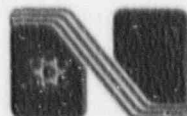


Nebraska Public Power District  
Cooper Nuclear Station

# Annual Radiological Environmental Operating Report

Environmental Radiation Monitoring Program  
January 1, 1990 - December 31, 1990

USNRC Docket Number 50-298



Prepared by

**TELEDYNE  
ISOTOPES**

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## Nebraska Public Power District

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NLS9100210  
April 2, 1991

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

**Subject: Annual Radiological Environmental Report  
Cooper Nuclear Station  
NRC Docket No. 50-298, DPR-46**

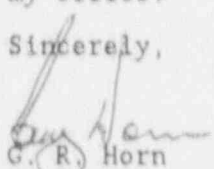
Gentlemen:

In accordance with specification 6.5.1.E of the Cooper Nuclear Station Technical Specifications, Nebraska Public Power District submits the Cooper Nuclear Station Annual Radiological Environmental Report for the period January 1, 1990 through December 31, 1990.

In accordance with 10 CFR 50.4(b)(1), we are enclosing one signed original of the report for your use, one copy to the Regional Office, and one copy to the NRC Resident Inspector.

Should you have any questions or comments regarding this report, please contact my office.

Sincerely,

  
G. R. Horn  
Nuclear Power Group Manager

GRH/dgl/gls  
Enclosures

cc: U.S. Nuclear Regulatory Commission  
Regional Office - Region IV

NRC Senior Resident Inspector  
Cooper Nuclear Station

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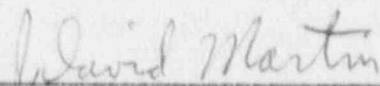


REPORT TO  
NEBRASKA PUBLIC POWER DISTRICT  
COLUMBUS, NEBRASKA  
RADIATION ENVIRONMENTAL MONITORING PROGRAM  
COOPER NUCLEAR STATION  
NEMAHA COUNTY, NEBRASKA

ANNUAL REPORT  
JANUARY 1 TO DECEMBER 31, 1990

PREPARED BY  
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REPORT APPROVED BY:

  
\_\_\_\_\_  
J. DAVID MARTIN, MANAGER  
ENVIRONMENTAL ANALYSIS DEPARTMENT

## PREFACE

This report covers the period of January 1 through December 31, 1990. All sample collections were made by a contractor and personnel of the Nebraska Public Power District. Analyses were performed and reports of analyses were prepared by Teledyne Isotopes and forwarded to Nebraska Public Power District.

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## I. INTRODUCTION

This report contains a complete tabulation of data collected during the period January through December 1990, for the operational Radiological Environmental Monitoring Program performed for the Cooper Nuclear Station (CNS) of the Nebraska Public Power District (NPPD) by Teledyne Isotopes.

Cooper Nuclear Station is located in Nemaha County in the southeast corner of Nebraska on the Missouri River. A portion of the site extends into Missouri. The reactor is a 778 megawatt boiling water reactor. Initial criticality was attained on February 21, 1974. The reactor reached 50% power on June 25, 1974 and 100% power on November 20, 1974.

Radiological environmental monitoring began in 1971 before the plant became operational and has continued to the present. The program monitors radiation levels in air, terrestrial and aquatic environments. Most samples are collected by NPPD personnel. All are shipped for analysis to a contractor's laboratory where there exists special facilities required for measurements of extremely low levels of radioactivity. From 1971 through 1976 the contractor was Teledyne Isotopes, Westwood, New Jersey. NALCO Environmental Sciences assumed responsibility for the analyses effective January 1, 1977.

On November 1, 1978 Hazelton Environmental Sciences Corporation (HESC) assumed responsibility for the program. Prior to November 1, 1978 Hazelton Environmental Sciences operated as NALCO Environmental Sciences. Teledyne Isotopes again assumed responsibility for the analyses effective January 1, 1979 through December 31, 1990.

## II. SUMMARY

Presented in this report are summaries and discussions of the data generated for the Radiological Environmental Monitoring Program (REMP) for the Cooper Nuclear Station (CNS) of the Nebraska Public Power District (NPPD) for 1990.

Part V, Table 3 presents the yearly summary of the program with the total number of samples of each type analyzed, the yearly average for all samples, the number of detections per total number of samples, the station with the highest average, the average of the control station, and the inclusive dates of the analyses.

Part VI is a discussion of each type of sample analyzed and its impact, if any, on the environment. Included also is a graph of the isotopes of interest since 1977 and the statistical results for each quarter of the year. This is followed by a complete tabulation of the data by sample type and station number.

The 1990 radiological environmental measurements for CNS indicates that there has been no residual fallout resulting from the explosion and fire at the Chernobyl Reactor in the Soviet Union which occurred on April 26, 1986. It may be concluded from all measurements taken that the operations of CNS had no detectable impact on the environment in the vicinity of CNS.

### III. SAMPLING AND ANALYSES PROGRAM, STATIONS AND MAPS

The 1990 sampling and analysis program is described in Table 1. Teledyne Isotopes has a comprehensive quality assurance/quality control program designed to assure the reliability of data obtained. The results for 1990 of the Intercomparison Program conducted by the EPA Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, are contained in Appendix B.

Sampling locations are summarized in Table 2. The type or status of each location and its distance and direction from the reactor elevated release point are specified. A map of locations follows (Figure 1). Complete descriptions of current and earlier sampling locations are given in Appendix G.

The annual land use census for 1990 is described in Appendix A. There were no milk animals found within three miles of CNS in 1990. The number of gardens found in 1990 was more than the number found in 1989. Gardens were found in 10 sectors within 3 miles of CNS in 1989 while gardens were found in 11 sectors within 3 miles of CNS in 1990. Sector N did not contain a garden within 3 miles of CNS in 1989 but did contain a garden in 1990. The nearest garden to CNS is in Sector Q, 0.9 miles from CNS.

All of the required samples were analyzed in 1990 except for the following:

<u>PATHWAY</u>	<u>SAMPLE</u>	<u>STATION</u>	<u>COLLECTION PERIOD</u>	<u>REASON</u>
Ambient Gamma Radiation	TLD	71	07/03-10/02	Reported as lost.
		58	10/02-01/03/91	Reported as lost.

TABLE 1

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
ENVIRONMENTAL RADIATION SURVEILLANCE PROGRAM

## SAMPLING SCHEDULE AND ANALYSES

ONCE PER 7 DAYS

<u>Sample Type</u>	<u>Station Nos.</u>	<u>Analyses</u>
Airborne - Particulates	1 - 10	Gross $\alpha$ , $\beta$ , Gamma isotopic on quarterly composite of each station and on each sample in which gross beta activity is > 10 times the yearly mean of control samples.
Airborne - Iodine	1 - 10	I-131

ONCE PER 15 DAYS

<u>Sample Type</u>	<u>Station Nos.</u>	<u>Analyses</u>
Milk - Nearest Producer (peak pasture only)	61	I-131 (low level) Gamma isotopic  Sr-89, Sr-90, Elem. Ca on monthly composite

ONCE PER 31 DAYS

<u>Sample Type</u>	<u>Station Nos.</u>	<u>Analyses</u>
River Water	12, 28	Gross $\alpha$ - sus and dis Gross $\beta$ - sus and dis Sr-89, Sr-90 Gamma isotopic  Tritium on quarterly composite
Milk - Nearest Producer (except peak pasture season)	61	I-131 (low level) Sr-89, Sr-90 Elem. Ca Gamma isotopic



Food products - Broad-  
leaf Vegetation (when  
available)

06, 35, 44

I-131  
Gamma isotopic

ONCE PER 92 DAYS

<u>Sample Type</u>	<u>Station Nos.</u>	<u>Analyses</u>
Background Radiation	1 - 10, 20, 44, 56, 58, 59, 66, 67, 71, 79 - 91, 94	TLD readout
Ground Water	11, 47	Gross $\alpha$ , $\beta$ Gamma isotopic Tritium
Milk - Commercial and Other Milk Producers	42, 95	I-131 (low level) Sr-89, Sr-90 Elem. Ca Gamma isotopic

2 TIMES/YEAR

<u>Sample Type</u>	<u>Station Nos.</u>	<u>Analyses</u>
Fish (Summer and Fall)	28, 35	Gross $\beta$ Sr-89, Sr-90 Gamma isotopic
Shoreline Sediment	28	Gamma isotopic



TABLE 2

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
BROWNVILLE, NEBRASKA

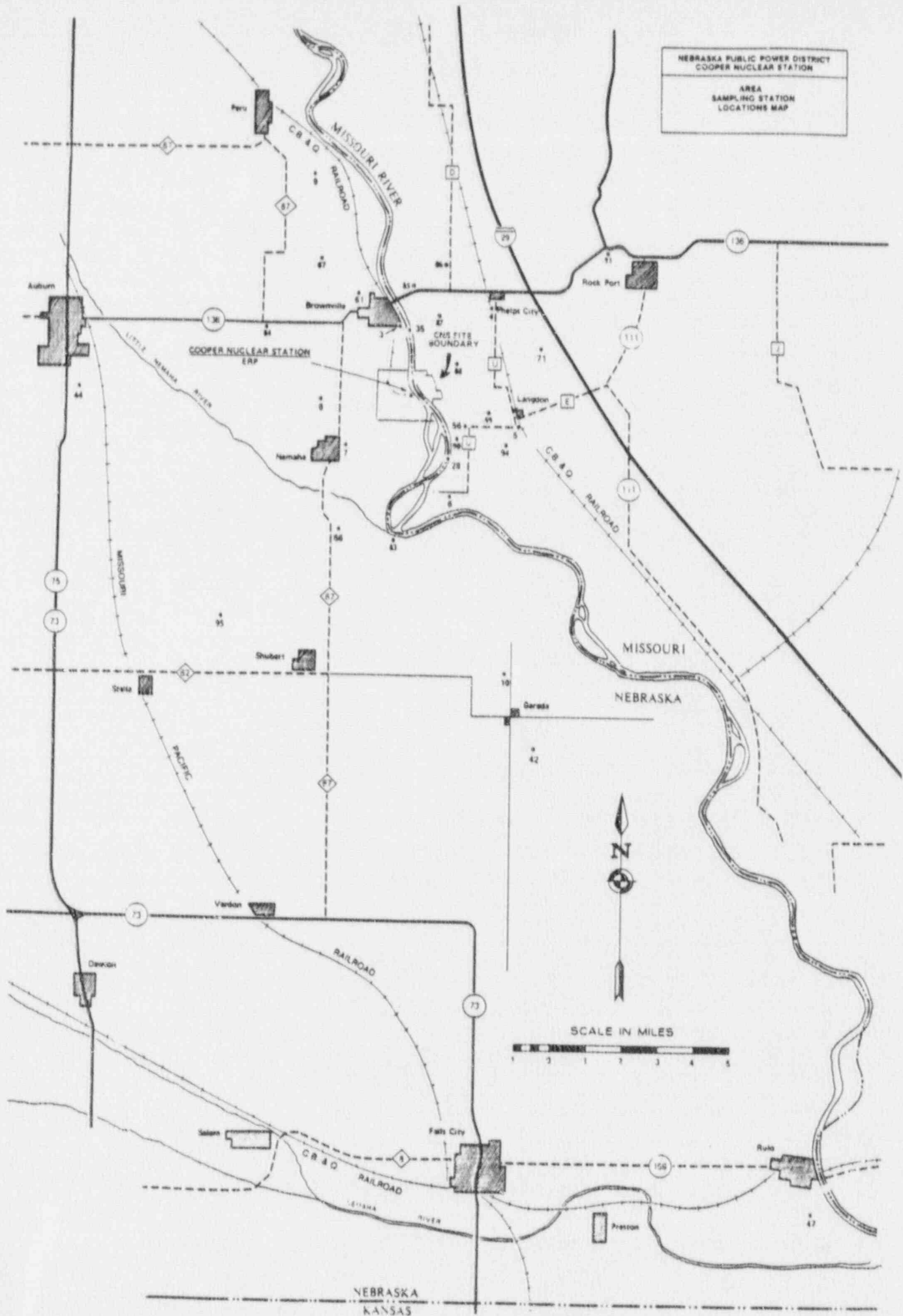
DISTANCE AND DIRECTION FROM THE ELEVATED RELEASE POINT (ERP) TO THE  
SAMPLE STATION LOCATIONS

<u>STATION NUMBER</u>	<u>DISTANCE<sup>a</sup> (MILES)</u>	<u>DIRECTION<sup>a</sup> (DEGREES)</u>	<u>CLASSIFICATION<sup>b</sup></u>
1	0.10	225	IND
2	0.75	225	IND
3	2.5	338	IND
4	3.0	43	IND
5	3.5	102	IND
6	3.0	165	IND
7	2.5	230	IND
8	2.5	260	IND
9	7.3	335	IND
10	10.0	160	IND
11	0.15	225	IND
12	0.10	360	CON
13	0.25	120	NA
14	0.50	140	PO
15	0.30	180	NA
16	0.75	202	NA
17	1.5	235	PO
18	0.80	270	NA
19	1.0	300	PO
20	0.96	315	IND
21	0.60	46	PO
22	0.70	95	NA
23	1.9	80	PO
24	3.0	97	PO
25	3.8	105	PO
26	3.0	130	PO
27	3.0	143	NA
28	1.8	150	IND
29	3.0	170	NA
30	5.0	178	PO
31	2.8	222	NA
32	3.4	268	PO
33	2.8	302	PO
34	2.5	333	NA
35	2.0	350	IND and CON
36	3.6	335	PO
37	3.9	330	NA
38	4.0	360	NA
39	2.8	25	PO
40	3.9	37	PO
41	8.4	11	NA
42	12.9	156	IND
43	11.8	217	NA
44	10.3	270	CON
45	4.0	325	NA
46	24.8	153	NA
47	25.8	154	IND
48	5.6	332	NA
49	11.4	222	NA
50	1.1	270	NA

<u>STATION NUMBER</u>	<u>DISTANCE<sup>a</sup> (MILES)</u>	<u>DIRECTION<sup>a</sup> (DEGREES)</u>	<u>CLASSIFICATION<sup>b</sup></u>
51	4.2	125	NA
52	7.4	79	NA
53	2.0	216	NA
54	5.2	320	NA
55	1.8	270	NA
56	1.9	118	IND
57	6.6	208	NA
58	1.1	219	IND
59	1.0	189	IND
60	8.4	42	NA
61	3.5	326	IND
62	1.5	225	NA
63	5.0	56	NA
64	2.3	99	NA
65	1.1	305	NA
66	4.5	200	IND
67	4.8	325	IND
68	3.4	270	NA
69	3.5	31	NA
70	3.5	36	NA
71	4.3	71	IND
72	3.8	39	NA
73	10.0	35	NA
74	2.4	270	NA
75	9.0	180	NA
76	5.3	212	NA
77	2.2	223	NA
78	8.2	74	NA
79	0.85	299	IND
80	0.75	284	IND
81	0.80	265	IND
82	0.80	176	IND
83	4.4	189	IND
84	4.4	297	IND
85	3.1	3	IND
86	4.6	16	IND
87	1.75	20	IND
88	1.75	63	IND
89	2.0	86	IND
90	2.25	134	IND
91	6.9	54	IND
92	10.5	90	NA
93	1.25	189	NA
94	3.6	108	IND
95	7.3	216	IND
96	1.25	334	NA
97	10.6	250	NA
98	11.5	220	NA

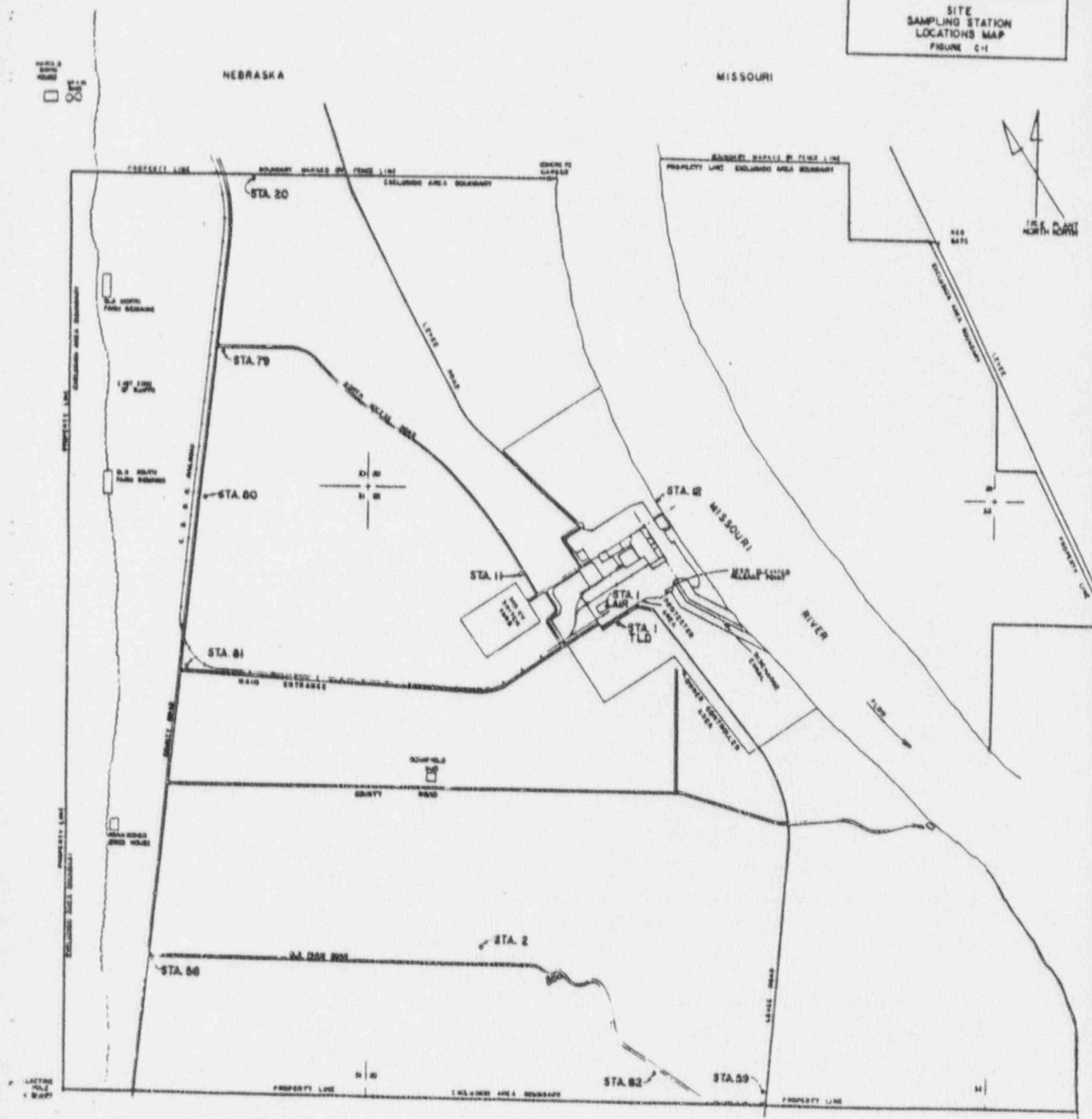
<sup>a</sup> Distance and direction are specified with respect to reactor elevated release point.

<sup>b</sup> Classification codes: IND = indicator; CON = control; PO = pre-operational sampling site; NA = not active



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

SITE  
SAMPLING STATION  
LOCATIONS MAP  
FIGURE C-1





#### IV. DISCUSSION

##### A. Program Objectives and Data Interpretation

The objective of the monitoring program is to detect and assess the impact of possible releases to the environs of radionuclides from the operations of the Cooper Nuclear Station. This objective requires measurements of low levels of radioactivity equal to or lower than pre-determined limits of detection. In addition the source of the environmental radiation must be established. Sources of environmental radiation include:

- (1) Natural background radiation from cosmic rays (Be-7).
- (2) Terrestrial, primordial radionuclides from the environment (K-40, Ra-226, Th-228).
- (3) Fallout from atmospheric nuclear tests such as the September 1977 detonation by the Peoples' Republic of China and the atmospheric weapons test of October 16, 1980 (fission products and fusion products).
- (4) Releases from nuclear power plants such as CNS (fission products and neutron activation products).
- (5) Fallout from the Chernobyl Nuclear Reactor Accident.

Radiation levels measured in the vicinity of an operating power station are compared with preoperational measurements at the same locations to distinguish power plant effects from other sources. Also, results of the monitoring program are related to events known to cause elevated levels of radiation in the environment, e.g., atmospheric nuclear detonations or abnormal plant releases.

##### B. Atmospheric Nuclear Tests

Three atmospheric nuclear detonations in the People's Republic of China influenced program results significantly in late 1976 and in 1977. Two of these detonations occurred in late 1976 (September 26 and November 17) and one in late 1977 (September 17). As a consequence of these tests elevated activities of gross beta in air particulate filters and I-131 in milk were observed throughout most of the United States.

No atmospheric nuclear tests were conducted during 1979 thus no short-lived fission products were detected in air particulate samples. Also no I-131 was detected from radiogases from any sources.

On April 26, 1986 the fire and explosion of Chernobyl Reactor No. 4 in the Soviet Union resulted in the release of fission products to the atmosphere and worldwide fallout. Following the explosion, elevated levels of gross beta activities in air particulates and I-131 in charcoal filters and milk samples were measured. Additionally, in 1986, Cs-137 and the short-lived isotopes I-131, Ru-106, and Cs-134 were detected in broadleaf vegetation. Similar results occurred in other areas of the United States and the entire Northern Hemisphere.

## V. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM TABLES

Presented in Table 3 are the radiological environmental monitoring program summaries (REMPS) generated from the reports of analyses performed during 1990 for the NPPD sampling and analyses program. The REMPS tables conform to the requirements of Table 1 in Regulatory Guide 4.8 (Reference 6).

The average activity level for all samples collected for the year for each sample type are summarized in this table. The mean, range and fraction of detections to total samples assayed are presented. The station location and station number with the highest annual mean is also tabulated. If a control station is specified the comparable results of the control are listed.

From the REMPS table it is possible to determine the total number of each type of sample analyzed and the average activity of all samples from all stations of each nuclide. If there were no positive detections the maximum of the lowest levels of detection is listed. The station having the highest level of activity is specified. From this data it is possible to determine any high levels of activity and the source. The dose impact on the population can thus be evaluated.



TABLE 3  
RADIOLOGICAL ENVIRONMENTAL  
MONITORING PROGRAM SUMMARIES  
(REMP)  
1990

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- AIRBORNE  
SAMPLE - AIR PARTICULATE FILTERS  
UNITS - PC/CU. M

COMPILED - ANNUAL SUMMARY  
CONTROL -

NBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE	STATION FRACTION STATION DESCRIPTION	LOCATION WITH HIGHEST MEAN MEAN X E-00 RANGE		CONTROL LOCATION MEAN X E-00 RANGE	NON- ROUTINE REPORTING PERIOD
					FRACTION	FRACTION		
GR-A	520	0.00200	0.00334 0.00110- 445/520	02 STATION 02 - 0.75 MI. 225 DEG. IND.	0.00398 0.00140- 0.0250	0.01/02/90-12/31/90		
GR-B	520	0.00300	0.0220 0.00740- 519/520	02 STATION 02 - 0.75 MI. 225 DEG. IND.	0.0245 0.00740- 0.0480	0.01/02/90-12/31/90		

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- AIRBORNE  
SAMPLE - CHARCOAL FILTERS  
UNITS - PCI/CU. M

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE FRACTION	LOCATION WITH HIGHEST MEAN MEAN X E-00 RANGE STATION FRACTION STATION DESCRIPTION	CONTROL LOCATION MEAN X E-00 RANGE FRACTION	NON- ROUTINE	REPORTING PERIOD
----------	----	--------------------------------------	---	---	--	-----------------	------------------

I-131 520

LT 0.06000  
LT 0.01000-LT 0.06000  
000/520

0 01/02/90-12/31/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- AIRBORNE		COMPILATION - ANNUAL SUMMARY		NEBRASKA PUBLIC POWER DISTRICT	
SAMPLE - COMPOSITE AIR PARTICULATE FILTERS		CONTROL -		COOPER NUCLEAR STATION	
UNITS - PCI/EU, M					
ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00	LOCATION WITH HIGHEST MEAN STATION FRACTION STATION DESCRIPTION	CONTROL LOCATION MEAN X E-00 RANGE FRACTION
RF-7	40	0.05000	0.09421 0.06740- 040/040	05 004/004 STATION 05 - 3.5 MI. 102 DEG. IND.	0 01/02/90-12/31/90
K-40	40	0.06000	0.01420 0.01420- 001/040	06 001/004 STATION 06 - 3.0 MI. 165 DEG. IND.	0 01/02/90-12/31/90
I-131	40		LT 0.4000 LT 0.0000 -LT 0.4000 000/040		0 01/02/90-12/31/90
CS-137	40	0.00300	LT 0.00080 0.00020-LT 0.00080 000/040		0 01/02/90-12/31/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- INGESTION  
SAMPLE - F I S H  
UNITS - PCI/GM WET

COMPIATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES		LOCATION WITH HIGHEST MEAN		CONTROL LOCATION		NON- ROUTINE	REPORTING PERIOD
			MEAN X E-00 RANGE FRACTION	STATION FRACTION STATION DESCRIPTION	MEAN X E-00 RANGE	IND.	MEAN X E-00 RANGE FRACTION			
GP-8	10	0.250	2.1 - 4.7 010/010	28 005/005 STATION 28 - 1.8 MI. 150 DEG. IND.	5.0 - 6.5				0 07/08/90-10/29/90	
SR-89	10	0.0300	LT 0.00800 0.00200-LT 0.00800 000/010						0 07/08/90-10/29/90	
SR-90	10	0.0300	0.00410- 0.0088 004/010	28 001/005 STATION 28 - 1.8 MI. 150 DEG. IND.	0.0180 - 0.0180				0 07/08/90-10/29/90	
R-40	10	0.4700	0.8350 - 2.33 010/010	28 005/005 STATION 28 - 1.8 MI. 150 DEG. IND.	2.09 - 2.72				0 07/08/90-10/29/90	
I-131	10	0.03100	LT 0.08000 0.00700-LT 0.08000 000/010						0 07/08/90-10/29/90	
CS-137	10	0.03100	LT 0.01000 0.00200-LT 0.01000 000/010						0 07/08/90-10/29/90	



# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- INGESTION  
SAMPLE - M I L K - OTHER PRODUCERS  
UNITS - PCI/LITER

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X F-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE FRACTION	LOCATION WITH HIGHEST MEAN MEAN X E-00 RANGE STATION FRACTION STATION DESCRIPTION	CONTROL LOCATION MEAN X F-00 RANGE FRACTION	NON- ROUTINE	REPORTING PERIOD
CA (mg/l)	8		2.0 2.1 2.9 008/008	95 004/004 2.0 2.2 2.9 STATION 95 - 7.3 MI. 216 DEG. IND.			0 01/09/90-10/08/90
I-131	8	0.780	LT 0.500 LT 0.100 -LT 0.500 000/008				0 01/09/90-10/08/90
SR-90	4	2.0	LT 2.0 LT 0.9 -LT 2.0 000/008				0 01/09/90-10/08/90
SR-90	8	1.4	1.6 3.3 0.850 - 007/008	42 004/004 1.1 1.9 3.3 STATION 42 - 12.85 MI. 156 DEG. IND.			0 01/09/90-10/08/90
K-40	8	140.0	1260. 1500. 1050. - 008/008	42 004/004 1170. 1267. -1500. STATION 42 - 12.85 MI. 156 DEG. IND.			0 01/09/90-10/08/90
I-131	8	0.7800	LT 10.00 LT 5.00 -LT 10.00 000/008				0 01/09/90-10/08/90
CS-137	8	9.00	LT 6.00 LT 4.00 -LT 6.00 000/008				0 01/09/90-10/08/90



# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- INGESTION  
SAMPLE - M I L K - NEAREST  
UNITS - PCI/GM WET

COMPILEATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE FRACTION	LOCATION WITH HIGHEST MEAN STATION FRACTION STATION DESCRIPTION	MEAN X E-00 RANGE FRACTION	CONTROL LOCATION MEAN X E-00 RANGE FRACTION	NON- ROUTINE	REPORTING PERIOD
CA (mg/l)	17		1.9 017/017	2.0 - 2.1	61	017/017	1.9 2.1	0 01/02/90-12/03/90
I-131	21		LT 0.500 0.100 -LT 0.500 000/021					0 01/02/90-12/03/90
SR-89	17		LT 4.0 0.8 -LT 4.0 000/017					0 01/02/90-12/03/90
SR-90	17		1.7 0.790 - 014/017	3.4	61	014/017	1.7 0.790 - 3.4	0 01/02/90-12/03/90
K-40	21		1217. 1110. - 021/021	1380.	61	021/021	1217. 1110. - 1380.	0 01/02/90-12/03/90
I-131	21		LT 10.00 4.00 -LT 10.00 000/021					0 01/02/90-12/03/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- INGESTION  
SAMPLE - M I L K - NEAREST  
UNITS - PCI/LITER

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION	ALL INDICATOR SAMPLES MEAN X E-00 RANGE	LOCATION WITH HIGHEST MEAN MEAN X E-00 RANGE	CONTROL LOCATION MEAN X E-00 RANGE	NON- ROUTINE	REPORTING PERIOD
			FRACTION	STATION FRACTION STATION DESCRIPTION	FRACTION		

CS-137	21		LT 6.00				
		LT	3.00	-LT 6.00			
			000/021				

0 01/02/90-12/03/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- AQUATIC  
SAMPLE - SHORELINE SEDIMENT  
UNITS - PCI/GM DRY

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-CO	ALL INDICATOR SAMPLES		LOCATION WITH HIGHEST MEAN		CONTROL LOCATION		NON- ROUTINE REPORTING PERIOD
			MEAN X E-CO RANGE	FRACTION	STATION FRACTION STATION DESCRIPTION	MEAN X E-CO RANGE	MEAN X F-00 RANGE	FRACTION	
K-40	2	0.4700	15.20 - 002/002	15.80 16.40	28 STATION 28 - 1.8 MI. 150 DEG. IND.	15.20 - 16.40	15.80		0 05/07/90-10/08/90
MN-54	2	0.03100	0.01980 - 001/002	0.01980 0.01980	28 STATION 28 - 1.8 MI. 150 DEG. IND.	0.01980 - 0.01980	0.01980		0 05/07/90-10/08/90
CO-60	2	0.04700	0.04150 - 002/002	0.1902 0.3390	28 STATION 28 - 1.8 MI. 150 DEG. IND.	0.04150 - 0.3390	0.1902		0 05/07/90-10/08/90
I-131	2	0.03100	LY 0.04000-LY 000/002	0.1000 0.1000					0 05/07/90-10/08/90
CS-137	2	0.03100	0.1560 - 002/002	0.2195 0.2850	28 STATION 28 - 1.8 MI. 150 DEG. IND.	0.1540 - 0.2850	0.2195		0 05/07/90-10/08/90
RA-226	2	0.1100	1.62 - 002/002	1.63 1.64	28 STATION 28 - 1.8 MI. 150 DEG. IND.	1.62 - 1.64	1.63		0 05/07/90-10/08/90
TH-232	2	0.1100	0.8050 - 002/002	0.8570 0.9090	28 STATION 28 - 1.8 MI. 150 DEG. IND.	0.8050 - 0.9090	0.8570		0 05/07/90-10/08/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- INGESTION  
 SAMPLE - BROADLEAF TERRESTRIAL VEGETATION  
 UNITS - PCI/CM WET

COMPILATION - ANNUAL SUMMARY  
 CONTROL - STATION 98 - 11.5 MI. 220 DEG. CO  
 NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF ALL INDICATOR SAMPLES			LOCATION WITH HIGHEST MEAN			CONTROL LOCATION		NON-ROUTINE	REPORTING PERIOD
		MEAN X F-00	RANGE	FRACTION	STATION	FRACTION	RANGE	MEAN X F-00	RANGE		
I-131	60	0.0500	LY 0.05 0.004 -LT 0.05 000/060	44	020/020	0.7480 - 4.27 2.13	0 05/15/90-10/01/90				
RF-7	60	1.20	0.3180 - 060/060	44	020/020	0.7480 - 4.27 2.13	0 05/15/90-10/01/90				
K-40	60	0.9300	2.99 - 060/060	44	020/020	3.25 - 14.00 7.04	0 05/15/90-10/01/90				
I-131	60	0.05000	LY 0.5000 0.02000-LT 0.5000 000/060	44	020/020	0.03240	0 05/15/90-10/01/90				
CS-137	60	0.1600	0.02410 - 002/060	44	001/020	0.03240 - 0.03240 0.03240	0 05/15/90-10/01/90				
TH-228	60	0.4700	0.1410 - 001/060	44	001/020	0.1410 - 0.1410 0.1410	0 05/15/90-10/01/90				

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- WATERBORNE  
SAMPLE - WATER - GROUND  
UNITS - PCl/LITER

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES		LOCATION WITH HIGHEST MEAN		CONTROL LOCATION		NON- ROUTINE REPORTING PERIOD
			MEAN X E-00	RANGE	STATION FRACTION	STATION DESCRIPTION	MEAN X E-00	RANGE	
GR-A	8	4.0	LY 3.0 000/008	LY 4.0 -LY 4.0					0 03/05/90-10/15/90
GR-B	8	1.8	6.6 008/008	9.9 - 15.0	11 004/004 STATION 11 - 0.15 MI. 275 DEG. IND.	6.6 10.2 - 15.0			0 03/05/90-10/15/90
I-131	8	9.00	LY 6.00 000/008	LY 10.00 -LY 10.00					0 01/15/90-10/15/90
CS-137	8	1.00	LY 3.00 000/008	LY 5.00 -LY 5.00					0 01/15/90-10/15/90
H-3	8	140.	91.0 002/008	160. - 230.	11 001/004 STATION 11 - 0.15 MI. 225 DEG. IND.	230. - 230.			0 01/15/90-10/15/90



# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- WATERBORNE  
SAMPLE - WATER - RIVER  
UNITS - PCI/LITER

COMPILATION - ANNUAL SUMMARY

CONTROL - STATION 12 - 0.1 MI. 360 DEG. CO NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE FRACTION	LOCATION WITH HIGHEST MEAN STATION FRACTION STATION DESCRIPTION	MEAN X E-00 RANGE	CONTROL LOCATION MEAN X E-00 RANGE FRACTION	NON- ROUTINE	REPORTING PERIOD
GR-A DIS	24	4.0	LT 40.0 LT 2.0 -LT 40.0 000/024			LT 30.0 LT 3.0 -LT 30.0 000/012		0 01/15/90-12/10/90
GR-A SUS	24	4.0	3.3 1.3 - 8.3 011/024	28 005/012 STATION 28 - 1.8 MI. 150 DEG. IND.	3.5 1.3 - 8.3	3.1 1.4 - 6.7 006/012		0 01/15/90-12/10/90
GR-B DIS	24	1.8	12.4 3.5 - 13.0 022/024	12 011/012 STATION 12 - 0.1 MI. 360 DEG. CON.	10.7 9.5 - 13.0	10.7 9.5 - 13.0 011/012		0 01/15/90-12/10/90
GR-B SUS	24	1.8	7.3 1.1 - 29.0 024/024	28 012/012 STATION 28 - 1.8 MI. 150 DEG. IND.	7.9 1.1 - 29.0	6.7 1.5 - 24.0 012/012		0 01/15/90-12/10/90
SR-89	24	1.1	LT 1.0 LT 0.5 -LT 1.0 000/024			LT 1.0 LT 0.500 -LT 1.0 000/012		0 01/15/90-12/10/90
SR-90	24	0.930	LT 0.900 LT 0.300 -LT 0.900 000/024			LT 0.900 LT 0.300 -LT 0.800 000/012		0 01/15/90-12/10/90
K-40	24	140.0	58.20 58.20 - 58.20 001/024	12 001/012 STATION 12 - 0.1 MI. 360 DEG. CON.	58.20 58.20 - 58.20	58.20 58.20 - 58.20 001/012		0 01/15/90-12/10/90

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY- WATERBORNE  
SAMPLE - WATER - RIVER  
UNITS - PCI/LITER

COMPILATION - ANNUAL SUMMARY  
CONTROL - STATION 12 - 0.1 MI. 360 DEG. CO COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION	ALL INDICATOR SAMPLES			LOCATION WITH HIGHEST MEAN			CONTROL LOCATION			NON- ROUTINE	REPORTING PERIOD
			MEAN X E-00	RANGE	FRACTION	MEAN X E-00	RANGE	STATION DESCRIPTION	MEAN X E-00	RANGE	FRACTION		
I-131	24	9.00	LY 4.00	-LY 10.00				LY 10.00					0 01/15/90-12/10/90
			000/024					LY 4.00	-LY 10.00				
								000/012					
CS-137	24	9.00	LY 3.00	-LY 5.00				LY 5.00					0 01/15/90-12/10/90
			000/024					LY 3.00	-LY 5.00				
								000/012					
H-3	2	140.	120.	- 170.				160.	- 170.				0 01/15/90-12/10/90
			004/008			12	002/004	150.	150.	- 170.			
						STATION 12 - 0.1 MI. 360 DEG. CON.			002/004				

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

PATHWAY - GAMMA EXPOSURE  
SAMPLE - ENVIRONMENTAL TLD  
UNITS - mR

COMPILATION - ANNUAL SUMMARY  
CONTROL -

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

ANALYSIS	NO	LIMIT OF DETECTION MEAN X E-00	ALL INDICATOR SAMPLES MEAN X E-00 RANGE FRACTION	LOCATION WITH HIGHEST MEAN STATION FRACTION STATION DESCRIPTION	CONTROL LOCATION MEAN X E-00 RANGE FRACTION	NON- ROUTINE	REPORTING PERIOD
TLD	126	2mR					
	(a)						0 01/03/90-01/03/91
	(b)						
Total Exposure/year			67.1 mR 53.0-107.0 126/126	01 107.0 mR 004/004 STATION 01 - 0.1 MI 225 DEG. IND	44 75.4 004/004 STATION 44 - 10.25 MI. 270 DEG. CON.		
Average Exposure/ quarter			17.0 mR 13.6-29.2 032/032	01 26.7 mR 22.2 - 29.2 004/004 STATION 01 - 0.1 MI 225 DEG. IND	44 16.4 16.0 - 22.1 004/004 STATION 44 - 10.25 MI. 270 DEG. CON.		

