 0.002	0.020 ± 0.001	0.019
18-Oct	0.014 ± 0.001	0.017 ± 0.001	0.012 ± 0.001	0.013 ± 0.001	0.014 ± 0.002	0.016 ± 0.002	0.013 ± 0.001	0.014
25-Oct	0.027 ± 0.002	0.027 ± 0.002	0.022 ± 0.001	0.029 ± 0.002	0.027 ± 0.002	0.024 ± 0.002	0.025 ± 0.002	0.026
1-Nov	0.023 ± 0.002	0.022 ± 0.002	0.023 ± 0.001	0.022 ± 0.002	0.020 ± 0.002	0.020 ± 0.002	0.023 ± 0.001	0.022
8-Nov	0.024 ± 0.002	0.022 ± 0.002	0.020 ± 0.001	0.024 ± 0.002	0.024 ± 0.002	0.020 ± 0.002	0.024 ± 0.002	0.023
15-Nov	0.020 ± 0.002	0.019 ± 0.002	0.016 ± 0.001	0.017 ± 0.002	0.020 ± 0.002	0.019 ± 0.002	0.020 ± 0.001	0.019
21-Nov	0.021 ± 0.002	0.019 ± 0.002	0.019 ± 0.002	0.020 ± 0.003	0.020 ± 0.002	0.017 ± 0.002	0.022 ± 0.002	0.020
27-Nov	0.016 ± 0.002	0.014 ± 0.002	0.012 ± 0.001	0.017 ± 0.003	0.014 ± 0.002	0.017 ± 0.003	0.016 ± 0.001	0.015
5-Dec	0.016 ± 0.001	0.015 ± 0.001	0.014 ± 0.001	0.016 ± 0.002	0.016 ± 0.002	0.016 ± 0.002	0.017 ± 0.001	0.016
13-Dec	0.023 ± 0.002	0.023 ± 0.002	0.019 ± 0.001	0.025 ± 0.002	0.023 ± 0.002	0.023 ± 0.002	0.024 ± 0.001	0.023
20-Dec	0.018 ± 0.002	0.018 ± 0.002	0.016 ± 0.001	0.018 ± 0.002	0.018 ± 0.002	0.026 ± 0.002	0.021 ± 0.001	0.019
27-Dec	0.015 ± 0.001	0.017 ± 0.002	0.017 ± 0.001	0.018 ± 0.002	0.020 ± 0.002	0.017 ± 0.002	0.019 ± 0.001	0.018
3-Jan	0.020 ± 0.002	0.019 ± 0.002	0.015 ± 0.001	0.019 ± 0.002	0.018 ± 0.002	0.018 ± 0.002	0.020 ± 0.001	0.018
Maximum	0.031	0.034	0.032	0.032	0.029	0.029	0.031	
Average	0.019	0.020	0.017	0.019	0.018	0.019	0.019	
Minimum	0.008	0.010	0.006	0.008	0.008	0.009	0.008	

Table 3-2 A
Off-Site Samplers
Results in pCi/m3

Week Ending	Sta. #8	Sta.#9	Sta. #10	Sta. #11	Sta.#12	Average
4-Jan	0.017 ± 0.003	0.016 ± 0.003	0.015 ± 0.002	0.018 ± 0.003	0.018 ± 0.002	0.017
11-Jan	0.017 ± 0.003	0.017 ± 0.003	0.024 ± 0.002	0.019 ± 0.003	0.019 ± 0.002	0.019
18-Jan	0.019 ± 0.003	0.018 ± 0.003	0.019 ± 0.002	0.019 ± 0.003	0.017 ± 0.002	0.018
25-Jan	0.022 ± 0.003	0.021 ± 0.003	0.021 ± 0.002	0.022 ± 0.003	0.022 ± 0.002	0.022
1-Feb	0.013 ± 0.002	0.014 ± 0.003	0.015 ± 0.002	0.015 ± 0.002	0.016 ± 0.002	0.015
8-Feb	0.021 ± 0.003	0.023 ± 0.003	0.023 ± 0.002	0.023 ± 0.003	0.024 ± 0.002	0.023
15-Feb	0.014 ± 0.002	0.013 ± 0.003	0.014 ± 0.002	0.016 ± 0.002	0.014 ± 0.002	0.014
22-Feb	0.014 ± 0.002	0.013 ± 0.003	0.014 ± 0.002	0.015 ± 0.002	0.013 ± 0.002	0.014
1-Mar	0.015 ± 0.002	0.011 ± 0.002	0.014 ± 0.001	0.014 ± 0.002	0.015 ± 0.002	0.014
8-Mar	0.013 ± 0.002	0.012 ± 0.003	0.013 ± 0.001	0.013 ± 0.002	0.014 ± 0.002	0.013
15-Mar	0.015 ± 0.002	0.019 ± 0.003	0.019 ± 0.002	0.019 ± 0.002	0.019 ± 0.002	0.018
22-Mar	0.015 ± 0.002	0.013 ± 0.002	0.016 ± 0.002	0.019 ± 0.002	0.017 ± 0.002	0.016
29-Mar	0.011 ± 0.002	0.011 ± 0.003	0.011 ± 0.001	0.012 ± 0.002	0.010 ± 0.002	0.011
5-Apr	0.022 ± 0.003	0.020 ± 0.003	0.021 ± 0.002	0.022 ± 0.002	0.021 ± 0.002	0.021
12-Apr	0.019 ± 0.002	0.021 ± 0.003	0.019 ± 0.002	0.022 ± 0.002	0.018 ± 0.002	0.020
19-Apr	0.014 ± 0.002	0.015 ± 0.003	0.014 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.014
26-Apr	0.018 ± 0.002	0.016 ± 0.003	0.015 ± 0.002	0.013 ± 0.002	0.013 ± 0.002	0.015
3-May	0.016 ± 0.002	0.014 ± 0.003	0.019 ± 0.002	0.017 ± 0.002	0.015 ± 0.002	0.016
10-May	0.006 ± 0.002	0.007 ± 0.002	0.007 ± 0.001	0.006 ± 0.002	0.006 ± 0.001	0.006
17-May	0.020 ± 0.002	0.022 ± 0.003	0.023 ± 0.002	0.021 ± 0.002	0.021 ± 0.002	0.021
24-May	0.021 ± 0.002	0.019 ± 0.003	0.019 ± 0.002	0.018 ± 0.002	0.019 ± 0.002	0.019
31-May	0.015 ± 0.002	0.017 ± 0.003	0.015 ± 0.002	0.016 ± 0.002	0.015 ± 0.002	0.016
7-Jun	0.010 ± 0.002	0.008 ± 0.002	0.011 ± 0.001	0.009 ± 0.002	0.008 ± 0.001	0.009
14-Jun	0.013 ± 0.002	0.012 ± 0.003	0.013 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.013
21-Jun	0.004 ± 0.002	0.002 ± 0.003	0.010 ± 0.002	0.008 ± 0.002	0.007 ± 0.002	0.006
28-Jun	0.017 ± 0.002	0.017 ± 0.003	0.018 ± 0.002	0.018 ± 0.002	0.017 ± 0.002	0.017
Maximum	0.022	0.023	0.024	0.023	0.024	
Average	0.015	0.015	0.016	0.016	0.016	
Minimum	0.004	0.002	0.007	0.006	0.006	

[illegible]

Table 3-2 B
Off-Site Samplers
Results in pCi/m3

Week Ending	Sta. #8	Sta. #9	Sta. #10	Sta. #11	Sta. #12	Average
3-Jul	0.013 ± 0.003	0.010 ± 0.004	0.015 ± 0.002	0.013 ± 0.002	0.015 ± 0.002	0.013
12-Jul	0.015 ± 0.002	0.013 ± 0.002	0.014 ± 0.001	0.016 ± 0.002	0.015 ± 0.001	0.015
19-Jul	0.019 ± 0.002	0.016 ± 0.003	0.024 ± 0.002	0.023 ± 0.002	0.020 ± 0.002	0.020
26-Jul	0.030 ± 0.003	0.028 ± 0.003	0.030 ± 0.002	0.030 ± 0.002	0.028 ± 0.002	0.029
2-Aug	0.011 ± 0.002	0.009 ± 0.002	0.015 ± 0.002	0.013 ± 0.002	0.013 ± 0.002	0.012
9-Aug	0.009 ± 0.002	0.010 ± 0.003	0.012 ± 0.002	0.012 ± 0.002	0.009 ± 0.001	0.010
16-Aug	0.013 ± 0.002	0.010 ± 0.002	0.015 ± 0.002	0.015 ± 0.002	0.012 ± 0.001	0.013
23-Aug	0.016 ± 0.002	0.015 ± 0.003	0.021 ± 0.002	0.019 ± 0.002	0.014 ± 0.001	0.017
30-Aug	0.023 ± 0.003	0.022 ± 0.003	0.027 ± 0.002	0.024 ± 0.002	0.022 ± 0.002	0.024
6-Sep	0.018 ± 0.002	0.020 ± 0.002	0.019 ± 0.002	0.018 ± 0.002	0.015 ± 0.001	0.018
13-Sep	0.020 ± 0.003	0.016 ± 0.003	0.022 ± 0.002	0.020 ± 0.002	0.018 ± 0.002	0.019
20-Sep	0.015 ± 0.002	0.014 ± 0.003	0.018 ± 0.002	0.017 ± 0.002	0.015 ± 0.001	0.016
27-Sep	0.006 ± 0.002	0.005 ± 0.002	0.009 ± 0.002	0.008 ± 0.002	0.007 ± 0.001	0.007
4-Oct	0.021 ± 0.002	0.019 ± 0.003	0.024 ± 0.002	0.021 ± 0.002	0.018 ± 0.001	0.021
11-Oct	0.018 ± 0.002	0.015 ± 0.003	0.021 ± 0.002	0.020 ± 0.002	0.019 ± 0.001	0.019
18-Oct	0.015 ± 0.002	0.011 ± 0.003	(B)	0.013 ± 0.002	0.013 ± 0.001	0.013
25-Oct	0.034 ± 0.002	0.024 ± 0.003	0.031 ± 0.002	0.027 ± 0.002	0.027 ± 0.002	0.029
1-Nov	0.026 ± 0.002	0.017 ± 0.003	0.022 ± 0.002	0.024 ± 0.002	0.024 ± 0.002	0.023
8-Nov	0.025 ± 0.002	0.019 ± 0.003	0.023 ± 0.002	0.024 ± 0.002	0.022 ± 0.002	0.023
15-Nov	0.021 ± 0.002	0.018 ± 0.003	0.020 ± 0.001	0.020 ± 0.002	0.019 ± 0.002	0.020
21-Nov	0.025 ± 0.002	0.016 ± 0.003	0.020 ± 0.002	0.019 ± 0.002	0.020 ± 0.002	0.020
27-Nov	0.018 ± 0.002	0.014 ± 0.003	0.015 ± 0.001	0.016 ± 0.002	0.016 ± 0.002	0.016
5-Dec	0.017 ± 0.001	0.014 ± 0.002	0.017 ± 0.001	0.017 ± 0.002	0.017 ± 0.001	0.016
13-Dec	0.025 ± 0.002	0.023 ± 0.002	0.023 ± 0.001	0.022 ± 0.002	0.022 ± 0.002	0.023
20-Dec	0.014 ± 0.002	0.019 ± 0.002	0.019 ± 0.001	0.018 ± 0.002	0.019 ± 0.002	0.018
27-Dec	0.017 ± 0.002	0.017 ± 0.002	0.017 ± 0.001	0.018 ± 0.002	0.019 ± 0.002	0.018
3-Jan	0.019 ± 0.002	0.017 ± 0.002	0.017 ± 0.001	0.018 ± 0.002	0.019 ± 0.002	0.018
Maximum	0.034	0.028	0.031	0.030	0.028	
Average	0.019	0.016	0.020	0.019	0.018	
Minimum	0.006	0.005	0.009	0.008	0.007	

(B) Filter torn or off center

Table 3 - 3 A
13 Week Composite
Gamma Isotopic Analysis
Result in pCi/m3
First Quarter

	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta. #8	Sta. #9	Sta. #10	Sta. #11	Sta. #12	Sta. #13A
Be-7	.083 ± .006	.094 ± .015	.073 ± .014	.094 ± .016	.094 ± .014	.088 ± .012	.104 ± .026	.088 ± .034	.105 ± .019	.088 ± .022	.078 ± .018	.091 ± .015
K-40	<.001	<.003	<.004	<.019	<.023	<.015	<.035	<.046	<.019	<.003	<.026	<.019
Mn-54	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Fe-59	<.002	<.002	<.003	<.003	<.003	<.003	<.005	<.007	<.003	<.006	<.004	<.003
Co-58	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.003	<.001	<.002	<.002	<.001
Co-60	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.002	<.001	<.001
Zn-65	<.001	<.001	<.002	<.002	<.002	<.001	<.003	<.004	<.002	<.003	<.002	<.002
Zr-95	<.001	<.002	<.002	<.002	<.002	<.002	<.003	<.005	<.002	<.004	<.003	<.002
Nb-95	<.001	<.002	<.002	<.002	<.002	<.001	<.003	<.005	<.002	<.004	<.003	<.002
Ru-103	<.001	<.001	<.001	<.002	<.002	<.001	<.003	<.004	<.002	<.003	<.003	<.002
Ru-106	<.005	<.006	<.006	<.006	<.007	<.006	<.011	<.014	<.006	<.011	<.009	<.007
Cs-134	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Cs-137	<.001	<.001	.002 ± .001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Ba-140	<.020	<.027	<.031	<.033	<.041	<.032	<.089	<.12	<.054	<.100	<.079	<.057
Ce-141	<.002	<.002	<.002	<.003	<.003	<.002	<.005	<.006	<.003	<.005	<.004	<.003
Ce-144	<.003	<.004	<.004	<.004	<.004	<.003	<.007	<.009	<.004	<.007	<.003	<.004

All values given as < are less than the LLD corrected for decay.