- (a) The TLD from Station 71 was missing from its location for the third quarter.  
(b) The TLD from Station 58 was missing from its location for the fourth quarter.

VI.

DISCUSSION, IMPACT ON THE ENVIRONMENT

GRAPHS OF RESULTS FROM 1977 -- 1990

AND

STATISTICAL TABLES

FOR

EACH QUARTER

A and B. AIR PARTICULATE SAMPLES - GROSS BETA AND GROSS ALPHA

(See Tables A-1 - A-4, B-1 - B-4)

STATIONS 01 to 10

Air particulates were collected on membrane filters at ten locations (01-10). The filters were changed weekly and analyzed for gross beta and gross alpha activities. Quarterly composites are analyzed for gamma emitting isotopes.

The average gross beta activity of all stations for each quarter of 1989 and 1990 is summarized below:

1989 First Quarter	0.026	pCi/Cu. M.
Second Quarter	0.020	pCi/Cu. M.
Third Quarter	0.020	pCi/Cu. M.
Fourth Quarter	0.033	pCi/Cu. M.
Average 1989	0.025	pCi/Cu. M.
1990 First Quarter	0.021	pCi/Cu. M.
Second Quarter	0.015	pCi/Cu. M.
Third Quarter	0.021	pCi/Cu. M.
Fourth Quarter	0.030	pCi/Cu. M.
Average 1990	0.022	pCi/Cu. M.

The level of beta activity was at normal environmental levels in 1990 showing the natural seasonal variations. There was a slight decline in the level of gross beta activity during the first and second quarters; there was a slight increase over the third quarter of 1989; the fourth quarter again showed a slight decline as shown in Table A-4. The increase and decline in activity often occurs and is attributed to natural phenomena.

The gross alpha activity continued low and close to the limits of detection. Gross alpha activity is probably due to the alpha emitters found in soil and particulates drawn into the filters.

No effect attributable to the Cooper Nuclear Station was observed in the results of monitoring air particulates.



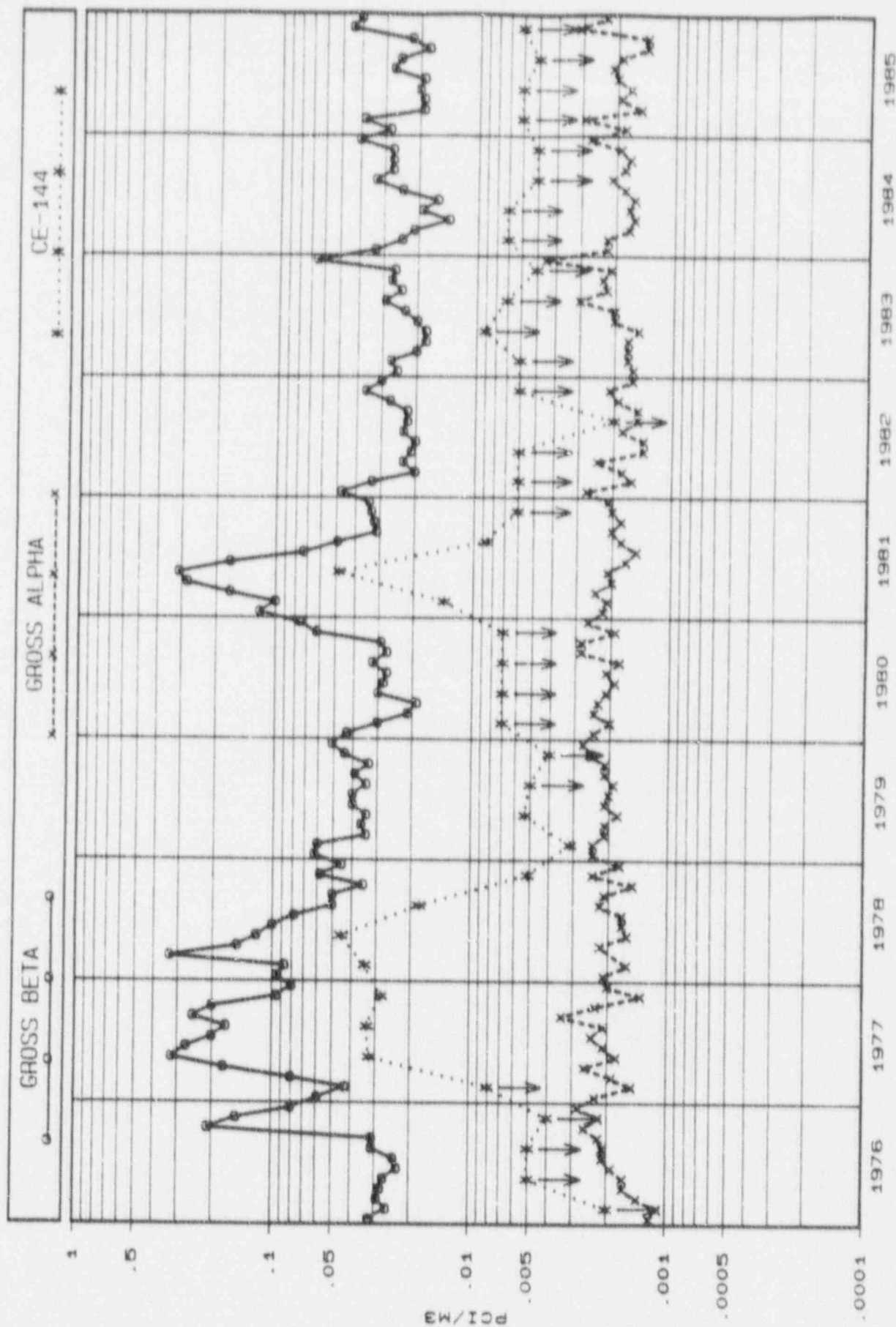
A and B. AIR PARTICULATE SAMPLES - GROSS BETA AND GROSS ALPHA

(See Tables A-1 - A-4, B-1 - B-4)

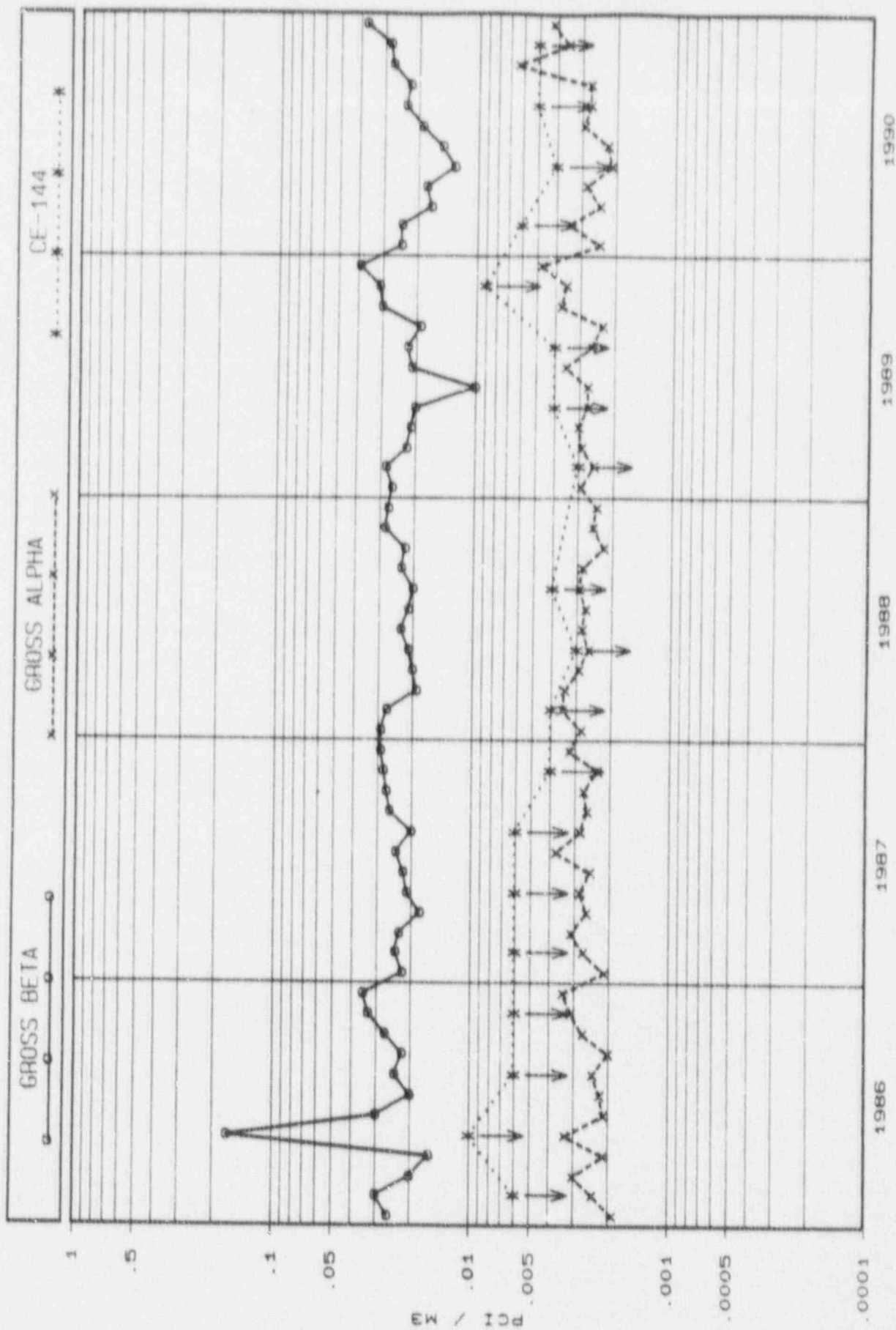
STATIONS 01 to 10

Figure A1, B1 shows the gross beta, gross alpha and Ce-144 activity in the environs of CNS. The results for 1986 through 1990 are on the second page of Figure A-1, B-1. The gross beta activity in 1990 was similar to previous years in which there were no nuclear atmospheric weapons tests or nuclear accidents. The gross alpha activity remained low and near the normal detection level. Ce-144 was below the level of detection.

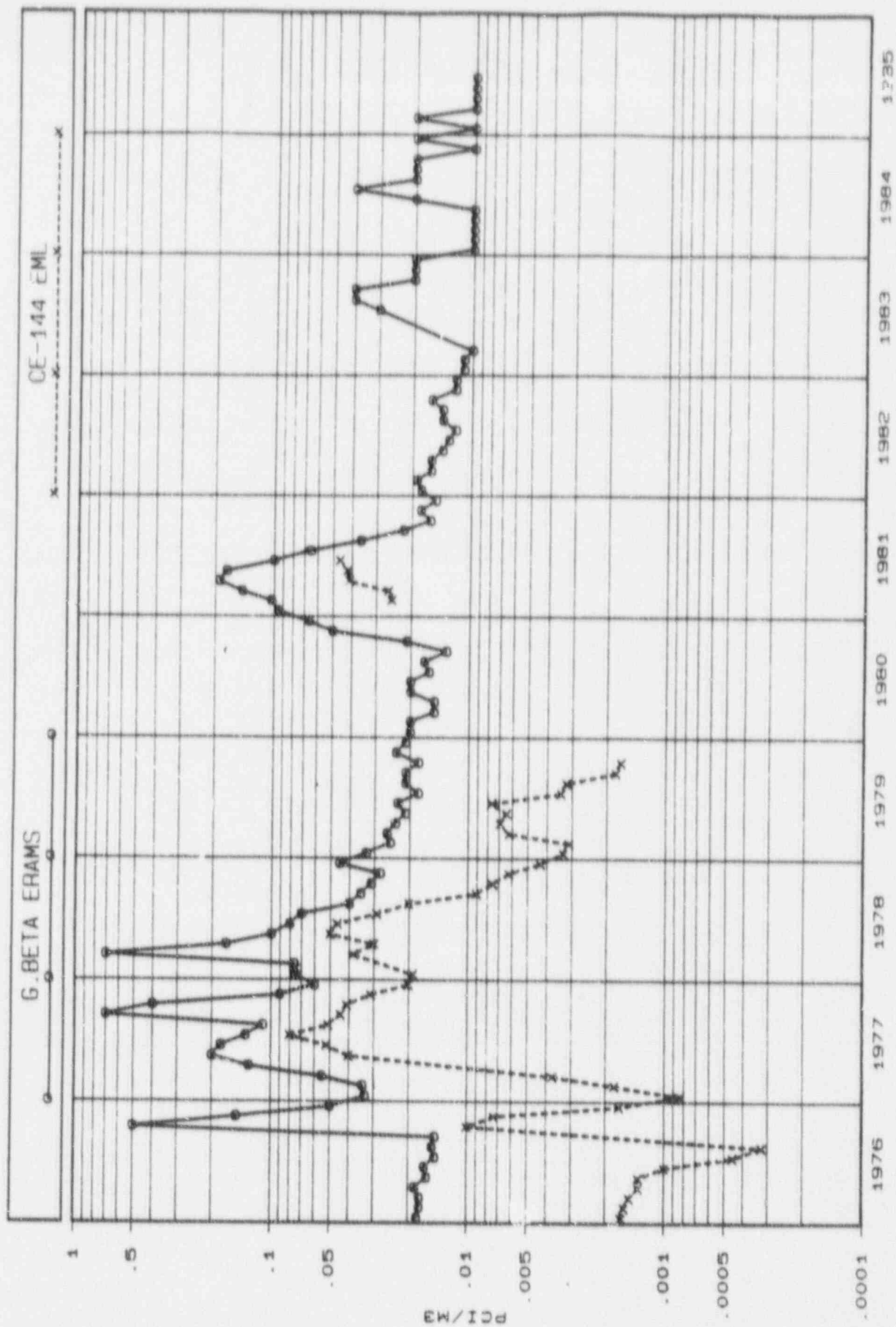
Figure A-2 shows the gross beta activity in air samples through April 1989 at Jefferson City, Missouri as reported by the Environmental Radiation Monitoring System (ERAMS) of the US Environmental Protection Agency. No more recent data was available. This data was taken from Environmental Radiation Data distributed by the Eastern Environmental Radiation Facility, Montgomery, Alabama. The measurements by ERAMS were made after a waiting period which may explain the somewhat lower results because of decay of the isotopes having a shorter half-life. Measurements of Ce-144 were no longer reported because the activity has approached the limit of detection by the analytical techniques now used.



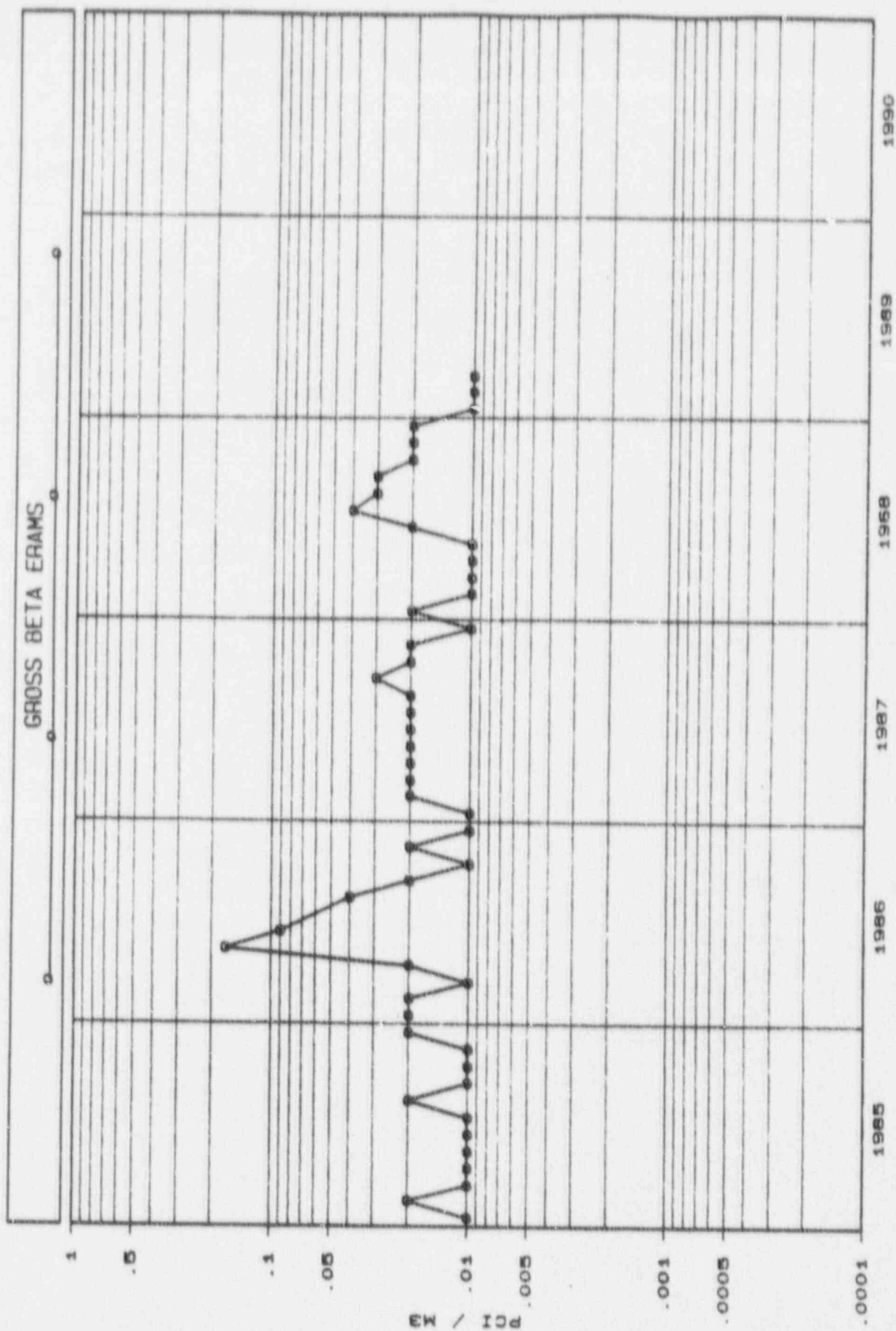
AIR PARTICULATES - CNS  
 ALPHA AND BETA MONTHLY AVERAGE - ALL LOCATIONS  
 CE-144 QUARTERLY AVERAGE - ALL LOCATIONS



AIR PARTICULATES - CNS  
 ALPHA AND BETA MONTHLY AVERAGE - ALL LOCATIONS  
 CE-144 QUARTERLY AVERAGE - ALL LOCATIONS



AIR PARTICULATES  
BETA MONTHLY AVERAGE - JEFFERSON CITY  
MISSOURI (ERAMS) EPA



AIR PARTICULATES  
BETA MONTHLY AVERAGE - JEFFERSON CITY  
MISSOURI (ERAMS) EPA



TABLE A-1  
WEEKLY COLLECTIONS FIRST QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 01/02-01/29	MONTHLY SUMMARY 01/29-02/26	MONTHLY SUMMARY 02/26-04/02	FIRST QUARTER SUMMARY 01/02-04/02
GROSS BETA	01	2.6 ± 1.0 E-02	2.6 ± 0.3 E-02	1.9 ± 0.6 E-02	2.3 ± 0.7 E-02
	02	2.4 ± 0.8 E-02	2.5 ± 0.2 E-02	1.7 ± 0.6 E-02	2.1 ± 0.7 E-02
	03	2.2 ± 0.8 E-02	2.1 ± 0.3 E-02	1.6 ± 0.5 E-02	2.0 ± 0.6 E-02
	04	2.8 ± 1.1 E-02	2.5 ± 0.3 E-02	1.8 ± 0.7 E-02	2.3 ± 0.8 E-02
	05	2.2 ± 0.8 E-02	2.2 ± 0.4 E-02	1.7 ± 0.5 E-02	2.0 ± 0.6 E-02
	06	2.6 ± 0.9 E-02	2.4 ± 0.3 E-02	1.9 ± 0.6 E-02	2.3 ± 0.7 E-02
	07	2.4 ± 0.9 E-02	2.6 ± 0.4 E-02	1.7 ± 0.3 E-02	2.2 ± 0.6 E-02
	08	2.5 ± 0.8 E-02	2.6 ± 0.6 E-02	1.8 ± 0.6 E-02	2.2 ± 0.7 E-02
	09	1.9 ± 0.6 E-02	2.3 ± 0.3 E-02	1.5 ± 0.4 E-02	1.9 ± 0.5 E-02
	10	2.4 ± 1.0 E-02	2.2 ± 0.4 E-02	1.5 ± 0.4 E-02	2.0 ± 0.7 E-02
AVERAGE ALL STATIONS	01-10	2.4 ± 0.8 E-02	2.4 ± 0.4 E-02	1.7 ± 0.5 E-02	2.1 ± 0.7 E-02

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Grand  $\bar{x}$  and s

TABLE A-2

WEEKLY COLLECTIONS SECOND QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 04/02-04/30	MONTHLY SUMMARY 04/30-05/29	MONTHLY SUMMARY 05/29-07/02	SECOND QUARTER SUMMARY 04/02-07/02
GROSS BETA	01	2.0 ± 0.6 E-02	1.4 ± 0.5 E-02	1.5 ± 0.5 E-02	1.6 ± 0.6 E-02
	02	1.8 ± 0.3 E-02	1.4 ± 0.5 E-02	1.8 ± 0.5 E-02	1.7 ± 0.4 E-02
	03	1.7 ± 0.3 E-02	1.4 ± 0.6 E-02	1.5 ± 0.5 E-02	1.6 ± 0.4 E-02
	04	1.9 ± 0.5 E-02	1.3 ± 0.5 E-02	1.5 ± 0.5 E-02	1.6 ± 0.5 E-02
	05	1.7 ± 0.3 E-02	1.4 ± 0.4 E-02	1.6 ± 0.6 E-02	1.6 ± 0.5 E-02
	06	1.7 ± 0.4 E-02	1.3 ± 0.3 E-02	1.3 ± 0.5 E-02	1.4 ± 0.4 E-02
	07	1.5 ± 0.5 E-02	1.3 ± 0.5 E-02	1.4 ± 0.4 E-02	1.4 ± 0.4 E-02
	08	1.9 ± 0.3 E-02	1.4 ± 0.4 E-02	1.5 ± 0.5 E-02	1.6 ± 0.4 E-02
	09	1.7 ± 0.3 E-02	1.3 ± 0.5 E-02	1.4 ± 0.4 E-02	1.5 ± 0.4 E-02
	10	1.8 ± 0.4 E-02	1.1 ± 0.7 E-02	1.4 ± 0.4 E-02	1.5 ± 0.5 E-02
AVERAGE ALL STATIONS	01-10	1.8 ± 0.4 E-02	1.3 ± 0.4 E-02	1.5 ± 0.5 E-02	1.5 ± 0.5 E-02

 $\bar{x}$  and sGrand  $\bar{x}$  and s

TABLE A-3

WEEKLY COLLECTIONS - THIRD QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 07/02-07/30	MONTHLY SUMMARY 07/30-09/04	MONTHLY SUMMARY 09/04-10/01	THIRD QUARTER SUMMARY 07/02-10/01
GROSS BETA	01	2.0 ± 0.2 E-02	2.4 ± 0.6 E-02	2.4 ± 0.5 E-02	2.3 ± 0.5 E-02
	02	2.6 ± 0.6 E-02	2.8 ± 0.6 E-02	2.8 ± 0.5 E-02	2.8 ± 0.5 E-02
	03	1.6 ± 0.4 E-02	2.1 ± 0.7 E-02	2.0 ± 0.3 E-02	1.9 ± 0.5 E-02
	04	1.6 ± 0.2 E-02	2.4 ± 0.6 E-02	2.4 ± 0.3 E-02	2.1 ± 0.6 E-02
	05	2.1 ± 0.4 E-02	2.4 ± 0.5 E-02	2.5 ± 0.3 E-02	2.3 ± 0.4 E-02
	06	1.9 ± 0.2 E-02	2.1 ± 0.5 E-02	1.8 ± 0.3 E-02	2.0 ± 0.4 E-02
	07	1.5 ± 0.7 E-02	1.8 ± 0.5 E-02	1.7 ± 0.3 E-02	1.7 ± 0.5 E-02
	08	1.8 ± 0.2 E-02	2.3 ± 0.5 E-02	2.0 ± 0.3 E-02	2.1 ± 0.4 E-02
	09	1.7 ± 0.4 E-02	1.9 ± 0.4 E-02	2.0 ± 0.5 E-02	1.9 ± 0.4 E-02
	10	1.9 ± 0.2 E-02	2.4 ± 0.6 E-02	2.2 ± 0.4 E-02	2.2 ± 0.5 E-02
AVERAGE ALL STATIONS	01-10	1.9 ± 0.4 E-02	2.3 ± 0.6 E-02	2.2 ± 0.5 E-02	2.1 ± 0.5 E-02

 $\bar{x}$  and sGrand  $\bar{x}$  and s

TABLE A-4

WEEKLY COLLECTIONS FOURTH QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 10/01-10/29	MONTHLY SUMMARY 10/29-12/03	MONTHLY SUMMARY 12/03-12/31	FOURTH QUARTER SUMMARY 10/01-12/31
GROSS BETA	01	$3.1 \pm 0.8 \text{ E-02}$	$2.7 \pm 0.8 \text{ E-02}$	$3.8 \pm 0.9 \text{ E-02}$	$3.1 \pm 0.9 \text{ E-02}$
	02	$3.4 \pm 1.0 \text{ E-02}$	$2.9 \pm 0.6 \text{ E-02}$	$3.6 \pm 0.8 \text{ E-02}$	$3.3 \pm 0.8 \text{ E-02}$
	03	$2.6 \pm 0.4 \text{ E-02}$	$2.7 \pm 0.5 \text{ E-02}$	$3.5 \pm 0.9 \text{ E-02}$	$2.9 \pm 0.7 \text{ E-02}$
	04	$3.1 \pm 0.8 \text{ E-02}$	$3.4 \pm 1.7 \text{ E-02}$	$3.8 \pm 0.9 \text{ E-02}$	$3.4 \pm 1.2 \text{ E-02}$
	05	$2.9 \pm 0.5 \text{ E-02}$	$2.8 \pm 0.5 \text{ E-02}$	$4.0 \pm 1.2 \text{ E-02}$	$3.2 \pm 0.9 \text{ E-02}$
	06	$2.4 \pm 0.4 \text{ E-02}$	$2.9 \pm 0.9 \text{ E-02}$	$3.8 \pm 0.8 \text{ E-02}$	$3.0 \pm 0.9 \text{ E-02}$
	07	$2.6 \pm 0.7 \text{ E-02}$	$2.6 \pm 0.5 \text{ E-02}$	$3.8 \pm 0.9 \text{ E-02}$	$2.9 \pm 0.9 \text{ E-02}$
	08	$2.6 \pm 0.6 \text{ E-02}$	$2.8 \pm 0.6 \text{ E-02}$	$4.2 \pm 1.1 \text{ E-02}$	$3.2 \pm 1.0 \text{ E-02}$
	09	$2.0 \pm 0.1 \text{ E-02}$	$2.1 \pm 0.4 \text{ E-02}$	$3.0 \pm 0.5 \text{ E-02}$	$2.3 \pm 0.6 \text{ E-02}$
	10	$2.3 \pm 0.3 \text{ E-02}$	$2.7 \pm 0.7 \text{ E-02}$	$3.6 \pm 1.2 \text{ E-02}$	$2.8 \pm 0.9 \text{ E-02}$
AVERAGE ALL STATIONS	01-10	$2.7 \pm 0.7 \text{ E-02}$	$2.8 \pm 0.8 \text{ E-02}$	$3.7 \pm 0.9 \text{ E-02}$	$3.0 \pm 0.9 \text{ E-02}$

 $\bar{x}$  and sGrand  $\bar{x}$  and s

TABLE B-1  
WEEKLY COLLECTIONS FIRST QUARTER 1990  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE FILTERS  
pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 01/02-01/29	MONTHLY SUMMARY 01/29-02/26	MONTHLY SUMMARY 02/26-04/02	FIRST QUARTER SUMMARY 01/02-04/02
GROSS ALPHA	01	2.7 ± 1.2 E-03	3.1 ± 0.9 E-03	2.5 ± 1.1 E-03	2.7 ± 1.0 E-03
	02	3.5 ± 1.1 E-03	3.7 ± 1.3 E-03	2.9 ± 1.4 E-03	3.3 ± 1.2 E-03
	03	2.4 ± 1.2 E-03	2.9 ± 0.2 E-03	2.4 ± 1.0 E-03	2.5 ± 0.9 E-03
	04	2.1 ± 1.2 E-03	3.5 ± 1.4 E-03	2.9 ± 1.4 E-03	2.8 ± 1.4 E-03
	05	2.3 ± 0.9 E-03	3.1 ± 0.7 E-03	1.8 ± 0.6 E-03	2.3 ± 0.9 E-03
	06	2.2 ± 0.5 E-03	2.8 ± 1.0 E-03	2.7 ± 0.7 E-03	2.6 ± 0.7 E-03
	07	2.2 ± 0.4 E-03	4.4 ± 1.0 E-03	2.4 ± 0.7 E-03	2.9 ± 1.2 E-03
	08	2.2 ± 1.0 E-03	3.2 ± 0.7 E-03	2.2 ± 0.9 E-03	2.5 ± 0.9 E-03
	09	2.1 ± 1.0 E-03	3.9 ± 1.5 E-03	2.0 ± 0.7 E-03	2.6 ± 1.3 E-03
	10	2.3 ± 1.2 E-03	3.3 ± 1.2 E-03	1.9 ± 0.9 E-03	2.5 ± 1.2 E-03
AVERAGE ALL STATIONS	01-10	2.4 ± 1.0 E-03	3.4 ± 1.1 E-03	2.4 ± 1.0 E-03	2.7 ± 1.1 E-03

$\bar{x}$  and s

Grand  $\bar{x}$  and s



TABLE B-2  
WEEKLY COLLECTIONS SECOND QUARTER 1990  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE FILTERS  
pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 04/02-04/30	MONTHLY SUMMARY 04/30-05/29	MONTHLY SUMMARY 05/29-07/02	SECOND QUARTER SUMMARY 04/02-07/02
GROSS ALPHA	01	3.7 ± 1.5 E-03	2.6 ± 0.6 E-03	2.0 ± 0.9 E-03	2.7 ± 1.2 E-03
	02	2.8 ± 1.0 E-03	2.3 ± 1.1 E-03	2.5 ± 0.8 E-03	2.5 ± 0.9 E-03
	03	2.3 ± 1.1 E-03	2.0 ± 0.3 E-03	2.4 ± 0.3 E-03	2.2 ± 0.6 E-03
	04	2.8 ± 2.0 E-03	1.8 ± 0.4 E-03	2.2 ± 0.4 E-03	2.2 ± 1.1 E-03
	05	3.0 ± 1.4 E-03	1.7 ± 0.8 E-03	2.1 ± 0.5 E-03	2.2 ± 1.0 E-03
	06	2.5 ± 1.3 E-03	2.1 ± 0.5 E-03	2.2 ± 0.6 E-03	2.3 ± 0.8 E-03
	07	3.0 ± 1.3 E-03	2.0 ± 0.4 E-03	2.3 ± 0.6 E-03	2.4 ± 0.9 E-03
	08	3.3 ± 0.7 E-03	2.1 ± 0.6 E-03	1.9 ± 0.9 E-03	2.4 ± 0.9 E-03
	09	2.3 ± 0.8 E-03	2.3 ± 1.2 E-03	2.0 ± 0.6 E-03	2.2 ± 0.8 E-03
	10	2.2 ± 1.2 E-03	2.0 ± 0.5 E-03	2.1 ± 0.4 E-03	2.1 ± 0.7 E-03
AVERAGE ALL STATIONS	01-10	2.8 ± 1.2 E-03	2.1 ± 0.7 E-03	2.2 ± 0.6 E-03	2.3 ± 0.9 E-03

$\bar{x}$  and s

Grand  $\bar{x}$  and s

TABLE B-3

## WEEKLY COLLECTIONS - THIRD QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 07/02-07/30	MONTHLY SUMMARY 07/30-09/04	MONTHLY SUMMARY 09/04-10/01	THIRD QUARTER SUMMARY 07/02-10/01
GROSS ALPHA	01	3.3 ± 1.2 E-03	2.8 ± 0.7 E-03	2.8 ± 0.6 E-03	2.9 ± 0.8 E-03
	02	4.3 ± 1.6 E-03	3.2 ± 1.3 E-03	3.0 ± 1.0 E-03	3.5 ± 1.4 E-03
	03	3.1 ± 1.1 E-03	2.4 ± 0.8 E-03	2.4 ± 0.3 E-03	2.6 ± 0.8 E-03
	04	2.2 ± 0.6 E-03	3.0 ± 0.9 E-03	2.9 ± 1.4 E-03	2.7 ± 1.0 E-03
	05	2.9 ± 1.1 E-03	2.3 ± 0.5 E-03	2.6 ± 0.9 E-03	2.5 ± 0.8 E-03
	06	3.0 ± 1.0 E-03	2.9 ± 1.0 E-03	2.9 ± 0.9 E-03	2.9 ± 0.9 E-03
	07	3.3 ± 0.9 E-03	2.6 ± 0.7 E-03	3.1 ± 0.3 E-03	2.9 ± 0.7 E-03
	08	2.7 ± 0.7 E-03	2.3 ± 0.4 E-03	2.6 ± 0.4 E-03	2.5 ± 0.5 E-03
	09	2.2 ± 0.4 E-03	2.0 ± 0.3 E-03	2.3 ± 0.4 E-03	2.2 ± 0.4 E-03
	10	2.6 ± 0.8 E-03	3.4 ± 0.5 E-03	3.0 ± 0.3 E-03	3.0 ± 0.6 E-03
AVERAGE ALL STATIONS	01-10	2.9 ± 1.1 E-03	2.7 ± 0.8 E-03	2.7 ± 0.7 E-03	2.8 ± 0.9 E-03

 $\bar{x}$  and sGrand  $\bar{x}$  and s

TABLE B-4

WEEKLY COLLECTIONS FOURTH QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 10/01-10/29	MONTHLY SUMMARY 10/29-12/03	MONTHLY SUMMARY 12/03-12/31	FOURTH QUARTER SUMMARY 10/01-12/31
GROSS ALPHA	01	7.2 ± 6.1 E-03	4.0 ± 3.0 E-03	5.1 ± 2.5 E-03	5.3 ± 4.0 E-03
	02	11 ± 10 E-03	3.7 ± 1.9 E-03	3.6 ± 1.9 E-03	6.0 ± 6.4 E-03
	03	4.9 ± 3.4 E-03	3.0 ± 0.8 E-03	4.5 ± 2.5 E-03	4.0 ± 2.3 E-03
	04	9.2 ± 9.2 E-03	5.1 ± 5.6 E-03	4.0 ± 3.2 E-03	6.0 ± 6.3 E-03
	05	6.5 ± 6.0 E-03	3.2 ± 0.8 E-03	5.0 ± 3.3 E-03	4.8 ± 3.8 E-03
	06	4.6 ± 3.1 E-03	2.9 ± 0.8 E-03	4.5 ± 2.2 E-03	3.9 ± 2.1 E-03
	07	7.2 ± 7.6 E-03	3.2 ± 0.8 E-03	4.2 ± 2.3 E-03	4.7 ± 4.4 E-03
	08	4.6 ± 3.5 E-03	4.7 ± 1.6 E-02	4.2 ± 2.4 E-03	4.2 ± 2.3 E-03
	09	3.8 ± 2.2 E-03	2.5 ± 0.8 E-03	2.9 ± 1.8 E-03	3.0 ± 1.6 E-03
	10	4.3 ± 1.6 E-03	3.5 ± 1.6 E-03	3.7 ± 3.0 E-03	3.8 ± 2.0 E-03
AVERAGE ALL STATIONS	01-10	6.3 ± 5.8 E-03	3.5 ± 2.1 E-03	4.2 ± 2.3 E-03	4.6 ± 3.9 E-03

 $\bar{x}$  and sGrand  $\bar{x}$  and s

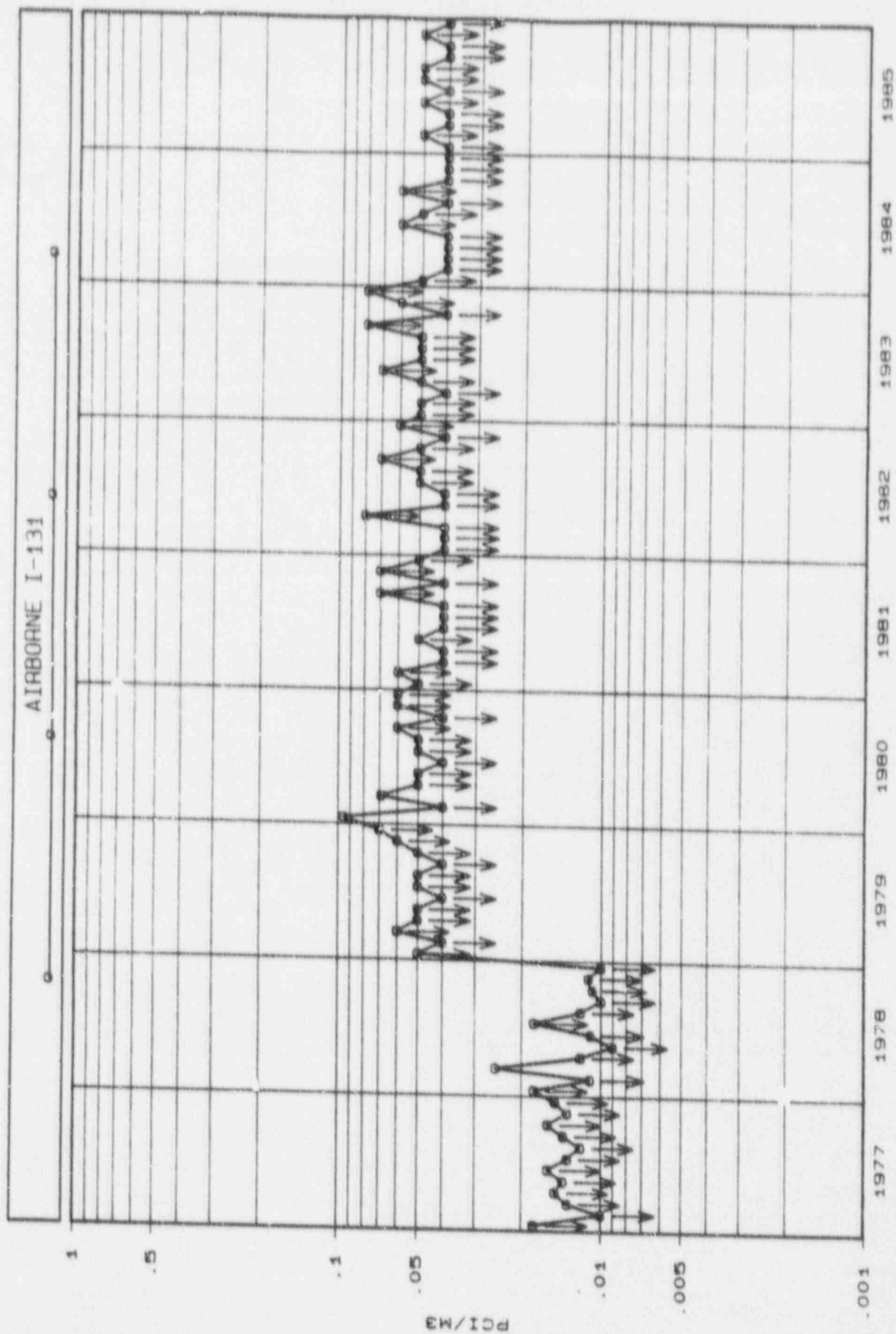
C. AIR RADIOIODINE - CHARCOAL FILTERS (See Tables C-1 through C-4)

STATIONS 01 to 10

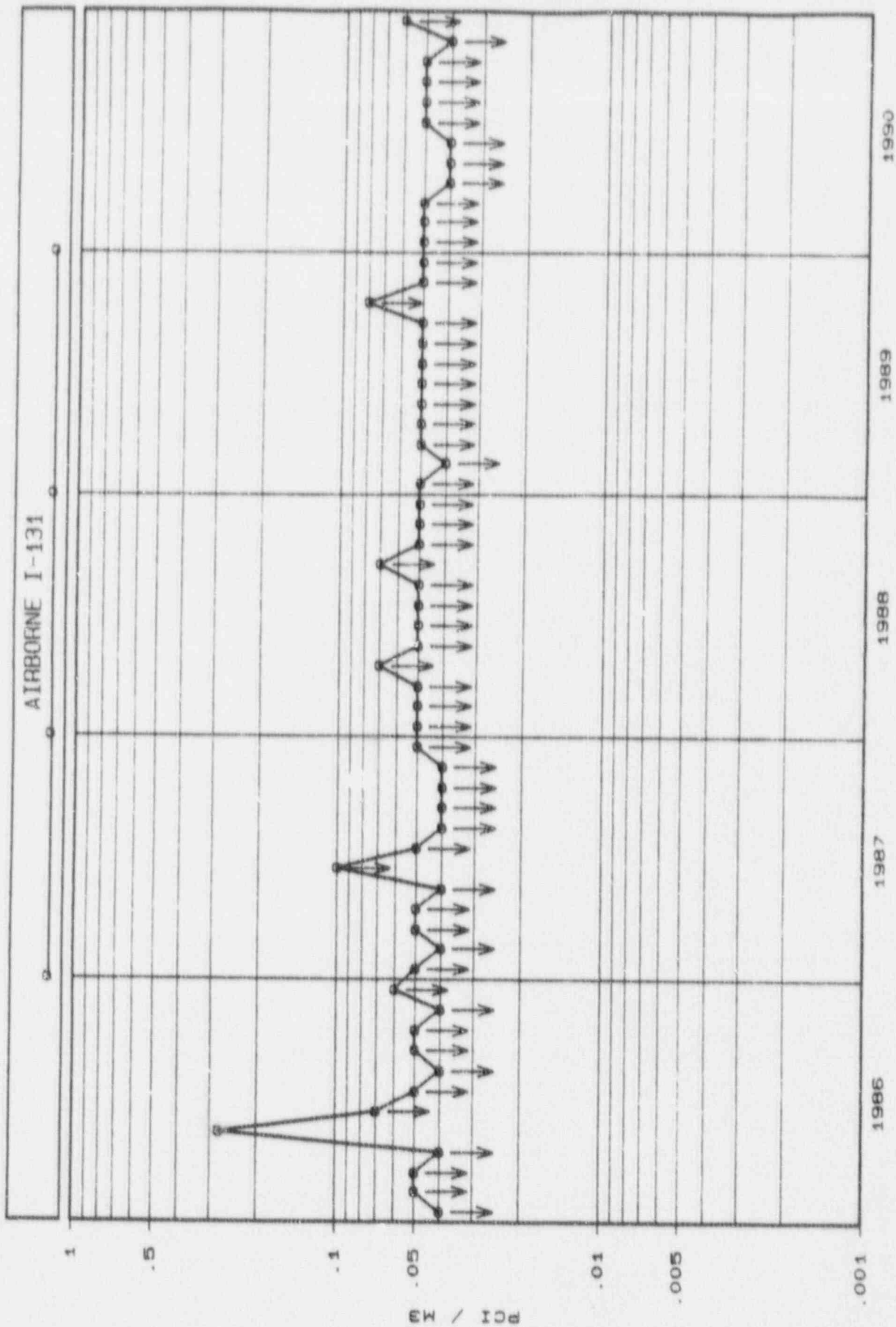
Charcoal filters used in series with air particulate filters were collected weekly during 1990 at stations 01 through 10 and monitored for radioiodine.

Tables C-1 through C-4 show the average monthly and quarterly results for each station and the average of all 10 stations. Airborne I-131 levels were below the limits of detection for all of 1990.

Figure C-1 plots the results of I-131 as monitored in charcoal filters and summarized monthly in 1990 compared with previous years. Results for 1990 were below the normal limits of detection indicating no atmospheric effect from the operations of CNS.



AIRBORNE I-131  
MONTHLY AVERAGE ALL LOCATIONS



AIRBORNE I-131  
MONTHLY AVERAGE ALL LOCATIONS



TABLE C-1  
WEEKLY COLLECTIONS FIRST QUARTER 1990  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
CHARCOAL FILTERS  
pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 01/02-01/29			MONTHLY SUMMARY 01/29-02/26			MONTHLY SUMMARY 02/26-04/02			QUARTERLY SUMMARY 01/02-04/02			DET./ TOTAL	RANGE
IODINE-131	01	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	0/13	(L.T.2.-L.T.4.)E-02
	02	L.T.	4	E-02	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4	E-02	0/13	(L.T.2.-L.T.4.)E-02
	03	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	0/13	(L.T.3.-L.T.4.)E-02
	04	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	L.T.	4.	E-02	0/13	(L.T.2.-L.T.4.)E-02
	05	L.T.	3.	E-02	L.T.	3.	E-02	L.T.	3.	E-02	L.T.	3.	E-02	0/13	(L.T.2.-L.T.3.)E-02
	06	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	0/13	(L.T.3.-L.T.5.)E-02
	07	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	0/13	(L.T.2.-L.T.5.)E-02
	08	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	0/13	(L.T.3.-L.T.5.)E-02
	09	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	0/13	(L.T.3.-L.T.5.)E-02
	10	L.T.	3.	E-02	L.T.	3.	E-02	L.T.	3.	E-02	L.T.	3.	E-02	0/13	(L.T.2.-L.T.3.)E-02
	01-10	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02	L.T.	5.	E-02		--
	DET./TOTAL		0/40			0/40			0/50			0/130		0/130	--
	RANGE	(L.T.2.-L.T.5.)E-02			(L.T.2.-L.T.5.)E-02			(L.T.2.-L.T.5.)E-02			(L.T.2.-L.T.5.)E-02			--	(L.T.2.-L.T.5.)E-02

TABLE C-2

WEEKLY COLLECTIONS SECOND QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

CHARCOAL FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 04/02-04/30	MONTHLY SUMMARY 04/30-05/29	MONTHLY SUMMARY 05/29-07/02	QUARTERLY SUMMARY 04/02-07/02	DET./ TOTAL	RANGE
IODINE-131	01	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.3.-L.T.4.)E-02
	03	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	04	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	05	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	0/13	(L.T.1.-L.T.3.)E-02
	06	L.T. 4. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	07	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	08	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	09	L.T. 4. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	10	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	0/13	(L.T.1.-L.T.3.)E-02
	01-10	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02		--
	DET./TOTAL	0/40	0/40	0/50	0/130	0/130	--
	RANGE	(L.T.2.-L.T.4.)E-02	(L.T.2.-L.T.4.)E-02	(L.T.1.-L.T.4.)E-02	(L.T.1.-L.T.4.)E-02	--	(L.T.1.-L.T.4.)E-02

TABLE C-3

WEEKLY COLLECTIONS THIRD QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

CHARCOAL FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 07/02-07/30	MONTHLY SUMMARY 07/30-09/04	MONTHLY SUMMARY 09/04-10/01	QUARTERLY SUMMARY 07/02-10/01	DET./ TOTAL	RANGE
IODINE-131	01	L.T. 3. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	03	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	04	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
	05	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	0/13	(L.T.2.-L.T.3.)E-02
	06	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	07	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	08	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	09	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	10	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	0/13	(L.T.2.-L.T.3.)E-02
01-10		L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02		
DET./TOTAL		0/40	0/50	0/40	0/130		
RANGE		(L.T.2.-L.T.5.)E-02	(L.T.2.-L.T.5.)E-02	(L.T.2.-L.T.5.)E-02	(L.T.2.-L.T.5.)E-02	--	(L.T.2.-L.T.5.)E-02

TABLE C-4

WEEKLY COLLECTIONS FOURTH QUARTER 1990

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

CHARCOAL FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER	MONTHLY SUMMARY 10/01-10/29	MONTHLY SUMMARY 10/29-12/03	MONTHLY SUMMARY 12/03-12/31	QUARTERLY SUMMARY 10/01-12/31	DET./ TOTAL	RANGE
IODINE-131	01	L.T. 4. E-02	L.T. 3. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	02	L.T. 4. E-02	L.T. 3. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	03	L.T. 4. E-02	L.T. 3. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	04	L.T. 4. E-02	L.T. 3. E-02	L.T. 5. E-02	L.T. 5. E-02	0/13	(L.T.2.-L.T.5.)E-02
	05	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	0/13	(L.T.2.-L.T.3.)E-02
	06	L.T. 5. E-02	L.T. 4. E-02	L.T. 6. E-02	L.T. 6. E-02	0/13	(L.T.3.-L.T.6.)E-02
	07	L.T. 4. E-02	L.T. 4. E-02	L.T. 6. E-02	L.T. 6. E-02	0/13	(L.T.3.-L.T.6.)E-02
	08	L.T. 4. E-02	L.T. 4. E-02	L.T. 6. E-02	L.T. 6. E-02	0/13	(L.T.3.-L.T.6.)E-02
	09	L.T. 5. E-02	L.T. 4. E-02	L.T. 6. E-02	L.T. 6. E-02	0/13	(L.T.3.-L.T.6.)E-02
	10	L.T. 3. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 4. E-02	0/13	(L.T.2.-L.T.4.)E-02
01-10		L.T. 5. E-02	L.T. 4. E-02	L.T. 6. E-02	L.T. 6. E-02	0/130	
DET./TOTAL		0/40	0/50	0/40	0/130		
RANGE		(L.T.2.-L.T.5.)E-02	(L.T.2.-L.T.4.)E-02	(L.T.2.-L.T.6.)E-02	(L.T.2.-L.T.6.)E-02	--	(L.T.2.-L.T.6.)E-02

D. COMPOSITES OF AIR PARTICULATE FILTERS - GAMMA

(See Tables D-1 and D-2)

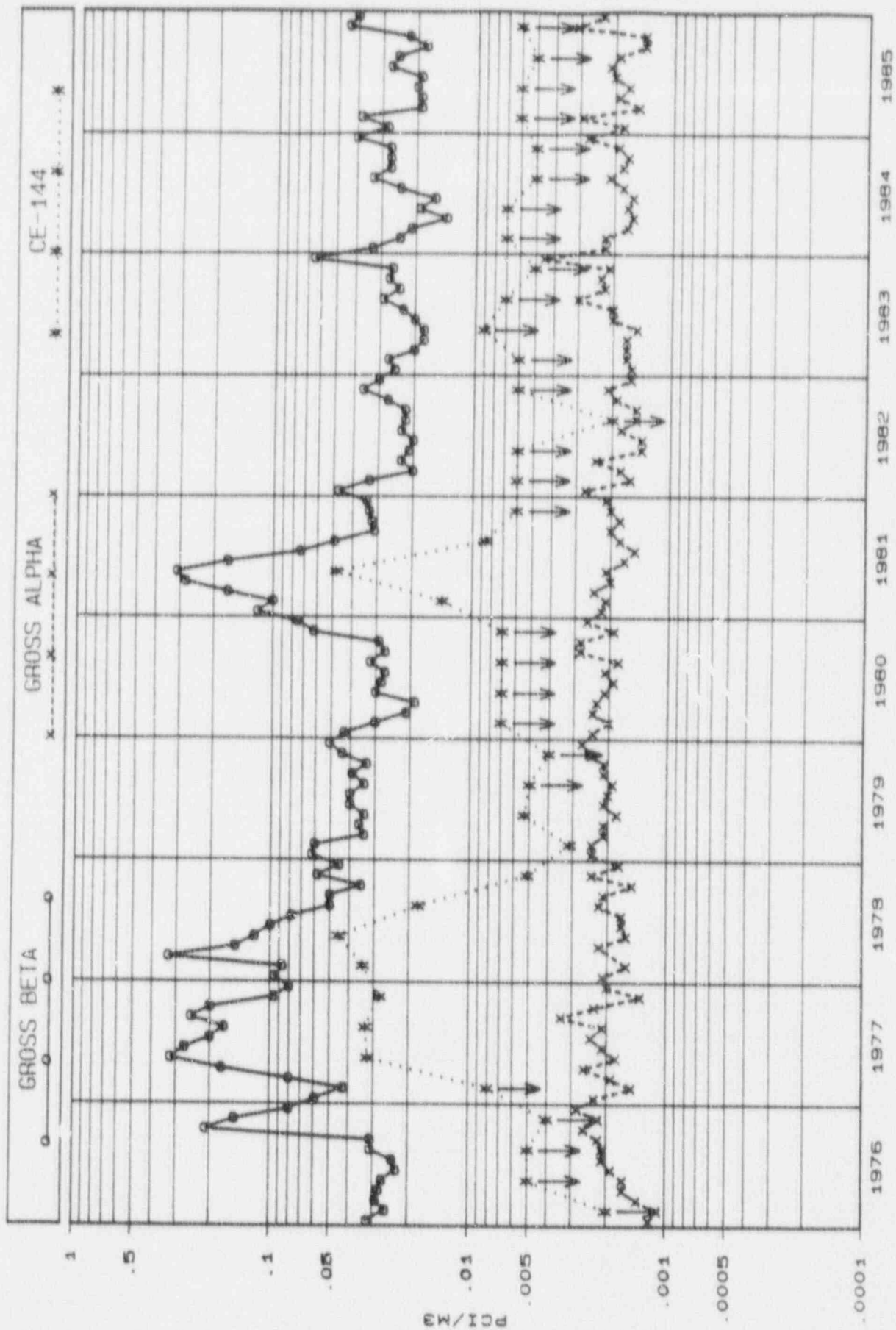
STATIONS 01 to 10

Air Particulate Filters, which were collected weekly, were composited for each station for a quarterly gamma spectral analysis during the four quarters of 1990.

Beryllium-7, a naturally occurring cosmogenic nuclide, was detected in 40 of 40 samples at a level of 0.094 pCi per cubic meter which is similar to the levels of past years. Potassium-40, also a naturally occurring nuclide, was detected in one of 40 samples at a level near the normal level of detection.

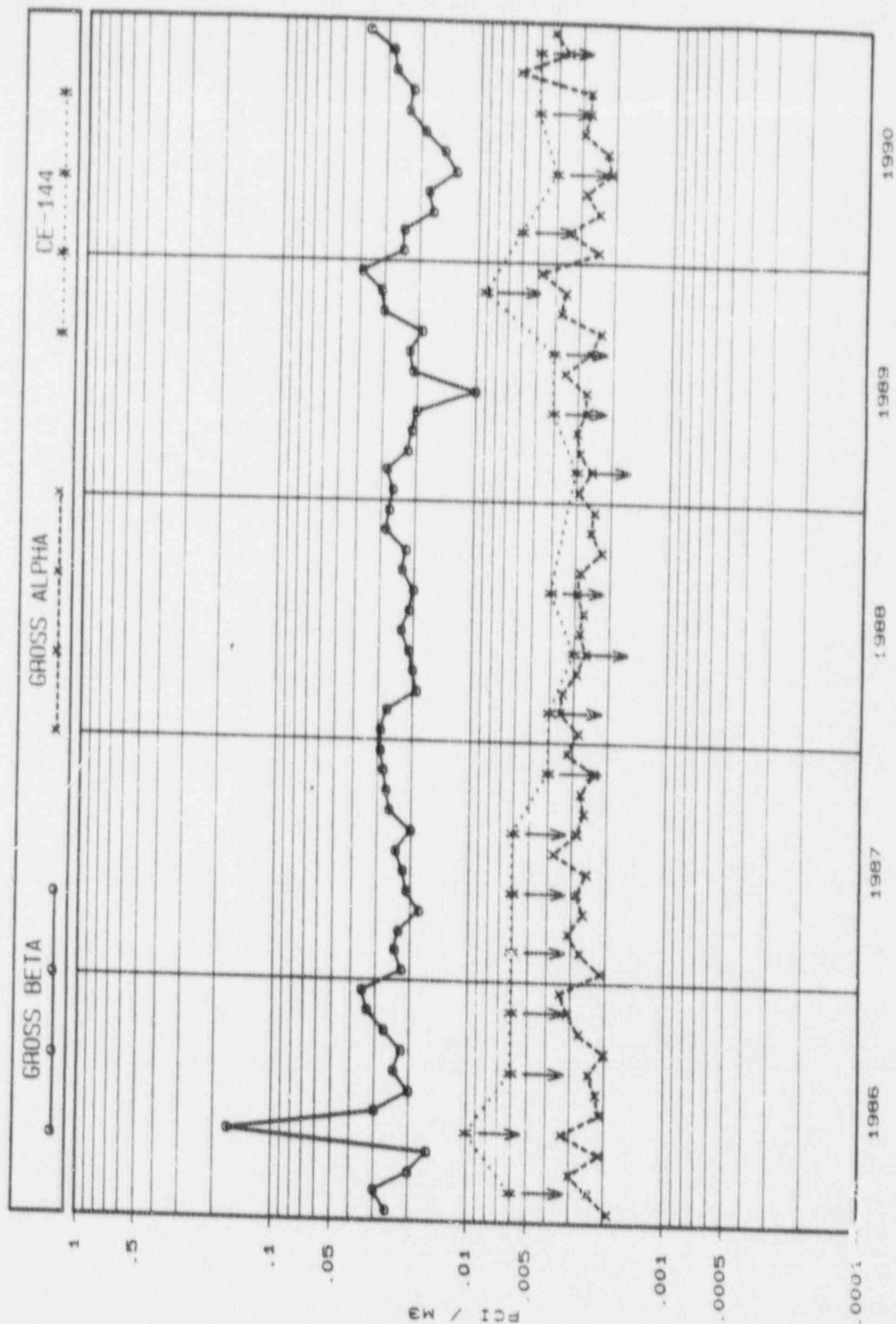
Figure D-1 graphs the gross beta, gross alpha and Ce-144 activity as measured on air particulate filters collected weekly at CNS. (This is the same as Figure A-1, B-1). The plot illustrates that there were no detections of Ce-144 above the normal level of detection as measured by the quarterly gamma scan of samples from CNS.

Figure D-2 shows that measurements of Ce-144 are no longer reported by the Environmental Measurements Laboratory of the U S Department of Energy because the artificial nuclides such as Ce-144, have reached the limits of detection by the analytical techniques now used.

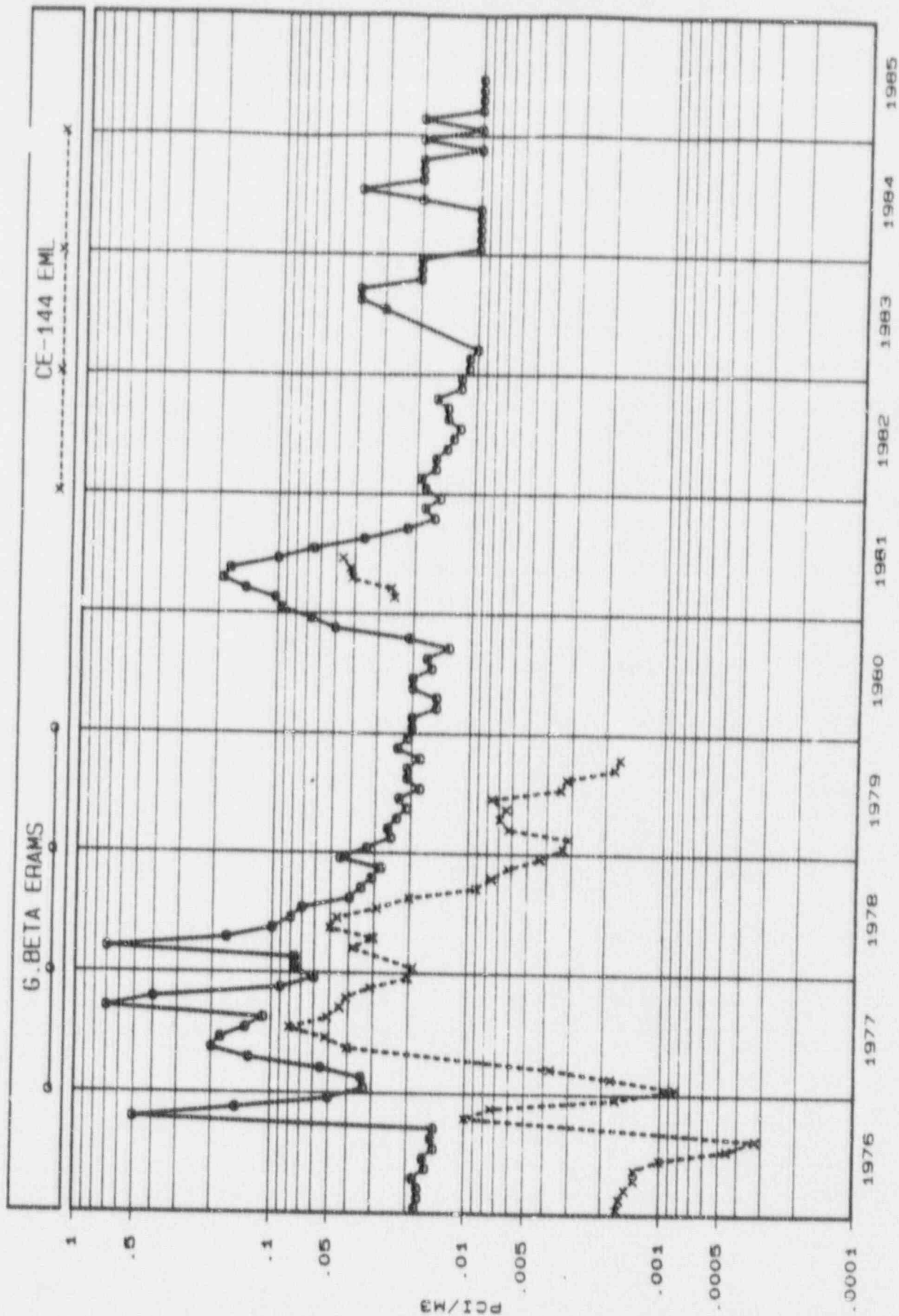


AIR PARTICULATES - CNS  
 ALPHA AND BETA MONTHLY AVERAGE - ALL LOCATIONS  
 CE-144 QUARTERLY AVERAGE - ALL LOCATIONS

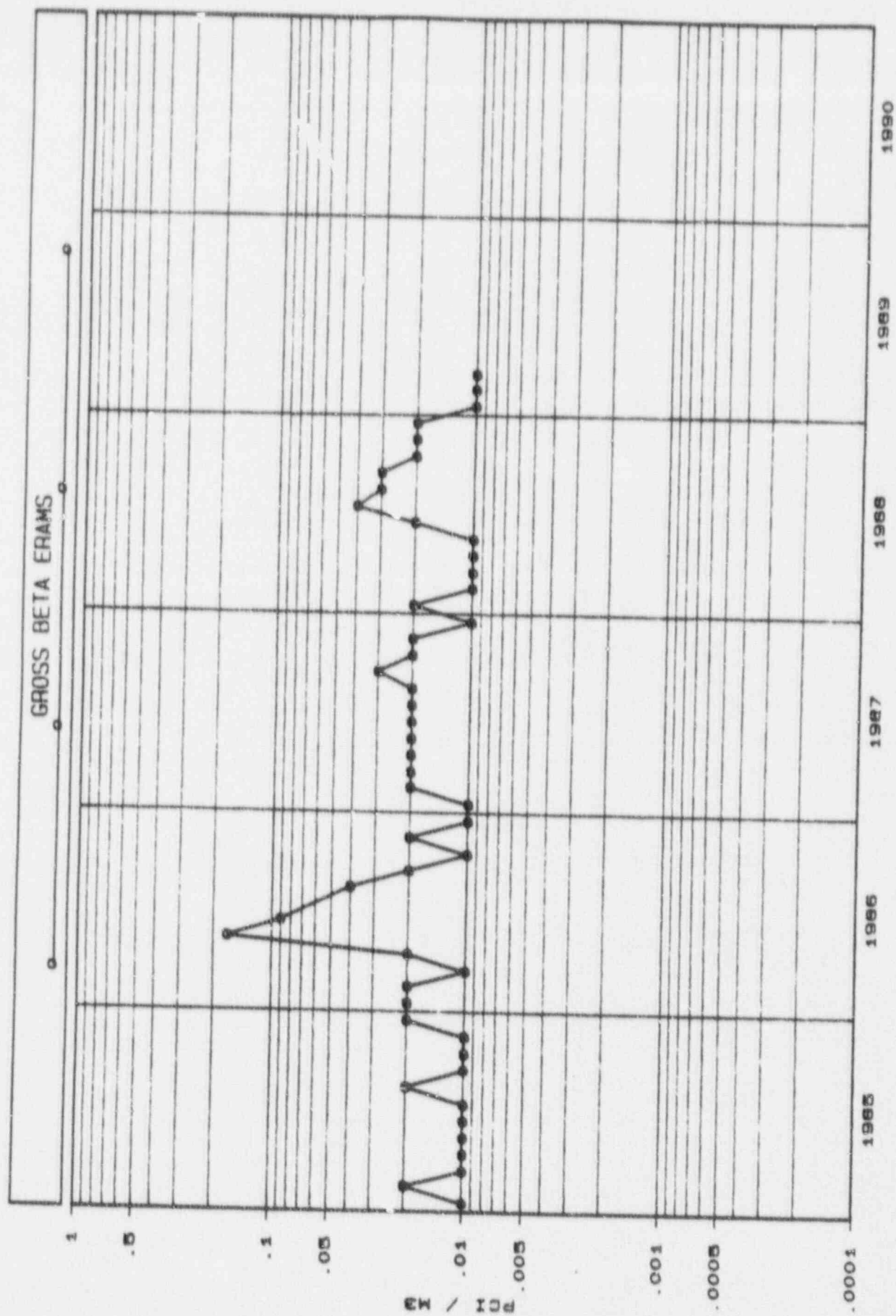




AIR PARTICULATES - CNS  
 ALPHA AND BETA MONTHLY AVERAGE - ALL LOCATIONS  
 CE-144 QUARTERLY AVERAGE - ALL LOCATIONS



AIR PARTICULATES  
BETA MONTHLY AVERAGE - JEFFERSON CITY  
MISSOURI (ERAMS) EPA



AIR PARTICULATES  
 BETA MONTHLY AVERAGE - JEFFERSON CITY  
 MISSOURI (ERAMS) EPA

TABLE D-1

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

COMPOSITE OF WEEKLY AIR PARTICULATE FILTERS

pCi/Cu. M.

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER 01/02-04/02	SECOND QUARTER 04/02-07/02	THIRD QUARTER 07/02-10/01	FOURTH QUARTER 10/01-12/31
BE-7	01-10	Meanstd.dev. det./total range	8.28 ± 0.6 E-02 10/10 (7.52-9.54)E-02	1.08 ± 0.3 E-01 10/10 (0.91-1.79)E-01	10 ± 1.6 E-02 10/10 (7.1-13.1)E-02	8.55 ± 1.1E-02 10/10 (6.7-11)E-02
K-40	01-10	Meanstd.dev. det./total range	L.T. 2. E-02 0/10 --	1.42±0.61 E-02 1/10 --	L.T. 3. E-02 0/10 --	L.T. 3. E-02 0/10 --
I-131 (by gamma spectroscopy)	01-10	Meanstd.dev. det./total range	L.T. 4. E-01 0/10 --	L.T. 1. E-01 0/10 --	L.T. 3. E-01 0/10 --	L.T. 2. E-01 0/10 --
Cs-134	01-10	Meanstd.dev. det./total range	L.T. 7. E-04 0/10 --	L.T. 8. E-04 0/10 --	L.T. 9. E-04 0/10 --	L.T. 8. E-04 0/10 --
Cs-137	01-10	Meanstd.dev. det./total range	L.T. 6. E-04 0/10 --	L.T. 7. E-04 0/10 --	L.T. 8. E-04 0/10 --	L.T. 7. E-04 0/10 --
Ra-226	01-10	Meanstd.dev. det./total range	L.T. 1. E-02 0/10 --	L.T. 1. E-02 0/10 --	L.T. 1. E-02 0/10 --	L.T. 1. E-02 0/10 --
Th-228	01-10	Meanstd.dev. det./total range	L.T. 1. E-03 0/10 --	L.T. 1. E-03 0/10 --	L.T. 1. E-03 0/10 --	L.T. 1. E-03 0/10 --

TABLE D-2

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AIRBORNE

COMPOSITE OF WEEKLY AIR PARTICULATE FILTERS - PCI/CU.M.