Table 3 - 3 B
13 Week Composite
Gamma Isotopic Analysis
Result in pCi/m3
Second Quarter

	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta. #8	Sta. #9	Sta. #10	Sta. #11	Sta. #12	Sta. #13A
Be-7	.090 ± .013	.111 ± .017	.104 ± .018	.098 ± .018	.105 ± .017	.121 ± .018	.072 ± .027	.011 ± .033	.102 ± .022	.097 ± .028	.089 ± .022	.112 ± .021
K-40	<.012	<.017	<.016	<.016	<.002	<.014	<.007	<.034	<.009	<.015	<.019	<.015
Mn-54	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.008	<.001	<.001	<.001
Fe-59	<.002	<.003	<.004	<.003	<.003	<.003	<.006	<.008	<.004	<.005	<.004	<.004
Co-58	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.002	<.001	<.002	<.002	<.001
Co-60	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Zn-65	<.001	<.002	<.002	<.002	<.002	<.001	<.003	<.003	<.002	<.002	<.002	<.002
Zr-95	<.001	<.002	<.002	<.002	<.002	<.002	<.004	<.005	<.003	<.004	<.003	<.002
Nb-95	<.002	<.002	<.002	<.002	<.003	<.002	<.004	<.006	<.003	<.004	<.004	<.003
Ru-103	<.001	<.002	<.002	<.002	<.002	<.002	<.004	<.005	<.002	<.004	<.003	<.002
Ru-106	<.005	<.006	<.006	<.006	<.006	<.005	<.011	<.014	<.007	<.009	<.007	<.006
Cs-134	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Cs-137	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.002 ± .002	<.001	.002 ± .001	.001 ± .001	<.001
Ba-140	<.053	<.081	<.093	<.093	<.092	<.084	<.230	<.279	<.147	<.210	<.180	<.183
Ce-141	<.002	<.003	<.003	<.003	<.003	<.003	<.007	<.009	<.005	<.006	<.005	<.004
Ce-144	<.003	<.004	<.004	<.004	<.004	<.003	<.007	<.008	<.003	<.006	<.005	<.004

All values given as < are less than the LLD corrected for decay.

Table 3 - 3 C
13 Week Composite
Gamma Isotopic Analysis
Result in pCi/m3
Third Quarter

	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta. #8	Sta. #9	Sta. #10	Sta. #11	Sta. #12	Sta. #13A
Be-7	.074 ± .013	.091 ± .017	.086 ± .014	.083 ± .015	.077 ± .015	.103 ± .018	.076 ± .032	.108 ± .039	.093 ± .022	.088 ± .023	.082 ± .022	.079 ± .019
K-40	<.005	<.011	<.014	<.007	<.003	<.005	<.028	<.036	<.020	<.022	<.016	<.013
Mn-54	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<<.001
Fe-59	<.002	<.003	<.003	<.003	<.003	<.003	<.006	<.008	<.004	<.005	<.004	<.004
Co-58	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.003	<.001	<.001	<.001	<.001
Co-60	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Zn-65	<.001	<.001	<.001	<.001	<.001	<.001	<.003	<.003	<.002	<.002	<.002	<.001
Zr-95	<.001	<.002	<.002	<.002	<.002	<.002	<.004	<.005	<.003	<.003	<.003	<.002
Nb-95	<.001	<.002	<.002	<.002	<.002	<.002	<.004	<.006	<.003	<.004	<.003	<.003
Ru-103	<.001	<.002	<.001	<.002	<.002	<.002	<.004	<.005	<.002	<.003	<.002	<.002
Ru-106	<.005	<.006	<.005	<.006	<.006	<.005	<.010	<.013	<.007	<.008	<.007	<.006
Cs-134	<.001	<.001	<.001	<.001	<.001	<.001	<.013	<.001	<.001	<.001	<.001	<.001
Cs-137	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Ba-140	<.038	<.049	<.053	<.063	<.064	<.069	<.222	<.036	<.162	<.195	<.222	<.253
Ce-141	<.002	<.003	<.002	<.003	<.003	<.003	<.006	<.009	<.004	<.006	<.005	<.005
Ce-144	<.003	<.004	<.003	<.004	<.003	<.003	<.007	<.008	<.005	<.005	<.004	<.003

All values given as < are less than the LLD corrected for decay.

Table 3 - 3 D
13 Week Composite
Gamma Isotopic Analysis
Result in pCi/m3
Fourth Quarter

	Sta. #2	Sta. #3	Sta. #4	Sta. #5	Sta. #6	Sta. #7	Sta. #8	Sta. #9	Sta. #10	Sta. #11	Sta. #12	Sta. #13A
Be-7	.093 ± .015	.079 ± .014	.069 ± .010	.080 ± .017	.087 ± .017	.071 ± .019	.093 ± .020	.073 ± .026	.090 ± .016	.074 ± .020	.068 ± .017	.083 ± .013
K-40	<.014	<.014	<.012	<.004	<.005	<.001	<.017	<.027	<.014	<.018	<.014	<.001
Mn-54	<.001	<.001	<.001	<.001	<.001	<.001	<.031	<.001	<.001	<.001	<.001	<.001
Fe-59	<.002	<.002	<.002	<.003	<.004	<.003	<.004	<.005	<.003	<.004	<.003	<.003
Co-58	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.002	<.001	<.001	<.001	<.001
Co-60	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Zn-65	<.001	<.001	<.001	<.002	<.002	<.001	<.001	<.002	<.001	<.002	<.001	<.001
Zr-95	<.002	<.002	<.001	<.002	<.002	<.002	<.002	<.004	<.002	<.003	<.002	<.002
Nb-95	<.002	<.002	<.001	<.002	<.002	<.002	<.003	<.004	<.002	<.003	<.002	<.002
Ru-103	<.001	<.001	<.001	<.002	<.002	<.002	<.002	<.004	<.002	<.003	<.002	<.002
Ru-106	<.005	<.005	<.004	<.007	<.007	<.007	<.006	<.010	<.006	<.007	<.005	<.004
Cs-134	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Cs-137	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Ba-140	<.039	<.040	<.036	<.062	<.086	<.088	<.106	<.172	<.139	<.179	<.144	<.125
Ce-141	<.002	<.002	<.002	<.003	<.003	<.003	<.004	<.006	<.004	<.004	<.003	<.003
Ce-144	<.003	<.003	<.003	<.004	<.004	<.004	<.004	<.006	<.003	<.004	<.003	<.003

All values given as < are less than the LLD corrected for decay.

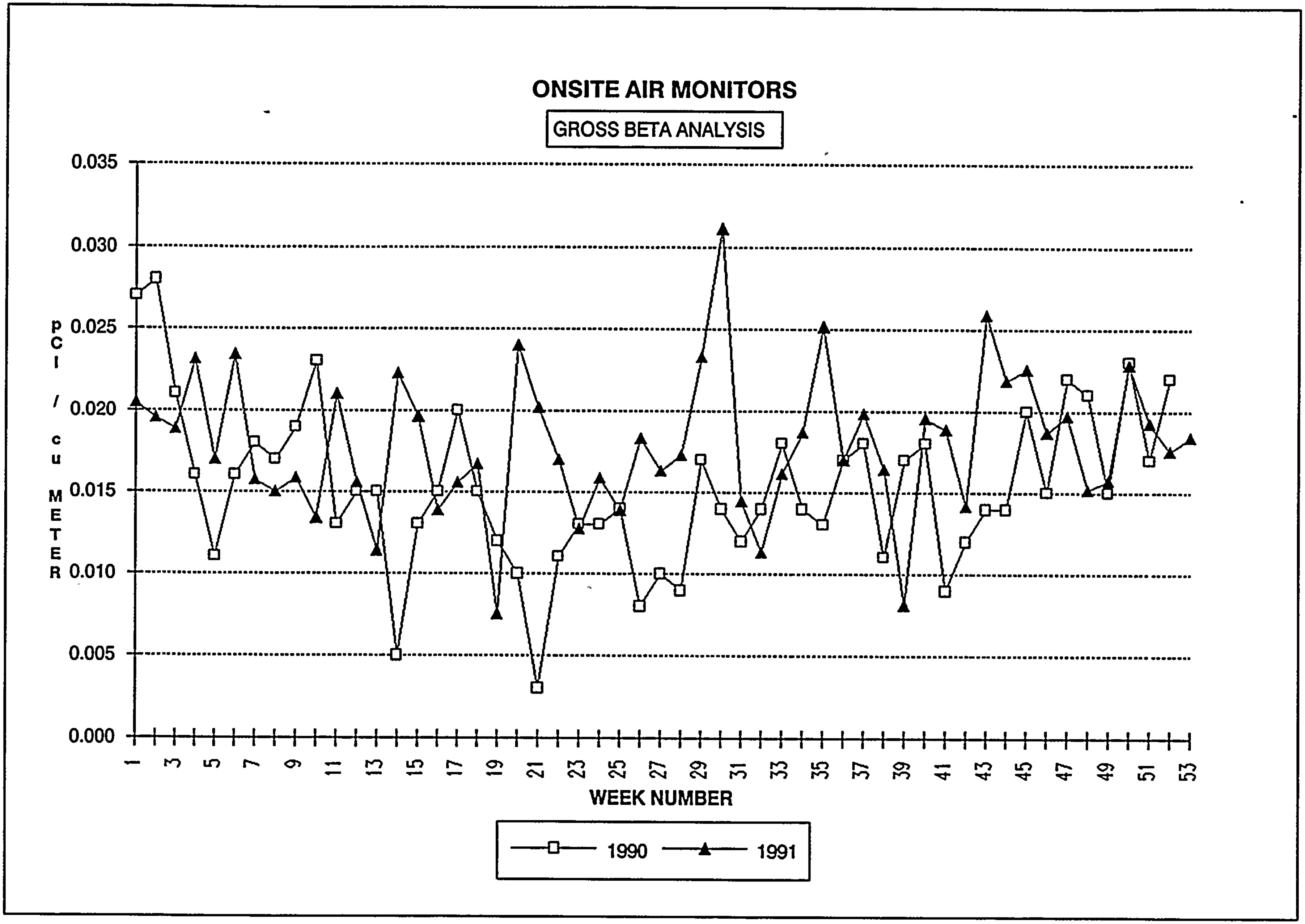
Table 3-4

Charcoal Cartridges Gamma Analysis for Iodine
Results in pCi/m3

Week Ending	Sta. #4	Sta. #7	Sta. #9	Sta. #11
4-Jan	<.038	<.034	<.085 *	<.066
11-Jan	<.035	<.028	<.083 *	<.069
18-Jan	<.037	<.031	<.080 *	<.069
25-Jan	<.038	<.031	<.087 *	<.072 *
1-Feb	<.038	<.031	<.091 *	<.065
8-Feb	<.033	<.030	<.091 *	<.062
15-Feb	<.039	<.032	<.088 *	<.065
22-Feb	<.037	<.027	<.091 *	<.065
1-Mar	<.039	<.030	<.093 *	<.063
8-Mar	<.062	<.054	<.110 *	<.083 *
15-Mar	<.038	<.033	<.092 *	<.073 *
22-Mar	<.035	<.033	<.080 *	<.072 *
29-Mar	<.037	<.029	<.090 *	<.065
5-Apr	<.036	<.034	<.092 *	<.067
12-Apr	<.034	<.027	<.093 *	<.062
19-Apr	<.034	<.033	<.091 *	<.066
26-Apr	<.036	<.032	<.087 *	<.066
3-May	<.039	<.030	<.102 *	<.065
10-May	<.040	<.032	<.124 *	<.059
17-May	<.033	<.032	<.086 *	<.063
24-May	<.035	<.035	<.099 *	<.063
31-May	<.035	<.035	<.089 *	<.056
7-Jun	<.035	<.029	<.080 *	<.054
14-Jun	<.033	<.035	<.089 *	<.058
21-Jun	<.033	<.037	<.085 *	<.051
28-Jun	<.036	<.031	<.092 *	<.050
5-Jul	<.044	<.040	<.097 *	<.058
12-Jul	<.029	<.025	<.072 *	<.043
19-Jul	<.035	<.028	<.080 *	<.034
26-Jul	<.032	<.030	<.079 *	<.049
2-Aug	<.036	<.031	<.072 *	<.049
9-Aug	<.034	<.033	<.088 *	<.051
16-Aug	<.028	<.033	<.078 *	<.041
23-Aug	<.027	<.036	<.076 *	<.049
30-Aug	<.027	<.036	<.078 *	<.040
6-Sep	<.026	<.034	<.076 *	<.043
13-Sep	<.026	<.030	<.088 *	<.039
20-Sep	<.030	<.035	<.076 *	<.046
27-Sep	<.027	<.035	<.073 *	<.043
4-Oct	<.025	<.028	<.080 *	<.047
11-Oct	<.027	<.033	<.075 *	<.051
18-Oct	<.025	<.036	<.081 *	<.050
25-Oct	<.026	<.064	<.076 *	<.046
1-Nov	<.027	<.041	<.076 *	<.035
8-Nov	<.023	<.037	<.069	<.039
15-Nov	<.029	<.039	<.077 *	<.043
22-Nov	<.029	<.069	<.083 *	<.042
29-Nov	<.032	<.059	<.078 *	<.040
6-Dec	<.023	<.035	<.060	<.034
13-Dec	<.022	<.034	<.045	<.034
20-Dec	<.025	<.044	<.040	<.037
27-Dec	<.022	<.040	<.039	<.040
3-Jan	<.027	<.040	<.048	<.038