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/02-04/02		SECOND QUARTER 04/02-07/02		THIRD QUARTER 07/02-10/01		FOURTH QUARTER 10/01-12/31	
BE-7	1-10	8.28±0.6	E-02 (10/10)	1.08 ± 0.3E-01	(10/10)	10 ± 1.6	E-02 (10/10)	8.55± 1.1	E-02 (10/10)
K-40	1-10	L.T.	2. E-02 (0/10)	1.42±0.61	E-02 (11/10)	L.T.	3. E-02 (0/10)	L.T.	3. E-02 (0/10)
Mn-54	1-10	L.T.	7. E-04 (0/10)	L.T.	8. E-04 (0/10)	L.T.	9. E-04 (0/10)	L.T.	8. E-04 (0/10)
Co-58	1-10	L.T.	1. E-03 (0/10)	L.T.	1. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	1. E-03 (0/10)
Fe-59	1-10	L.T.	4. E-03 (0/10)	L.T.	4. E-03 (0/10)	L.T.	4. E-03 (0/10)	L.T.	3. E-03 (0/10)
Co-60	1-10	L.T.	9. E-04 (0/10)	L.T.	8. E-04 (0/10)	L.T.	9. E-04 (0/10)	L.T.	8. E-04 (0/10)
Zn-65	1-10	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)
Zr-95	1-10	L.T.	1. E-03 (0/10)	L.T.	1. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	1. E-03 (0/10)
Ru-103	1-10	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)	L.T.	2. E-03 (0/10)
Ru-106	1-10	L.T.	6. E-03 (0/10)	L.T.	7. E-03 (0/10)	L.T.	8. E-03 (0/10)	L.T.	7. E-03 (0/10)
I-131	1-10	L.T.	4. E-01 (0/10)	L.T.	1. E-01 (0/10)	L.T.	3. E-01 (0/10)	L.T.	2. E-01 (0/10)
Cs-134	1-10	L.T.	7. E-04 (0/10)	L.T.	8. E-04 (0/10)	L.T.	9. E-04 (0/10)	L.T.	8. E-04 (0/10)
Cs-137	1-10	L.T.	6. E-04 (0/10)	L.T.	7. E-04 (0/10)	L.T.	8. E-04 (0/10)	L.T.	7. E-04 (0/10)
Ba-140	1-10	L.T.	4. E-02 (0/10)	L.T.	2. E-02 (0/10)	L.T.	4. E-02 (0/10)	L.T.	2. E-02 (0/10)
Ce-141	1-10	L.T.	5. E-03 (0/10)	L.T.	3. E-03 (0/10)	L.T.	4. E-03 (0/10)	L.T.	4. E-03 (0/10)
Ce-144	1-10	L.T.	6. E-03 (0/10)	L.T.	4. E-03 (0/10)	L.T.	5. E-03 (0/10)	L.T.	5. E-03 (0/10)
Ra-226	1-10	L.T.	1. E-02 (0/10)	L.T.	1. E-02 (0/10)	L.T.	1. E-02 (0/10)	L.T.	1. E-02 (0/10)
Th-228	1-10	L.T.	1. E-03 (0/10)	L.T.	1. E-03 (0/10)	L.T.	1. E-03 (0/10)	L.T.	1. E-03 (0/10)



E. FISH (See Tables E-1, E-2)

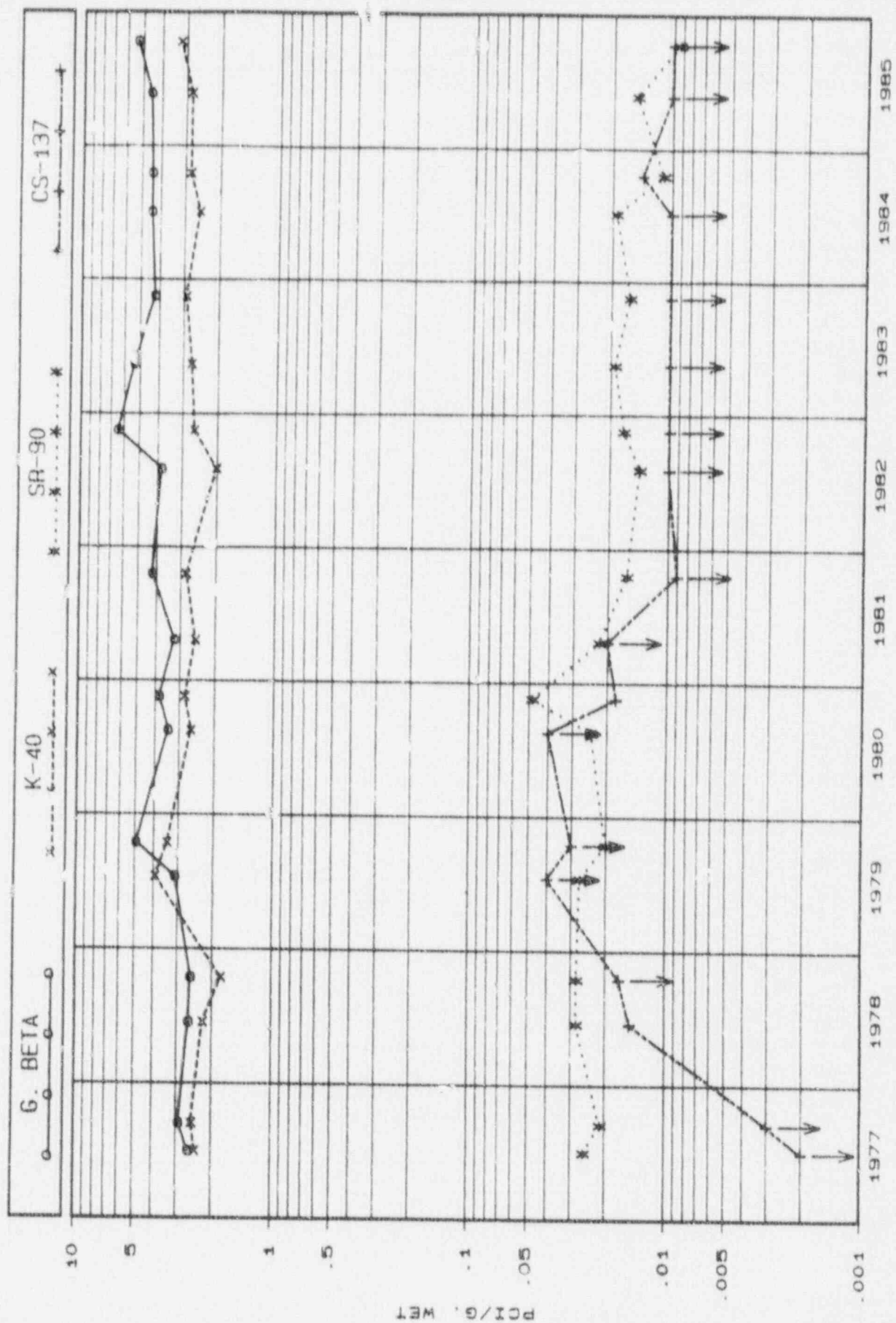
STATIONS 28, 35

Fish samples were collected during the summer and fall at the above stations and analyzed for gross beta, Sr-89, Sr-90 and gamma emitting isotopes. The gross beta and Sr-90 activities were similar to the levels of previous years. Strontium-90 was detected in four of ten samples at a level of 0.009 pCi/gram, wet, which is below the normal level of detection. There were no detections of Sr-89. Naturally occurring K-40 was detected in all samples at an average level of 2.33 pCi/gm, wet.

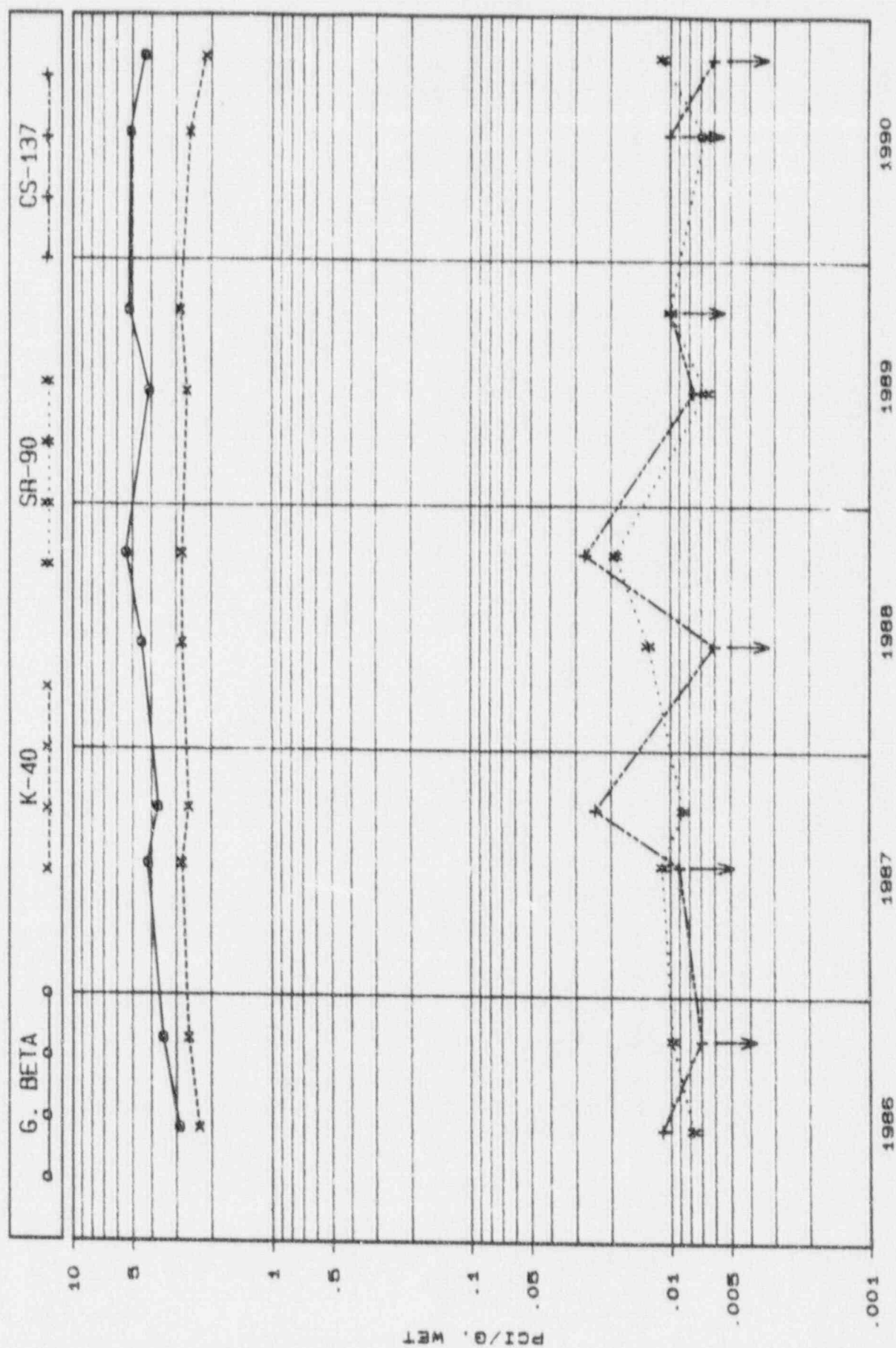
There were no detections of Cs-137 during 1990.

Plotted in Figure E-1 are the radionuclides gross beta, K-40, Sr-90 and Cs-137 monitored in fish samples which show no appreciable change from 1977 through 1990. The plot of the nuclides shows that most of the gross beta activity is due to the terrestrial nuclide K-40.





FISH  
SEMIANNUAL AVERAGE - ALL LOCATIONS  
GROSS BETA K-40 SR-90 CS-137



FISH  
SEMIANNUAL AVERAGE - ALL LOCATIONS  
GROSS BETA K-40 SR-90 CS-137

TABLE E-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
FISH - PCI/GM, WET

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER	SECOND QUARTER	THIRD QUARTER 07/08	FOURTH QUARTER 10/29
Gross Beta	29, 35	Meanstd.dev. det./total range			5.1 ± 0.8E 00 5/5 (4.5-6.5)E 00	4.3 ± 1.4E 00 5/5 (2.1-5.4)E 00
Sr-89	28, 35	Meanstd.dev. det./total range			L.T. 8. E-03 0/5 --	L.T. 5. E-03 0/5 --
Sr-90	28, 35	Meanstd.dev. det./total range			6.7 ± 0.6E-03 2/5 (6.3-7.1)E-03	11 ± 9.8E-03 2/5 (4.1-18) E-03
K-40	28, 35	Meanstd.dev. det./total range			2.55±1.1E 00 5/5 (0.84-3.8)E 00	2.12± 0.3 E 00 5/5 (1.9-2.6) E 00
Co-60	28, 35	Meanstd.dev. det./total range			L.T. 1. E-02 0/5 --	L.T. 7. E-03 0/5 --
I-131	28, 35	Meanstd.dev. det./total range			L.T. 3. E-02 0/5 --	L.T. 8. E-02 0/5 --
Cs-134	28, 35	Meanstd.dev. det./total range			L.T. 1. E-02 0/5 --	L.T. 6. E-03 0/5 --
Cs-137	28, 35	Meanstd.dev. det./total range			L.T. 1. E-02 0/5 --	L.T. 6. E-03 0/5 --

TABLE E-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
FISH - PCI/GM, WET

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER 07/08	FOURTH QUARTER 10/29
BE-7	28, 35			L.T. 9. E-02 (0/5)	L.T. 7. E-02 (0/5)
K-40	28, 35			2.55±1.1 E 00 (5/5)	2.12±0.3 E 00 (5/5)
Mn-54	28, 35			L.T. 9. E-03 (0/5)	L.T. 6. E-03 (0/5)
Co-58	28, 35			L.T. 1. E-02 (0/5)	L.T. 7. E-03 (0/5)
Fe-59	28, 35			L.T. 2. E-02 (0/5)	L.T. 2. E-02 (0/5)
Co-60	28, 35			L.T. 1. E-02 (0/5)	L.T. 7. E-03 (0/5)
Zn-65	28, 35			L.T. 2. E-02 (0/5)	L.T. 1. E-02 (0/5)
Zr-95	28, 35			L.T. 1. E-02 (0/5)	L.T. 8. E-03 (0/5)
Ru-103	28, 35			L.T. 1. E-02 (0/5)	L.T. 9. E-03 (0/5)
Ru-106	28, 35			L.T. 9. E-02 (0/5)	L.T. 5. E-02 (0/5)
I-131	28, 35			L.T. 3. E-02 (0/5)	L.T. 8. E-02 (0/5)
Cs-134	28, 35			L.T. 1. E-02 (0/5)	L.T. 6. E-03 (0/5)
Cs-137	28, 35			L.T. 1. E-02 (0/5)	L.T. 6. E-03 (0/5)
Ba-140	28, 35			L.T. 2. E-02 (0/5)	L.T. 3. E-02 (0/5)
Ce-141	28, 35			L.T. 2. E-02 (0/5)	L.T. 2. E-02 (0/5)
Ce-144	28, 35			L.T. 7. E-02 (0/5)	L.T. 5. E-02 (0/5)
Ra-226	28, 35			L.T. 2. E-01 (0/5)	L.T. 1. E-01 (0/5)
Th-228	28, 35			L.T. 2. E-02 (0/5)	L.T. 1. E-02 (0/5)

F. MILK (See Tables F-1, F-2)

STATION 61 (NEAREST PRODUCER)

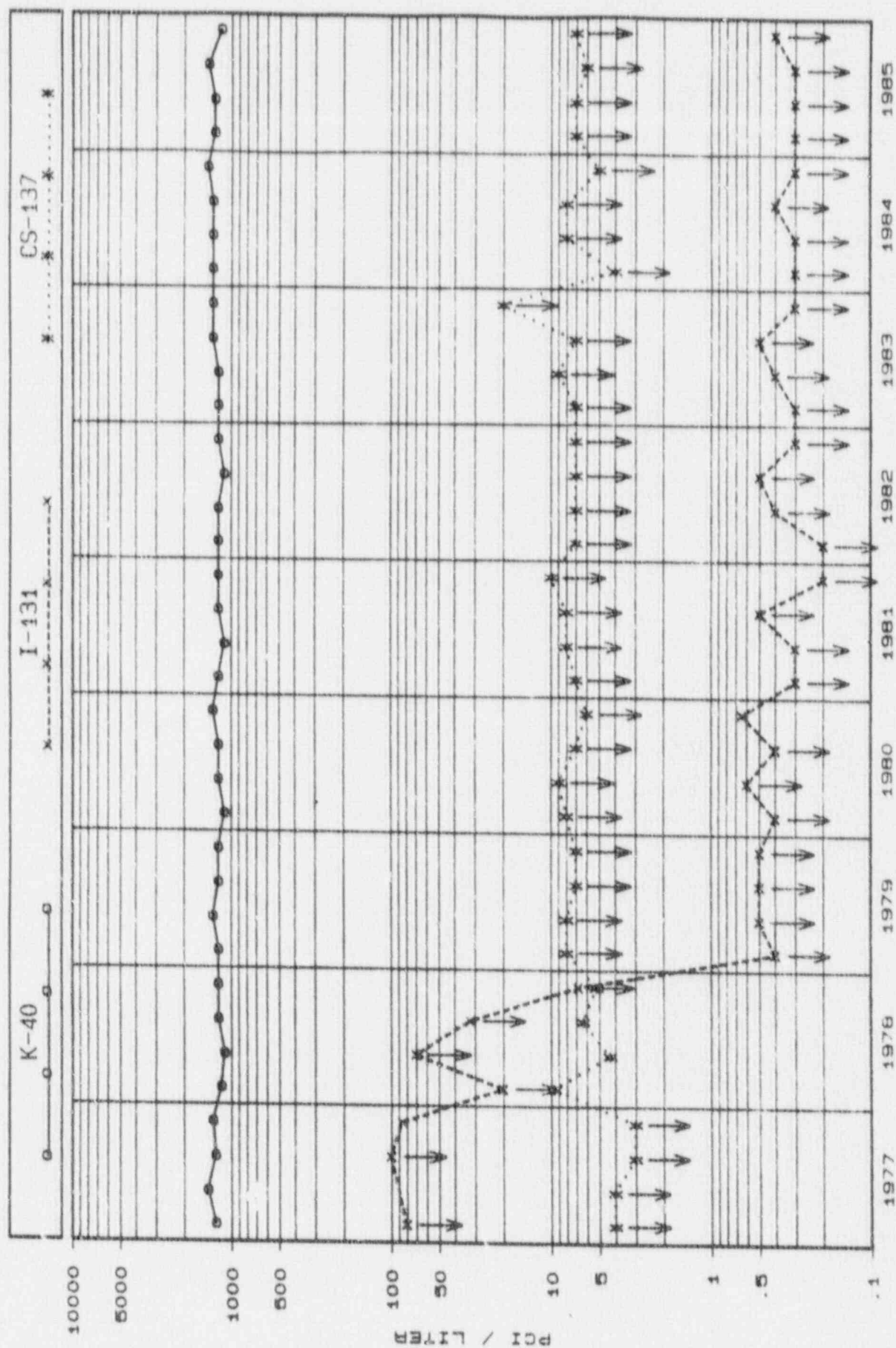
Milk samples from the nearest producer Station 61, 3.5 miles, 326 degrees from the elevated release point of CNS were collected once every 15 days in peak pasture season and once every 31 days the rest of the year. The monthly samples collected January through May and October through December were analyzed for I-131 by chemical separation, for elemental calcium and strontium 89 and 90. In addition they were analyzed for gamma emitting isotopes on a high resolution gamma spectrometer. The samples collected every 15 days during peak pasture season were analyzed upon receipt for I-131 and gamma emitting isotopes. A monthly composite was prepared and analyzed as described above.

There were no detections of I-131 in the twenty-one samples analyzed by chemical separation. There were no detections of Sr-89 in the samples analyzed. Strontium-90 was detected at an average level of 1.7 pCi/liter, which is a normal environmental level. Elemental calcium was found at an average level of 2.0 mg/liter. Potassium-40, a naturally occurring isotope, was detected at an average level of 1217 pCi/liter.

Cesium-137 was not detected in any of the samples analyzed. There was no indication of an effect on the milk of the producer nearest the plant from the operations of CNS.

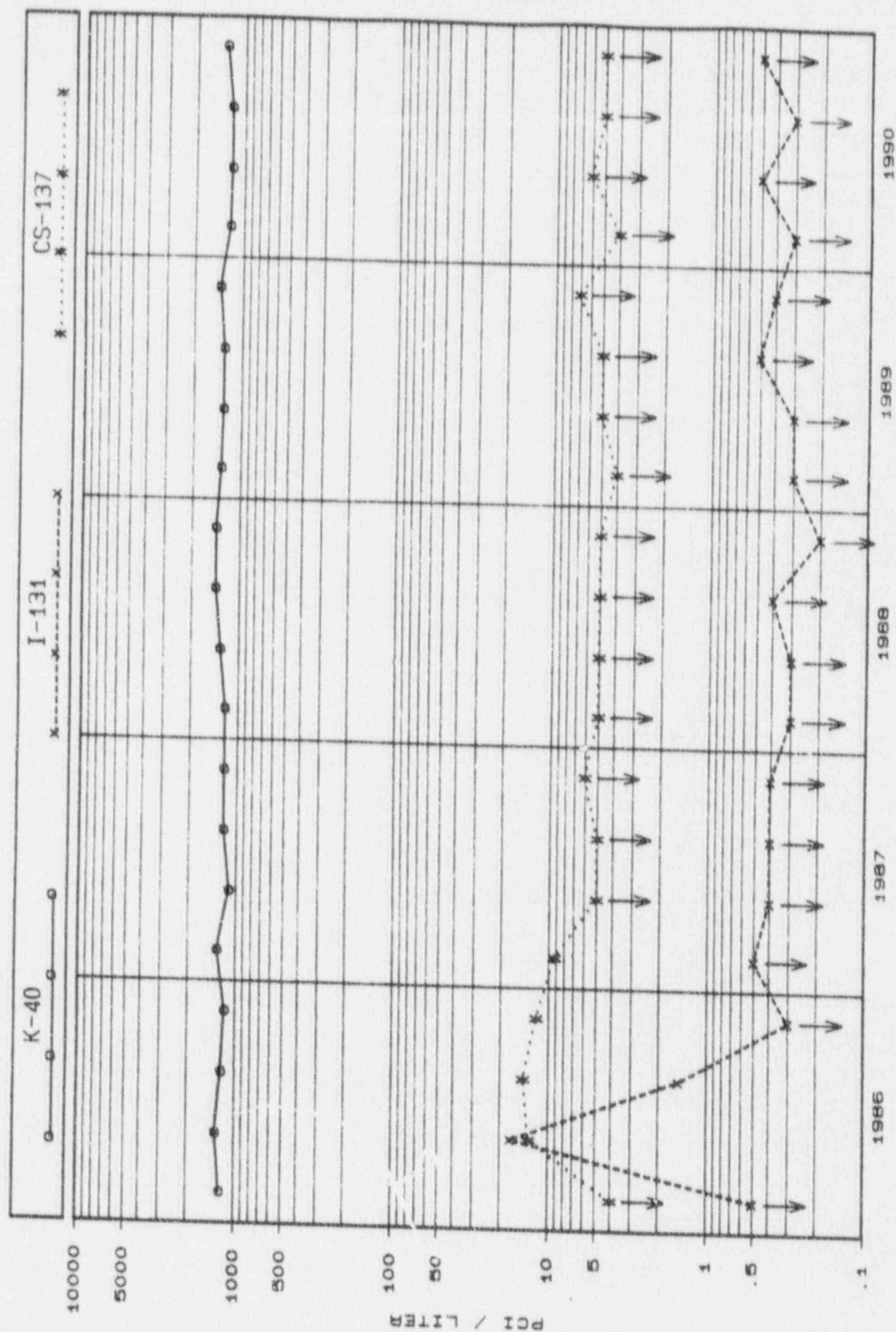
Shown in Figure F-1 and F-2 are the plots of radionuclides monitored from 1977 through 1990 in milk samples from producers nearest the reactor. The levels of K-40, elemental calcium and Sr-90 remained stable. There were no detections of I-131, Sr-89 or Cs-137. This indicates no effect on milk samples from the operations of CNS.



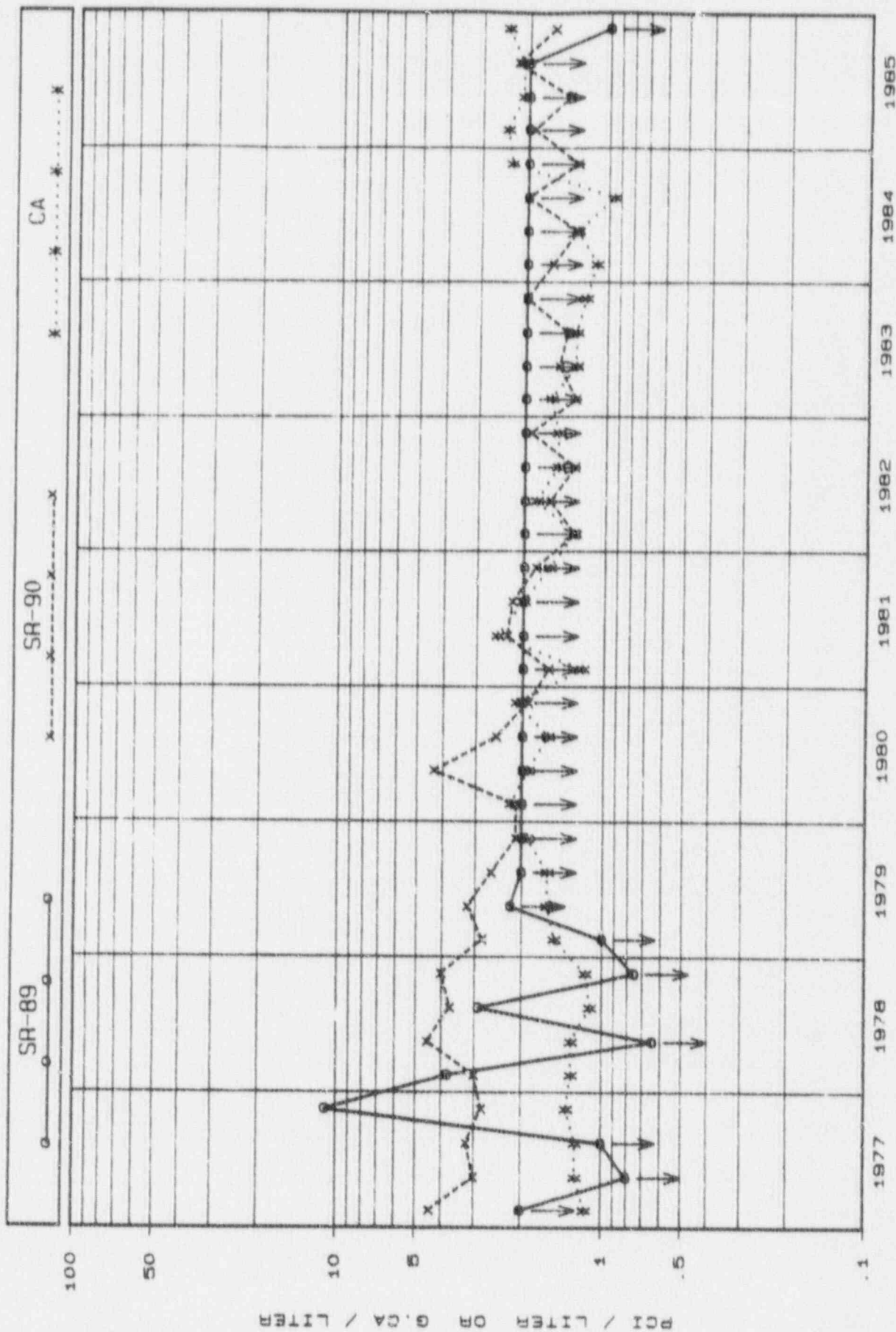


MILK - NEAREST PRODUCER  
 QUARTERLY AVERAGE - STATION 61  
 K-40 I-131 CS-137

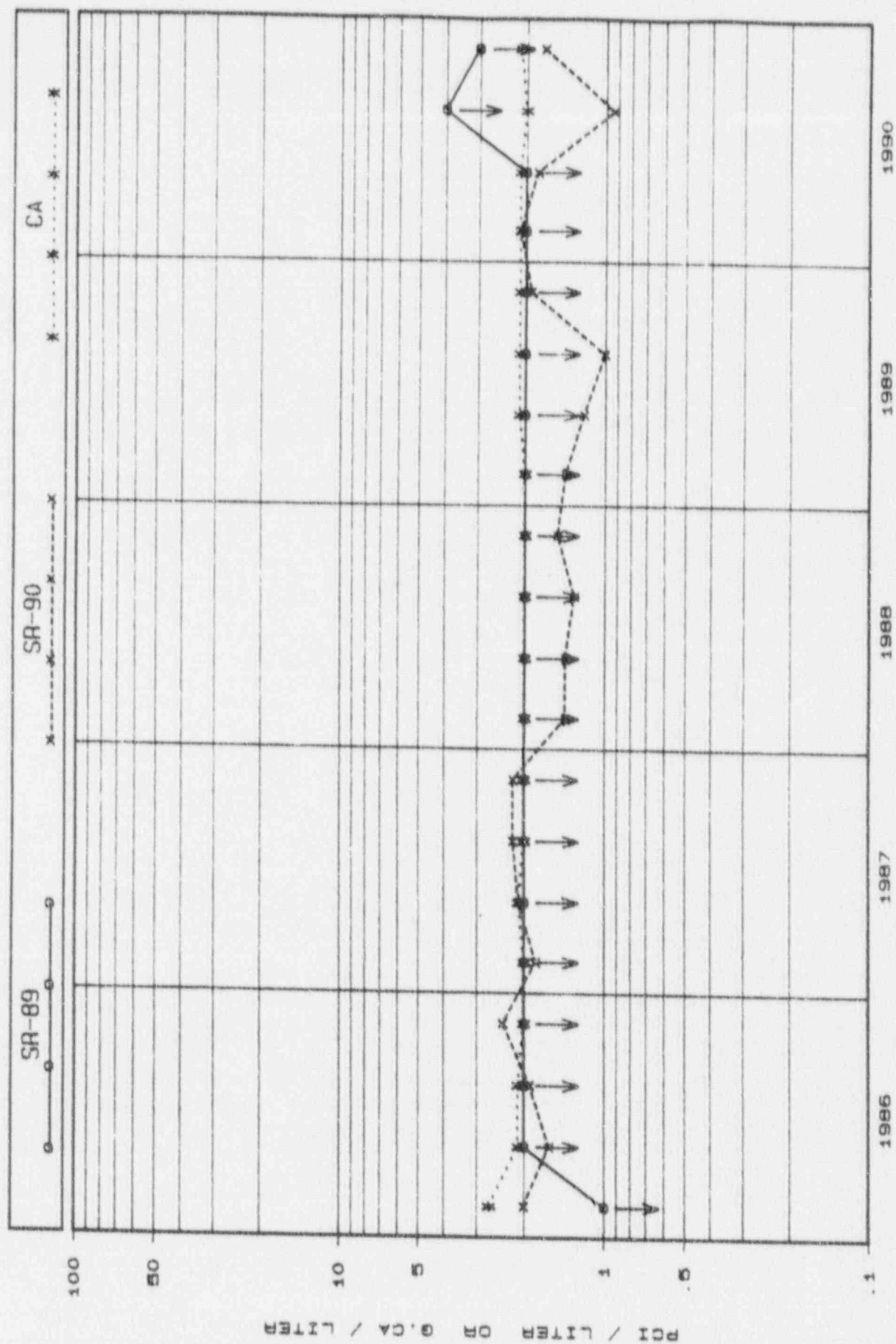




MILK - NEAREST PRODUCER  
QUARTERLY AVERAGE - STATION 61  
K-40 I-131 CS-137



MILK - NEAREST PRODUCER  
 QUARTERLY AVERAGE - STATION 61  
 SR-89 SR-90 ELEM. CA.



MILK - NEAREST PRODUCER  
 QUARTERLY AVERAGE - STATION 61  
 SR-89 SR-90 ELEM. CA.

TABLE F-1

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - INGESTION

MILK - NEAREST PRODUCER - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER 01/02-03/05	SECOND QUARTER 04/02-06/18	THIRD QUARTER 07/02-09/17	FOURTH QUARTER 10/08-12/03
SR-89	61	Meanstd.dev. det./total range	L.T. 2. E 00 0/5 --	L.T. 2. E 00 0/4 --	L.T. 4. E 00 0/3 --	L.T. 3. E 00 0/3 --
SR-90	61	Meanstd.dev. det./total range	2.1 ± 0.8 E 00 5/5 (1.4-3.4)E 00	2.3 ± 1.4 E 00 3/4 (.79-3.4)E 00	9.3 ± 0.2 E-01 2/3 (9.1-9.4)E-01	1.7 ± 0.3 E 00 2/5 (1.5-1.9)E 00
I-131 by chemical separation	61	Meanstd.dev. det./total range	L.T. 3. E-01 0/5 --	L.T. 5. E-01 0/5 --	L.T. 3. E-01 0/7 --	L.T. 5. E-01 0/3 --
Ca mg/liter	61	Meanstd.dev. det./total range	2.1 ± 0.1 E 00 5/5 (2.0-2.1) E 00	2.1 ± 0.2 E 00 4/4 (2.1-2.1)E 00	2.0 ± 0.1 E 00 3/3 (1.9-2.1)E 00	2.1 ± 0.0 E 00 3/3 (2.1-2.1)E 00
K-40	61	Meanstd.dev. det./total range	1.21 ± 0.07E 03 5/5 (1.11-1.30)E 03	1.17±0.04E 03 5/5 (1.11-1.20)E 03	1.20±0.05E 03 7/7 (1.15-1.29)E 03	1.3 ± 0.1 E 03 3/3 (1.2-1.4)E 03
I-131 by gamma spectroscopy	61	Meanstd.dev. det./total range	L.T. 8. E 00 0/5 --	L.T. 1. E 01 0/5 --	L.T. 1. E 01 0/7 --	L.T. 9. E 00 0/3 --
Cs-134	61	Meanstd.dev. det./total range	L.T. 4. E 00 0/5 --	L.T. 5. E 00 0/5 --	L.T. 4. E 00 0/7 --	L.T. 5. E 00 0/3 --
Cs-137	61	Meanstd.dev. det./total range	L.T. 4. E 00 0/5 --	L.T. 6. E 00 0/5 --	L.T. 5. E 00 0/7 --	L.T. 5. E 00 0/3 --



TABLE F-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK - NEAREST PRODUCER - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/02-03/05	SECOND QUARTER 04/02-06/18	THIRD QUARTER 07/16-09/17	FOURTH QUARTER 10/08-12/03
BE-7	61	L.T. 3. E 01 (0/5)	L.T. 4. E 01 (0/5)	L.T. 4. E 01 (0/7)	L.T. 4. E 01 (0/3)
K-40	61	1.21±0.07 E 03 (5/5)	1.17±0.04 E 03 (5/5)	1.20 ± 0.05E 03(7/7)	1.28 ± 0.09E 03(3/3)
Mn-54	61	L.T. 4. E 00 (0/5)	L.T. 5. E 00 (0/5)	L.T. 4. E 00 (0/7)	L.T. 5. E 00 (0/3)
Co-58	61	L.T. 4. E 00 (0/5)	L.T. 5. E 00 (0/5)	L.T. 4. E 00 (0/7)	L.T. 4. E 00 (0/3)
Fe-59	61	L.T. 9. E 00 (0/5)	L.T. 1. E 01 (0/5)	L.T. 1. E 01 (0/7)	L.T. 1. E 01 (0/3)
Co-60	61	L.T. 5. E 00 (0/5)	L.T. 5. E 00 (0/5)	L.T. 4. E 00 (0/7)	L.T. 5. E 00 (0/3)
Zn-65	61	L.T. 9. E 00 (0/5)	L.T. 1. E 01 (0/5)	L.T. 9. E 00 (0/7)	L.T. 1. E 01 (0/3)
Zr-95	61	L.T. 4. E 00 (0/5)	L.T. 5. E 00 (0/5)	L.T. 4. E 00 (0/7)	L.T. 5. E 00 (0/3)
Ru-103	61	L.T. 4. E 00 (0/5)	L.T. 6. E 00 (0/5)	L.T. 5. E 00 (0/7)	L.T. 5. E 00 (0/3)
Ru-106	61	L.T. 3. E 01 (0/5)	L.T. 4. E 01 (0/5)	L.T. 4. E 01 (0/7)	L.T. 4. E 01 (0/3)
I-131	61	L.T. 8. E 00 (0/5)	L.T. 1. E 01 (0/5)	L.T. 1. E 01 (0/7)	L.T. 9. E 00 (0/3)
Cs-134	61	L.T. 4. E 00 (0/5)	L.T. 5. E 00 (0/5)	L.T. 4. E 00 (0/7)	L.T. 5. E 00 (0/3)
Cs-137	61	L.T. 4. E 00 (0/5)	L.T. 6. E 00 (0/5)	L.T. 5. E 00 (0/7)	L.T. 5. E 00 (0/3)
Ba-140	61	L.T. 6. E 00 (0/5)	L.T. 8. E 00 (0/5)	L.T. 7. E 00 (0/7)	L.T. 7. E 00 (0/3)
Ce-141	61	L.T. 8. E 00 (0/5)	L.T. 9. E 00 (0/5)	L.T. 9. E 00 (0/7)	L.T. 9. E 00 (0/3)
Ce-144	61	L.T. 3. E 01 (0/5)	L.T. 4. E 01 (0/5)	L.T. 4. E 01 (0/7)	L.T. 4. E 01 (0/3)
Ra-226	61	L.T. 8. E 01 (0/5)	L.T. 9. E 01 (0/5)	L.T. 1. E 02 (0/7)	L.T. 1. E 02 (0/3)
Th-228	61	L.T. 7. E 00 (0/5)	L.T. 8. E 00 (0/5)	L.T. 8. E 00 (0/7)	L.T. 8. E 00 (0/3)

G. MILK (See Tables G-1, G-2)

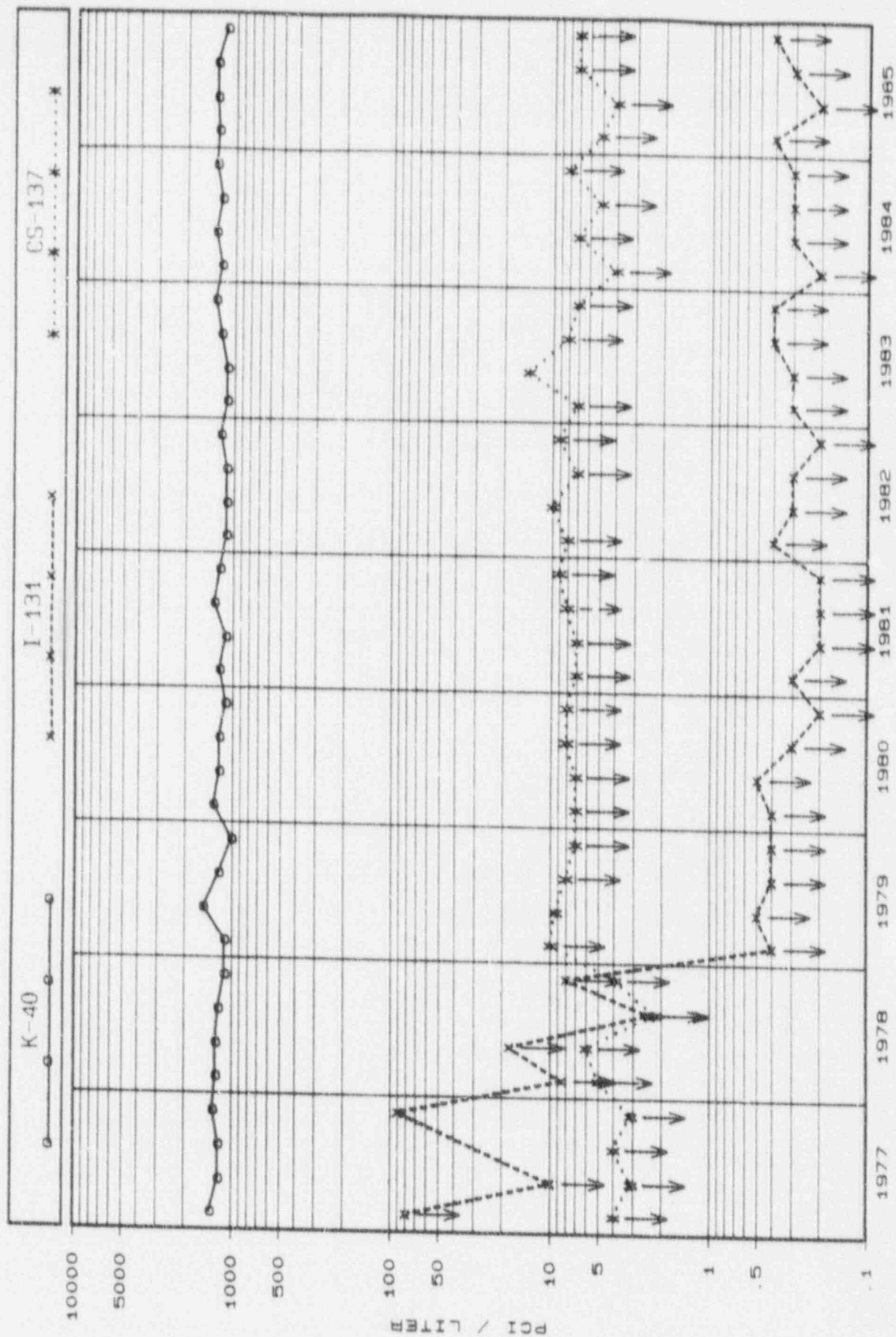
STATIONS 42, 95 (OTHER PRODUCERS)

Milk samples were collected quarterly from other producers within a ten mile radius of the plant. The samples were analyzed for I-131 by chemical separation, for elemental calcium, for Sr-89 and 90 and for gamma emitting isotopes. There were no detections of I-131 in the eight samples monitored.

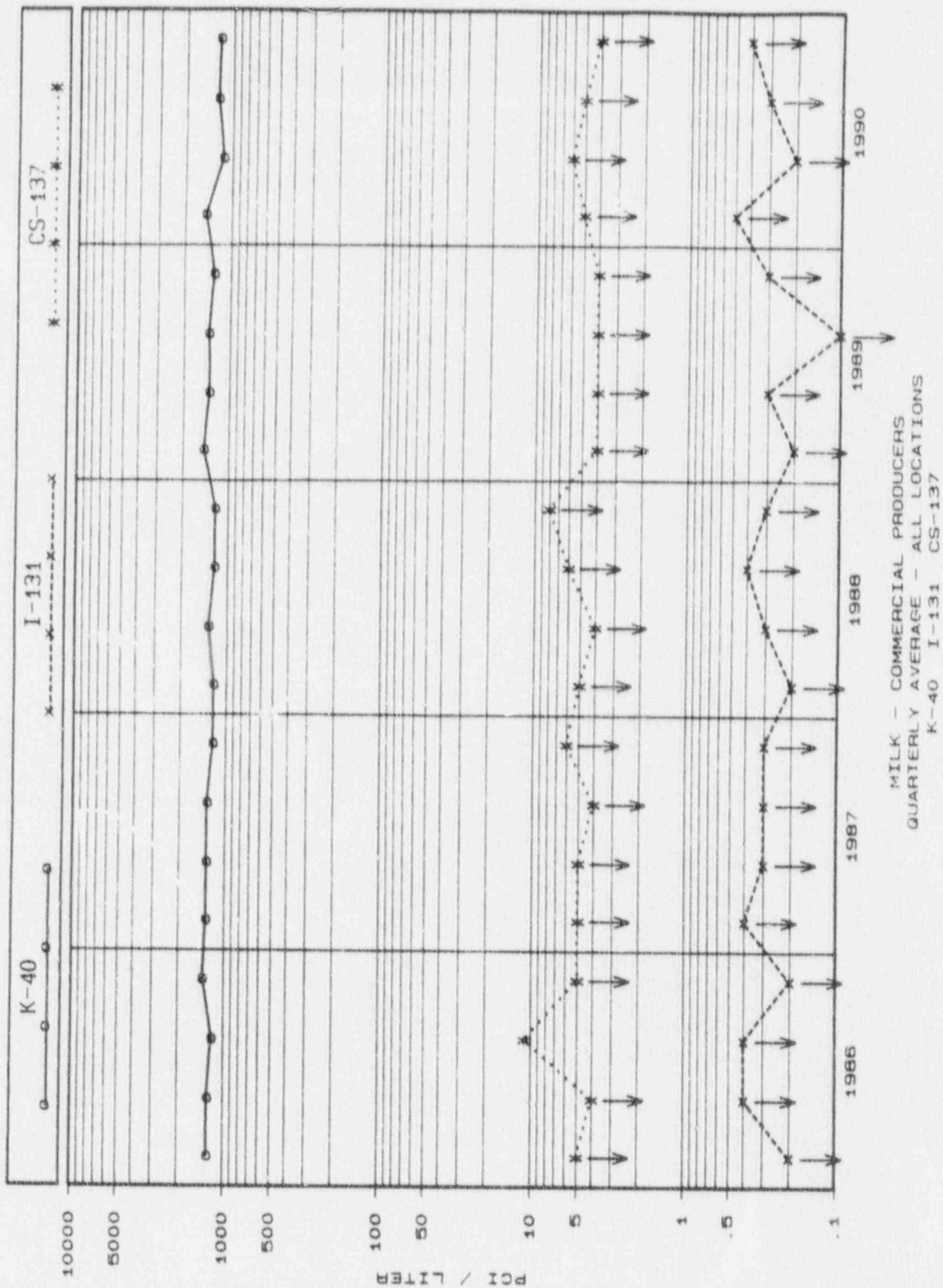
There were no detections of Sr-89. Strontium-90 was found at an average level of 1.6 pCi/liter. There were 2.1 mg of calcium per liter of milk. Potassium-40 was detected at an average level of 1260. pCi/liter. The strontium-90, K-40 and elemental calcium were at normal environmental levels and were similar to the results obtained from analyses of milk from the nearest producer. There were no detections of Cs-137 in the samples collected. It can be concluded that the operations of CNS had no effect on milk samples and thus no dose impact on the population.

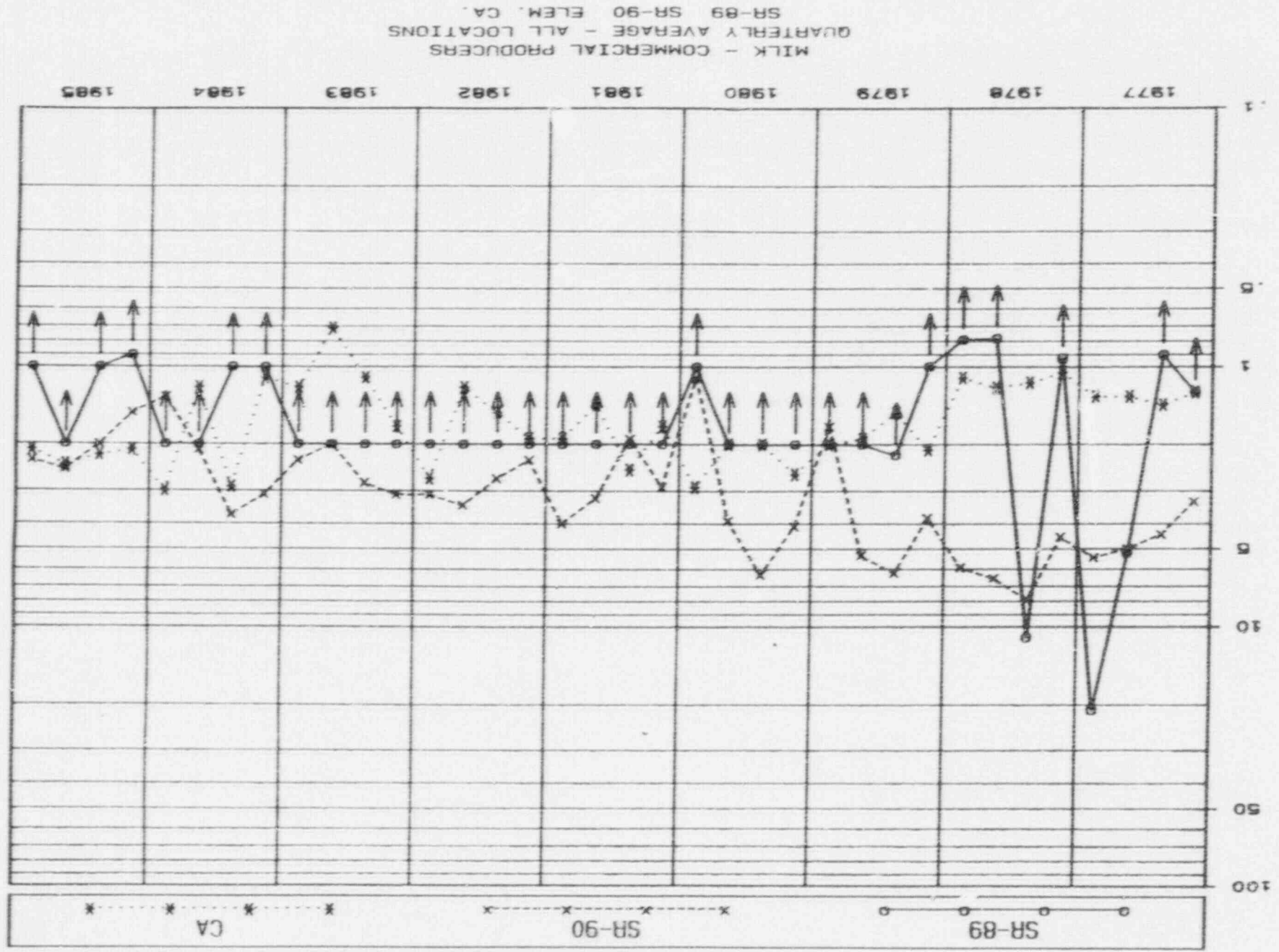
The levels of radioactivities or the nuclides K-40, I-131 and Cs-137 are plotted on Figure G-1. Potassium-40 was at normal environmental levels as in previous years. There were no detections of I-131 or Cs-137. Figure G-2 shows that Sr-90 and elemental calcium are at a level comparable to previous years and there were no detections of Sr-89. These graphs indicate that there was no appreciable difference between the levels of activity of the nearest producer and the commercial producers. This indicated no effect on milk samples from the operations of CNS.

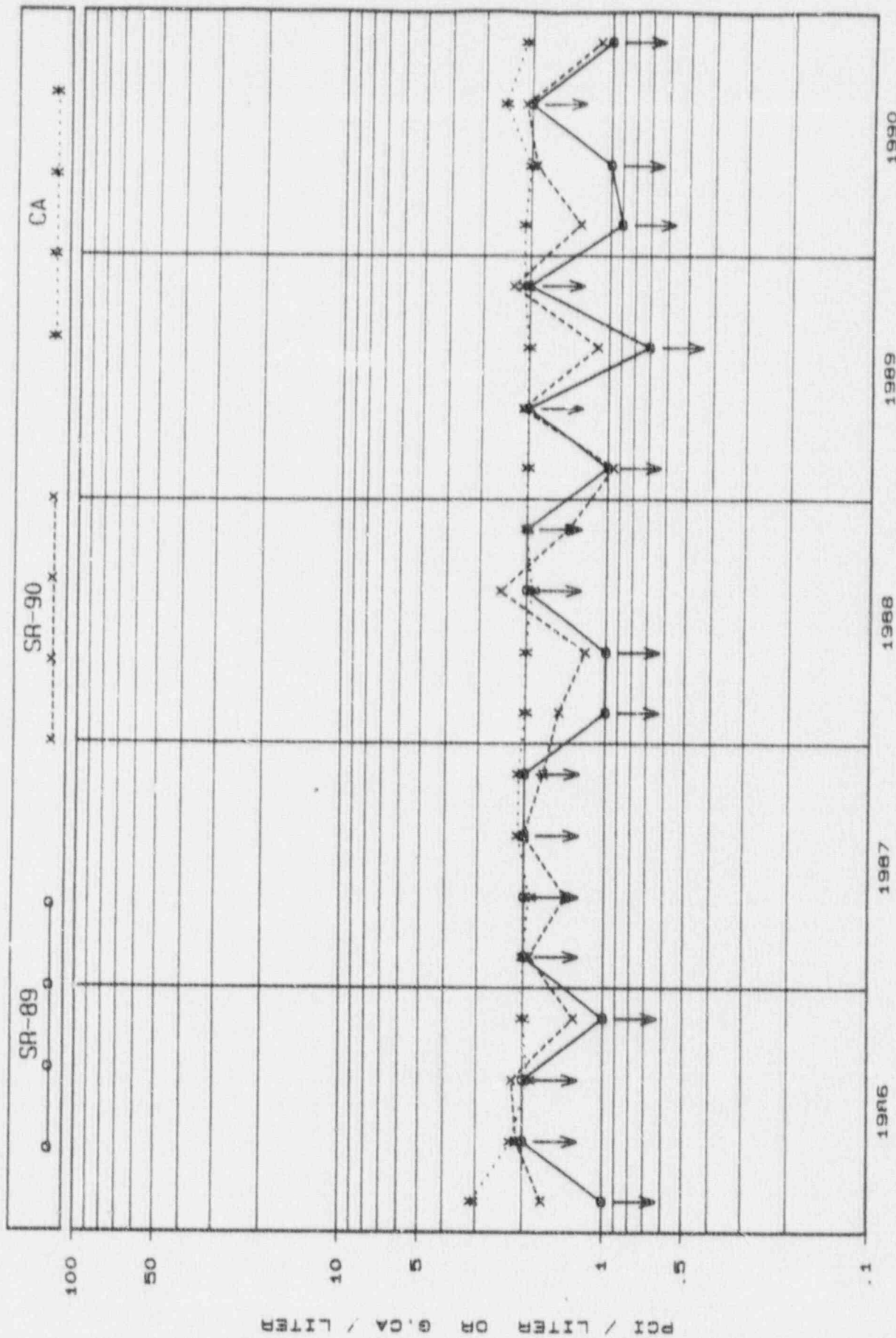




MILK - COMMERCIAL PRODUCERS  
QUARTERLY AVERAGE - ALL LOCATIONS  
K-40 I-131 CS-137







MILK - COMMERCIAL PRODUCERS  
 QUARTERLY AVERAGE - ALL LOCATIONS  
 SR-89 SR-90 ELEM. CA.



TABLE C-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK - OTHER PRODUCERS - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER 01/09	SECOND QUARTER 04/09	THIRD QUARTER 07/09	FOURTH QUARTER 10/08
SR-89	42, 95	Meanstd.dev. det./total range	L.T. 9. E-01 0/2 --	L.T. 1. E 00 0/2 --	L.T. 2. E 00 0/2 --	L.T. 1. E 00 0/2 --
SR-90	42, 95	Meanstd.dev. det./total range	1.3 ± 0.7 E 00 1/2 --	1.9 ± 0.02 E 00 2/2 (1.87-1.9)E 00	2.1 ± 1.7 E 00 2/2 (0.9-3.3)E 00	1.1 ± 0.1 E 00 2/2 (1.0-1.1) E 00
I-131 (by chemical separation)	42, 95	Meanstd.dev. det./total range	L.T. 5. E-01 0/2 --	L.T. 2. E-01 0/2 --	L.T. 3. E-01 0/2 --	L.T. 4. E-01 0/2 --
Ca mg/liter	42, 95	Meanstd.dev. det./total range	2.1 ± 0.1 E 00 2/2 --	2.0 ± 0.2 E 00 2/2 (2.0-2.0)E 00	2.5 ± 0.6 E 00 2/2 (2.1-2.9)E 00	2.1 ± 0.0 E 00 2/2 (2.1-2.1)E 00
K-40	42, 95	Meanstd.dev. det./total range	1.45 ± 0.7E 03 2/2 (1.40-1.50)E 03	1.13 ± 0.1 E 03 2/2 (1.1 -1.2)E 03	1.23±0.06E 03 2/2 (1.2-1.3)E 03	1.2 ±0.1 E 03 2/2 (1.2-1.3)E 03
I-131 (by gamma spectroscopy)	42, 95	Meanstd.dev. det./total range	L.T. 6. E 00 0/2 --	L.T. 1. E 01 0/2 --	L.T. 6. E 00 0/2 --	L.T. 1. E 01 0/2 --
Cs-137	42, 95	Meanstd.dev. det./total range	L.T. 5. E 00 0/2 --	L.T. 6. E 00 0/2 --	L.T. 5. E 00 0/2 --	L.T. 4. E 00 0/2 --

TABLE C-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK - OTHER PRODUCERS - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/09	SECOND QUARTER 04/09	THIRD QUARTER 07/09	FOURTH QUARTER 10/08
BE-7	42, 95	L.T. 4. E 01 (0/2)	L.T. 5. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 3. E 01 (0/2)
K-40	42, 95	1.45±0.07 E 03 (2/2)	1.13±0.1 E 03 (2/2)	1.33±0.06 E 03 (2/2)	1.23 ± 0.08E 03 (2/2)
Mn-54	42, 95	L.T. 4. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 3. E 00 (0/2)
Co-58	42, 95	L.T. 4. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Fe-59	42, 95	L.T. 9. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 1. E 01 (0/2)	L.T. 9. E 00 (0/2)
Co-60	42, 95	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Zn-65	42, 95	L.T. 1. E 01 (0/2)	L.T. 1. E 01 (0/2)	L.T. 1. E 01 (0/2)	L.T. 9. E 00 (0/2)
Zr-95	42, 95	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Ru-103	42, 95	L.T. 5. E 00 (0/2)	L.T. 6. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Ru-106	42, 95	L.T. 4. E 01 (0/2)	L.T. 5. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 3. E 01 (0/2)
I-131	42, 95	L.T. 6. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 6. E 00 (0/2)	L.T. 1. E 01 (0/2)
Cs-134	42, 95	L.T. 5. E 00 (0/2)	L.T. 6. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Cs-137	42, 95	L.T. 5. E 00 (0/2)	L.T. 6. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Ba-140	42, 95	L.T. 5. E 00 (0/2)	L.T. 9. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 7. E 00 (0/2)
Ce-141	42, 95	L.T. 8. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 8. E 00 (0/2)	L.T. 8. E 00 (0/2)
Ce-144	42, 95	L.T. 3. E 01 (0/2)	L.T. 5. E 01 (0/2)	L.T. 3. E 01 (0/2)	L.T. 3. E 01 (0/2)
Ra-226	42, 95	L.T. 9. E 01 (0/2)	L.T. 1. E 02 (0/2)	L.T. 9. E 01 (0/2)	L.T. 8. E 01 (0/2)
Th-228	42, 95	L.T. 8. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 8. E 00 (0/2)	L.T. 7. E 00 (0/2)



H. GROUNDWATER (See Tables H-1 and H-2)

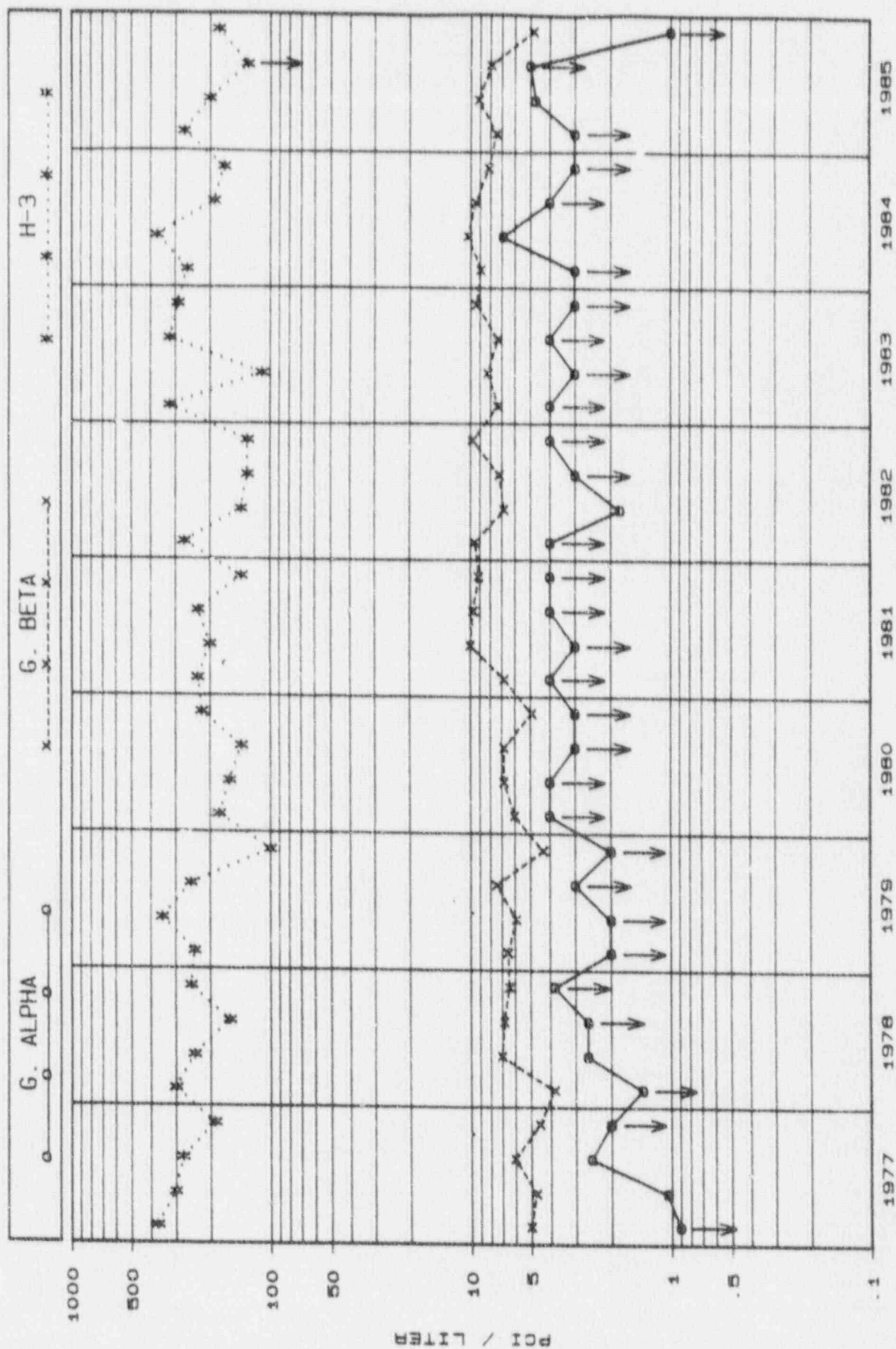
STATIONS 11, 47

Groundwater was collected from two stations quarterly and analyzed for gross beta and gross alpha activity, for tritium and for gamma emitting radionuclides. Station 11 is 0.15 miles from the plant and station 47 is 25.75 miles from the plant.

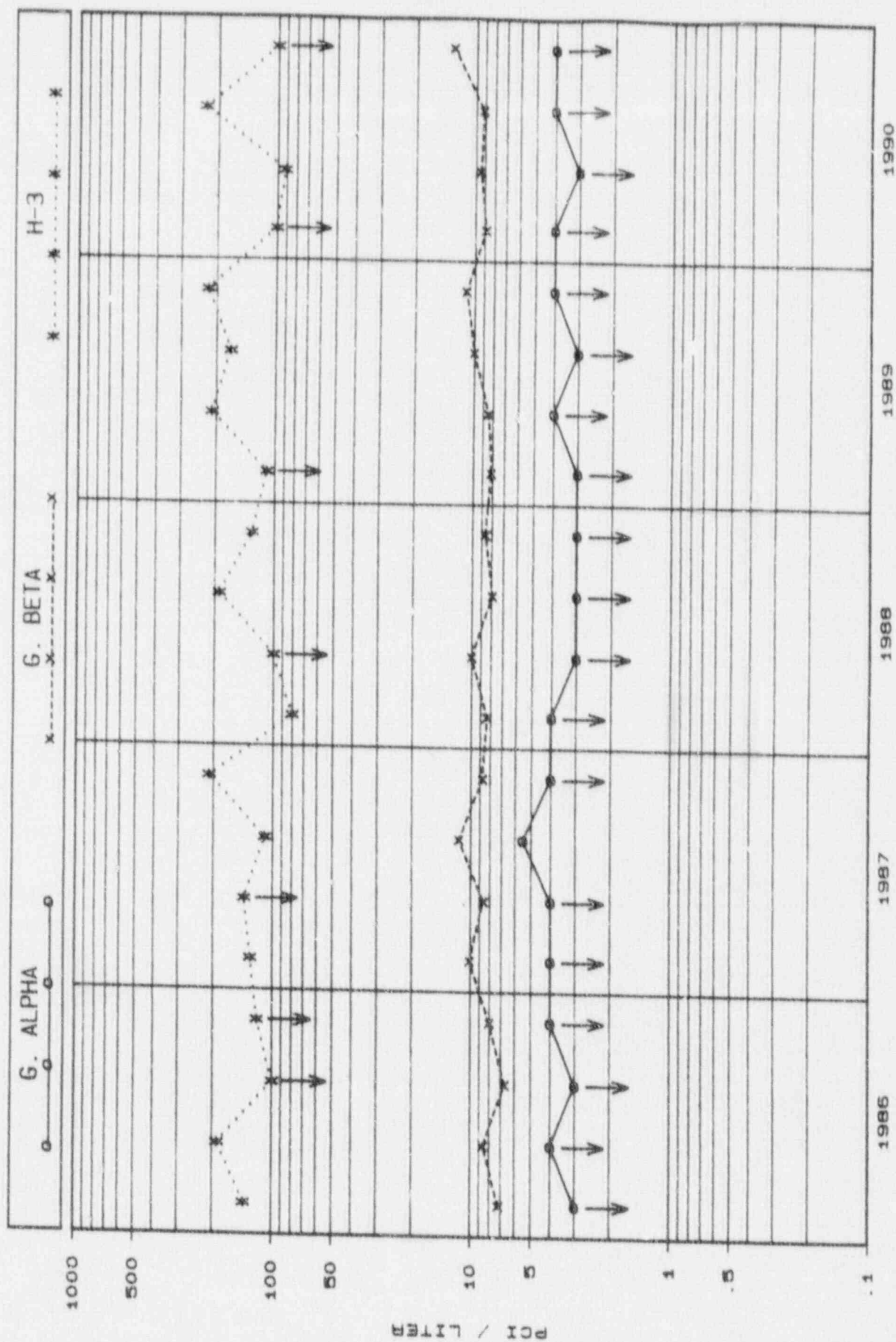
The gross beta activity averaged 9.9 pCi/liter which is statistically similar to past years. There were no detections of alpha activity in any of the samples collected. There were no detections of gamma emitters above the normal level of detection. The tritium level averaged 160 pCi/liter for the year which is the normal environmental level.

There was no difference in levels of beta activity or tritium for the station close to the plant as compared with the more distant station. It may be concluded that there was no impact from the operations of CNS on the environment as shown by measurements of radionuclides in groundwater.

Shown in Figure I-1 are the gross alpha, gross beta and tritium levels in groundwater. The levels of these activities have remained essentially unchanged.



GROUND WATER  
QUARTERLY AVERAGE - ALL LOCATIONS  
GROSS ALPHA GROSS BETA H-3



GROUND WATER  
QUARTERLY AVERAGE - ALL LOCATIONS  
GROSS ALPHA GROSS BETA H-3

TABLE H-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
GROUNDWATER - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER 01/15-03/05	SECOND QUARTER 04/16	THIRD QUARTER 07/16	FOURTH QUARTER 10/15
GROSS ALPHA	11, 47	Meanistd.dev. det./total range	L.T. 4. E 00 0/2 --	L.T. 3. E 00 0/2 --	L.T. 4. E 00 0/2 --	L.T. 4. E 00 0/2 --
GROSS BETA	11, 47	Meanistd.dev. det./total range	8.8 ± 3.1 E 00 2/2 (6.6-11) E 00	9.4 ± 0.6 E 00 2/2 (9.0-9.8) E 00	9.1 ± 0.8 E 00 2/2 (8.5-9.6) E 00	1.3 ± 0.4 E 01 2/2 (1.0 ± 1.5)E 01
K-40	11, 47	Meanistd.dev. det./total range	L.T. 6. E 01 0/2 --	L.T. 1. E 02 0/2 --	L.T. 8. E 01 0/2 --	L.T. 6. E 01 0/2 --
I-131 (by gamma spectroscopy)	11, 47	Meanistd.dev. det./total range	L.T. 7. E 00 0/2 --	L.T. 1. E 01 0/2 --	L.T. 1. E 01 0/2 --	L.T. 1. E 01 0/2 --
Cs-137	11, 47	Meanistd.dev. det./total range	L.T. 3. E 00 0/2 --	L.T. 5. E 00 0/2 --	L.T. 5. E 00 0/2 --	L.T. 4. E 00 0/2 --
H-3	11, 47	Meanistd.dev. det./total range	L.T. 1. E 02 0/2 --	9.1 ± 4.1 E 01 1/2 --	2.3 ± 1.1 E 02 1/2 --	L.T. 1. E 02 0/2 --



TABLE H-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
GROUNDWATER - PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/15	SECOND QUARTER 04/16	THIRD QUARTER 07/16	FOURTH QUARTER 10/15
BE-7	11, 47	L.T. 3. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 3. E 01 (0/2)
K-40	11, 47	L.T. 6. E 01 (0/2)	L.T. 1. E 02 (0/2)	L.T. 8. E 01 (0/2)	L.T. 6. E 01 (0/2)
Mn-54	11, 47	L.T. 3. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 3. E 00 (0/2)
Co-58	11, 47	L.T. 3. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 4. E 00 (0/2)
Fe-59	11, 47	L.T. 7. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 8. E 00 (0/2)	L.T. 8. E 00 (0/2)
Co-60	11, 47	L.T. 3. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 4. E 00 (0/2)
Zn-65	11, 47	L.T. 7. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 8. E 00 (0/2)	L.T. 7. E 00 (0/2)
Zr-95	11, 47	L.T. 4. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)	L.T. 3. E 00 (0/2)
Ru-103	11, 47	L.T. 4. E 00 (0/2)	L.T. 6. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Ru-106	11, 47	L.T. 3. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 4. E 01 (0/2)	L.T. 3. E 01 (0/2)
I-131	11, 47	L.T. 7. E 00 (0/2)	L.T. 1. E 01 (0/2)	L.T. 1. E 01 (0/2)	L.T. 1. E 01 (0/2)
Cs-134	11, 47	L.T. 3. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Cs-137	11, 47	L.T. 3. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 5. E 00 (0/2)	L.T. 4. E 00 (0/2)
Ba-140	11, 47	L.T. 5. E 00 (0/2)	L.T. 7. E 00 (0/2)	L.T. 8. E 00 (0/2)	L.T. 7. E 00 (0/2)
Ce-141	11, 47	L.T. 7. E 00 (0/2)	L.T. 9. E 00 (0/2)	L.T. 9. E 00 (0/2)	L.T. 9. E 00 (0/2)
Ce-144	11, 47	L.T. 3. E 01 (0/2)	L.T. 3. E 01 (0/2)	L.T. 4. E 00 (0/2)	L.T. 3. E 01 (0/2)
Ra-226	11, 47	L.T. 8. E 01 (0/2)	L.T. 9. E 01 (0/2)	L.T. 6. E 01 (0/2)	L.T. 8. E 01 (0/2)
Th-228	11, 47	L.T. 7. E 00 (0/2)	L.T. 8. E 00 (0/2)	L.T. 8. E 00 (0/2)	L.T. 7. E 00 (0/2)

I. RIVER WATER (See Table I-1 and I-2)

STATIONS 12,28

River water was collected monthly and monitored for gross beta and gross alpha, suspended and dissolved, Sr-89 and Sr-90 plus gamma emitting isotopes. A quarterly composite was measured for tritium.