All values given as < are less than LLD

* Values exceed required LLD value. See text for discussion


ONSITE AIR MONITORS
GROSS BETA ANALYSIS
pCi / cu METER
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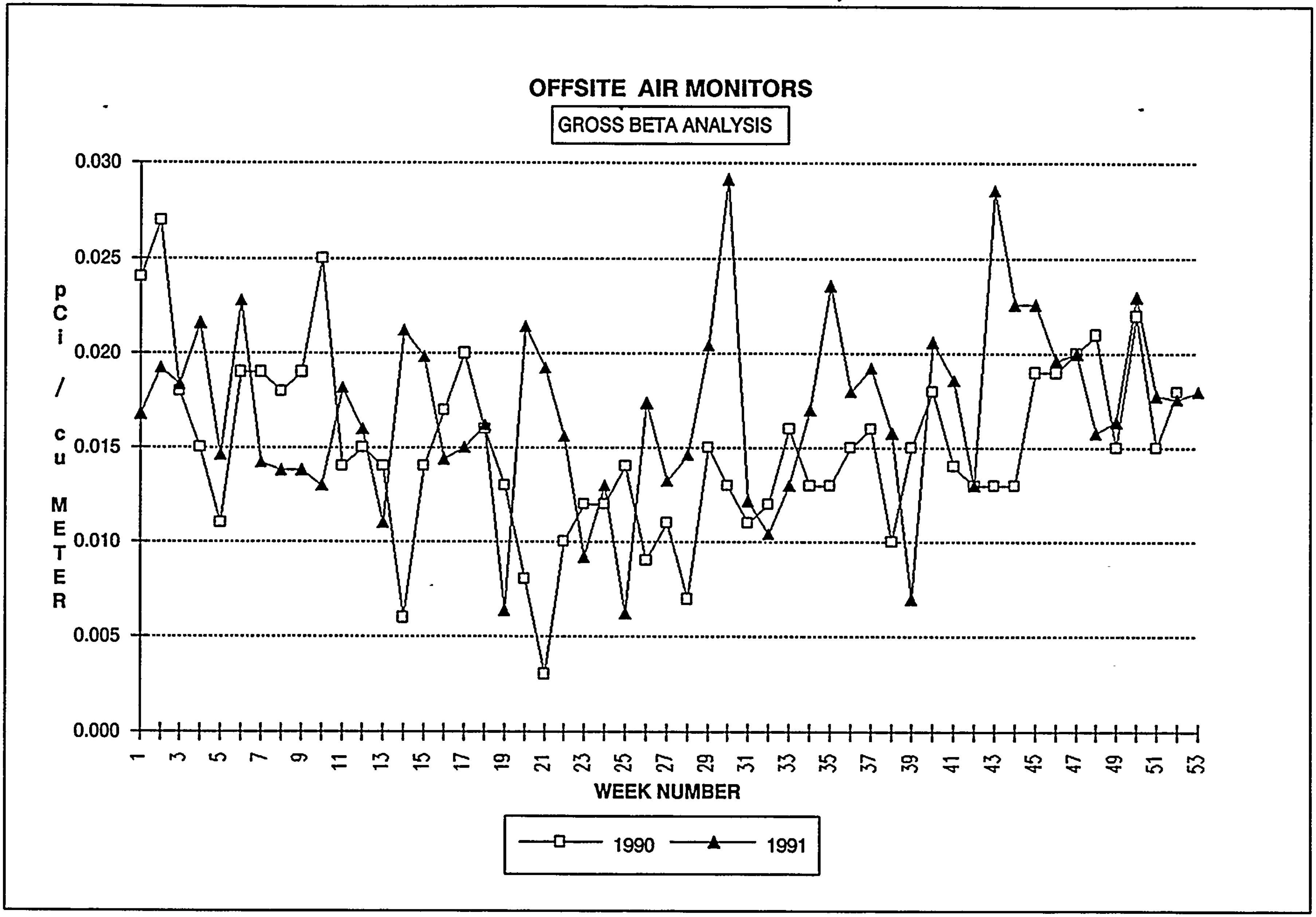
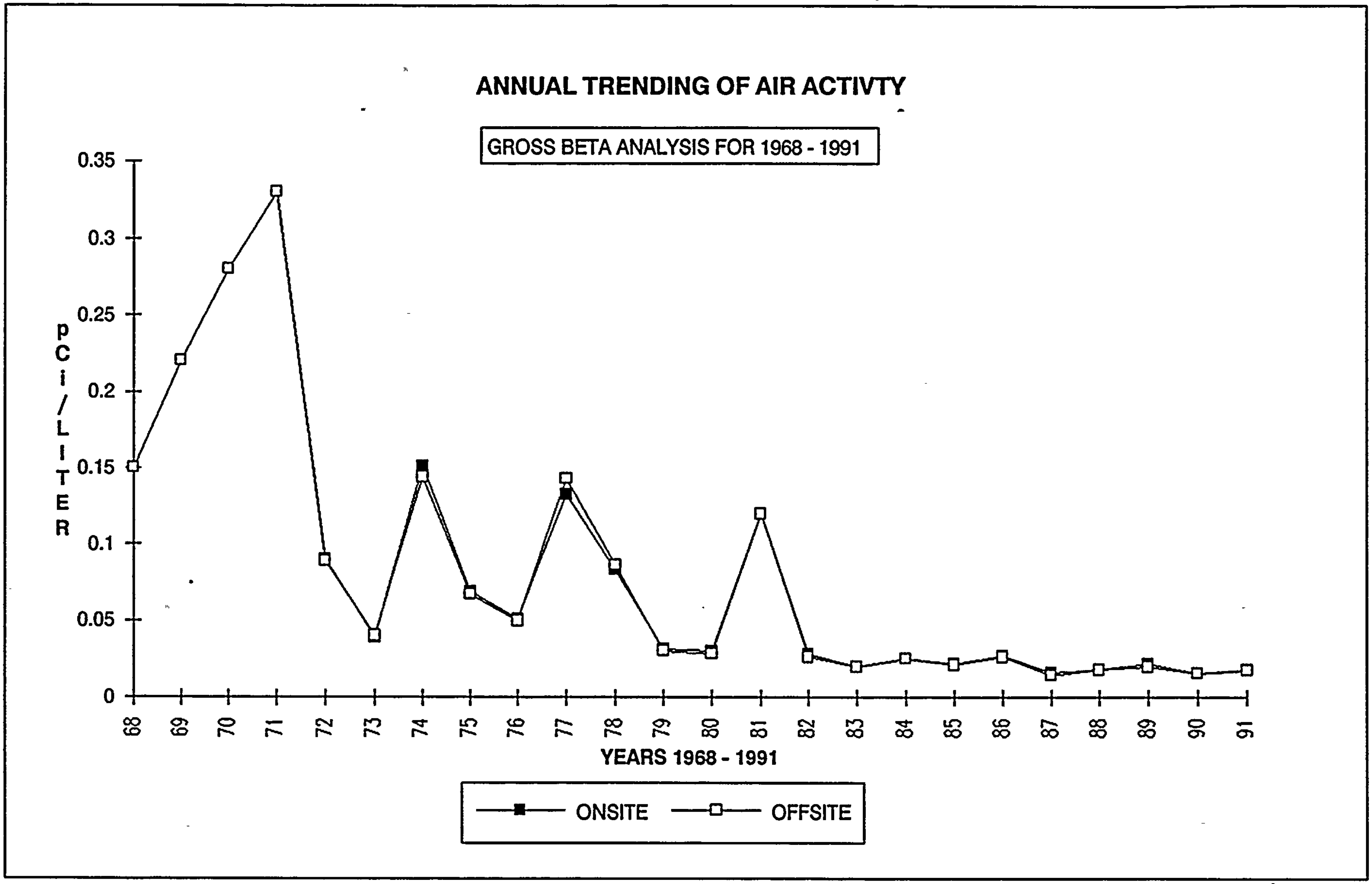
0.030
0.025
0.020
0.015
0.010
0.005
0.000
WEEK NUMBER
1990
1991


OFFSITE AIR MONITORS
GROSS BETA ANALYSIS
pCi / cu METER
0.030
0.025
0.020
0.015
0.010
0.005
0.000
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
WEEK NUMBER
1990
1991



PEAKS ARE INDICATIVE OF NUCLEAR DETONATIONS IN THE ATMOSPHERE

3.3 Water Samples

Water samples are collected on a regular schedule from locations surrounding the plant to demonstrate that there is no measurable influence or contamination of drinking or irrigation water from liquid effluent releases or deposition from gaseous effluent releases.

Composite samples are collected weekly from Lake Ontario, upstream (Russell Station) and downstream (Ontario Water District Plant - OWD), and analyzed for gross beta activity. There was no significant difference between the upstream and downstream sample concentrations. The 1991 averages were 2.34 and 2.36 pCi/liter for the upstream and downstream samples respectively.

Weekly composite samples are taken from the plant circulating water intake (Circ In) and discharge canal (Circ Out). The yearly averages were 2.48 and 2.56 pCi/liter for the intake and discharge canal respectively. These are essentially the same as the upstream and downstream values as they fall within the ± 2 sigma error band and range of the measurement. A gamma isotopic analysis of biweekly composites of the OWD and the discharge canal is performed.

For all batch releases, the average concentration in the discharge canal from the identified activity during 1991 was 0.26 pCi/liter. The normal 2 sigma variation for the activity calculation of composite samples is 0.72 pCi/liter or 3 times the average concentration added by releases from the plant.

Samples of tap water, the nearest well, and the creek which crosses the site are collected and analyzed monthly. The results show no indication of plant influence. Results for all beta analyses are listed in Tables 3-5A, 3-5B.

Gamma isotopic analysis is done on each monthly sample and each biweekly or monthly composite of weekly samples. These are listed in Tables 3-6 to 3-11 and separated by source of sample.

Trend plots are included to show the weekly upstream and downstream beta activities. A trend plot showing the annual average activity measured during the years 1968 to 1991 is included to show the data during the years the R.E. Ginna Nuclear Power Plant has been in operation. The peaks correspond to the years when atmospheric testing of nuclear weapons occurred.

[illegible]

Fallout

Fallout is a term used to denote radioactive material settling from the atmosphere to the ground. At the sampling stations, the fallout settles as dust or is collected with rainfall by a funnel and bottle. There are two on-site sampling stations and three off-site. Fallout generally increases in the spring months due to transfer of fission products from the upper to the lower atmosphere in conjunction with increased rainfall. The onsite average and the offsite average were 4.54 and 4.18 $pCi/m^2/day$ respectively. Based on the two sigma error of the measurement, there was no significant difference between on-site and off-site samples for the period of January through December, 1991. Table 3-5C lists the values for fallout samples.

Tritium Analysis

Tritium analysis is done on all water samples on a monthly basis. Composites are made from the weekly composites and a portion distilled for analysis to remove interfering elements or activity. Tritium data is given in Tables 3-12 A & B. All positive counts and the 2 sigma error are reported. All negative counts after background correction are reported as <LLD for that months analysis.

Iodine Analysis

All monthly composite water samples except the fallout samples are analyzed for Iodine-131. The analysis is done by chemical separation using an added carrier solution and gross beta counting. The analysis allows the determination of Iodine-131 activity of < 1 pCi/liter. Iodine data is given in Table 3-13. All positive counts and the 2 sigma error are reported. All negative counts after background correction are reported as <LLD for that analysis. The average for positive values from indicator samples is 0.129 ± 0.07 and for background samples is 0.168 ± 0.129. The normal LLD for the analysis is 0.20.

Table 3-5 A
Environmental Water Samples Gross Beta Analysis
Results in pCi/L

Week Ending	Russell	O.W.D.	Circ In	Circ Out	Deer Creek	Tap	Well 'B'
4-Jan	2.13 ± 0.79	2.33 ± 0.81	2.74 ± 0.81	2.03 ± 0.76			
11-Jan	3.04 ± 0.84	1.40 ± 0.83	2.45 ± 0.87	3.81 ± 0.84			
18-Jan	3.46 ± 0.94	2.69 ± 0.81	2.70 ± 0.83	3.08 ± 0.84	1.71 ± 0.95		2.21 ± 0.97
25-Jan	1.52 ± 0.83	2.22 ± 0.85	1.75 ± 0.77	1.99 ± 0.81		1.51 ± 0.85	
1-Feb	1.37 ± 0.73	3.74 ± 0.87	1.27 ± 0.65	3.52 ± 0.83			
8-Feb	2.49 ± 0.87	2.47 ± 0.83	2.12 ± 0.82	1.28 ± 0.79	2.86 ± 0.84	1.40 ± 0.69	3.41 ± 1.14
15-Feb	1.96 ± 0.81	2.47 ± 0.83	3.88 ± 0.87	0.79 ± 0.67			
22-Feb	2.52 ± 0.73	2.49 ± 0.73	3.33 ± 0.76	12.43 ± 1.06			
1-Mar	3.16 ± 0.74	5.32 ± 0.78	2.20 ± 0.67	2.69 ± 0.69			
8-Mar	(a)	2.02 ± 0.66	2.85 ± 0.71	2.40 ± 0.69			
15-Mar	4.79 ± 0.79	1.75 ± 0.67	2.79 ± 0.73	3.60 ± 0.77	2.88 ± 0.72		
22-Mar	3.07 ± 0.74	0.87 ± 0.76	1.32 ± 0.76	1.47 ± 0.78		8.10 ± 0.92	3.31 ± 0.76
29-Mar	1.14 ± 0.66	1.12 ± 0.64	2.83 ± 0.72	2.49 ± 0.71			
5-Apr	3.30 ± 0.76	2.59 ± 0.72	2.22 ± 0.69	3.31 ± 0.75			
12-Apr	(b)	1.98 ± 0.66	4.03 ± 0.74	2.02 ± 0.66			
19-Apr	1.82 ± 0.68	2.88 ± 0.73	2.88 ± 0.71	3.23 ± 0.74	2.22 ± 0.74		3.71 ± 0.80
26-Apr	1.99 ± 0.68	3.44 ± 0.76	3.26 ± 0.75	2.27 ± 0.70		2.01 ± 0.68	
3-May	2.61 ± 0.71	2.84 ± 0.72	2.91 ± 0.71	2.92 ± 0.72			
10-May	(b)	1.67 ± 0.68	2.23 ± 0.71	2.61 ± 0.73			
17-May	2.69 ± 0.70	2.10 ± 0.66	2.36 ± 0.67	1.74 ± 0.63			
24-May	2.07 ± 0.69	2.43 ± 0.70	2.85 ± 0.72	2.47 ± 0.70	2.89 ± 0.74	1.97 ± 0.69	3.56 ± 0.76
31-May	2.45 ± 0.70	2.10 ± 0.68	2.97 ± 0.72	1.90 ± 0.68			
7-Jun	1.54 ± 0.68	1.68 ± 0.70	1.78 ± 0.70	1.49 ± 0.69			
14-Jun	1.64 ± 0.70	2.17 ± 0.70	1.99 ± 0.69	1.93 ± 0.69			
21-Jun	3.85 ± 0.77	2.47 ± 0.71	(b)	2.04 ± 0.70	3.20 ± 0.76		5.07 ± 0.83
28-Jun	4.62 ± 0.80	2.73 ± 0.69	1.15 ± 0.75	2.48 ± 0.68		2.43 ± 0.71	
Maximum	4.79	5.32	4.03	12.43	3.20	8.10	5.07
Average	2.58	2.38	2.51	2.77	2.63	2.90	3.55
Minimum	1.14	0.87	1.15	0.79	1.71	1.40	2.21

(a) Sample not taken when power lost during ice storm.

(b) Sample not received.