There was one detection of potassium-40 (58.20 pCi/l) above the normal level of detection. There were no detections of Sr-89 or Sr-90.

The average gross alpha and gross beta readings were similar to previous years as indicated in the summary of 1989 and 1990 averages below:

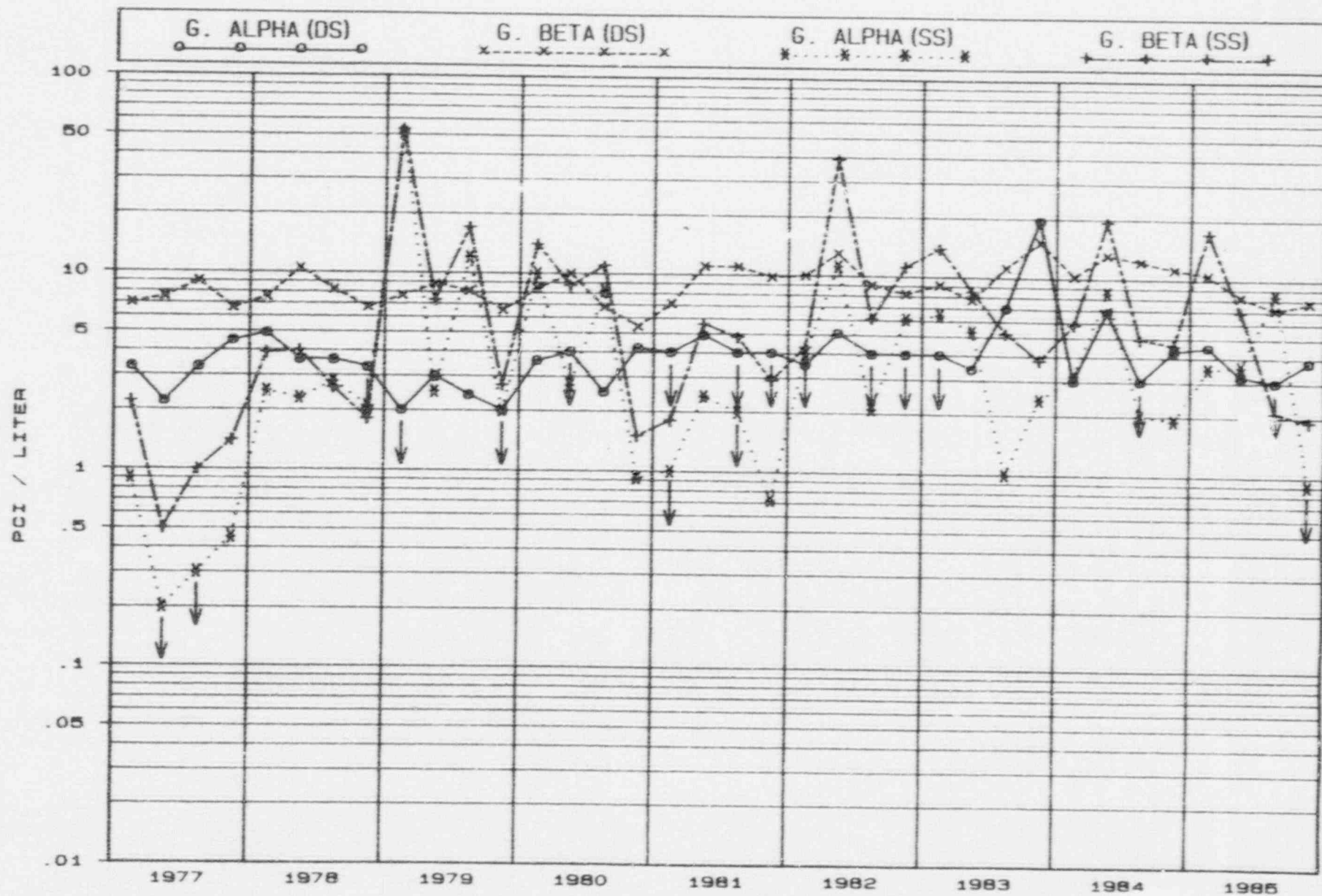
	1989 Average pCi/liter	1990 Average pCi/liter
Gross Alpha (dissolved)	5.0	<4.0 (a)
Gross Alpha (suspended)	3.5	3.3
Gross Beta (dissolved)	11.5	10.4
Gross Beta (suspended)	9.5	7.3

Seasonal variations are reflected in the gross alpha and beta results. Changing weather conditions and flooding activity is responsible for the rise in suspended particles in the second quarter.

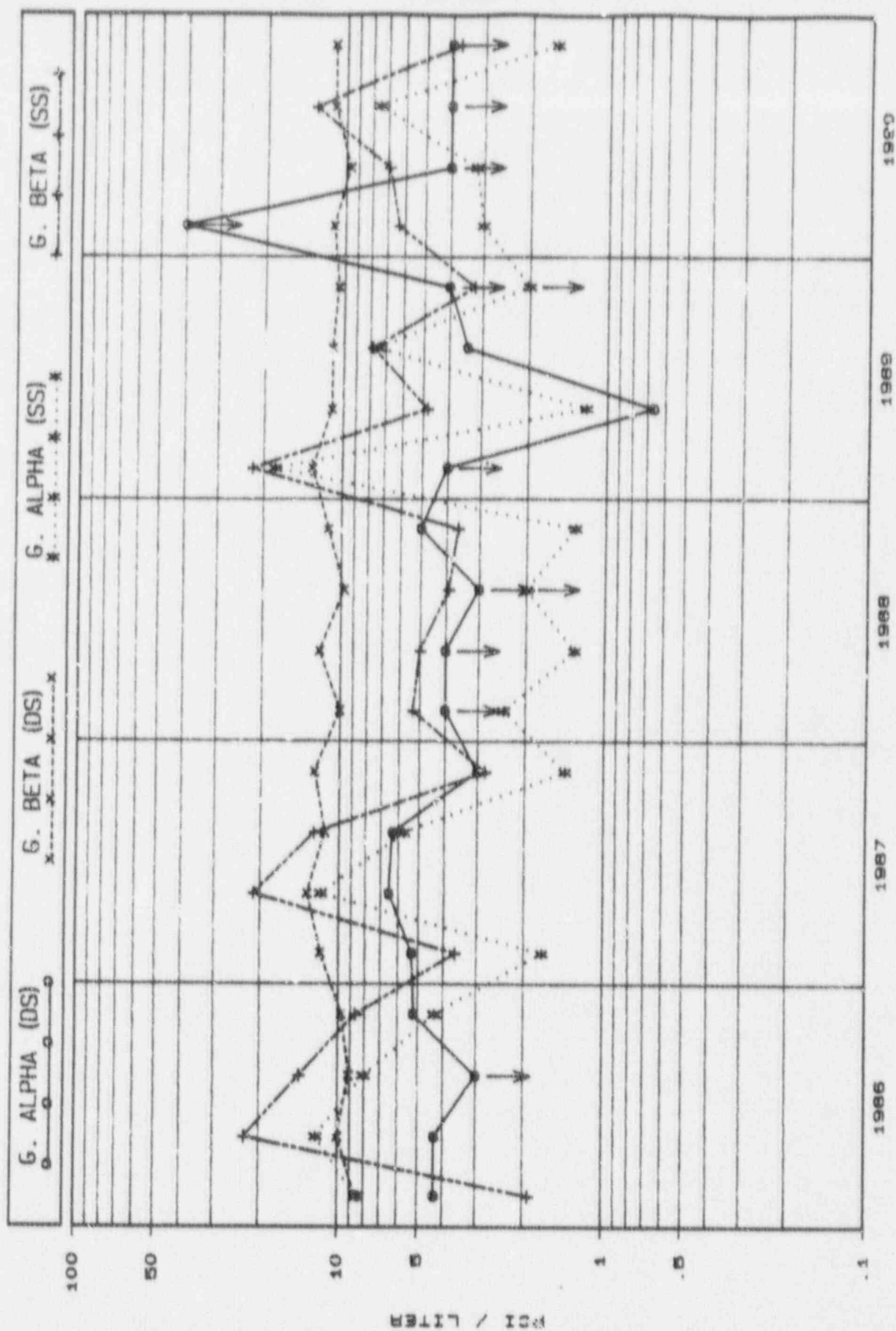
Figure I-1, which follows, is a plot of the gross alpha and gross beta of suspended and dissolved particles. The results for 1986 through 1990 are on the second page. The levels of activity continued to rise and fall within statistical limits depending on water levels and turbulence and were probably due to naturally occurring isotopes. No fission or reactor activation products were detected. Figure I-2 illustrates the level of activity for tritium, Sr-89 and Sr-90.

- (a) Two gross alpha LLDs were 30 and 40 pCi/l. The LLDs were high because sodium bisulfite was inadvertently added to the samples.

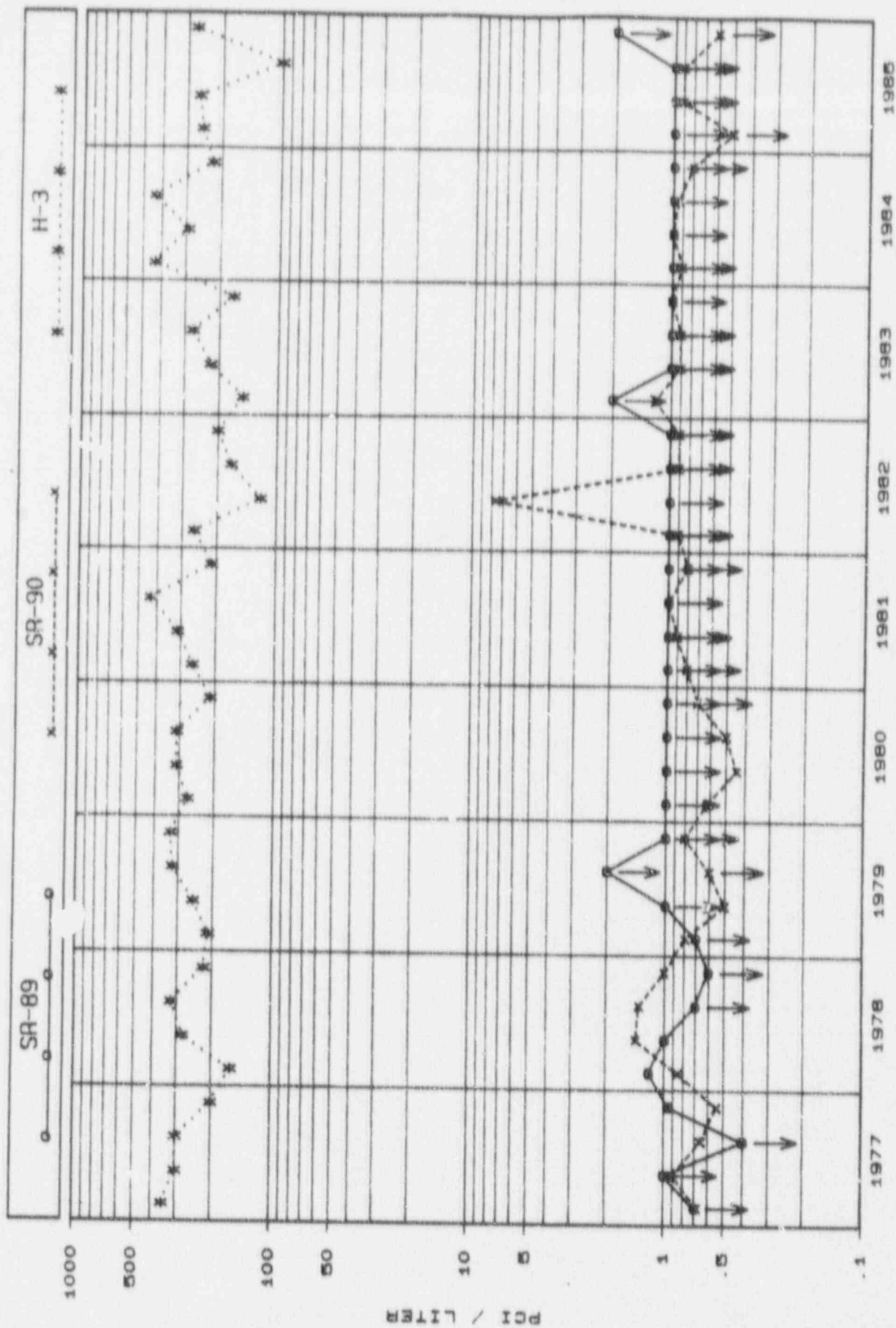




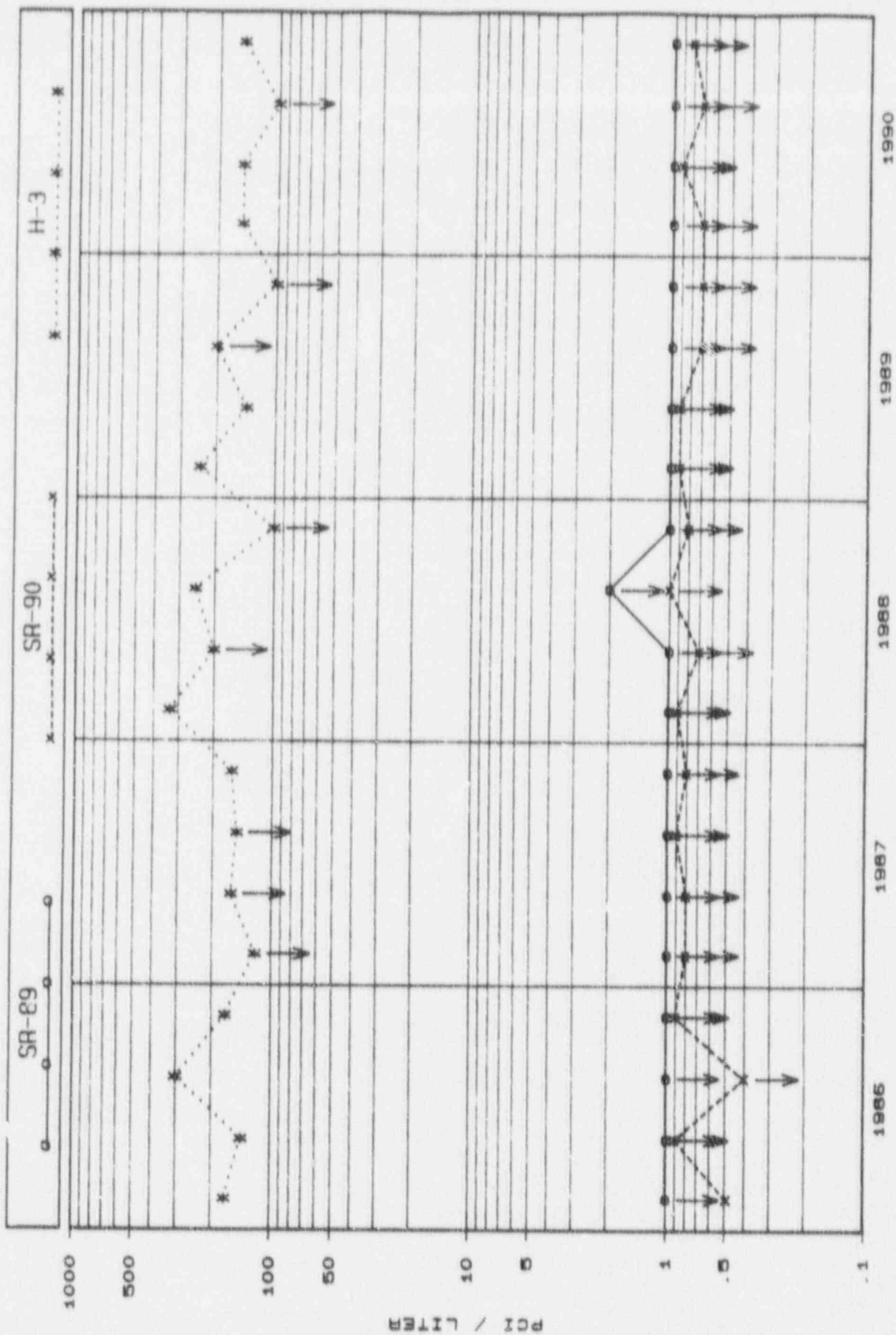
RIVER WATER  
 QUARTERLY AVERAGE - ALL LOCATIONS  
 GROSS ALPHA AND GROSS BETA (SUSPENDED AND DISSOLVED SOLIDS)



RIVER WATER  
 QUARTERLY AVERAGE - ALL LOCATIONS  
 GROSS ALPHA AND GROSS BETA (SUSPENDED AND DISSOLVED SOLIDS)



RIVER WATER  
QUARTERLY AVERAGE - ALL LOCATIONS  
SR-89 SR-90 H-3



RIVER WATER  
QUARTERLY AVERAGE - ALL LOCATIONS  
SR-89 SR-90 H-3

TABLE I-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - RIVER  
PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER		FIRST QUARTER 01/15-03/12	SECOND QUARTER 04/09-06/11	THIRD QUARTER 07/10-09/11	FOURTH QUARTER 10/08-12/10
GROSS ALPHA (dissolved)	12, 28	Mean/std.dev. det./total range	L.T. 4. E 01 0/6 —	L.T. 4. E 00 0/6 —	L.T. 4. E 00 0/6 —	L.T. 4. E 00 0/6 —
GROSS ALPHA (suspended)	12, 28	Mean/std.dev. det./total range	3.0 ± 0.8 E 00 3/6 (2.5-3.9) E 00	3.2 ± 0.7 E 00 2/6 (2.7-3.7) E 00	7.5 ± 1.1 E 00 2/6 (6.7-8.3) E 00	1.6 ± 0.3 E 00 4/6 (1.3-2.0) E 00
GROSS BETA (dissolved)	12, 28	Mean/std.dev. det./total range	11 ± 1.7 E 00 4/6 (9.5-13) E 00	(9.6 ± 3.0) E 00 6/6 (3.5-11) E 00	11 ± 1.1 E 00 6/6 (9.5-12) E 00	1.1 ± 0.1 E 01 6/6 (0.95-1.2) E 01
GROSS BETA (suspended)	12, 28	Mean/std.dev. det./total range	6.3 ± 4.5 E 00 6/6 (1.1-12) E 00	(6.9 ± 3.3) E 00 6/6 (3.9-11) E 00	13 ± 11 E 00 6/6 (2.4-29) E 00	3.7 ± 1.2 E 00 6/6 (1.9-5.5) E 00
Sr-89	12, 28	Mean/std.dev. det./total range	L.T. 1. E 00 0/6 —	L.T. 1. E 00 0/6 —	L.T. 1. E 00 0/6 —	L.T. 1. E 00 0/6 —
Sr-90	12, 28	Mean/std.dev. det./total range	L.T. 7. E-01 0/6 —	L.T. 9. E-01 0/6 —	L.T. 7. E-01 0/6 —	L.T. 8. E-01 0/6 —
H-3 (a)	12, 28	Mean/std.dev. det./total range	1.5 ± 0.4 E 02 2/2 (1.2-1.7) E 02	1.5 ± 0.9 E 02 1/2 —	L.T. 1. E 02 0/2 —	1.5 ± 0.9 E 02 1/2 —
I-131 (by gamma spectroscopy)	12, 28	Mean/std.dev. det./total range	L.T. 8. E 00 0/6 —	L.T. 1. E 01 0/6 —	L.T. 8. E 00 0/6 —	L.T. 1. E 01 0/6 —
Cs-137	12, 28	Mean/std.dev. det./total range	L.T. 4. E 00 0/6 —	L.T. 5. E 00 0/6 —	L.T. 4. E 00 0/6 —	L.T. 5. E 00 0/6 —

(a) Tritium analysis is performed on the quarterly composite of each station only.

TABLE I-2

## 1996 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - WATERBORNE

WATER - RIVER

PCI/LITER

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/15-03/12	SECOND QUARTER 04/09-06/11	THIRD QUARTER 07/10-09/11	FOURTH QUARTER 10/08-12/10
BE-7	12, 28	L.T. 3. E 01 (0/6)	L.T. 4. E 01 (0/6)	L.T. 4. E 01 (0/6)	L.T. 4. E 01 (0/6)
K-40	12, 28	L.T. 6. E 01 (0/6)	L.T. 1. E 02 (0/6)	5.82±2.74 E 01 (1/6)	L.T. 1. E 02 (0/6)
Mn-54	12, 28	L.T. 3. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 4. E 00 (0/6)
Co-58	12, 28	L.T. 3. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 4. E 00 (0/6)
Fe-59	12, 28	L.T. 6. E 00 (0/6)	L.T. 1. E 01 (0/6)	L.T. 9. E 00 (0/6)	L.T. 9. E 00 (0/6)
Co-60	12, 28	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 4. E 00 (0/6)
Zn-65	12, 28	L.T. 7. E 00 (0/6)	L.T. 1. E 01 (0/6)	L.T. 9. E 00 (0/6)	L.T. 1. E 01 (0/6)
Zr-95	12, 28	L.T. 3. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)
Ru-103	12, 28	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 5. E 00 (0/6)
Ru-106	12, 28	L.T. 3. E 01 (0/6)	L.T. 4. E 01 (0/6)	L.T. 3. E 01 (0/6)	L.T. 4. E 01 (0/6)
I-131	12, 28	L.T. 8. E 00 (0/6)	L.T. 1. E 01 (0/6)	L.T. 8. E 00 (0/6)	L.T. 1. E 01 (0/6)
Cs-134	12, 28	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 4. E 00 (0/6)
Cs-137	12, 28	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)	L.T. 4. E 00 (0/6)	L.T. 5. E 00 (0/6)
Ba-140	12, 28	L.T. 6. E 00 (0/6)	L.T. 7. E 00 (0/6)	L.T. 6. E 00 (0/6)	L.T. 8. E 00 (0/6)
Ce-141	12, 28	L.T. 7. E 00 (0/6)	L.T. 9. E 00 (0/6)	L.T. 9. E 00 (0/6)	L.T. 1. E 01 (0/6)
Ce-144	12, 28	L.T. 3. E 01 (0/6)	L.T. 4. E 01 (0/6)	L.T. 4. E 01 (0/6)	L.T. 4. E 01 (0/6)
Pb-226	12, 28	L.T. 8. E 01 (0/6)	L.T. 1. E 02 (0/6)	L.T. 1. E 02 (0/6)	L.T. 1. E 02 (0/6)
Th-228	12, 28	L.T. 6. E 00 (0/6)	L.T. 8. E 00 (0/6)	L.T. 8. E 00 (0/6)	L.T. 8. E 00 (0/6)



J. AMBIENT RADIATION - THERMOLUMINESCENT DOSIMETERS (TLDs - SEE TABLES J-1 AND J-2)

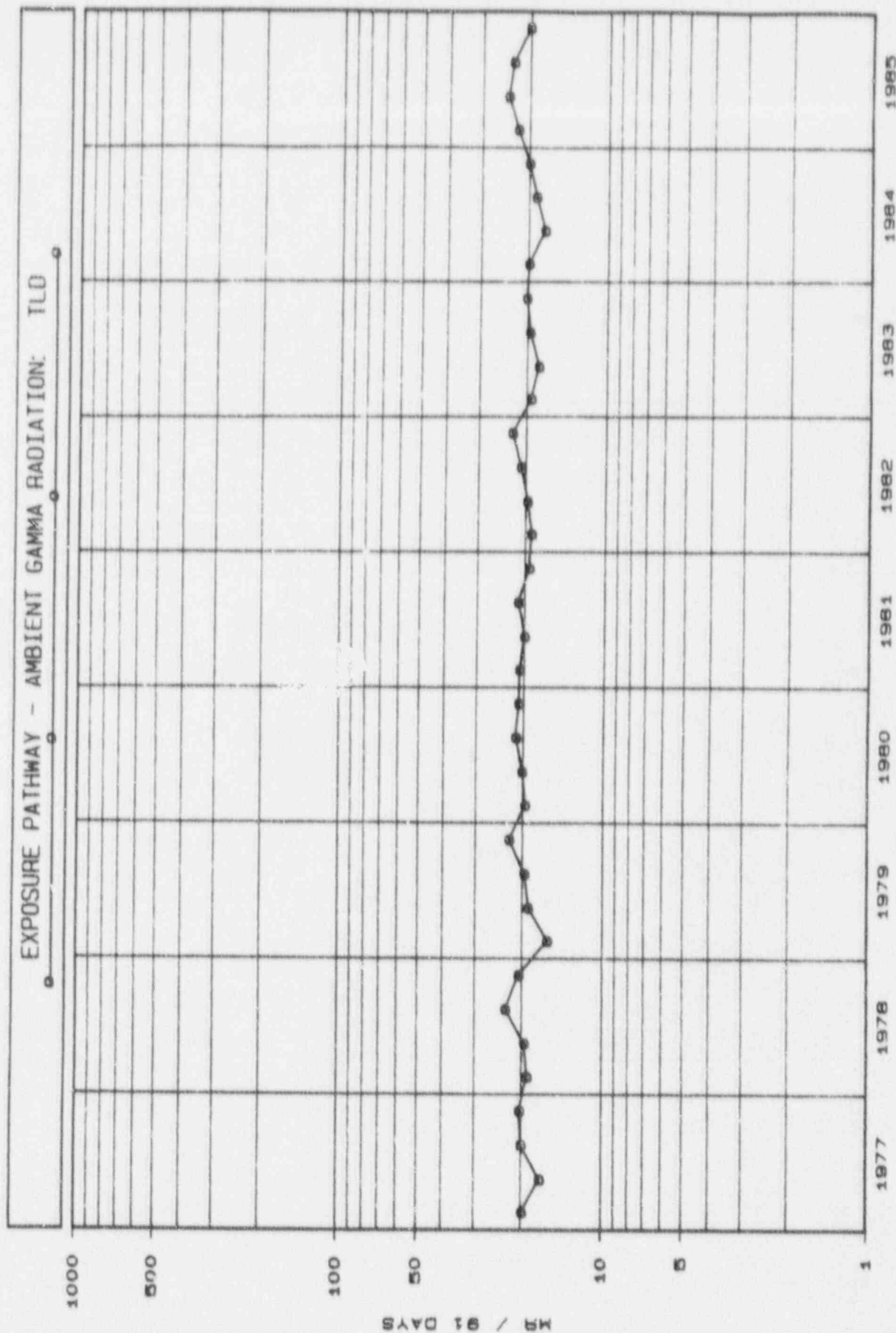
STATIONS 01-10,20,44,56,58,59,66,67,71,79-91,94

Ambient radiation was monitored at 32 locations within a 10 mile radius of CNS and collected quarterly. The quarterly averages for all stations of ambient net gamma radiation ranged from 13.6 milliRoentgen/quarter to 29.2 milliRoentgen/quarter. The highest exposure during each of the four quarters was at Station 01 (0.1 mile, 225 degrees) and averaged 26.7 mR/quarter. The lowest exposure was at Station 02 (0.75 mile, 225 degrees) averaging 15.1 milliRoentgen/quarter.

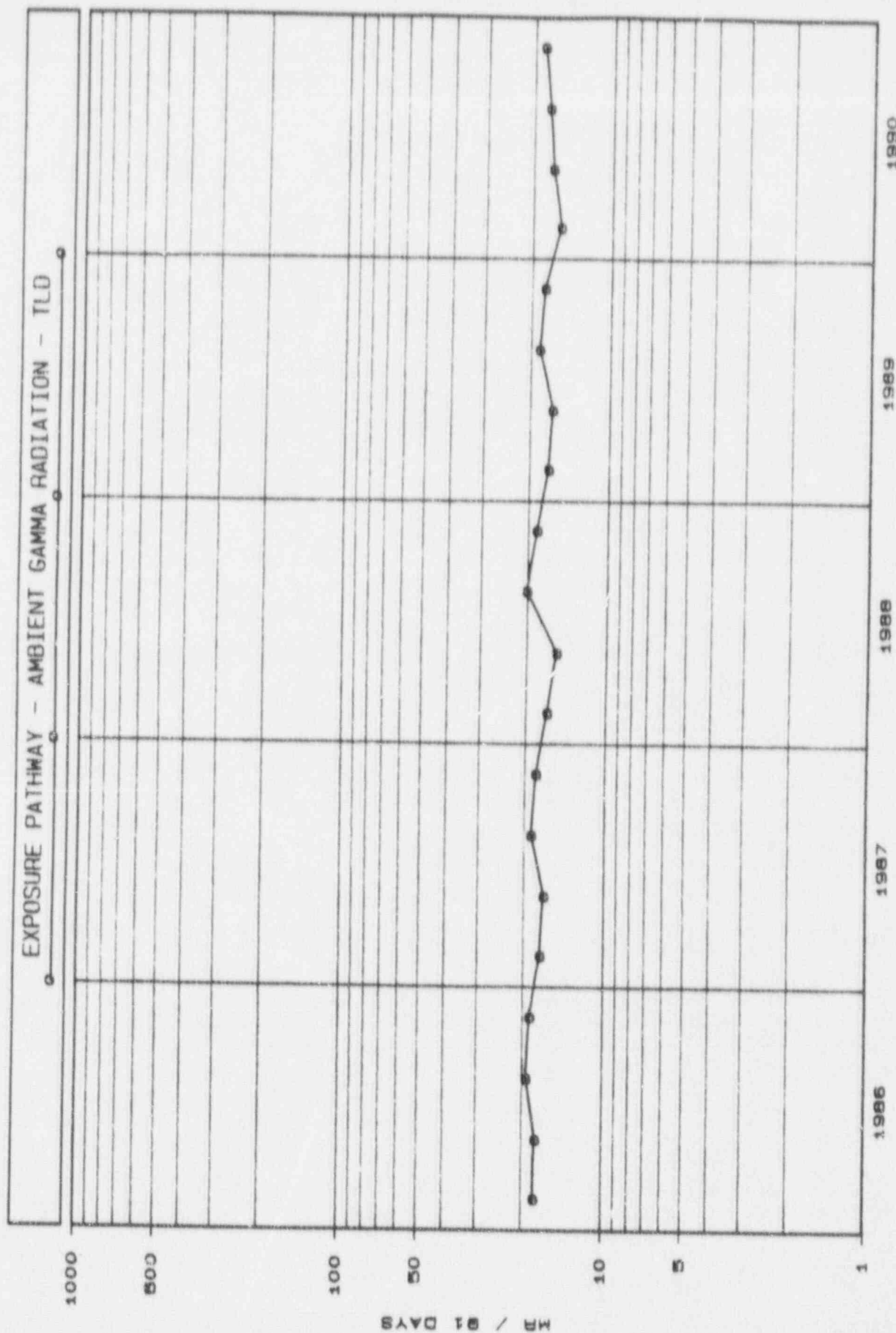
The radiation at station 44, (10.5 miles, 270 degrees) which is the control station, was an average of 16.4 mR/quarter. This was similar to other stations and to the average of all stations which was 17.0 mR/quarter.

The average total exposure for the year was 67.1 mR which is considerably below the 125 millirems per quarter specified in 10 CFR 20.105 for an unrestricted area. The relationship between milliRoentgen (mR) and millirems (mr) is approximately one for the exposure conditions encountered. No plant effect from CNS was indicated.

The gamma exposures monitored by thermoluminescent dosimeters from 1977 through 1990 are plotted on Figure J-1. The data from year to year is in good agreement and indicates no adverse changes in radiation exposure to the population near CNS.



AMBIENT RADIATION  
THERMOLUMINESCENT DOSIMETRY  
QUARTERLY AVERAGE - ALL LOCATIONS



AMBIENT RADIATION  
THERMOLUMINESCENT DOSIMETRY  
QUARTERLY AVERAGE - ALL LOCATIONS

TABLE J-1

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD

milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/03-04/03	SECOND QUARTER 04/03-07/03	THIRD QUARTER 07/03-10/02	FOURTH QUARTER 10/02-01/02/91
TLD (Gamma)	01**	22.2 ± 3.1	26.6 ± 3.3	28.9 ± 4.4	29.2 ± 2.6
	02	14.1 ± 0.8	15.4 ± 0.8	14.6 ± 0.9	16.1 ± 0.8
	03	16.0 ± 0.8	14.2 ± 0.6	15.9 ± 0.8	15.3 ± 0.8
	04	15.3 ± 1.1	15.8 ± 1.0	15.4 ± 0.6	16.2 ± 0.6
	05	16.7 ± 1.2	17.0 ± 0.6	14.2 ± 0.8	16.5 ± 0.9
	06	16.2 ± 1.0	15.7 ± 1.1	16.9 ± 0.5	16.4 ± 0.7
	07	15.6 ± 0.3	16.1 ± 0.9	14.8 ± 0.9	15.3 ± 1.5
	08	16.2 ± 0.9	16.4 ± 0.5	15.2 ± 1.0	16.8 ± 0.9
	09	16.3 ± 0.4	14.3 ± 0.5	14.9 ± 0.6	15.9 ± 0.8
	10	13.7 ± 0.5	15.3 ± 0.6	17.6 ± 1.3	15.9 ± 1.4
	20	14.7 ± 0.9	15.7 ± 0.8	19.6 ± 1.2	16.3 ± 1.0
	44	16.0 ± 0.6	17.8 ± 0.5	22.1 ± 1.9	19.5 ± 1.2
	56	15.8 ± 0.4	18.6 ± 1.5	16.1 ± 1.1	18.3 ± 0.8
	58	16.8 ± 0.8	16.9 ± 0.9	19.3 ± 0.9	*
	59	15.5 ± 0.7	19.7 ± 1.2	17.2 ± 1.2	18.3 ± 1.0
	66	15.5 ± 1.0	18.4 ± 0.7	19.0 ± 1.2	19.6 ± 1.1
	67	15.0 ± 0.6	16.2 ± 0.8	17.2 ± 0.9	20.5 ± 0.5
	71	14.7 ± 1.1	19.6 ± 0.4	*	19.3 ± 1.5

\* TLD was lost.

\*\*The TLD from Station 01 was in the field from 10/02/90-01/03/91 for the fourth quarter 1990.