Table 3-5 B
Environmental Water Samples Gross Beta Analysis
Results in pCi/L

Week Ending	Russell	O.W.D.	Circ In	Circ Out	Deer Creek	Tap	Well 'B'
5-Jul	1.90 ± 0.69	2.12 ± 0.70	2.54 ± 0.73	2.34 ± 0.72			
12-Jul	2.09 ± 0.73	1.89 ± 0.69	2.19 ± 0.73	2.20 ± 0.71			
19-Jul	2.47 ± 0.72	2.45 ± 0.71	1.93 ± 0.69	2.07 ± 0.70	3.89 ± 0.80	1.60 ± 0.68	3.69 ± 0.79
26-Jul	1.75 ± 0.69	2.10 ± 0.70	2.92 ± 0.73	2.02 ± 0.70			
2-Aug	2.00 ± 0.69	2.38 ± 0.71	1.96 ± 0.67	1.94 ± 0.70			
9-Aug	0.47 ± 0.56	2.73 ± 0.73	1.74 ± 0.69	2.59 ± 0.72			
16-Aug	1.08 ± 0.66	1.89 ± 0.69	2.05 ± 0.68	2.55 ± 0.72			
23-Aug	1.57 ± 0.65	2.41 ± 0.69	3.26 ± 0.73	2.22 ± 0.68	3.55 ± 0.76	1.54 ± 0.67	4.21 ± 0.81
30-Aug	2.27 ± 0.69	2.31 ± 0.70	2.32 ± 0.70	2.38 ± 0.69			
6-Sep	1.75 ± 0.67	2.65 ± 0.71	2.16 ± 0.69	2.78 ± 0.71			
13-Sep	2.54 ± 0.70	1.63 ± 0.65	2.32 ± 0.69	2.23 ± 0.69			
20-Sep	2.91 ± 0.70	2.26 ± 0.67	2.32 ± 0.90	0.66 ± 0.53	3.38 ± 0.74	1.94 ± 0.66	
27-Sep	1.58 ± 0.65	1.64 ± 0.60	2.45 ± 0.69	2.54 ± 0.69			4.50 ± 0.79
4-Oct	2.27 ± 0.68	2.71 ± 0.70	1.64 ± 0.63	3.04 ± 0.71			
11-Oct	2.24 ± 0.68	2.76 ± 0.70	2.53 ± 0.69	2.17 ± 0.68			
18-Oct	2.37 ± 0.68	2.97 ± 0.72	1.95 ± 0.66	3.08 ± 0.71		1.66 ± 0.64	
25-Oct	2.42 ± 0.68	1.91 ± 0.67	2.27 ± 0.69	2.36 ± 0.66	4.11 ± 0.76		4.32 ± 0.78
1-Nov	2.76 ± 0.71	2.64 ± 0.70	3.03 ± 0.72	2.66 ± 0.70			
8-Nov	2.50 ± 0.72	2.02 ± 0.70	2.62 ± 0.70	2.13 ± 0.70		2.14 ± 0.70	
15-Nov	1.78 ± 0.69	2.71 ± 0.70	2.60 ± 0.69	1.93 ± 0.69	3.31 ± 0.77		4.29 ± 0.81
22-Nov	1.91 ± 0.67	1.84 ± 0.66	2.29 ± 0.68	2.80 ± 0.71			
29-Nov	2.72 ± 0.70	3.27 ± 0.73	2.91 ± 0.72	3.00 ± 0.71			
6-Dec	2.09 ± 0.65	2.57 ± 0.68	2.97 ± 0.69	2.74 ± 0.68			
13-Dec	3.14 ± 0.69	2.85 ± 0.69	2.55 ± 0.68	2.42 ± 0.67		2.16 ± 0.65	
20-Dec	1.87 ± 0.68	2.18 ± 0.69	3.53 ± 0.75	1.61 ± 0.67			
27-Dec	1.97 ± 0.68	1.98 ± 0.69	2.65 ± 0.71	2.76 ± 0.72	3.91 ± 0.78		5.09 ± 0.83
3-Jan	2.38 ± 0.70	2.79 ± 0.72	2.64 ± 0.71	2.76 ± 0.72			
Maximum	3.14	3.27	3.53	3.08	4.11	2.16	5.09
Average	2.09	2.34	2.45	2.35	3.69	1.84	4.35
Minimum	0.47	1.63	1.64	0.66	3.31	1.54	3.69

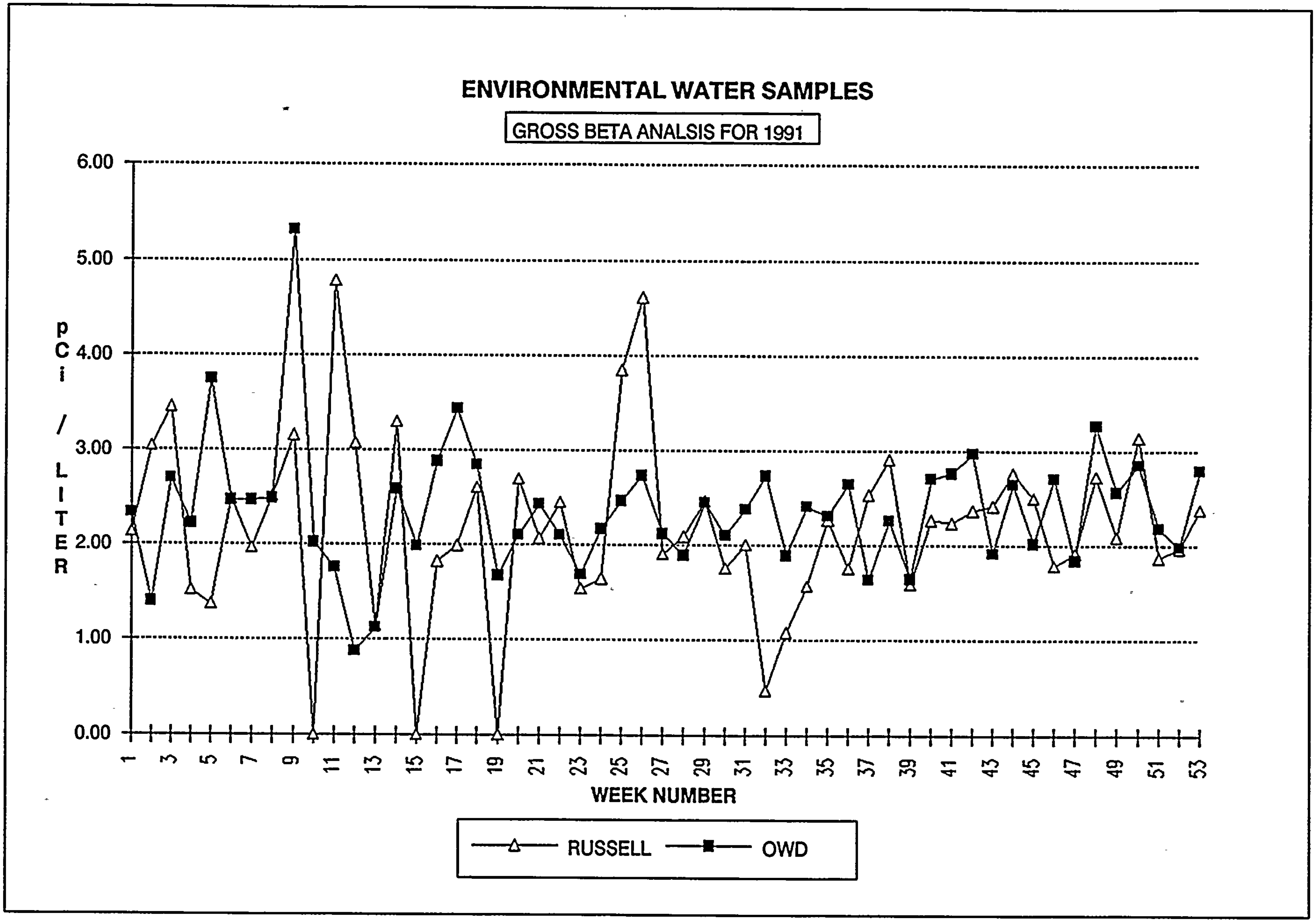
ROCHESTER GAS AND ELECTRIC

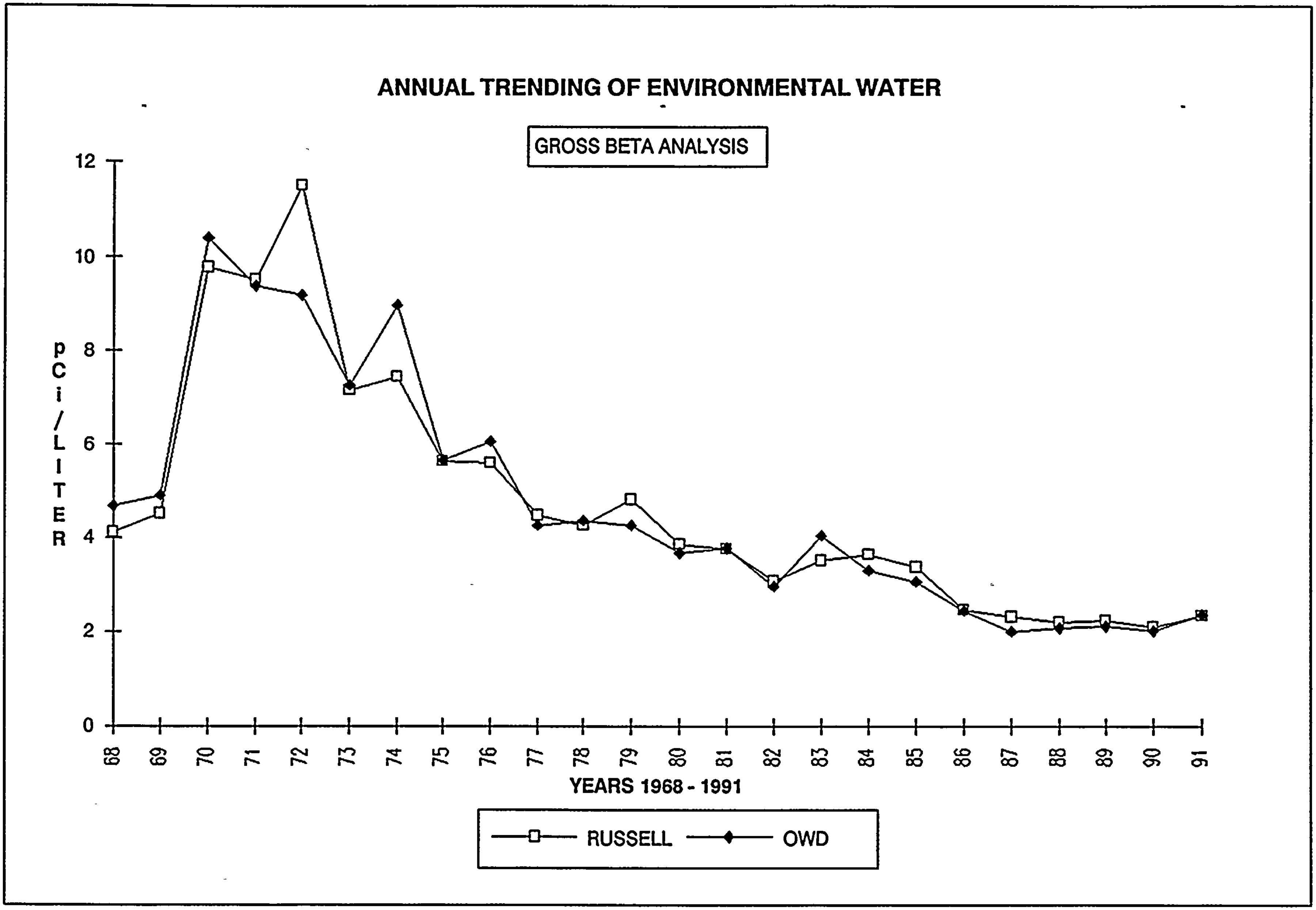
TABLE 3 - 5 C

FALLOUT
RESULT IN pCi/m2/DAY

	Sta. #3	Sta. #5	Sta. #8	Sta. #10	Sta. #12
January	4.42 ± 1.24	3.83 ± 1.16	5.26 ± 1.44	5.56 ± 1.41	3.41 ± 1.14
February	1.23 ± 0.43	4.92 ± 0.49	2.05 ± 0.45	1.31 ± 0.51	3.94 ± 0.73
March	4.86 ± 2.11	5.78 ± 2.39	4.95 ± 2.66	7.42 ± 2.31	7.57 ± 2.06
April	3.24 ± 1.23	4.48 ± 1.29	4.05 ± 1.45	4.50 ± 1.54	5.10 ± 1.32
May	10.22 ± 1.31	4.47 ± 1.04	3.72 ± 1.33	5.12 ± 1.17	6.65 ± 1.74
June	3.12 ± 0.49	4.61 ± 0.60	0.41 ± 0.11	1.85 ± 0.26	3.91 ± 0.44
July	4.86 ± 0.98	5.44 ± 1.02	1.29 ± 0.7	2.15 ± 0.52	4.2 ± 0.82
August	3.78 ± 1.2	0.87 ± 1.12	2.14 ± 1.09	0.06 ± 0.87	6.55 ± 1.44
September	5.68 ± 1.37	0.68 ± 1.51	4.52 ± 1.73	2.25 ± 1.50	8.29 ± 1.81
October	6.62 ± 1.16	5.77 ± 1.11	2.15 ± 0.76	4.29 ± 1.03	6.92 ± 1.24
November	7.32 ± 1.47	4.73 ± 1.21	5.11 ± 1.37	2.64 ± 1.14	10.34 ± 1.68
December	5.32 ± 1.06	2.66 ± 0.71	4.26 ± 0.90	1.76 ± 0.85	4.76 ± 0.97
Maximum	10.22	5.78	5.26	7.42	10.34
Average	5.06	4.02	3.33	3.24	5.97
Minimum	1.23	0.68	0.41	0.06	3.41

All values given as < are less than LLD corrected for decay


ENVIRONMENTAL WATER SAMPLES
GROSS BETA ANALSIS FOR 1991
pCi / LITER
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
WEEK NUMBER
RUSSELL
OWD


ANNUAL TRENDING OF ENVIRONMENTAL WATER
GROSS BETA ANALYSIS
pCi/LITER
0
2
4
6
8
10
12
68
69
70
71
72
73
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91
YEARS 1968 - 1991
RUSSELL
OWD

Table 3-6
Ontario Water District Water Gamma Isotopic Analyses
Results in pCi/Liter

Between Dates Of		7Be	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb	103Ru	106Ru	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
4-Jan	18-Jan	<37	<42	< 4	< 7	< 4	< 4	< 7	< 6	< 4	< 4	<35	< 4	< 5	<21	< 9	<37	< 9
18-Jan	1-Feb	<99	<40	< 4	< 7	< 4	< 4	< 8	< 6	< 4	< 4	<35	< 4	< 4	<19	< 9	<37	< 9
1-Feb	15-Feb	<37	<41	< 3	< 8	< 3	< 3	< 7	< 7	< 4	< 4	<33	< 4	< 5	<20	< 9	<36	< 8
15-Feb	1-Mar	<42	<51	< 4	< 8	< 4	< 4	< 8	< 8	< 5	< 5	<35	< 4	< 4	<33	<11	<37	< 8
1-Mar	15-Mar	<38	<45	< 4	< 7	< 4	< 4	< 8	< 7	< 4	< 5	<36	< 4	< 4	<24	< 9	<37	< 8
15-Mar	29-Mar	<36	<40	< 4	< 7	< 4	< 3	< 7	< 7	< 4	< 4	<35	< 4	< 4	<19	< 9	<35	< 8
29-Mar	12-Apr	<36	<40	< 4	< 7	< 4	< 4	< 7	< 7	< 4	< 4	<34	< 4	< 4	<18	< 9	<35	< 8
12-Apr	26-Apr	<36	<42	< 4	< 7	< 4	< 3	< 7	< 7	< 4	< 4	<34	< 4	< 4	<22	< 9	<36	< 8
26-Apr	10-May	<36	<41	< 4	< 8	< 4	< 4	< 7	< 6	< 4	< 5	<32	< 4	< 4	<20	< 9	<36	< 8
10-May	24-May	<37	<39	< 4	< 7	< 4	< 4	< 7	< 7	< 4	< 5	<38	< 4	< 5	<21	< 9	<36	< 8
24-May	7-Jun	<35	<40	< 4	< 7	< 4	< 4	< 6	< 7	< 4	< 4	<30	< 4	< 6	<21	< 9	<36	< 8
7-Jun	21-Jun	<35	<45	< 4	< 6	< 4	< 3	< 7	< 7	< 4	< 5	<31	< 4	< 4	<25	< 9	<36	< 8
21-Jun	28-Jun	<35	<40	< 3	< 7	< 4	< 4	< 6	< 6	< 4	< 4	<35	< 4	< 4	<21	< 9	<33	< 7
28-Jun	12-Jul	<32	<36	< 3	< 7	< 3	< 4	< 6	< 6	< 4	< 4	<30	< 4	< 4	<16	< 8	<33	< 7
12-Jul	26-Jul	<34	<37	< 4	< 6	< 4	< 3	< 6	< 5	< 4	< 4	<33	< 3	< 4	<19	< 8	<33	< 7
26-Jul	2-Aug	<31	<36	< 3	< 7	< 3	< 4	< 7	< 6	< 4	< 4	<29	< 3	< 4	<18	< 8	<32	< 7
2-Aug	16-Aug	<35	<40	< 3	< 6	< 4	< 4	< 7	< 7	< 4	< 4	<29	< 4	< 4	<21	< 9	<35	< 7
16-Aug	30-Aug	<34	<36	< 3	< 7	< 3	< 4	< 7	< 6	< 3	< 4	<34	< 4	< 4	<18	< 8	<35	< 7
30-Aug	13-Sep	<30	<35	< 3	< 7	< 4	< 4	< 7	< 6	< 3	< 4	<30	< 3	< 2	<16	< 8	<34	< 7
13-Sep	27-Sep	<34	<40	< 4	< 7	< 4	< 3	< 7	< 6	< 4	< 4	<33	< 4	< 4	<21	< 9	<35	< 7
27-Sep	11-Oct	<32	<37	< 4	< 7	< 4	< 3	< 6	< 6	< 4	< 4	<33	< 4	< 4	<17	< 8	<35	< 7
11-Oct	25-Oct	<32	<37	< 3	< 8	< 3	< 4	< 6	< 6	< 4	< 4	<28	< 3	< 4	<20	< 5	<31	< 7
25-Oct	8-Nov	<28	<35	< 3	< 6	< 3	< 3	< 6	< 6	< 4	< 4	<31	< 4	< 4	<17	< 8	<30	< 6
8-Nov	22-Nov	<28	<33	< 3	< 7	< 3	< 3	< 6	< 6	< 3	< 4	<33	< 3	< 3	<17	< 8	<32	< 7
22-Nov	6-Dec	<30	<29	< 3	< 6	< 3	< 3	< 6	< 6	< 3	< 3	<27	< 4	< 4	<12	< 7	<32	< 7
6-Dec	20-Dec	<30	<37	< 3	< 7	< 3	< 4	< 6	< 6	< 4	< 4	<30	< 4	< 4	<19	< 9	<32	< 7
20-Dec	3-Jan	<27	<31	< 3	< 6	< 3	< 3	< 6	< 6	< 3	< 3	<29	< 3	< 4	<16	< 7	<31	< 7

All values given as < are less than LLD corrected for decay.

Table 3-7
Circ. Outlet Water Gamma Isotopic Analyses
Results in pCi/Liter

Between Dates Of		7Be	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb	103Ru	106Ru	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
2-Jan	16-Jan	<35	<41	< 4	< 7	< 4	< 3	< 7	< 7	< 4	< 5	<35	< 4	< 5	<21	< 9	<37	< 8
16-Jan	30-Jan	<34	<42	< 4	< 7	< 4	< 4	< 8	< 7	< 4	< 4	<37	< 3	< 4	<20	< 9	<36	< 8
30-Jan	13-Feb	<37	<43	< 4	< 7	< 4	< 4	< 7	< 6	< 4	< 4	<34	< 4	< 5	<23	< 9	<37	< 9
13-Feb	27-Feb	<34	<43	< 4	< 8	< 4	< 3	< 8	< 7	< 4	< 4	<34	< 3	< 5	<21	< 9	<35	< 8
27-Feb	13-Mar	<36	<39	< 4	< 7	< 4	< 4	< 7	< 7	< 4	< 4	<34	< 4	< 4	<22	< 9	<36	< 8
13-Mar	27-Mar	<37	<46	< 4	< 7	< 4	< 4	< 7	< 7	< 4	< 5	<35	< 4	< 4	<26	<10	<36	< 8
27-Mar	10-Apr	<35	<40	< 4	< 7	< 4	< 3	< 7	< 7	< 4	< 4	<36	< 4	< 4	<20	< 9	<35	< 8
10-Apr	24-Apr	<38	<40	< 4	< 8	< 4	< 4	< 7	< 7	< 4	< 4	<33	< 4	< 4	<20	< 9	<37	< 9
24-Apr	8-May	<35	<41	< 4	< 7	< 4	< 4	< 8	< 7	< 4	< 4	<32	< 4	< 4	<20	< 9	<36	< 8
8-May	22-May	<36	<40	< 4	< 7	< 4	< 4	< 7	< 7	< 4	< 4	<36	< 4	< 4	<20	< 9	<36	< 8
22-May	5-Jun	<36	<39	< 4	< 8	< 3	< 4	< 7	< 7	< 4	< 4	<35	< 4	< 4	<18	< 8	<35	< 8
5-Jun	19-Jun	<35	<33	< 4	< 6	< 4	< 4	< 8	< 6	< 3	< 4	<31	< 4	< 4	<13	< 8	<36	< 8
19-Jun	26-Jun	<36	<42	< 4	< 8	< 4	< 3	< 7	< 7	< 4	< 4	<33	< 4	< 4	<21	< 9	<34	< 7
26-Jun	10-Jul	<34	<39	< 4	< 7	< 4	< 3	< 7	< 6	< 4	< 4	<32	< 4	< 4	<19	< 8	<33	< 6
10-Jul	17-Jul	<34	<38	< 3	< 6	< 3	< 4	< 6	< 7	< 4	< 4	<31	< 4	< 4	<20	< 8	<35	< 7
17-Jul	31-Jul	<34	<37	< 3	< 6	< 4	< 3	< 6	< 6	< 4	< 4	<32	< 4	< 4	<20	< 8	<33	< 7
31-Jul	14-Aug	<31	<34	< 3	< 6	< 3	< 4	< 6	< 6	< 4	< 4	<32	< 4	< 4	<14	< 8	<34	< 7
14-Aug	28-Aug	<30	<38	< 3	< 7	< 4	< 4	< 6	< 7	< 4	< 4	<32	< 4	< 4	<18	< 8	<34	< 8
28-Aug	11-Sep	<32	<38	< 3	< 6	< 3	< 3	< 7	< 6	< 4	< 4	<33	< 4	< 4	<17	< 8	<33	< 7
11-Sep	25-Sep	<33	<40	< 4	< 6	< 4	< 4	< 7	< 6	< 4	< 4	<33	< 4	< 4	<19	< 9	<36	< 7
25-Sep	9-Oct	<31	<36	< 3	< 7	< 3	< 4	< 6	< 6	< 4	< 4	<30	< 4	< 4	<17	< 8	<34	< 7
9-Oct	23-Oct	<33	<36	< 3	< 6	< 3	< 3	< 6	< 6	< 4	< 4	<30	< 4	< 4	<18	< 8	<34	< 7
23-Oct	6-Nov	<28	<36	< 3	< 6	< 3	< 4	< 6	< 6	< 4	< 4	<30	< 3	< 4	<17	< 8	<32	< 6
6-Nov	20-Nov	<29	<34	< 3	< 7	< 4	< 4	< 6	< 6	< 4	< 4	<28	< 3	< 4	<16	< 8	<32	< 6
20-Nov	4-Dec	<32	<36	< 3	< 6	< 3	< 4	< 6	< 6	< 4	< 4	<29	< 4	< 4	<18	< 8	<32	< 6
4-Dec	18-Dec	<29	<32	< 3	< 6	< 3	< 4	< 7	< 6	< 3	< 4	<28	< 3	< 4	<17	< 8	<32	< 6
25-Dec	2-Jan (A)	<29	<81	< 3	< 6	< 3	< 3	< 7	< 6	< 4	< 3	<30	< 4	< 4	<15	< 8	<31	< 7

All values given as < are less than LLD corrected for decay.

(A) Compositor out of service 12/18/91-12/25/91.

Table 3-8
Russel Station Water Gamma Isotopic Analyses
Results in pCi/Liter

Month of	7Be	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb	103Ru	106Ru	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
Jan-91	<32	<35	< 3	< 6	< 4	< 4	< 7	< 7	< 4	< 4	<32	< 4	< 4	<14	< 8	<35	< 8
Feb-91	<32	<34	< 4	< 6	< 4	< 4	< 7	< 7	< 3	< 4	<33	< 4	< 5	<14	< 8	<36	< 8
Mar-91	<34	<36	< 3	< 7	< 4	< 4	< 6	< 7	< 3	< 4	<33	< 4	< 4	<16	< 8	<34	< 8
Apr-91	<35	<42	< 4	< 7	< 4	< 3	< 8	< 6	< 4	< 4	<32	< 4	< 4	<20	< 9	<36	< 9
May-91	<35	<35	< 4	< 6	< 4	< 4	< 7	< 6	< 4	< 4	<34	< 4	< 4	<17	< 8	<36	< 9
Jun-91	<30	<32	< 3	< 6	< 3	< 4	< 6	< 6	< 3	< 4	<30	< 4	< 4	<13	< 7	<33	< 7
Jul-91	<33	<38	< 3	< 6	< 3	< 4	< 6	< 6	< 4	< 4	<32	< 4	< 4	<18	< 8	<32	< 7
Aug-91	<29	<31	< 4	< 6	< 3	< 4	< 6	< 6	< 3	< 3	<29	< 4	< 4	<13	< 7	<35	< 7
Sep-91	<39	<49	< 3	< 8	< 4	< 3	< 8	< 7	< 5	< 5	<31	< 4	< 4	<31	<10	<35	< 7
Oct-91	<27	<33	< 3	< 6	< 3	< 3	< 7	< 6	< 3	< 4	<29	< 4	< 4	<15	< 7	<33	< 7
Nov-91	<30	<32	< 3	< 6	< 3	< 3	< 6	< 5	< 4	< 4	<31	< 4	< 4	<14	< 7	<32	< 7
Dec-91	<30	<35	< 3	< 8	< 3	< 3	< 6	< 6	< 4	< 4	<29	< 3	< 4	<17	< 8	<33	< 7

All values given as < are less than LLD corrected for decay.

Table 3-9
Tap Water Gamma Isotopic Analyses
Results in pCi/Liter

Month of	^{7}Be	^{51}Cr	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	^{95}Zr	^{95}Nb	^{103}Ru	^{106}Ru	^{134}Cs	^{137}Cs	^{140}Ba	^{141}Ce	^{144}Ce	^{226}Ra
Jan-91	<33	<31	<4	<6	<4	<5	<7	<6	<4	<4	<36	<4	<4	<14	<8	<36	<9
Feb-91	<32	<35	<4	<7	<4	<3	<8	<7	<4	<4	<35	<4	<4	<14	<8	<35	<8
Mar-91	<34	<34	<4	<7	<4	<4	<7	<6	<3	<4	<35	<4	<4	<15	<7	<35	<8
Apr-91	<33	<34	<4	<6	<4	<4	<8	<7	<3	<4	<35	<4	<4	<14	<8	<36	<8
May-91	<33	<34	<4	<7	<4	<4	<7	<6	<3	<4	<36	<4	<4	<13	<7	<35	<9
Jun-91	<31	<32	<3	<6	<4	<4	<7	<6	<3	<4	<34	<4	<4	<14	<8	<35	<8
Jul-91	<30	<33	<3	<6	<3	<4	<6	<6	<3	<3	<32	<4	<4	<12	<7	<33	<7
Aug-91	<29	<30	<3	<6	<3	<3	<7	<6	<3	<3	<32	<4	<4	<11	<7	<33	<7
Sep-91	<29	<32	<3	<6	<3	<3	<7	<6	<3	<3	<33	<4	<4	<13	<7	<34	<7
Oct-91	<32	<32	<3	<5	<3	<4	<7	<6	<3	<3	<29	<4	<4	<12	<7	<34	<7
Nov-91	<27	<29	<3	<5	<3	<3	<6	<6	<3	<3	<28	<4	<4	<11	<7	<31	<7
Dec-91	<27	<29	<3	<7	<3	<3	<7	<6	<3	<3	<30	<4	<4	<11	<7	<32	<6

All values given as < are less than LLD corrected for decay.

Table 3-10
Well "B" Water Gamma Isotopic Analyses
Results in pCi/Liter

Month of	7Be	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb	103Ru	106Ru	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
Jan-91	<33	<35	<4	<6	<4	<4	<8	<7	<4	<4	<33	<4	<5	<15	<8	<38	41±12
Feb-91	<34	<34	<4	<7	<3	<4	<8	<6	<4	<4	<36	<4	<4	<14	<8	<37	45±12
Mar-91	<33	<36	<4	<7	<4	<4	<8	<7	<4	<4	<34	<4	<4	<15	<8	<37	52±9
Apr-91	<35	<36	<4	<7	<4	<4	<8	<6	<4	<4	<38	<4	<4	<15	<8	<37	44±10
May-91	<34	<34	<4	<6	<4	<4	<8	<7	<4	<4	<35	<4	<4	<14	<8	<36	45±10
Jun-91	<33	<39	<4	<7	<3	<4	<8	<6	<4	<4	<35	<4	<5	<17	<8	<36	40±10
Jul-91	<32	<31	<3	<6	<3	<4	<6	<6	<3	<3	<33	<4	<4	<14	<7	<34	25±9
Aug-91	<31	<31	<4	<6	<3	<4	<7	<6	<3	<3	<31	<4	<4	<12	<7	<35	21±9
Sep-91	<29	<33	<3	<7	<4	<4	<7	<6	<3	<4	<33	<4	<4	<13	<8	<35	16±8
Oct-91	<31	<32	<35	<6	<3	<4	<7	<6	<3	<4	<31	<4	<4	<13	<7	<35	28±9
Nov-91	<27	<29	<3	<6	<3	<3	<6	<6	<3	<3	<29	<4	<4	<13	<7	<32	16±10
Dec-91	<27	<29	<3	<6	<3	<4	<7	<5	<3	<3	<32	<3	<4	<11	<7	<33	15±12

All values given as < are less than LLD corrected for decay.