TABLE J-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/03-04/03	SECOND QUARTER 04/03-07/03	THIRD QUARTER 07/03-10/02	FOURTH QUARTER 10/02-01/02/91
TLD (Gamma)	79	14.1 ± 1.7	15.7 ± 0.7	16.7 ± 1.0	18.1 ± 2.2
	80	15.3 ± 0.7	18.9 ± 0.9	16.2 ± 1.1	24.3 ± 1.1
	91	15.6 ± 0.8	15.8 ± 0.5	16.2 ± 1.1	17.9 ± 0.8
	82	16.2 ± 0.8	15.7 ± 0.5	16.8 ± 0.9	18.8 ± 1.0
	83	17.1 ± 1.3	15.6 ± 0.8	18.7 ± 1.1	18.0 ± 0.8
	84	16.0 ± 0.9	16.5 ± 0.8	22.3 ± 1.4	18.7 ± 1.5
	65	14.3 ± 0.8	18.3 ± 0.6	16.9 ± 0.4	17.6 ± 0.8
	86	15.5 ± 0.7	16.0 ± 0.7	16.6 ± 1.0	17.4 ± 1.1
	87	15.1 ± 0.7	15.8 ± 0.6	15.6 ± 1.6	16.5 ± 0.8
	88	14.1 ± 0.7	15.7 ± 0.6	17.4 ± 1.5	17.0 ± 1.1
	89	13.6 ± 0.9	16.0 ± 0.4	15.9 ± 0.5	21.9 ± 1.0
	90	15.9 ± 1.2	16.1 ± 0.7	18.8 ± 0.3	18.2 ± 0.9
	91	14.0 ± 0.9	16.3 ± 0.4	16.3 ± 0.8	17.6 ± 1.4
	94	16.0 ± 1.0	16.1 ± 0.7	17.3 ± 1.3	21.2 ± 1.0
Average/Quarter		90 days 15.6±1.52 mR/90 days	91 days 16.8±2.3 mR/91 days	91 days 17.4±2.9 mR/91 days	92 days 18.3±2.9 mR/92 days
Average/Day		0.17±0.02 mR/day	0.18±0.03 mR/day	0.19±0.03 mR/day	0.20±0.03 mR/day
Range		(13.6-22.2)mR/90 days	(14.2-26.6)mR/91 days	(14.2-28.9)mR/91 days	(15.3-29.2)mR/92 days
Det./Total		32/32	32/32	31/31	31/31



TABLE J-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	Aver./Quarter	TOTAL mR/year 01/03-01/03/91
TLD (Gamma)	01	26.7 ± 3.2	107.0
	02	15.1 ± 0.9	60.2
	03	15.4 ± 0.8	61.4
	04	15.7 ± 0.4	62.7
	05	16.1 ± 1.3	64.4
	06	16.3 ± 0.5	65.2
	07	15.5 ± 0.5	61.8
	08	15.7 ± 0.8	64.6
	09	15.4 ± 0.9	61.4
	10	15.6 ± 1.6	62.5
	20	16.6 ± 2.1	66.3
	44	16.4 ± 7.1	75.4
	56	17.2 ± 1.5	68.8
	58 (a)	17.7 ± 1.4	53.0
	59	17.7 ± 1.8	70.7
	66	18.1 ± 1.8	72.5
	67	17.2 ± 2.4	68.9
	71 (b)	17.9 ± 2.7	53.6

TABLE J-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	Aver./Quarter	TOTAL mR/year 01/03-01/03/91
TLD (Gamma)	79	16.2 ± 1.7	64.6
	80	18.7 ± 4.1	74.7
	81	16.4 ± 1.1	65.5
	82	16.9 ± 1.4	67.5
	83	17.4 ± 1.3	69.4
	84	18.4 ± 2.9	73.5
	85	16.8 ± 1.7	67.1
	86	16.4 ± 0.8	65.5
	87	15.8 ± 0.6	63.0
	88	16.1 ± 1.5	64.2
	89	14.9 ± 3.5	67.4
	90	17.3 ± 1.5	69.0
	91	16.1 ± 1.5	64.2
	94	17.7 ± 2.4	70.6
		17.0 ± 2.6 Average mR/Quarter	67.1 ± 8.9
	Range	(13.6-29.2)	Aver. total mR year. All stations Range (53.0-107.0)

- (a) The TLDs for the fourth quarter station 58 were reported as lost.  
(b) The TLDs for the third quarter station 71 were reported as lost.

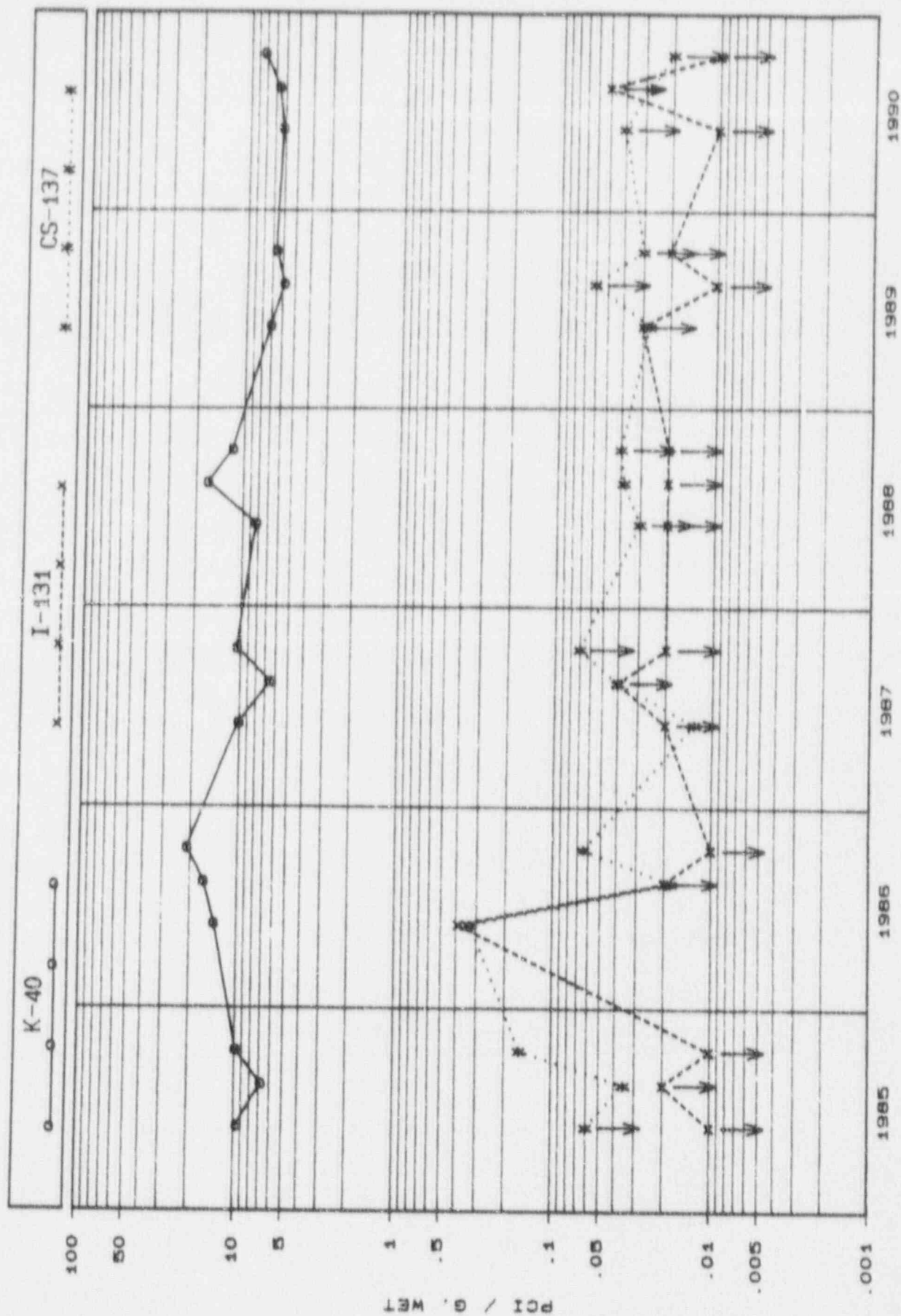
K. VEGETATION, BROADLEAF (SEE TABLES K-1 and K-2)

STATIONS 06, 35, 44

Broadleaf vegetation was collected each month during the growing season, May through October. Three samples were collected each month from each station plus a quality control sample. The samples were tested for I-131 by chemical separation and for gamma emitting isotopes by high resolution spectrometry.

The naturally occurring isotopes Be-7 and K-40 were detected in the samples at normal environmental levels. No I-131 was detected in any of the 60 samples. Cesium-137 was detected in two samples at an average of 0.028 pCi/gm, wet. Cesium-137 is detected in other areas of the United States and is attributed to fallout from previous atomic weapons testing. The amounts detected are not considered to be significant.

See Figure H-1 for the levels of activities in food samples as represented in broadleaf vegetation in 1990.



FOOD - BROADLEAF VEGETATION  
 QUARTERLY AVERAGE - ALL STATIONS  
 K-40 I-131 CS-137

TABLE K-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
BROADLEAF TERRESTRIAL VEGETATION  
PCI/GM, WET

SAMPLE NUCLIDE	STATION NUMBER		SECOND QUARTER 05/15, 06/12	THIRD QUARTER 07/09-09/10	FOURTH QUARTER 10/01
I-131 (by chemical separation)	06, 35, 44	Meanstd.dev. det./total range	L. T. 1. E-02 0/20 --	L.T. 5. E-02 0/30 --	L.T. 1. E-02 0/9 --
Be-7	06, 35, 44	Meanstd.dev. det./total range	1.2 ± 0.6 E 00 20/20 (0.3 - 2.4) E 00	2.2 ± 1.2 E 00 30/30 (0.8-4.3)E 00	1.2 ± 0.6 E 00 9/9 (0.76-2.3)E 00
K-40	06, 35, 44	Meanstd.dev. det./total range	6.18 ± 2.1 E 00 20/20 (4.2 - 14) E 00	6.6 ± 1.9 E 00 30/30 (3.0-11) E 00	8.2 ± 3.0 E 00 9/9 (4.5-13)E 00
Co-60	06, 35, 44	Meanstd.dev. det./total range	L. T. 4. E-02 0/20 --	L.T. 6. E-02 0/30 --	L.T. 2. E-02 0/9 --
Ru-103	06, 35, 44	Meanstd.dev. det./total range	L. T. 4. E-02 0/20 --	L.T. 8. E-02 0/30 --	L.T. 3. E-02 0/9 --
I-131 (by gamma spectroscopy)	06, 35, 44	Meanstd.dev. det./total range	L. T. 1. E-01 0/20 --	L.T. 5. E-01 0/30 --	L.T. 2. E-01 1/9 --
Cs-134	06, 35, 44	Meanstd.dev. det./total range	L. T. 4. E-02 0/20 --	L.T. 6. E-02 0/30 --	L.T. 2. E-02 0/9 --
Cs-137	06, 35, 44	Meanstd.dev. det./total range	L. T. 4. E-02 0/20 --	2.8 ± 0.6 E-02 2/30 (2.4-3.2)E-02	L.T. 2. E-02 0/9 --



TABLE K-1

## 1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - INGESTION

BROADLEAF TERRESTRIAL VEGETATION

PCI/GM, WET

SAMPLE NUCLIDE	STATION NUMBER		SECOND QUARTER 05/15, 06/12	THIRD QUARTER 07/09-09/10	FOURTH QUARTER 10/01
Ba-140	06, 35, 44	Mean/std.dev. det./total range	L. T. 7. E-02 0/20 --	L.T. 2. E-01 0/30 --	L.T. 7. E-02 0/9 --
Ra-226	06, 35, 44	Mean/std.dev. det./total range	L. T. 7. E-01 0/20 --	L.T. 1. E 00 0/30 --	L.T. 4. E-01 0/9 --
Th-228	06, 35, 44	Mean/std.dev. det./total range	1.41 ± 0.51E-01 1/20 --	L.T. 1. E-01 0/30 --	L.T. 4. E-02 0/9 --

TABLE K-2

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - INGESTION

BROADLEAF TERRESTRIAL VEGETATION - PCI/GM, WET

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER	SECOND QUARTER 05/15-06/12	THIRD QUARTER 07/09-09/10	FOURTH QUARTER 10/01
BE-7	35, 96, 98		1.19±0.55 E 00 (20/20)	2.22±1.17 E 00 (30/30)	1.22±0.56 E 00 (9/9)
K-40	35, 96, 98		6.18±2.06 E 00 (20/20)	6.57±1.86 E 00 (30/30)	8.17±2.97 E 00 (9/9)
Mn-54	35, 96, 98		L.T. 3. E-02 (0/20)	L.T. 6. E-02 (0/30)	L.T. 2. E-02 (0/9)
Co-58	35, 96, 98		L.T. 3. E-02 (0/20)	L.T. 6. E-02 (0/30)	L.T. 2. E-02 (0/9)
Fe-59	35, 96, 98		L.T. 8. E-02 (0/20)	L.T. 1. E-01 (0/30)	L.T. 6. E-02 (0/9)
Co-60	35, 96, 98		L.T. 4. E-02 (0/20)	L.T. 6. E-02 (0/30)	L.T. 2. E-02 (0/9)
Zn-65	35, 96, 98		L.T. 7. E-02 (0/20)	L.T. 1. E-01 (0/30)	L.T. 5. E-02 (0/9)
Zr-95	35, 96, 98		L.T. 3. E-02 (0/20)	L.T. 7. E-02 (0/30)	L.T. 2. E-03 (0/9)
Ru-103	35, 96, 98		L.T. 4. E-02 (0/20)	L.T. 8. E-02 (0/30)	L.T. 3. E-02 (0/9)
Ru-106	35, 96, 98		L.T. 3. E-01 (0/20)	L.T. 5. E-01 (0/30)	L.T. 2. E-01 (0/9)
I-131	35, 96, 98		L.T. 1. E-01 (0/20)	L.T. 5. E-01 (0/30)	L.T. 2. E-01 (0/9)
Cs-134	35, 96, 98		L.T. 4. E-02 (0/20)	L.T. 6. E-02 (0/30)	L.T. 2. E-02 (0/9)
Cs-137	35, 96, 98		L.T. 4. E-02 (0/20)	2.8 ± 0.6 E-02 (2/30)	L.T. 2. E-02 (0/9)
Ba-140	35, 96, 98		L.T. 7. E-02 (0/20)	L.T. 2. E-01 (0/30)	L.T. 7. E-02 (0/9)
Ce-141	35, 96, 98		L.T. 7. E-02 (0/20)	L.T. 2. E-01 (0/30)	L.T. 6. E-02 (0/9)
Ce-144	35, 96, 98		L.T. 2. E-01 (0/20)	L.T. 5. E-01 (0/30)	L.T. 2. E-01 (0/9)
Ra-226	35, 96, 98		L.T. 7. E-01 (0/20)	L.T. 1. E 00 (0/30)	L.T. 4. E-01 (0/9)
Th-228	35, 96, 98		1.41± 0.51E-01 (1/20)	L.T. 1. E-01 (0/30)	L.T. 4. E-02 (0/9)

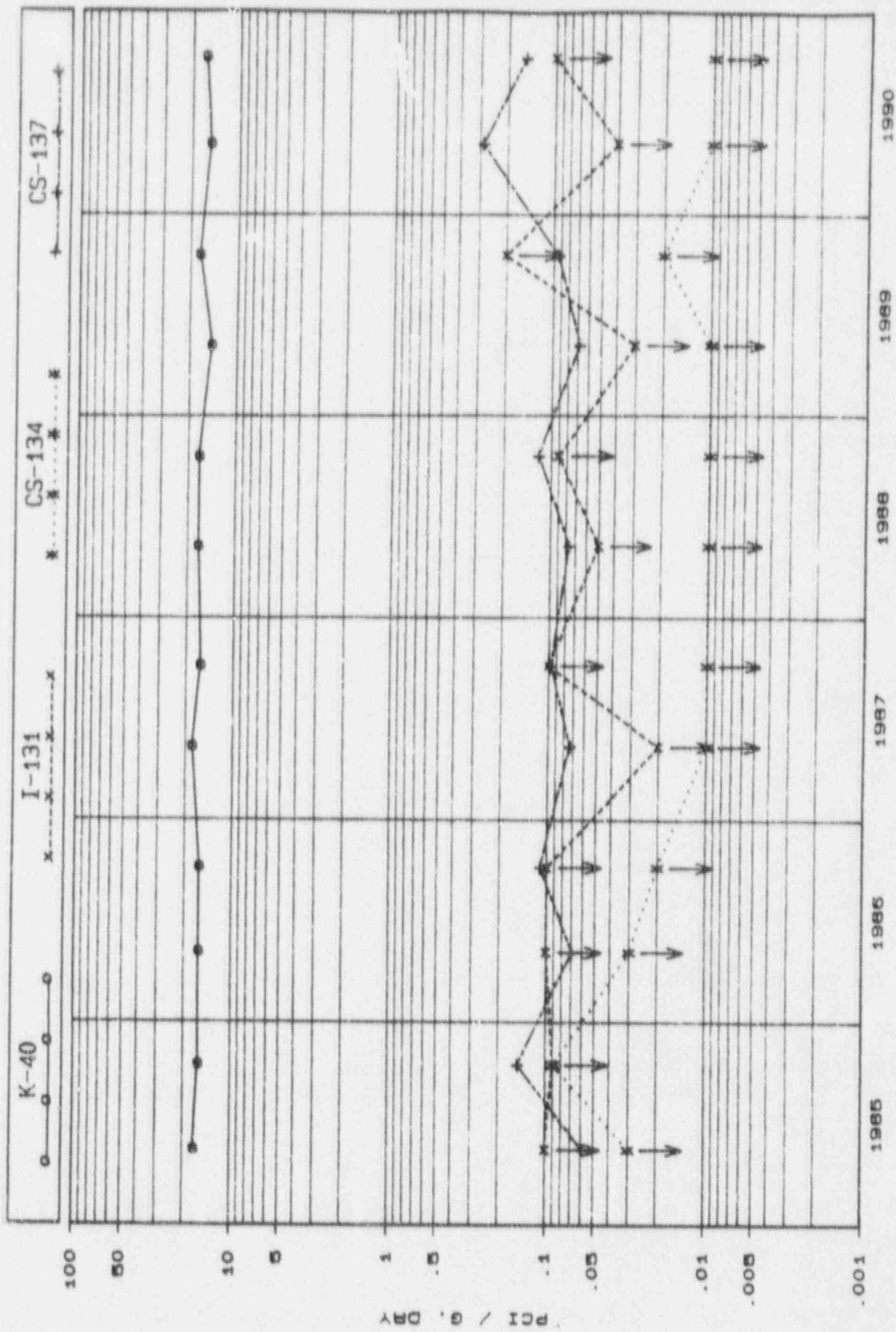
## L. SHORELINE SEDIMENT

### STATION 28

Shoreline sediment samples were collected in the spring and fall from Station 28, 1.8 miles, 150 degrees downstream of the release point of CNS. They were analyzed for gamma emitters by means of a high resolution gamma spectrometer. In the samples collected the naturally occurring isotopes K-40, Ra-226 and Th-228 were detected at normal environmental levels; Be-7 was below the detection limit. Cesium-137, a fission product, was detected at an average level of 0.219 pCi/gm, dry.

For the samples collected in the fourth quarter the naturally occurring isotopes were detected at about the same level as in the second quarter. Cesium-137 was found at a level of 0.154 pCi/gm, dry. Manganese-54, an activation product was detected at a level of 0.019 pCi/gm, dry in the fall sample. Cobalt-60, another activation product, was detected in both quarters at a level of 0.190 pCi/gm, dry.

Presented in Figure L-1 are the plots of the radionuclides K-40, I-131, Cs-134 and Cs-137 in shoreline sediment since 1985. No detections of I-131 nor Cs-134 were seen and K-40 was at a normal environmental level. The Cs-137 was at a low level which is found in many areas and media. Since sediment tends to trap and retain any elements in the water pathway, it acts as a good indicator of the effects on the water pathway of any reactor effluents.



SHORELINE SEDIMENT  
QUARTERLY AVERAGE - STATION 28  
K-40 I-131 CS-134 CS-137

TABLE L-1

QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AQUATIC

SHORLINE SEDIMENT - PCI/GM, DRY

SAMPLE NUCLIDE	STATION NUMBER		SECOND QUARTER 05/07	THIRD QUARTER	FOURTH QUARTER 10/08
Be-7	28	Meanstd.dev. det./total range	L.T. 8. E-02 0/1 --		L.T. 1. E 01 0/1 --
K-40	28	Meanstd.dev. det./total range	1.52 ± 0.15E 01 1/1 --		1.64±0.16E 01 1/1 --
Mn-54	28	Meanstd.dev. det./total range	L.T. 9. E-03 0/1 --		1.98±0.96E-02 1/1 --
CO-60	28	Meanstd.dev. det./total range	3.39±0.34 E-01 1/1 --		4.15±1.05E-02 1/1 --
I-131 (by gamma spectroscopy)	28	Meanstd.dev. det./total range	L.T. 4. E-02 0/1 --		L.T. 1. E 01 0/1 --
Cs-134	28	Meanstd.dev. det./total range	L.T. 1. E-02 0/1 --		L.T. 1. E-02 0/1 --
Cs-137	28	Meanstd.dev. det./total range	2.85 ± 0.29E-01 1/1 --		1.54±0.15E-01 1 -
Ra-226	28	Meanstd.dev. det./total range	1.64 ± 0.16E 00 1/1 --		1.62±0.21E 00 1/1 --
Th-228	28	Meanstd.dev. det./total range	8.05 ± 0.80E-01 1/1 --		9.09±0.91E-01 1/1 --

TABLE L-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AQUATIC  
SHORELINE SEDIMENT - PCI/GM, DRY

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER	SECOND QUARTER 05/07	THIRD QUARTER	FOURTH QUARTER 10/08
BE-7	28		L.T. 8. E-02(0/1)		L.T. 1. E-01(0/1)
K-40	28		1.52±0.15 E 01(1/1)		1.64±0.16 E 01(1/1)
Mn-54	28		L.T. 9. E-03(0/1)		1.98±0.96 E-02(1/1)
Co-58	28		L.T. 9. E-03(0/1)		L.T. 1. E-02(0/1)
Fe-59	28		L.T. 3. E-02(0/1)		L.T. 4. E-02(0/1)
Co-60	28		3.39±0.34 E-01(1/1)		4.15±1.05 E-02(1/1)
Zn-65	28		L.T. 3. E-02(0/1)		L.T. 4. E-02(0/1)
Zr-95	28		L.T. 1. E-02(0/1)		L.T. 2. E-02(0/1)
Ru-103	28		L.T. 1. E-02(0/1)		L.T. 2. E-02(0/1)
Ru-106	28		L.T. 7. E-02(0/1)		L.T. 1. E-01(0/1)
I-131	28		L.T. 4. E-02(0/1)		L.T. 1. E-01(0/1)
Cs-134	28		L.T. 1. E-02(0/1)		L.T. 1. E-02(0/1)
Cs-137	28		2.85±0.29 E-01(1/1)		1.54±0.15 E-01(1/1)
Ba-140	28		L.T. 2. E-02(0/1)		L.T. 4. E-02(0/1)
Ce-141	28		L.T. 2. E-02(0/1)		L.T. 3. E-02(0/1)
Ce-144	28		L.T. 6. E-02(0/1)		L.T. 9. E-02(0/1)
Ra-226	28		1.64±0.16 E 00(1/1)		1.62±0.21 E 00(1/1)
Th-228	28		8.05±0.80 E-01(1/1)		9.09±0.91 E-01(1/1)



SECTION VII  
COMPLETE DATA TABLES

A, B, C.

GROSS ALPHA, GROSS BETA, I-131

STATIONS 01-10

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 01  
STATION 01 - 0.1 MI. 225 DEG. IND.

COLL. TIME START STOP DATE DATE	VOLUME	UNITS	AP FILTER		AP FILTER GROSS ALPHA (PCI/CU. M I)	MID-COUNT TIME DATE TIME	CHARCOAL FILTER	
			GROSS BETA (PCI/CU. M I)				I-131 (PCI/CU. M I)	
01/02 01/08	8.54E 03	CU. FT	2.9 +0.4 E-02		3.1 +-1.7 F-03	01/11	L.T. 4	E-02
01/08 01/15	1.02E 04	CU. FT	1.9 +0.3 E-02		L.T. 1. E-03	01/19	L.T. 4	E-02
01/15 01/22	1.01E 04	CU. FT	3.9 +0.4 E-02		3.9 +-1.7 E-03	01/25	L.T. 4	E-02
01/22 01/29	1.01E 04	CU. FT	1.7 +0.3 E-02		2.9 +-1.5 E-03	02/01	L.T. 2	E-02
01/29 02/05	1.01E 04	CU. FT	2.9 +0.3 E-02		4.3 +-2.0 E-03	02/09	L.T. 4	E-02
02/05 02/12	1.01E 04	CU. FT	2.2 +0.3 E-02		3.2 +-1.8 F-03	02/15	L.T. 4	E-02
02/12 02/19	1.01E 04	CU. FT	2.8 +0.3 E-02		2.7 +-1.6 F-03	02/21	L.T. 4	E-02
02/19 02/26	1.01E 04	CU. FT	2.5 +0.3 E-02		2.1 +-1.5 F-03	03/02	L.T. 4	E-02
02/26 03/05	1.01E 04	CU. FT	2.7 +0.3 E-02		2.7 +-1.5 F-03	03/08	L.T. 4	E-02
03/05 03/12	1.01E 04	CU. FT	1.8 +0.3 E-02		2.4 +-1.6 E-03	03/15	L.T. 3	E-02
03/12 03/19	9.95E 03	CU. FT	1.1 +0.2 E-02		1.5 +-1.2 F-03	03/22	L.T. 4	E-02
03/19 03/26	1.01E 04	CU. FT	2.2 +0.3 E-02		4.2 +-1.8 E-03	03/30	L.T. 4	E-02
03/26 04/02	9.62E 03	CU. FT	1.5 +0.3 E-02		1.5 +-1.3 F-03	04/05	L.T. 4	E-02
04/02 04/09	9.74E 03	CU. FT	2.6 +0.3 E-02		4.5 +-1.9 F-03	04/13	L.T. 3	E-02
04/09 04/16	9.74E 03	CU. FT	2.1 +0.3 E-02		5.2 +-2.0 E-03	04/19	L.T. 4	E-02
04/16 04/23	9.99E 03	CU. FT	2.2 +0.3 E-02		2.9 +-1.6 F-03	04/26	L.T. 2	E-02
04/23 04/30	1.01E 04	CU. FT	1.2 +0.2 E-02		L.T. 2. E-03	05/03	L.T. 4	E-02
04/30 05/07	1.01E 04	CU. FT	2.1 +0.3 E-02		3.2 +-1.7 E-03	05/13	L.T. 4	E-02
05/07 05/14	1.02E 04	CU. FT	1.3 +0.2 E-02		L.T. 2. F-03	05/17	L.T. 4	E-02
05/14 05/21	9.94E 03	CU. FT	1.0 +0.2 E-02		2.3 +-1.4 F-03	05/24	L.T. 4	E-02
05/21 05/29	1.15E 04	CU. FT	1.1 +0.2 E-02		3.0 +-1.5 F-03	06/02	L.T. 3	E-02
05/29 06/04	8.65E 03	CU. FT	1.3 +0.3 E-02		1.5 +-1.3 E-03	06/09	L.T. 4	E-02
06/04 06/11	1.02E 04	CU. FT	1.3 +0.2 E-02		1.6 +-1.2 E-03	06/14	L.T. 3	E-02
06/11 06/18	1.00E 04	CU. FT	1.2 +0.2 E-02		1.8 +-1.5 F-03	06/22	L.T. 3	E-02
06/18 06/25	1.01E 04	CU. FT	1.3 +0.3 E-02		1.6 +-1.3 F-03	06/29	L.T. 3	E-02
06/25 07/02	1.01E 04	CU. FT	2.4 +0.3 E-02		3.6 +-1.7 F-03	07/07	L.T. 3	E-02
07/02 07/09	1.01E 04	CU. FT	2.0 +0.3 E-02		3.9 +-1.7 F-03	07/12	L.T. 3	E-02
07/09 07/16	1.01E 04	CU. FT	1.7 +0.3 E-02		1.8 +-1.3 F-03	07/19	L.T. 2	E-02
07/16 07/23	1.00E 04	CU. FT	2.0 +0.3 E-02		2.9 +-1.7 F-03	07/27	L.T. 3	E-02
07/23 07/30	1.01E 04	CU. FT	2.3 +0.3 E-02		4.5 +-2.0 F-03	08/02	L.T. 2	E-02
07/30 08/06	1.01E 04	CU. FT	1.8 +0.3 E-02		L.T. 2. F-03	08/09	L.T. 3	E-02
08/06 08/13	1.01E 04	CU. FT	2.4 +0.3 E-02		3.4 +-1.6 F-03	08/16	L.T. 3	E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 01  
STATION 01 - 0.1 MI. 225 DEG. INO.

COLL. TIME START STOP DATE DATE	VOLUME	UNITS	AP FILTER		MID-COUNT TIME DATE	CHARCOAL FILTER	
			GROSS BETA (PCI/CU. M)	GROSS ALPHA (PCI/CU. M)		I-131 (PCI/CU. M)	
08/13 08/20	1.01E 04	CU. FT	2.3 +-0.3 E-02	L.Y. 2. E-03	08/25	L.Y. 4. E-02	
08/20 08/27	1.01E 04	CU. FT	2.3 +-0.3 E-02	3.1 +-1.5 E-03	08/30	L.Y. 3. E-02	
08/27 09/04	1.15E 04	CU. FT	3.4 +-0.3 E-02	3.5 +-1.7 E-03	09/09	L.Y. 3. E-02	
09/04 09/10	8.67E 03	CU. FT	2.8 +-0.4 E-02	1.9 +-1.6 E-03	09/14	L.Y. 4. E-02	
09/10 09/17	1.01E 04	CU. FT	2.7 +-0.3 E-02	3.2 +-1.7 E-03	09/20	L.Y. 2. E-02	
09/17 09/24	1.01E 04	CU. FT	1.7 +-0.3 E-02	3.2 +-1.6 E-03	09/29	L.Y. 3. E-02	
09/24 10/01	1.01E 04	CU. FT	2.5 +-0.3 E-02	2.7 +-1.6 E-03	10/05	L.Y. 4. E-02	
10/01 10/08	1.01E 04	CU. FT	2.4 +-0.3 E-02	3.4 +-1.7 E-03	10/12	L.Y. 3. E-02	
10/08 10/15	1.01E 04	CU. FT	3.1 +-0.3 E-02	6.1 +-2.3 E-03	10/19	L.Y. 3. E-02	
10/15 10/22	9.76E 03	CU. FT	2.5 +-0.3 E-02	2.7 +-1.5 E-03	10/26	L.Y. 4. E-02	
10/22 10/29	1.03E 04	CU. FT	4.2 +-0.4 E-02	1.6 +-0.3 E-02	11/01	L.Y. 2. E-02	
10/29 11/05	1.01E 04	CU. FT	3.8 +-0.4 E-02	9.0 +-2.6 E-03	11/08	L.Y. 3. E-02	
11/05 11/13	1.15E 04	CU. FT	2.9 +-0.3 E-02	2.1 +-1.3 E-03	11/17	L.Y. 3. E-02	
11/13 11/19	8.65E 03	CU. FT	3.0 +-0.4 E-02	4.9 +-2.1 E-03	11/24	L.Y. 3. E-02	
11/19 11/26	1.01E 04	CU. FT	2.0 +-0.3 E-02	2.1 +-1.4 E-03	11/30	L.Y. 3. E-02	
11/26 12/03	1.01E 04	CU. FT	1.8 +-0.3 E-02	L.Y. 2. E-03	12/07	L.Y. 3. E-02	
12/03 12/10	1.01E 04	CU. FT	2.8 +-0.3 E-02	4.3 +-1.8 E-03	12/13	L.Y. 3. E-02	
12/10 12/17	1.01E 04	CU. FT	3.6 +-0.3 E-02	3.7 +-1.8 E-03	12/22	L.Y. 2. E-02	
12/17 12/24	9.97E 03	CU. FT	4.9 +-0.4 E-02	8.8 +-2.5 E-03	01/03	L.Y. 5. E-02	
12/24 12/31	1.01E 04	CU. FT	3.7 +-0.3 E-02	9.5 +-1.6 E-03	01/06	L.Y. 3. E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 02  
STATION 02 - 0.75 MI. 225 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MED-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA (PCI/CU. M 3)		GROSS ALPHA (PCI/CU. M 3)		TIME DATE TIME		I-131 (PCI/CU. M 3)	
01/02	01/08	8.71E 03	CU. FT	2.5 +-0.3 E-02		2.2 +-1.5 E-03		01/11		L.T. 4. E-02	
01/08	01/15	1.01E 04	CU. FT	1.9 +-0.3 E-02		4.4 +-1.9 E-03		01/19		L.T. 4. E-02	
01/15	01/22	9.94E 03	CU. FT	3.4 +-0.4 E-02		4.3 +-1.8 E-03		01/25		L.T. 4. E-02	
01/22	01/29	1.01E 04	CU. FT	1.6 +-0.3 E-02		2.9 +-1.5 E-03		02/01		L.T. 2. E-02	
01/29	02/05	1.03E 04	CU. FT	2.6 +-0.3 E-02		4.3 +-2.0 E-03		02/09		L.T. 4. E-02	
02/05	02/12	9.73E 03	CU. FT	2.4 +-0.3 E-02		5.2 +-2.2 E-03		02/15		L.T. 4. E-02	
02/12	02/19	1.01E 04	CU. FT	2.8 +-0.3 E-02		2.3 +-1.5 E-03		02/21		L.T. 4. E-02	
02/19	02/26	1.03E 04	CU. FT	2.3 +-0.3 E-02		3.0 +-1.7 E-03		03/02		L.T. 4. E-02	
02/26	03/05	1.01E 04	CU. FT	2.3 +-0.3 E-02		4.2 +-1.8 E-03		03/08		L.T. 4. E-02	
03/05	03/12	9.81E 03	CU. FT	7.4 +-2.1 E-03		L.T. 2. E-03		03/15		L.T. 4. E-02	
03/12	03/19	9.62E 03	CU. FT	1.4 +-0.3 E-02		1.4 +-1.2 E-03		03/22		L.T. 4. E-02	
03/19	03/26	1.00E 04	CU. FT	2.2 +-0.3 E-02		4.6 +-1.8 E-03		03/30		L.T. 4. E-02	
03/26	04/02	1.01E 04	CU. FT	1.7 +-0.3 E-02		2.4 +-1.5 E-03		04/05		L.T. 4. E-02	
04/02	04/09	1.04E 04	CU. FT	1.8 +-0.3 E-02		4.2 +-1.8 E-03		04/13		L.T. 3. E-02	
04/09	04/16	9.82E 03	CU. FT	1.9 +-0.3 E-02		2.0 +-1.3 E-03		04/19		L.T. 4. E-02	
04/16	04/23	1.00E 04	CU. FT	2.0 +-0.3 E-02		2.8 +-1.6 E-03		04/26		L.T. 3. E-02	
04/23	04/30	1.01E 04	CU. FT	1.3 +-0.2 E-02		L.T. 2. E-03		05/03		L.T. 4. E-02	
04/30	05/07	1.00E 04	CU. FT	2.0 +-0.3 E-02		3.9 +-1.8 E-03		05/13		L.T. 4. E-02	
05/07	05/14	1.02E 04	CU. FT	1.4 +-0.2 E-02		L.T. 2. E-03		05/17		L.T. 4. E-02	
05/14	05/21	9.97E 03	CU. FT	8.7 +-2.1 E-03		1.6 +-1.2 E-03		05/24		L.T. 4. E-02	
05/21	05/29	1.15E 04	CU. FT	1.4 +-0.2 E-02		1.7 +-1.2 E-03		06/02		L.T. 3. E-02	
05/29	06/04	8.62E 03	CU. FT	1.4 +-0.3 E-02		2.6 +-1.6 E-03		06/09		L.T. 4. E-02	
06/04	06/11	1.02E 04	CU. FT	1.5 +-0.3 E-02		2.7 +-1.5 E-03		06/14		L.T. 3. E-02	
06/11	06/18	9.72E 03	CU. FT	1.6 +-0.3 E-02		L.T. 2. E-03		06/22		L.T. 4. E-02	
06/18	06/25	9.73E 03	CU. FT	1.8 +-0.3 E-02		1.5 +-1.3 E-03		06/29		L.T. 4. E-02	
06/25	07/02	1.00E 04	CU. FT	2.6 +-0.3 E-02		3.6 +-1.7 E-03		07/07		L.T. 3. E-02	
07/02	07/09	1.01E 04	CU. FT	2.4 +-0.3 E-02		4.2 +-1.8 E-03		07/12		L.T. 3. E-02	
07/09	07/16	1.01E 04	CU. FT	2.2 +-0.3 E-02		4.4 +-1.9 E-03		07/19		L.T. 2. E-02	
07/16	07/23	1.00E 04	CU. FT	2.3 +-0.3 E-02		2.3 +-1.6 E-03		07/27		L.T. 4. E-02	
07/23	07/30	1.01E 04	CU. FT	3.4 +-0.4 E-02		6.3 +-2.3 E-03		08/02		L.T. 2. E-02	
07/30	08/06	1.01E 04	CU. FT	2.4 +-0.3 E-02		2.4 +-1.8 E-03		08/09		L.T. 3. E-02	
08/06	08/13	1.01E 04	CU. FT	2.8 +-0.3 E-02		4.7 +-1.9 E-03		08/16		L.T. 3. E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION 02 - 0.75 MI. 225 DEG. IND.  
STATION NUMBER 02