Table 3-11
Deer Creek Water Gamma Isotopic Analyses
Results in pCi/Liter

Month of	7Be	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb	103Ru	106Ru	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
Jan-91	<33	<35	<3	<6	<4	<3	<7	<7	<4	<4	<33	<4	<4	<14	<8	<37	29±8
Feb-91	<34	<35	<4	<7	<4	<3	<7	<6	<3	<4	<35	<3	<4	<13	<8	<36	21±9
Mar-91	<32	<33	<4	<7	<4	<4	<7	<6	<3	<4	<34	<4	<4	<14	<8	<37	16±9
Apr-91	<32	<35	<4	<6	<4	<5	<7	<7	<4	<4	<35	<4	<5	<14	<8	<36	<9
May-91	<33	<35	<4	<7	<4	<4	<7	<6	<3	<4	<36	<4	<4	<13	<7	<36	25±10
Jun-91	<33	<35	<3	<7	<3	<4	<7	<7	<4	<4	<35	<4	<4	<15	<8	<35	<9
Jul-91	<30	<34	<3	<6	<4	<4	<7	<6	<4	<4	<33	<4	<4	<14	<7	<34	<7
Aug-91	<28	<34	<3	<7	<3	<3	<6	<6	<3	<3	<35	<4	<4	<13	<7	<35	<8
Sep-91	<30	<30	<3	<6	<3	<4	<7	<5	<3	<4	<30	<4	<4	<13	<7	<34	<8
Oct-91	<27	<31	<3	<6	<3	<3	<7	<6	<3	<3	<32	<4	<4	<13	<7	<34	<8
Nov-91	<27	<30	<3	<6	<3	<3	<6	<5	<3	<3	<30	<4	<4	<12	<7	<31	<8
Dec-91	<27	<29	<3	<6	<3	<3	<7	<5	<3	<3	<28	<4	<4	<12	<7	<31	22±11

All values given as < are less than LLD corrected for decay.

Table 3 - 12 A
Environmental Water Samples Tritium Analysis
Results in pCi/L

Month of	Russell	O.W.D.	Circ In	Circ Out	Deer Creek	Tap	Well 'B'
January	230 ± 610	380 ± 610	420 ± 650	370 ± 650	26 ± 620	440 ± 630	<990
February	410 ± 510	<690	250 ± 430	<690	720 ± 480	740 ± 480	<690
March	230 ± 460	86 ± 510	<750	<750	410 ± 520	430 ± 490	260 ± 510
April	<1000	51 ± 610	<1000	230 ± 610	<1000	<1000	<1000
May	82 ± 380	83 ± 380	31 ± 350	160 ± 370	<630	34 ± 390	270 ± 360
June	54 ± 560	800 ± 570	97 ± 560	73 ± 500	<920	300 ± 560	220 ± 560
July	190 ± 570	340 ± 550	(A)	51 ± 520	300 ± 540	160 ± 550	53 ± 550
August	50 ± 520	27 ± 560	190 ± 560	240 ± 550	340 ± 540	130 ± 540	160 ± 550
September	270 ± 560	890 ± 340	200 ± 530	240 ± 550	130 ± 520	<990	100 ± 550
October	<860	50 ± 540	380 ± 530	290 ± 540	26 ± 540	160 ± 540	<860
November	230 ± 400	490 ± 400	190 ± 400	86 ± 400	800 ± 410	<650	190 ± 400
December	<690	110 ± 410	<690	42 ± 390	<400	320 ± 410	150 ± 410

(A) Sample contaminated in processing

All values given as < are less than the LLD corrected for decay.

Table 3 - 12 B
Fallout Tritium Analysis
Results in pCi/L

Month of	Station 3	Station 5	Station 8	Station 10	Station 12
January	110 ± 640	110 ± 640	<990	<990	<990
February	490 ± 430	770 ± 510	36 ± 420	560 ± 480	430 ± 510
March	450 ± 540	470 ± 520	160 ± 540	90 ± 430	23 ± 540
April	230 ± 550	970 ± 420	140 ± 440	1180 ± 630	310 ± 440
May	<630	110 ± 380	330 ± 400	160 ± 360	190 ± 400
June	220 ± 570	250 ± 530	25 ± 520	48 ± 500	80 ± 560
July	330 ± 570	26 ± 550	<900	<900	<900
August	160 ± 540	<910	100 ± 550	<910	240 ± 550
September	<990	230 ± 540	30 ± 630	320 ± 620	230 ± 610
October	160 ± 550	51 ± 530	<860	<860	<860
November	300 ± 400	640 ± 410	170 ± 400	<650	230 ± 400
December	230 ± 410	260 ± 400	<680	21.5 ± 400	380 ± 690

All values given as < are less than the LLD corrected for decay.

Table 3 - 13
Iodine in Water
Results in pCi/L

Month of	Russell	O.W.D.	Circ. In	Circ. Out	Deer Creek	Tap	Well "B"
January	<0.28	0.17 ± 0.07	<0.23	<0.23	0.12 ± 0.07	0.13 ± 0.07	0.09 ± 0.08
February	(a)	<0.23	(a)	0.03 ± 0.10	<0.23	0.05 ± 0.07	<0.23
March	0.06 ± 0.08	0.04 ± 0.06	<0.25	0.05 ± 0.07	<0.30	0.08 ± 0.06	0.02 ± 0.06
April	0.37 ± 0.14	<0.24	0.11 ± 0.08	<0.19	<0.19	<0.18	<0.24
May	0.02 ± 0.09	0.03 ± 0.06	0.02 ± 0.08	0.16 ± 0.06	<0.19	<0.21	<.019
June	0.13 ± 0.19	0.22 ± 0.08	0.28 ± 0.20	0.07 ± 0.09	<0.23	0.05 ± 0.15	<0.21
July	<0.78	<0.35	0.13 ± 0.10	0.18 ± 0.14	<0.40	0.08 ± 0.06	<0.24
August	0.35 ± 0.12	<.045	0.08 ± 0.16	0.14 ± 0.18	0.35 ± 0.10	<0.20	0.06 ± 0.06
September	0.16 ± 0.11	0.02 ± 0.09	<0.57	<0.21	0.10 ± 0.07	<0.20	0.08 ± 0.06
October	0.02 ± 0.12	0.16 ± 0.08	0.12 ± 0.08	0.36 ± 0.12	<0.26	<0.33	0.13 ± 0.07
November	0.18 ± 0.14	0.12 ± 0.12	0.11 ± 0.10	0.13 ± 0.15	0.06 ± 0.07	0.14 ± 0.08	<0.25
December	<0.51	0.13 ± 0.12	0.55 ± 0.17	0.04 ± 0.11	<0.25	0.13 ± 0.07	<0.25

(a) Monthly composite samples not run when power lost to lab for four days during ice storm.

All values given as < are less than the LLD corrected for decay

3.4 Milk Samples

There are three dairy herds located three to five miles from the plant. Milk samples are collected monthly during November through May from one of the three and biweekly during June through October from each. A control farm sample is taken for each monthly sample and once during each biweekly period. The milk is analyzed for Iodine-131 and also gamma scanned for major fission products. The method involves chemical separation of iodine and gross beta counting. The counting procedure is not specific for Iodine-131 and other isotopes may add to the count rate.

All positive counts and the 2 sigma error are reported. All negative counts after background correction are reported as <LLD for that analysis. The average for all positive values from indicator farms is 0.142 ± 0.080 and from the background farm is 0.127 ± 0.080. During 1991, no samples indicated positive I-131 activity that exceeded the LLD for the analysis. One sample from farm C exceeded the required LLD of 1 pCi/liter when the yield for the separation was 12%. Table 3-14 is a listing of all samples collected during 1991.

The annual dose to the thyroid of an infant which could result from the measured plant release rate, was calculated by the method described in the Offsite Dose Calculation Manual using equation 13. The calculation is done for releases during the growing season when cows may be grazing. For R.E. Ginna, this includes only releases during the months of May through October. The maximum resultant annual thyroid dose for 1991 would be 0.55 mrem using the cow-milk-infant pathway for a hypothetical farm at the site boundary. Using the real farm with the highest D/Q which is 5 miles from the plant, the maximum calculated dose to the infant is 0.0070 mrem from plant releases during the growing season. The annual average plant release rate during the grazing season would give a concentration of < 0.0422 pCi/liter of Iodine-131 in milk at this real farm. This concentration is equal to 1/15 of the LLD for this analysis.

Table 3-14
Milk
Results in pCi/Liter

Farm	Date		I-131	Cs-137	Ba-140	K-40
C	15-Jan		0.028 ± 0.088	<5	<14	1363 ± 128
D	17-Jan		0.191 ± 0.082	<5	<14	1295 ± 126
B	12-Feb		0.146 ± 0.088	<5	<14	1540 ± 126
D	13-Feb		0.183 ± 0.087	<5	<14	1375 ± 123
A	12-Mar		0.165 ± 0.068	<5	<15	1379 ± 123
D	14-Mar		<0.24	<5	<16	1383 ± 128
C	9-Apr		<0.21	<5	<16	1389 ± 116
D	11-Apr		0.135 ± 0.096	<5	<15	1399 ± 124
B	14-May		<0.22	<5	<14	1346 ± 115
D	15-May		<0.27	<5	<16	1459 ± 122
A	4-Jun		<0.24	<5	<15	1416 ± 124
C	6-Jun		<0.21	<5	<15	1493 ± 126
B	11-Jun		<0.24	<5	<15	1379 ± 127
D	13-Jun		<0.27	<5	<14	1420 ± 125
A	18-Jun		0.048 ± 0.082	<9	<26	1751 ± 207
C	19-Jun		0.115 ± 0.066	<4	<15	1458 ± 123
B	25-Jun		0.138 ± 0.068	<5	<15	1400 ± 119
D	27-Jun		0.017 ± 0.064	<5	<14	1475 ± 120
A	2-Jul		0.093 ± 0.063	<4	<13	1303 ± 115
C	3-Jul		0.018 ± 0.068	<5	<17	1182 ± 114
B	9-Jul		0.111 ± 0.133	<3	<14	1314 ± 118
D	11-Jul		0.120 ± 0.072	<4	<14	1279 ± 113
A	16-Jul		<0.18	<5	<13	1361 ± 113
C	18-Jul	(b)	0.930 ± 0.487	<4	<13	1366 ± 120
B	23-Jul		0.053 ± 0.071	<5	<14	1356 ± 121
D	25-Jul		<0.24	<4	<13	1273 ± 118
A	30-Jul		0.079 ± 0.063	<4	<14	1398 ± 155
C	1-Aug		0.145 ± 0.074	<4	<13	1362 ± 115
B	6-Aug		0.155 ± 0.087	<4	<13	1283 ± 111
D	8-Aug		0.172 ± 0.105	<4	<14	1293 ± 112
A	13-Aug		<0.35	<4	<14	1394 ± 113
C	15-Aug		0.169 ± 0.065	<4	<13	1377 ± 115
B	20-Aug		<0.21	<5	<13	1306 ± 117
D	22-Aug		0.128 ± 0.063	<4	<14	1407 ± 120
A	27-Aug		0.089 ± 0.06	<4	<13	1353 ± 118
C	29-Aug		0.037 ± 0.079	<5	<13	1398 ± 118
B	3-Sep		0.119 ± 0.065	<4	<13	1318 ± 115
D	5-Sep		0.030 ± 0.064	<4	<14	1357 ± 119
A	10-Sep		0.113 ± 0.064	<5	<13	1363 ± 115
C	12-Sep		<0.21	<5	<12	1489 ± 122
B	17-Sep		<0.20	<4	<13	1417 ± 112
D	19-Sep		<0.24	<4	<13	1324 ± 112
A	24-Sep		(a)	<5	<14	1371 ± 114
C	26-Sep		0.122 ± 0.064	<5	<13	1514 ± 119
B	1-Oct		0.055 ± 0.062	<5	<13	1255 ± 116
D	3-Oct		<0.21	<4	<13	1380 ± 118
A	8-Oct		0.094 ± 0.073	<3	<8	1499 ± 85
C	10-Oct		0.310 ± 0.063	<4	<13	1464 ± 118
B	15-Oct		0.011 ± 0.0767	<4	<12	1396 ± 115
D	16-Oct		0.134 ± 0.094	<4	<13	1426 ± 119
A	22-Oct		0.141 ± 0.075	<4	<14	1470 ± 119
C	24-Oct		0.077 ± 0.082	<4	<13	1522 ± 119
B	12-Nov		0.162 ± 0.092	<4	<14	1383 ± 116
D	26-Nov		0.114 ± 0.075	<4	<12	1464 ± 115
A	17-Dec		0.117 ± 0.075	<4	<12	1415 ± 118
D	18-Dec		0.170 ± 0.079	<5	<14	1384 ± 117

All values given as < are less than the LLD corrected for decay

(a) Sample lost during processing.
(b) LLD exceeded 1.0 pCi/l. See text for discussion.

3.5 Fish Samples

Indicator fish are caught in the plume from the Discharge Canal and tested for radioactivity ingested from liquid effluent releases from the plant. The fish are filleted to represent that portion which would normally be eaten. Additional fish are caught more than 15 miles away to be used as background indicators and are prepared in the same manner.

Four different species of fish are analyzed during each half year from the indicator and background locations if they are available.

There was no real difference in the activity of the fish caught between the indicator and background locations.

Isotopic gamma concentrations (pCi/wet kilogram) are listed in Tables 3-15A, 3-15B.

Samples of algae (cladophora) and sand were obtained from the lake bottom in the discharge plume area. Results of the gamma scan are included in Table 3-16.

Most fish are held for extended periods before being counted by gamma scan. The LLD value for the shorter half life isotopes will become large. This is the case for most of the chromium, iodine and barium data in the table. This data is also affected by small fish samples in some species.

Table 3-15 A
Fish Samples
Results in pCi/kgm Wet

Description	40K	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb
Indicator Fish									
First Half 1991									
WHITE SUCKER	3580 ± 220	<110	<7	<20	<8	<7	<16	<15	<10
LAKE TROUT	3420 ± 230	<99	<7	<20	<8	<8	<17	<15	<9
BROWN TROUT	2890 ± 170	<58	<5	<13	<5	<6	<13	<10	<6
SMALLMOUTH BASS	3110 ± 190	<110	<6	<20	<8	<7	<15	<15	<10
Second Half 1991									
BROWN TROUT	3110 ± 190	<240	<7	<29	<10	<8	<17	<19	<19
ROCK BASS	2490 ± 170	<500	<7	<49	<14	<5	<16	<28	<35
LAKE TROUT	2240 ± 180	<41	<6	<12	<5	<8	<14	<10	<5
SMALLMOUTH BASS	3430 ± 190	<170	<6	<25	<10	<6	<16	<16	<15
Background Fish									
First Half 1991									
COHO SALMON	4190 ± 280	<330	<10	<49	<15	<10	<26	<30	<29
CENTRACHID	3070 ± 230	<260	<8	<34	<12	<7	<20	<22	<22
BROWN TROUT	4180 ± 250	<290	<9	<40	<13	<10	<23	<25	<26
LAKE TROUT	2700 ± 220	<110	<8	<20	<10	<9	<18	<16	<11
Second Half 1991									
RAINBOW TROUT	3980 ± 260	<18	<8	<30	<11	<9	<19	<19	<16
CHINOOK SALMON	3670 ± 190	<140	<6	<22	<9	<7	<15	<16	<12
ROCK BASS	1730 ± 170	<1910	<8	<120	<25	<7	<20	<50	<100
LAKE TROUT	2500 ± 150	<14	<5	<20	<7	<6	<11	<13	<12

All values given as < are less than the LLD corrected for decay

Table 3-15 B
Fish Samples
Results in pCi/kgm Wet

Description	103Ru	106Ru	131I	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
Indicator Fish									
First Half 1991									
WHITE SUCKER	<10	<66	<64	<8	17 ± 8	<97	<20	<60	<14
LAKE TROUT	<10	<66	<35	<9	38 ± 11	<70	<19	<65	<16
BROWN TROUT	<7	<48	<17	<6	24 ± 8	<37	<13	<46	<11
SMALLMOUTH BASS	<11	<63	<100	<8	29 ± 9	<9	<22	<56	<13
Second Half 1991									
BROWN TROUT	<17	<59	<1210	<7	21 ± 8	<524	<40	<61	<12
ROCK BASS	<28	<62		<7	17 ± 7	<2940	<77	<62	<11
LAKE TROUT	<5	<56	<3	<7	18 ± 9	<12	<10	<54	<14
SMALLMOUTH BASS	<13	<56	<465	<6	15 ± 9	<274	<30	<55	<12
Background Fish									
First Half 1991									
COHO SALMON	<24	<90	<1640	<11	30 ± 14	<770	<59	<87	<18
CENTRACHID	<19	<70	<1090	<8	<9	<510	<45	<71	<14
BROWN TROUT	<20	<80	<1440	<10	38 ± 11	<660	<51	<80	<14
LAKE TROUT	<11	<76	<48	<9	23 ± 10	<79	<22	<71	<16
Second Half 1991									
RAINBOW TROUT	<15.8	<75.8	<223	<10	26 ± 14	<210	<33	<78	<17
CHINOOK SALMON	<11.4	<55.4	<301	<6	30 ± 8	<210	<27	<51	<10
ROCK BASS	<73.3	<74.4		<7	<8		<250	<77	<14
LAKE TROUT	<10.8	<44.6	<501	<6	18 ± 7	<270	<26	<45	<9

All values given as < are less than the LLD corrected for decay

Table 3-16
Lake Samples
Results in pCi/kgm

Description	40K	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb
Cladophora	2440 ± 190	<70	<7	<16	<7	<7	<15	<13	<8
Lake Bottom	1130 ± 230	<63	<67	<15	<7	<7	<17	<11	<7

Description	103Ru	106Ru	131I	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
Cladophora	<7	<61	<13	<9	<19	<35	<15	<13	54 ± 18
Lake Bottom	<7	<53	<12	<9	39 ± 10	<32	<14	<58	170 ± 18

All values given as < are less than LLD corrected for decay

3.6 Vegetation Samples

Crops are grown on the plant property and samples of the fruits and grains are collected at harvest time for testing. Background samples are purchased from farms greater than 10 miles from the plant. There was no indication in the samples of any measurable activity. Gamma isotopic data is given in Table 3-17.

Burdock leaves, large leaves similar to rhubarb but not edible, were picked in an open area 450 m east of the plant after a reactor trip. It had been determined that small releases were occurring from the hogger system after trips from power when the plant was being held at hot shutdown and would again be escalated back to normal operation. The leaves were picked to determine if an iodine release occurred, but the activity observed was cesium. The sample size was 1.24 kgm.

Table 3-17
Vegetation Samples
Results in pCi/kgm Wet

Description	40K	51Cr	54Mn	59Fe	58Co	60Co	65Zn	95Zr	95Nb
LETTUCE	5840 ± 390	<110	<13	<23	<13	<14	<28	<22	<12
APPLES	610 ± 110	<36	<4	<7	<4	<4	<9	<7	<4
CHERRIES	1400 ± 110	<33	<3	<8	<4	<4	<9	<7	<4
BURDOCK LEAVES	8310 ± 420	<105	<13	<27	<12	<15	<30	<21	<13
GRAPES	2050 ± 150	<38	<4	<9	<4	<6	<10	<8	<5
SQUASH	4060 ± 410	<140	<15	<32	<14	<17	<30	<29	<15
Control Vegetation Samples									
APPLES	800 ± 113	<16	<4	<9	<4	<4	<10	<7	<5
SWISSCHARD	4710 ± 283	<72	<9	<19	<8	<11	<21	<15	<9

Description	103Ru	106Ru	131I	134Cs	137Cs	140Ba	141Ce	144Ce	226Ra
LETTUCE	<12	<107	<13	<15	<14	<15	<23	<111	<26
APPLES	<4	<39	<5	<5	<5	<16	<9	<13	<8
CHERRIES	<4	<34	<4	<4	<5	<14	<7	<35	<8
BURDOCK LEAVES	<12	<117	<14	<16	25.7 ± 14.6	<43	<23	<105	<25
GRAPES	<4	<43	<5	<5	<5	<15	<9	<43	<12
SQUASH	<15	<136	<19	<17	<18	<54	<30	<132	<31
Control Vegetation Samples									
APPLES	<5	<37	<10	<4	<5	<21	<10	<39	<8
SWISSCHARD	<8	<79	<9	<10	<10	<29	<16	<76	<18

All values given as < are less than LLD corrected for decay

[illegible]

3.7 External Penetrating Radiation

A thermoluminescent dosimeter (TLD) with a sensitivity of 5 millirem/quarter is issued as part of the environmental monitoring program. Thirty-nine TLD badges are currently placed in four rings around the plant. These rings range from less than 1000 feet to 15 miles and have been dispersed to give indications in each of the nine land based sectors around the plant should an excessive release occur from the plant. Badges are changed and read after approximately 3 months exposure.

TLD location #7 is influenced by its close proximity to the Contaminated Equipment Storage Area established in 1983 and will normally read 20-40 mRem/quarter. For the year of 1991, omitting location 7, on-site exposure ranged between 7.3 -17.0 mrem/quarter, with an average exposure of 11.4 mrem/quarter and off-site 7.3 - 21.3 mrem/quarter with an average exposure of 10.0 mrem/quarter. Table 3-18 gives TLD readings for each quarter. One TLD was wet at the time of being read and its value is deleted. The high value at location 34 during the third quarter may be due to poor annealing before being placed in the field.

A trend chart with a comparison of data for each location for the years of 1990 and 1991 is included. The data plotted is the average quarterly dose measured.

The NRC also obtains TLD measurements around the plant. The following is a comparison of the data for the first and second quarters of 1991 using NRC data from NUREG-0837 Vol. 10, No. 1, 2, 3, and 4. Results in mrem/quarter:

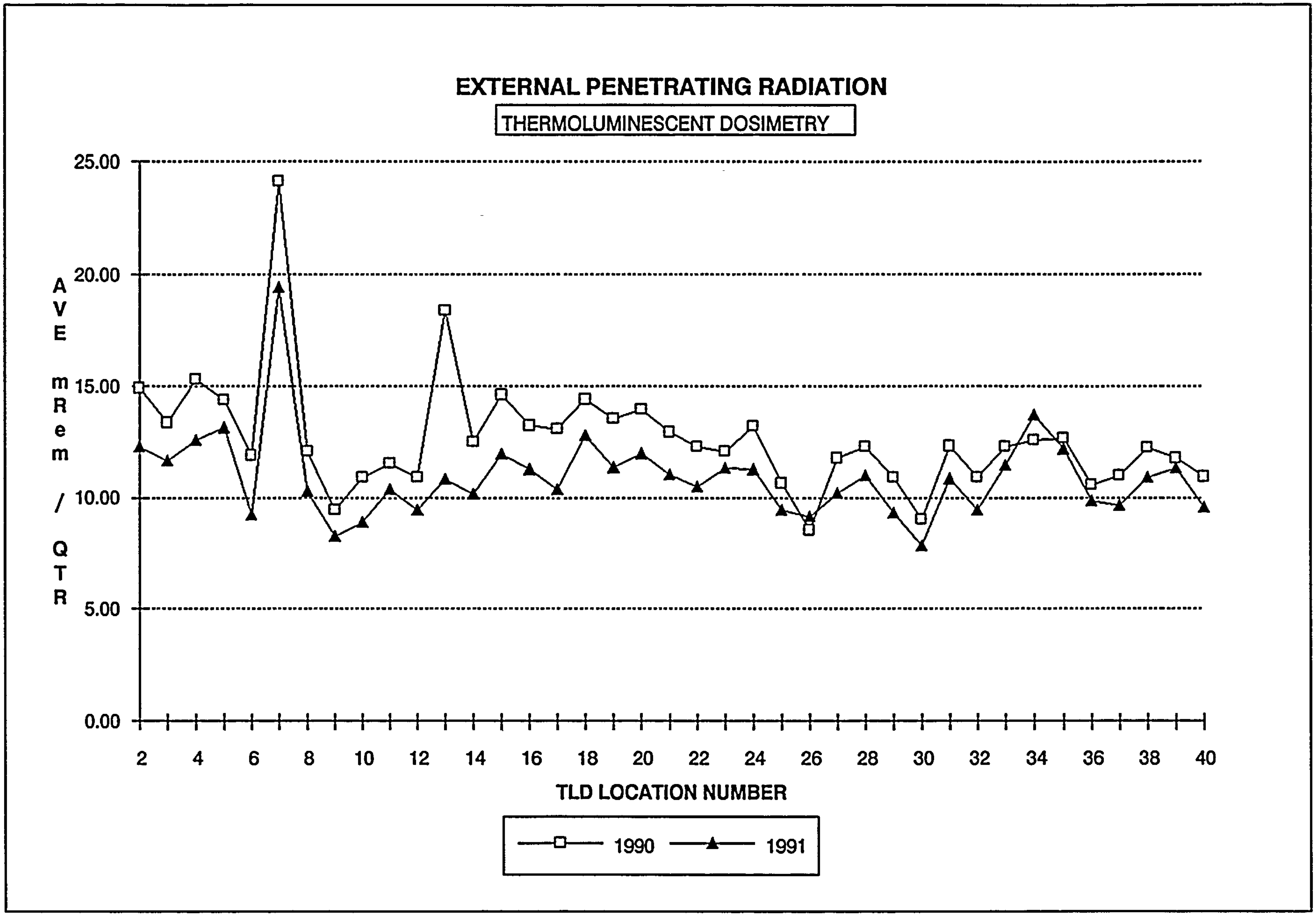
	Ginna				NRC			
	First	Second	Third	Fourth	First	Second	Third	Fourth
<2 miles	9.3	11.1	9.3	12.6	15.1	15.5	15.1	14.5
2-5 miles	8.7	10.2	12.7	12.0	15.6	15.5	15.0	13.9
>5 miles	8.0	9.0	10.2	10.6	16.2	15.3	14.0	14.8

There are three stations at the same location. These comparisons are:

A	8.1	10.4	12.2	12.7	16.8	17.6	17.1	16.3
B	9.8	10.5	12.6	12.4	16.9	15.5	15.5	16.9
C	7.6	8.9	10.6	11.1	14.7	13.4	14.7	14.4

Table 3-18
External Penetrating Radiation
Thermoluminescent Dosimetry 1991
Units = Mr/91 Day Quarter

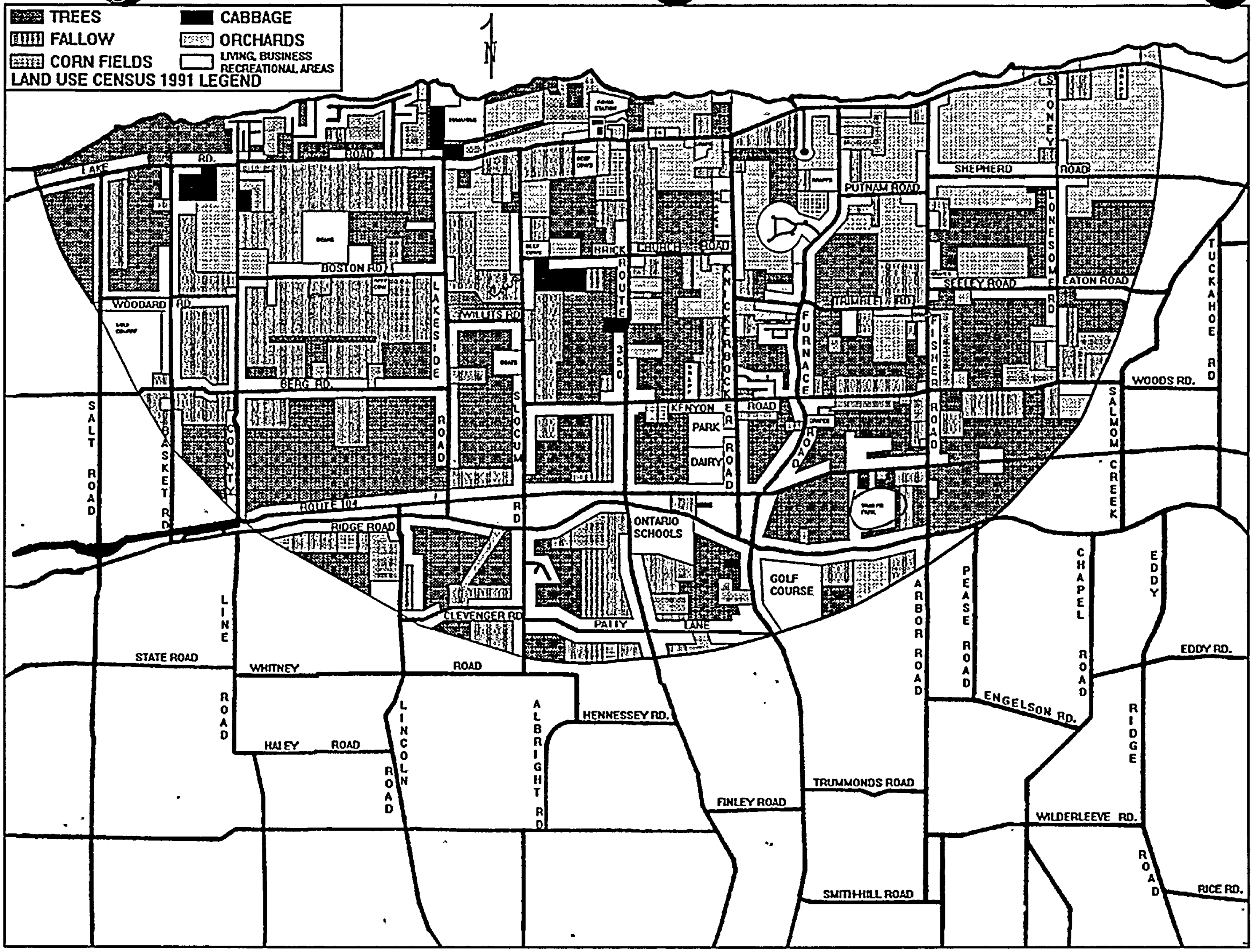
	Location	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
#2 - #7 are	2	9.9 ± 2.5	12.1 ± 3.0	13.9 ± 3.5	13.2 ± 3.3
on-site near the line	3	9.4 ± 2.4	11.4 ± 2.9	12.9 ± 3.2	12.9 ± 3.3
of the highest annual	4	10.5 ± 2.6	12.7 ± 3.2	12.3 ± 3.1	14.8 ± 3.7
average ground level	5	10.7 ± 2.7	12.2 ± 3.1	17.0 ± 4.3	12.8 ± 3.2
concentration.	6	7.4 ± 1.9	9.0 ± 2.3	10.0 ± 2.5	10.5 ± 2.7
	7	15.3 ± 3.9	17.9 ± 4.5	22.4 ± 5.6	22.2 ± 5.6
#8 - #12 are offsite at	8	8.6 ± 2.2	9.7 ± 2.5	11.2 ± 2.8	11.6 ± 2.9
a distance of 8 to 15 miles.	9	6.4 ± 1.6	8.1 ± 2.0	8.9 ± 2.3	9.6 ± 2.4
	10	7.3 ± 1.8	8.7 ± 2.2	9.2 ± 2.3	10.4 ± 2.6
	11	10.4 ± 2.6	9.9 ± 2.5	10.2 ± 2.6	11.0 ± 2.8
	12	8.0 ± 2.0	9.3 ± 2.3	9.7 ± 2.4	10.7 ± 2.7
	13	7.3 ± 1.8	11.6 ± 2.9	a	13.5 ± 3.4
#14 - #16 are located	14	8.1 ± 2.0	9.6 ± 2.4	11.6 ± 2.9	11.2 ± 2.8
along a line 3000 ft. west	15	10.2 ± 2.6	11.6 ± 2.9	13.0 ± 3.3	13.0 ± 3.3
of the plant.	16	9.2 ± 2.3	11.1 ± 2.8	12.6 ± 3.2	12.2 ± 3.1
#17 - #21 plus #13 are	17	8.9 ± 2.3	9.7 ± 2.4	11.3 ± 2.9	11.5 ± 2.9
located along Lake Road.	18	10.7 ± 2.7	12.8 ± 3.2	13.5 ± 3.4	14.1 ± 3.5
	19	9.6 ± 2.4	10.5 ± 2.6	12.7 ± 3.2	12.6 ± 3.2
	20	10.0 ± 2.5	11.7 ± 3.0	13.2 ± 3.3	13.0 ± 3.3
	21	8.8 ± 2.2	10.9 ± 2.8	11.9 ± 3.0	12.6 ± 3.2
#22 - #24 are located	22	8.3 ± 2.1	10.4 ± 2.6	11.5 ± 2.9	11.7 ± 2.9
along the east site	23	9.4 ± 2.4	10.3 ± 2.6	13.3 ± 3.4	12.3 ± 3.1
boundary line.	24	9.0 ± 2.3	11.0 ± 2.8	12.2 ± 3.1	13.0 ± 3.3
#25 - #30 are offsite	25	8.0 ± 2.0	8.9 ± 2.2	10.7 ± 2.7	10.1 ± 2.5
at a distance of 8	26	8.1 ± 2.0	8.5 ± 2.1	10.1 ± 2.6	9.8 ± 2.5
to 15 miles.	27	8.1 ± 2.1	9.7 ± 2.5	11.6 ± 2.9	11.3 ± 2.8
	28	8.7 ± 2.2	10.7 ± 2.7	12.1 ± 3.1	12.4 ± 3.1
	29	7.6 ± 1.9	8.9 ± 2.2	10.3 ± 2.6	10.5 ± 2.6
	30	6.4 ± 1.6	7.4 ± 1.9	8.6 ± 2.2	8.9 ± 2.2
#31 - #40 are located	31	8.1 ± 2.0	10.4 ± 2.6	12.2 ± 3.1	12.7 ± 3.2
in an arc at a distance	32	7.5 ± 1.9	9.2 ± 2.3	10.5 ± 2.6	10.5 ± 2.6
of 4 - 5 miles.	33	9.2 ± 2.3	10.8 ± 2.7	12.9 ± 3.3	12.9 ± 3.2
	34	9.2 ± 2.3	11.3 ± 2.8	21.3 ± 5.4	13.1 ± 3.3
	35	10.5 ± 2.6	11.3 ± 2.8	13.9 ± 3.5	13.1 ± 3.3
	36	8.5 ± 2.1	9.1 ± 2.3	11.1 ± 2.8	10.7 ± 2.7
	37	7.7 ± 1.9	9.6 ± 2.4	10.5 ± 2.6	10.8 ± 2.7
	38	9.0 ± 2.3	10.7 ± 2.7	11.6 ± 2.9	12.3 ± 3.1
(a) Data lost due to wet dosimeter.	39	9.8 ± 2.5	10.5 ± 2.6	12.6 ± 3.2	12.4 ± 3.1
	40	7.6 ± 1.9	8.9 ± 2.2	10.6 ± 2.7	11.1 ± 2.8


EXTERNAL PENETRATING RADIATION
THERMOLUMINESCENT DOSIMETRY
AVE mRem / QTR
25.00
20.00
15.00
10.00
5.00
0.00
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
TLD LOCATION NUMBER
1990
1991

4.0 LAND USE CENSUS

A land use census is done each year to determine any major changes in the use of the land within 5 miles of the plant. There were no major changes. The land use remains mainly agricultural in nature. There were several private homes constructed, but no new housing developments or large business construction projects. The three dairy operations nearest the plant continued in operation with an average of 40 to 70 milking cows. There are no goats used for milk on a regular basis within the 5 mile radius. Beef cattle are still raised on 3 farms within 2 miles of the plant as in the past.

A copy of the Land Use Census is attached.



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LAND USE CENSUS, 1991

5.0 EXTERNAL INFLUENCES

During 1990, there were no external influences such as atmospheric weapons testing or accidents at other nuclear facilities which caused an influence on the data reported. The annual trending graphs for air and water indicate a level effect in the measured activity.

6.0 EPA INTERLABORATORY COMPARISON STUDY

An indication of the laboratory's ability to analyze samples and achieve results consistent with other laboratories is the aim of the EPA Interlaboratory Comparison. Selected unknowns are received and analyzed by our procedures and the results are sent to the EPA Environmental Monitoring Systems Laboratory. A report is returned from them indicating the concentrations with which the samples were spiked and how we compared to other laboratories analyzing the same samples. Table 6-1 is a tabulation of the samples analyzed during 1991.

TABLE 6-1

EPA INTERLABORATORY COMPARISON PROGRAM - 1991

Description	Date	Sample Analysis		Experimental Data			EPA Value ±1 Sigma
Alpha/Beta in Water (Results in pCi/1)	1/25/91	Alpha	*	20	18	10	5 ± 5
		Beta		9	9	8	5 ± 5
	5/17/91	Alpha		16	19	25	24 ± 6
		Beta		43	38	40	46 ± 5
	9/20/91	Alpha		6	9	10	10 ± 5
		Beta		19	19	19	20 ± 5
Gamma in Water (Results in pCi/l)	2/8/91	Co-60		44	44	42	40 ± 5
		Zn-65		160	138	155	149 ± 15
		Ru-106		204	173	210	186 ± 19
		Cs-134		12	9	10	8 ± 5
		Cs-137		10	12	15	8 ± 5
		Ba-133		84	75	82	75 ± 8
	6/7/91	Co-60		12	12	14	10 ± 5
		Zn-65		116	123	105	108 ± 11
		Ru-106		169	148	147	149 ± 15
		Ba-133		66	68	71	62 ± 6
		Cs-134		20	15	14	15 ± 5
		Cs-137		21	16	19	14 ± 5
	10/4/91	Co-60		35	34	36	29 ± 5
		Zn-65		84	87	85	73 ± 7
		Ru-106		217	228	200	199 ± 20
		Ba-133		112	112	112	98 ± 10
		Cs-134		9	10	13	10 ± 5
		Cs-137		16	15	13	10 ± 5
Iodine-131 in Water (Results in pCi/1)	2/15/91	I-131		85	79	83	75 ± 8
	8/9/91	I-131		20	21	21	20 ± 6

* Average of results reported exceeding ± 2 sigma.

ROCHESTER GAS AND ELECTRIC

TABLE 6-1 (Cont'd)

EPA INTERLABORATORY COMPARISON PROGRAM - 1991

Description	Date	Sample Analysis		Experimental Data			EPA Value ±1 Sigma
Air Filters (Results in pCi/filter)	3/29/91	Alpha	*	43	43	41	25 ± 6
		Beta	*	154	151	145	124 ± 6
		Cs-137	*	60	55	51	40 ± 5
	8/30/91	Alpha		31	33	31	25 ± 6
		Beta		95	95	93	92 ± 10
		Cs-137	*	42	37	46	30 ± 5
Milk (Results in pCi/1)	4/26/91	I-131	*	72	74	71	60 ± 6
		Cs-137	*	60	57	63	49 ± 5
		K-40	*	1780	1920	1770	1650 ± 83
	9/27/91	I-131		120	118	126	108 ± 11
		Cs-137		36	40	35	30 ± 5
		K-40		1800	1740	1730	1740 ± 87

* Average of results reported exceeding ± 2 sigma.

Notes to Table 6-1

Gross Alpha-Beta in Water

1/25/91	Alpha	The efficiency used for the weight of solids on the sample overestimated the true activity. A recalibration showed the efficiency should have been 4 to 6 times larger.

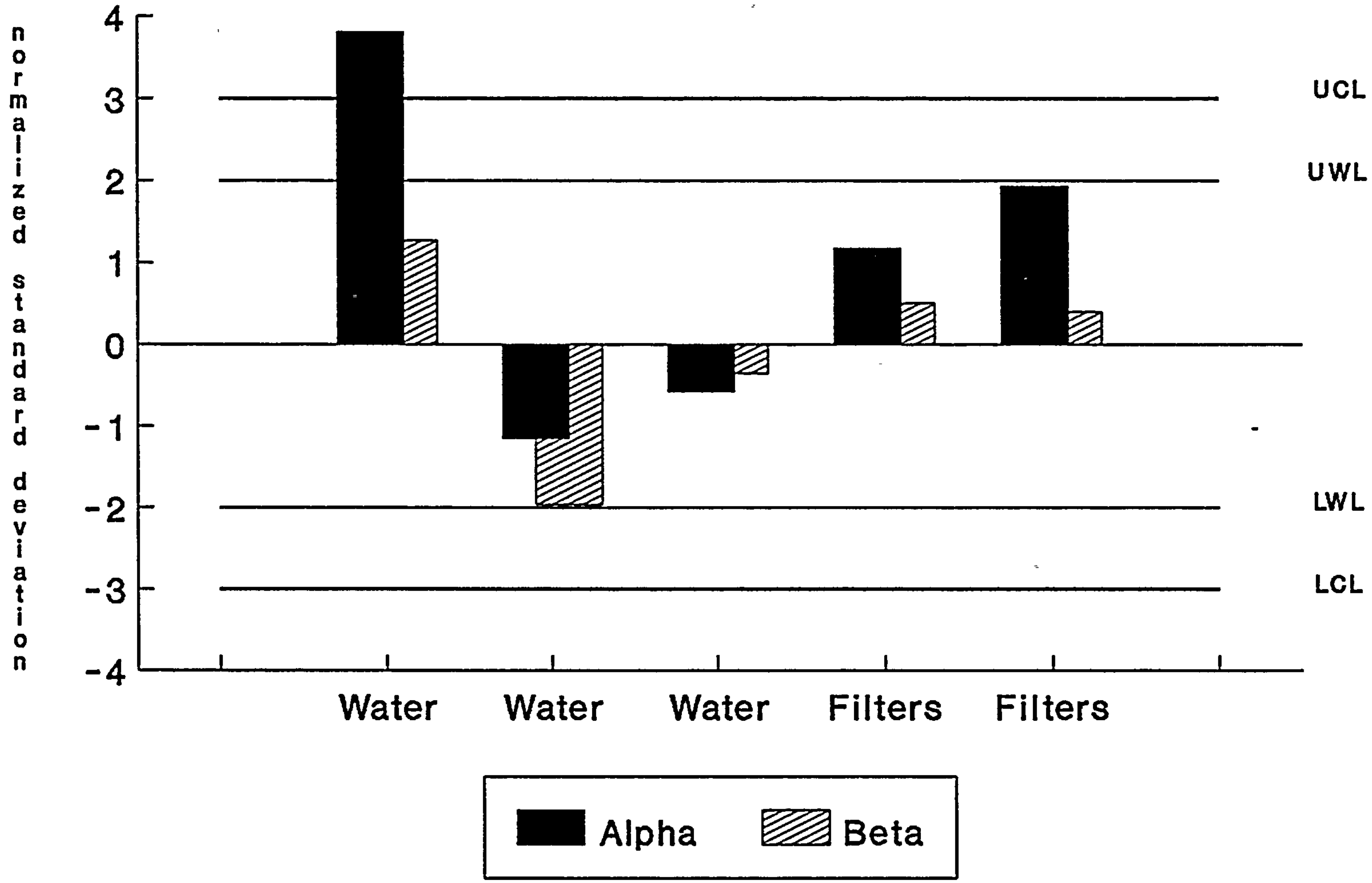
Air Filter

3/29/91	Alpha Beta Cs-137	The alpha and beta were calculated with the efficiency for the wrong geometry. The reported values should have been for alpha 33, 33, 31 and for beta 131, 128, 123.
8/30/91	Cs-137	A check of the Ge(Li) detector with a Cs-137 source and comparison to an NIST intralab check program source indicate the calibration may overestimate by 7%. This would not be sufficient to bring the value down to the EPA value for the 3/29/91 sample, but would for the 8/30/91 sample. The calibration for the filter geometry is difficult and normally overestimates the true activity.

Milk

4/26/91	I-131 Cs-137	See discussion above on check of calibration. The same variation appeared to be present in liquid and filter geometries calibrated with the sources used for the 1991 calibration.
	K-40	A 7% change would have brought these values within ± 2 sigma.

EPA Interlaboratory Comparison Program
1991 RG&E Normalized Standard Deviation



EPA Interlaboratory Comparison Program
1991 RG&E Normalized Standard Deviation