COLL. TIME START STOP DATE DATE	VOLUME	UNITS	AP FILTER		MID-COUNT TIME DATE TIME	CHARCOAL FILTER	
			GROSS BETA (PCI/CU. M )	GROSS ALPHA (PCI/CU. M )		1-131 (PCI/CU. M )	
08/13 08/20	1.00E 04	CU. FT	2.6 +-0.3 E-02	2.1 +-1.6 E-03	08/25	L.T.	4. E-02
08/20 08/27	1.01E 04	CU. FT	2.6 +-0.3 E-02	4.5 +-1.8 E-03	08/30	L.T.	3. E-02
08/27 09/04	1.15E 04	CU. FT	3.8 +-0.3 E-02	2.3 +-1.5 E-03	09/09	L.T.	3. E-02
09/04 09/10	5.62E 03	CU. FT	3.1 +-0.4 E-02	2.8 +-1.8 E-03	09/14	L.T.	4. E-02
09/10 09/17	1.01E 04	CU. FT	2.6 +-0.3 E-02	3.9 +-1.8 E-03	09/20	L.T.	2. E-02
09/17 09/24	1.00E 04	CU. FT	2.2 +-0.3 E-02	3.6 +-1.7 E-03	09/29	L.T.	3. E-02
09/24 10/01	1.01E 04	CU. FT	3.4 +-0.3 E-02	1.6 +-1.4 E-03	10/05	L.T.	4. E-02
10/01 10/08	9.80E 03	CU. FT	2.9 +-0.3 E-02	4.1 +-1.9 E-03	10/12	L.T.	4. E-02
10/08 10/15	1.03E 04	CU. FT	3.3 +-0.3 E-02	1.3 +-0.3 E-02	10/19	L.T.	3. E-02
10/15 10/22	9.84E 03	CU. FT	2.4 +-0.3 E-02	3.1 +-1.6 E-03	10/26	L.T.	4. E-02
10/22 10/29	1.03E 04	CU. FT	4.8 +-0.4 E-02	2.5 +-0.4 E-02	11/01	L.T.	2. E-02
10/29 11/05	9.92E 03	CU. FT	3.8 +-0.4 E-02	4.3 +-1.9 E-03	11/08	L.T.	3. E-02
11/05 11/13	1.17E 04	CU. FT	3.0 +-0.3 E-02	5.0 +-1.8 E-03	11/17	L.T.	3. E-02
11/13 11/19	8.44E 03	CU. FT	3.1 +-0.4 E-02	3.5 +-1.8 E-03	11/24	L.T.	3. E-02
11/19 11/26	1.03E 04	CU. FT	2.4 +-0.3 E-02	3.2 +-1.6 E-03	11/30	L.T.	3. E-02
11/26 12/03	1.01E 04	CU. FT	2.2 +-0.3 E-02	2.4 +-1.7 E-03	12/07	L.T.	3. E-02
12/03 12/10	1.01E 04	CU. FT	2.6 +-0.3 E-02	1.6 +-1.3 E-03	12/13	L.T.	3. E-02
12/10 12/17	1.00E 04	CU. FT	3.9 +-0.4 E-02	3.6 +-1.8 E-03	12/22	L.T.	2. E-02
12/17 12/24	1.01E 04	CU. FT	4.5 +-0.4 E-02	6.1 +-2.1 E-03	01/03	L.T.	5. E-02
12/24 12/31	1.01E 04	CU. FT	3.5 +-0.3 E-02	3.0 +-1.5 E-03	01/06	L.T.	3. E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 03  
STATION 03 - 2.5 MI. 338 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )		GROSS ALPHA (PCI/CU. M )		TIME DATE TIME		I-131 (PCI/CU. M )	
01/02	01/08	8.63E 03	CU. FT	2.2 +-0.3	E-02	3.2 +-1.7	E-03	01/11		L.T. 4.	E-02
01/08	01/15	1.03E 04	CU. FT	1.9 +-0.3	E-02	L.T. 1.	E-03	01/19		L.T. 4.	E-02
01/15	01/22	9.96E 03	CU. FT	3.3 +-0.4	E-02	3.6 +-1.7	E-03	01/25		L.T. 4.	E-02
01/22	01/29	9.95E 03	CU. FT	1.5 +-0.3	E-02	1.6 +-1.2	E-03	02/01		L.T. 3.	E-02
01/29	02/05	1.02E 04	CU. FT	2.2 +-0.3	E-02	2.9 +-1.7	E-03	02/09		L.T. 4.	E-02
02/05	02/12	9.92E 03	CU. FT	1.7 +-0.3	E-02	2.8 +-1.8	E-03	02/15		L.T. 4.	E-02
02/12	02/19	1.01E 04	CU. FT	2.4 +-0.3	E-02	3.1 +-1.7	E-03	02/21		L.T. 4.	E-02
02/19	02/26	1.01E 04	CU. FT	2.1 +-0.3	E-02	2.6 +-1.6	E-03	03/02		L.T. 4.	E-02
02/26	03/05	1.01E 04	CU. FT	2.2 +-0.3	E-02	2.1 +-1.3	E-03	03/08		L.T. 4.	E-02
03/05	03/12	1.00E 04	CU. FT	1.4 +-0.2	E-02	L.T. 2.	E-03	03/15		L.T. 4.	E-02
03/12	03/19	1.01E 04	CU. FT	8.8 +-2.2	E-03	1.3 +-1.1	E-03	03/22		L.T. 4.	E-02
03/19	03/26	1.00E 04	CU. FT	2.0 +-0.3	E-02	4.1 +-1.8	E-03	03/30		L.T. 4.	E-02
03/26	04/02	1.01E 04	CU. FT	1.6 +-0.3	E-02	2.6 +-1.5	E-03	04/05		L.T. 4.	E-02
04/02	04/09	1.02E 04	CU. FT	1.9 +-0.3	E-02	3.7 +-1.7	E-03	04/13		L.T. 3.	E-02
04/09	04/16	9.87E 03	CU. FT	1.6 +-0.3	E-02	2.3 +-1.4	E-03	04/19		L.T. 4.	E-02
04/16	04/23	1.01E 04	CU. FT	2.0 +-0.3	E-02	L.T. 1.	E-03	04/26		L.T. 2.	E-02
04/23	04/30	1.00E 04	CU. FT	1.4 +-0.3	E-02	L.T. 2.	E-03	05/03		L.T. 4.	E-02
04/30	05/07	1.01E 04	CU. FT	2.2 +-0.3	E-02	1.9 +-1.4	E-03	05/13		L.T. 4.	E-02
05/07	05/14	1.01E 04	CU. FT	1.2 +-0.2	E-02	L.T. 2.	E-03	05/17		L.T. 4.	E-02
05/14	05/21	1.01E 04	CU. FT	9.0 +-2.1	E-03	2.4 +-1.4	E-03	05/24		L.T. 4.	E-02
05/21	05/29	1.15E 04	CU. FT	1.4 +-0.2	E-02	1.8 +-1.2	E-03	06/07		L.T. 3.	E-02
05/29	06/04	8.65E 03	CU. FT	1.3 +-0.3	E-02	2.3 +-1.5	E-03	06/09		L.T. 4.	E-02
06/04	06/11	1.01E 04	CU. FT	1.3 +-0.2	E-02	2.4 +-1.4	E-03	06/14		L.T. 3.	E-02
06/11	06/18	1.01E 04	CU. FT	1.3 +-0.2	E-02	2.1 +-1.5	E-03	06/22		L.T. 4.	E-02
06/18	06/25	1.00E 04	CU. FT	1.3 +-0.3	E-02	2.8 +-1.6	E-03	06/29		L.T. 4.	E-02
06/25	07/02	1.02E 04	CU. FT	2.4 +-0.3	E-02	2.2 +-1.4	E-03	07/07		L.T. 3.	E-02
07/02	07/09	1.00E 04	CU. FT	1.4 +-0.3	E-02	2.6 +-1.5	E-03	07/12		L.T. 3.	E-02
07/09	07/16	1.00E 04	CU. FT	1.7 +-0.3	E-02	2.6 +-1.5	E-03	07/19		L.T. 3.	E-02
07/16	07/23	1.00E 04	CU. FT	1.2 +-0.2	E-02	2.3 +-1.6	E-03	07/27		L.T. 4.	E-02
07/23	07/30	1.01E 04	CU. FT	2.2 +-0.3	E-02	4.7 +-2.0	E-03	08/02		L.T. 2.	E-02
07/30	08/06	1.00E 04	CU. FT	1.6 +-0.3	E-02	L.T. 2.	E-03	08/09		L.T. 3.	E-02
08/06	08/13	1.01E 04	CU. FT	2.0 +-0.3	E-02	2.9 +-1.5	E-03	08/16		L.T. 3.	E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 03  
STATION 03 - 2.5 MI. 330 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP			GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU. M )		(PCI/CU. M )		DATE TIME		(PCI/CU. M )	
08/13	08/20	1.01E 04	CU. FT	2.2	+0.3 E-02	L.T.	2. E-03	08/25	L.T.	4. E-02	
08/20	08/27	1.01E 04	CU. FT	1.6	+0.3 E-02	1.6	+1.2 E-03	08/30	L.T.	3. E-02	
08/27	09/04	1.15E 04	CU. FT	3.2	+0.3 E-02	3.5	+1.7 E-03	09/09	L.T.	3. E-02	
09/04	09/10	8.67E 03	CU. FT	2.2	+0.3 E-02	2.4	+1.7 E-03	09/14	L.T.	4. E-02	
09/10	09/17	1.01E 04	CU. FT	2.0	+0.3 E-02	2.2	+1.5 E-03	09/20	L.T.	2. E-02	
09/17	09/24	1.01E 04	CU. FT	1.6	+0.3 E-02	2.1	+1.3 E-03	09/29	L.T.	3. E-02	
09/24	10/01	1.00E 04	CU. FT	2.2	+0.3 E-02	2.8	+1.6 E-03	10/05	L.T.	4. E-02	
10/01	10/08	1.01E 04	CU. FT	2.1	+0.3 E-02	2.7	+1.6 E-03	10/12	L.T.	4. E-02	
10/08	10/15	1.00E 04	CU. FT	2.8	+0.3 E-02	4.1	+1.9 E-03	10/19	L.T.	3. E-02	
10/15	10/22	9.77E 03	CU. FT	2.5	+0.3 E-02	2.7	+1.5 E-03	10/26	L.T.	4. E-02	
10/22	10/29	1.00E 04	CU. FT	3.1	+0.3 E-02	9.9	+2.8 E-03	11/01	L.T.	3. E-02	
10/29	11/05	1.01E 04	CU. FT	3.2	+0.4 E-02	3.7	+1.8 E-03	11/08	L.T.	3. E-02	
11/05	11/13	1.15E 04	CU. FT	3.1	+0.3 E-02	3.7	+1.6 E-03	11/17	L.T.	3. E-02	
11/13	11/19	8.64E 03	CU. FT	2.8	+0.4 E-02	3.4	+1.8 E-03	11/24	L.T.	3. E-02	
11/19	11/26	1.01E 04	CU. FT	2.3	+0.3 E-02	2.2	+1.4 E-03	11/30	L.T.	3. E-02	
11/26	12/03	1.01E 04	CU. FT	2.0	+0.3 E-02	L.T.	2. E-03	12/07	L.T.	3. E-02	
12/03	12/10	1.01E 04	CU. FT	2.5	+0.3 E-02	3.2	+1.6 E-03	12/10	L.T.	3. E-02	
12/10	12/17	1.01E 04	CU. FT	3.7	+0.4 E-02	3.5	+1.8 E-03	12/17	L.T.	2. E-02	
12/17	12/24	1.01E 04	CU. FT	4.5	+0.4 E-02	8.2	+2.4 E-03	01/03	L.T.	5. E-02	
12/24	12/31	1.01E 04	CU. FT	3.1	+0.3 E-02	3.1	+1.5 E-03	01/06	L.T.	3. E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 04  
STATION 04 - 3.0 MI. 43 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MIC-COUNT		CHARCOAL FILTER	
START	STOP			GROSS BETA		GROSS ALPHA		TIME		E-131	
DATE	DATE			(PCI/CU. M )		(PCI/CU. M )		DATE TIME		(PCI/CU. M )	
01/02	01/08	8.38E 03	CU. FT	3.6	+0.4 E-02	2.9	+1.7 E-03	01/11	L.T.	4.	E-02
01/08	01/15	1.00E 04	CU. FT	1.9	+0.3 E-02	L.T.	1. E-03	01/19	L.T.	4.	E-02
01/15	01/22	9.95E 03	CU. FT	3.8	+0.4 E-02	3.3	+1.6 E-03	01/25	L.T.	4.	E-02
01/22	01/29	1.02E 04	CU. FT	1.7	+0.3 E-02	L.T.	1. E-03	02/01	L.T.	2.	E-02
01/29	02/05	9.92E 03	CU. FT	2.8	+0.3 E-02	3.1	+1.8 E-03	02/09	L.T.	4.	E-02
02/05	02/12	9.97E 03	CU. FT	2.3	+0.3 E-02	5.5	+2.2 E-03	02/15	L.T.	4.	E-02
02/12	02/19	1.01E 04	CU. FT	2.7	+0.3 E-02	2.3	+1.5 E-03	02/21	L.T.	4.	E-02
02/19	02/26	1.01E 04	CU. FT	2.2	+0.3 E-02	2.9	+1.7 E-03	03/02	L.T.	4.	E-02
02/26	03/05	1.01E 04	CU. FT	2.7	+0.3 E-02	2.7	+1.5 E-03	03/08	L.T.	4.	E-02
03/05	03/12	1.00E 04	CU. FT	1.3	+0.2 E-02	L.T.	2. E-03	03/15	L.T.	4.	E-02
03/12	03/19	1.01E 04	CU. FT	8.9	+2.2 E-03	2.6	+1.4 E-03	03/22	L.T.	4.	E-02
03/19	03/26	1.00E 04	CU. FT	2.3	+0.3 E-02	5.4	+2.0 E-03	03/30	L.T.	4.	E-02
03/26	04/02	1.01E 04	CU. FT	1.8	+0.3 E-02	1.8	+1.3 E-03	04/05	L.T.	4.	E-02
04/02	04/09	1.02E 04	CU. FT	2.3	+0.3 E-02	5.7	+2.1 E-03	04/13	L.T.	3.	E-02
04/09	04/16	9.86E 03	CU. FT	1.9	+0.3 E-02	1.7	+1.2 E-03	04/19	L.T.	6.	E-02
04/16	04/23	1.01E 04	CU. FT	2.3	+0.3 E-02	1.6	+1.3 E-03	04/26	L.T.	2.	E-02
04/23	04/30	1.00E 04	CU. FT	1.2	+0.2 E-02	L.T.	2. E-03	05/03	L.T.	4.	E-02
04/30	05/07	1.01E 04	CU. FT	2.0	+0.3 E-02	2.2	+1.5 E-03	05/13	L.T.	4.	E-02
05/07	05/14	1.01E 04	CU. FT	1.1	+0.2 E-02	L.T.	2. E-03	05/17	L.T.	4.	E-02
05/14	05/21	1.01E 04	CU. FT	9.5	+2.2 E-03	1.3	+1.1 E-03	05/24	L.T.	4.	E-02
05/21	05/29	1.15E 04	CU. FT	1.1	+0.2 E-02	1.6	+1.2 E-03	06/02	L.T.	3.	E-02
05/29	06/04	8.65E 03	CU. FT	1.3	+0.3 E-02	2.6	+1.6 E-03	06/09	L.T.	4.	E-02
06/04	06/11	1.01E 04	CU. FT	1.3	+0.2 E-02	1.5	+1.2 E-03	06/14	L.T.	3.	E-02
06/11	06/18	1.03E 04	CU. FT	1.1	+0.2 E-02	L.T.	2. E-03	06/22	L.T.	3.	E-02
06/18	06/25	9.84E 03	CU. FT	1.3	+0.3 E-02	2.3	+1.5 E-03	06/29	L.T.	4.	E-02
06/25	07/02	1.01E 04	CU. FT	2.3	+0.3 E-02	2.4	+1.5 E-03	07/07	L.T.	3.	E-02
07/02	07/09	1.01E 04	CU. FT	1.6	+0.3 E-02	3.1	+1.5 E-03	07/12	L.T.	3.	E-02
07/09	07/16	1.00E 04	CU. FT	1.3	+0.3 E-02	2.0	+1.4 E-03	07/19	L.T.	3.	E-02
07/16	07/23	1.01E 04	CU. FT	1.5	+0.3 E-02	L.T.	2. E-03	07/27	L.T.	4.	E-02
07/23	07/30	1.01E 04	CU. FT	1.8	+0.3 E-02	1.8	+1.5 E-03	08/02	L.T.	2.	E-02
07/30	08/06	9.97E 03	CU. FT	1.8	+0.3 E-02	3.6	+2.0 E-03	08/09	L.T.	3.	E-02
08/06	08/13	1.01E 04	CU. FT	2.3	+0.3 E-02	3.9	+1.7 E-03	08/16	L.T.	3.	E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 04  
STATION 04 - 3.0 MI. 43 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER	AP FILTER	MID-COUNT	CHARCOAL FILTER
START	STOP			GROSS BETA	GROSS ALPHA		T-131
DATE	DATE			(PCI/CU. M )	(PCI/CU. M )	DATE TIME	(PCI/CU. M )
08/13	08/20	1.01E 04	CU. FT	2.5 +-0.3 E-02	L.T. 2. E-03	08/25	L.T. 4. E-02
08/20	08/27	1.01E 04	CU. FT	2.2 +-0.3 E-02	2.1 +-1.3 E-03	08/30	L.T. 3. E-02
08/28	09/04	9.94E 03	CU. FT	3.3 +-0.4 E-02	3.4 +-1.9 E-03	09/09	L.T. 4. E-02
09/04	09/10	8.66E 03	CU. FT	2.7 +-0.4 E-02	2.4 +-0.4 E-03	09/14	L.T. 4. E-02
09/10	09/17	1.01E 04	CU. FT	2.3 +-0.3 E-02	2.4 +-1.5 E-03	09/20	L.T. 2. E-02
09/17	09/24	1.01E 04	CU. FT	2.0 +-0.3 E-02	5.0 +-1.9 E-03	09/29	L.T. 3. E-02
09/24	10/01	1.00E 04	CU. FT	2.6 +-0.3 E-02	1.8 +-1.4 E-03	10/05	L.T. 4. E-02
10/01	10/08	1.01E 04	CU. FT	2.4 +-0.3 E-02	2.9 +-1.6 E-03	10/12	L.T. 4. E-02
10/08	10/15	1.00E 04	CU. FT	3.3 +-0.3 E-02	9.6 +-2.7 E-03	10/19	L.T. 3. E-02
10/15	10/22	1.00E 04	CU. FT	2.5 +-0.3 E-02	2.1 +-1.3 E-03	10/26	L.T. 4. E-02
10/22	10/29	1.01E 04	CU. FT	4.2 +-0.4 E-02	2.2 +-0.4 E-02	11/01	L.T. 3. E-02
10/29	11/05	1.01E 04	CU. FT	4.0 +-0.4 E-02	3.7 +-1.8 E-03	11/08	L.T. 3. E-02
11/05	11/13	1.15E 04	CU. FT	3.2 +-0.3 E-02	2.1 +-1.3 E-03	11/17	L.T. 3. E-02
11/13	11/19	8.58E 03	CU. FT	6.1 +-2.3 E-02	1.5 +-1.3 E-02	11/24	L.T. 3. E-02
11/19	11/26	1.00E 04	CU. FT	2.2 +-0.3 E-02	2.6 +-1.5 E-03	11/30	L.T. 3. E-02
11/26	12/03	1.01E 04	CU. FT	1.7 +-0.3 E-02	L.T. 2. E-03	12/07	L.T. 3. E-02
12/03	12/10	1.01E 04	CU. FT	2.8 +-0.3 E-02	L.T. 1. E-03	12/13	L.T. 3. E-02
12/10	12/17	1.01E 04	CU. FT	3.8 +-0.4 E-02	2.9 +-1.7 E-03	12/22	L.T. 2. E-02
12/17	12/24	1.01E 04	CU. FT	4.9 +-0.4 E-02	8.5 +-2.5 E-03	01/03	L.T. 5. E-02
12/24	12/31	1.01E 04	CU. FT	3.7 +-0.3 E-02	3.4 +-1.6 E-03	01/06	L.T. 3. E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 05  
STATION 05 - 3.5 MI. 102 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )		GROSS ALPHA (PCI/CU. M )		TIME DATE TIME		I-131 (PCI/CU. M )	
01/02	01/08	8.38E 03	CU. FT	2.4	+ -0.4 E-02	2.3	+ -1.6 F-03	01/11		L.T.	3.
01/08	01/15	1.04E 04	CU. FT	1.7	+ -0.3 E-02	2.4	+ -1.5 F-03	01/19		L.T.	3.
01/15	01/22	9.95E 03	CU. FT	3.2	+ -0.3 E-02	3.3	+ -1.6 F-03	01/25		L.T.	3.
01/22	01/29	1.02E 04	CU. FT	1.3	+ -0.2 E-02	1.1	+ -1.1 F-03	02/01		L.T.	2.
01/29	02/05	9.95E 03	CU. FT	2.0	+ -0.3 E-02	3.1	+ -1.8 E-03	02/09		L.T.	3.
02/05	02/12	9.83E 03	CU. FT	1.9	+ -0.3 E-02	4.1	+ -2.0 E-03	02/15		L.T.	3.
02/12	02/19	1.01E 04	CU. FT	2.8	+ -0.3 E-02	2.6	+ -1.5 F-03	02/21		L.T.	3.
02/19	02/26	1.01E 04	CU. FT	1.9	+ -0.3 E-02	2.7	+ -1.7 F-03	03/02		L.T.	3.
02/26	03/05	1.01E 04	CU. FT	2.4	+ -0.3 E-02	2.3	+ -1.4 E-03	03/08		L.T.	2.
03/05	03/12	1.00E 04	CU. FT	1.4	+ -0.2 E-02	1.9	+ -1.5 E-03	03/15		L.T.	3.
03/12	03/19	1.01E 04	CU. FT	1.2	+ -0.2 E-02	1.5	+ -1.2 E-03	03/22		L.T.	3.
03/19	03/26	1.00E 04	CU. FT	2.1	+ -0.3 E-02	2.4	+ -1.4 E-03	03/30		L.T.	3.
03/26	04/02	1.01E 04	CU. FT	1.5	+ -0.2 E-02	L.T.	1.	04/05		L.T.	3.
04/02	04/09	1.02E 04	CU. FT	1.7	+ -0.3 E-02	4.8	+ -1.9 F-03	04/13		L.T.	2.
04/09	04/16	9.83E 03	CU. FT	2.1	+ -0.3 E-02	2.8	+ -1.5 E-03	04/19		L.T.	3.
04/16	04/23	1.02E 04	CU. FT	1.8	+ -0.3 E-02	1.4	+ -1.2 E-03	04/26		L.T.	2.
04/23	04/30	1.00E 04	CU. FT	1.3	+ -0.2 E-02	2.9	+ -1.8 E-03	05/03		L.T.	3.
04/30	05/07	1.01E 04	CU. FT	1.9	+ -0.3 E-02	2.7	+ -1.6 E-03	05/13		L.T.	3.
05/07	05/14	1.00E 04	CU. FT	1.4	+ -0.2 E-02	L.T.	2.	05/17		L.T.	2.
05/14	05/21	1.01E 04	CU. FT	9.1	+ -2.1 E-03	1.1	+ -1.1 F-03	05/24		L.T.	3.
05/21	05/29	1.15E 04	CU. FT	1.2	+ -0.2 E-02	L.T.	1.	06/02		L.T.	2.
05/29	06/04	8.65E 03	CU. FT	1.6	+ -0.3 E-02	2.8	+ -1.6 E-03	06/09		L.T.	3.
06/04	06/11	1.01E 04	CU. FT	1.5	+ -0.3 F-02	1.6	+ -1.2 E-03	06/14		L.T.	1.
06/11	06/18	1.02E 04	CU. FT	1.2	+ -0.2 E-02	L.T.	2.	06/22		L.T.	2.
06/18	06/25	9.86E 03	CU. FT	1.1	+ -0.2 E-02	1.5	+ -1.3 E-03	06/29		L.T.	3.
06/25	07/02	1.01E 04	CU. FT	2.6	+ -0.3 F-02	2.4	+ -1.5 F-03	07/07		L.T.	2.
07/02	07/09	1.01E 04	CU. FT	1.9	+ -0.3 E-02	2.6	+ -1.4 E-03	07/12		L.T.	2.
07/09	07/16	1.00E 04	CU. FT	1.7	+ -0.3 E-02	2.1	+ -1.4 E-03	07/19		L.T.	2.
07/16	07/23	1.01E 04	CU. FT	2.0	+ -0.3 E-02	2.3	+ -1.6 F-03	07/27		L.T.	3.
07/23	07/30	1.01E 04	CU. FT	2.6	+ -0.3 E-02	4.5	+ -2.0 E-03	08/02		L.T.	2.
07/30	08/06	1.01E 04	CU. FT	1.9	+ -0.3 E-02	L.T.	2.	08/09		L.T.	2.
08/06	08/13	1.01E 04	CU. FT	2.1	+ -0.3 E-02	2.9	+ -1.5 F-03	08/16		L.T.	3.

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 05  
STATION 05 - 3.5 MI. 102 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP			GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU. M )		(PCI/CU. M )		DATE TIME		(PCI/CU. M )	
08/13	08/20	1.01E 04	CU. FT	2.4	+0.3 E-02	L.T.	2. E-03	08/25		L.T.	3. E-02
08/20	08/27	1.01E 04	CU. FT	2.2	+0.3 E-02	2.7	+1.5 E-03	08/30		L.T.	2. E-02
08/27	09/04	1.15E 04	CU. FT	3.3	+0.3 E-02	1.7	+1.4 E-03	09/09		L.T.	3. E-02
09/04	09/10	8.66E 03	CU. FT	2.6	+0.4 E-02	L.T.	2. E-03	09/14		L.T.	3. E-02
09/10	09/17	1.01E 04	CU. FT	2.6	+0.3 E-02	3.7	+1.8 E-03	09/20		L.T.	2. E-02
09/17	09/24	1.01E 04	CU. FT	2.1	+0.3 E-02	2.9	+1.5 E-03	09/29		L.T.	2. E-02
09/24	10/01	1.00E 04	CU. FT	2.6	+0.3 E-02	1.6	+1.4 E-03	10/05		L.T.	3. E-02
10/01	10/08	1.01E 04	CU. FT	2.6	+0.3 E-02	2.4	+1.5 E-03	10/12		L.T.	3. E-02
10/08	10/15	1.01E 04	CU. FT	2.7	+0.3 E-02	6.6	+2.2 E-03	10/19		L.T.	2. E-02
10/15	10/22	1.00E 04	CU. FT	2.5	+0.3 E-02	2.0	+1.3 E-03	10/26		L.T.	3. E-02
10/22	10/29	1.01E 04	CU. FT	3.6	+0.4 E-02	1.5	+0.3 E-02	11/01		L.T.	2. E-02
10/29	11/05	1.01E 04	CU. FT	3.5	+0.4 E-02	4.2	+1.9 E-03	11/08		L.T.	3. E-02
11/05	11/13	1.15E 04	CU. FT	3.1	+0.3 E-02	3.5	+1.6 E-03	11/17		L.T.	2. E-02
11/13	11/19	8.65E 03	CU. FT	2.9	+0.4 E-02	3.2	+1.7 E-03	11/24		L.T.	3. E-02
11/19	11/26	1.01E 04	CU. FT	2.5	+0.3 E-02	3.2	+1.6 E-03	11/30		L.T.	3. E-02
11/26	12/03	1.01E 04	CU. FT	2.1	+0.3 E-02	L.T.	2. E-03	12/07		L.T.	2. E-02
12/03	12/10	1.01E 04	CU. FT	2.6	+0.3 E-02	3.4	+1.7 E-03	12/13		L.T.	2. E-02
12/10	12/17	1.01E 04	CU. FT	4.2	+0.4 E-02	3.2	+1.8 E-03	12/22		L.T.	2. E-02
12/17	12/24	1.01E 04	CU. FT	5.5	+0.4 E-02	1.0	+0.3 E-02	01/03		L.T.	3. E-02
12/24	12/31	1.01E 04	CU. FT	3.5	+0.3 E-02	3.5	+1.6 E-03	01/06		L.T.	3. E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 06  
STATION 06 - 3.0 MI. J65 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )		GROSS ALPHA (PCI/CU. M )		TIME DATE TIME		I-131 (PCI/CU. M )	
01/02	01/06	8.37E 03	CU. FT	2.9 +-0.4 E-02		2.5 +-1.6 E-03		01/12		L.T. 5. E-02	
01/08	01/15	1.03E 04	CU. FT	1.9 +-0.3 E-02		1.9 +-1.4 E-03		01/20		L.T. 4. E-02	
01/15	01/22	9.95E 03	CU. FT	3.7 +-0.4 E-02		2.8 +-1.5 E-03		01/26		L.T. 4. E-02	
01/22	01/29	1.01E 04	CU. FT	1.7 +-0.3 E-02		1.6 +-1.2 E-03		02/01		L.T. 4. E-02	
01/29	02/05	9.97E 03	CU. FT	2.6 +-0.3 E-02		2.3 +-1.7 E-03		02/09		L.T. 5. E-02	
02/05	02/12	9.79E 03	CU. FT	1.9 +-0.3 E-02		3.1 +-1.8 E-03		02/16		L.T. 4. E-02	
02/12	02/19	1.01E 04	CU. FT	2.5 +-0.3 E-02		1.8 +-1.4 E-03		02/21		L.T. 3. E-02	
02/19	02/26	1.00E 04	CU. FT	2.6 +-0.3 E-02		4.1 +-1.9 E-03		03/02		L.T. 3. E-02	
02/26	03/05	1.01E 04	CU. FT	2.6 +-0.3 E-02		3.4 +-1.6 E-03		03/09		L.T. 4. E-02	
03/05	03/12	1.00E 04	CU. FT	1.7 +-0.3 E-02		L.T. 2. E-03		03/15		L.T. 3. E-02	
03/12	03/19	1.01E 04	CU. FT	1.3 +-0.2 E-02		2.1 +-1.3 E-03		03/22		L.T. 4. E-02	
03/19	03/26	9.99E 03	CU. FT	2.4 +-0.3 E-02		3.3 +-1.6 E-03		03/30		L.T. 5. E-02	
03/26	04/02	1.01E 04	CU. FT	1.6 +-0.3 E-02		2.7 +-1.5 E-03		04/06		L.T. 4. E-02	
04/02	04/09	1.02E 04	CU. FT	2.0 +-0.3 E-02		4.5 +-1.9 E-03		04/13		L.T. 2. E-02	
04/09	04/16	9.83E 03	CU. FT	1.9 +-0.3 E-02		1.5 +-1.2 E-03		04/19		L.T. 3. E-02	
04/16	04/23	1.01E 04	CU. FT	1.8 +-0.3 E-02		2.1 +-1.4 E-03		04/27		L.T. 4. E-02	
04/23	04/30	9.90E 03	CU. FT	1.2 +-0.2 E-02		L.T. 2. E-03		05/03		L.T. 3. E-02	
04/30	05/07	1.01E 04	CU. FT	1.7 +-0.3 E-02		2.9 +-1.6 E-03		05/13		L.T. 3. E-02	
05/07	05/14	1.00E 04	CU. FT	1.2 +-0.2 E-02		L.T. 2. E-03		05/17		L.T. 4. E-02	
05/14	05/21	9.46E 03	CU. FT	1.1 +-0.2 E-02		1.7 +-1.3 E-03		05/24		L.T. 3. E-02	
05/21	05/29	1.15E 04	CU. FT	1.1 +-0.2 E-02		1.8 +-1.2 E-03		06/03		L.T. 3. E-02	
05/29	06/04	8.65E 03	CU. FT	1.1 +-0.3 E-02		1.7 +-1.4 E-03		06/09		L.T. 3. E-02	
06/04	06/11	1.01E 04	CU. FT	1.1 +-0.2 E-02		1.8 +-1.3 E-03		06/14		L.T. 2. E-02	
06/11	06/18	1.02E 04	CU. FT	1.1 +-0.2 E-02		2.4 +-1.6 E-03		06/22		L.T. 3. E-02	
06/18	06/25	9.88E 03	CU. FT	1.1 +-0.2 E-02		2.0 +-1.4 E-03		06/29		L.T. 3. E-02	
06/25	07/02	1.01E 04	CU. FT	2.2 +-0.3 E-02		3.2 +-1.6 E-03		07/07		L.T. 2. E-02	
07/02	07/09	1.01E 04	CU. FT	2.1 +-0.3 E-02		4.4 +-1.3 E-03		07/12		L.T. 2. E-02	
07/09	07/16	1.00E 04	CU. FT	1.7 +-0.3 E-02		2.9 +-1.6 E-03		07/19		L.T. 4. E-02	
07/16	07/23	1.01E 04	CU. FT	1.7 +-0.3 E-02		L.T. 2. E-03		07/27		L.T. 5. E-02	
07/23	07/30	1.01E 04	CU. FT	1.9 +-0.3 E-02		2.7 +-1.7 E-03		08/02		L.T. 4. E-02	
07/30	08/06	1.00E 04	CU. FT	1.7 +-0.3 E-02		3.1 +-1.9 E-03		08/09		L.T. 4. E-02	
08/06	08/13	1.01E 04	CU. FT	2.2 +-0.3 E-02		4.0 +-1.7 E-03		08/16		L.T. 3. E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 06  
STATION 06 - 3.0 MI. 165 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER	AP FILTER	MID-COUNT	CHARCOAL FILTER
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )	GROSS ALPHA (PCI/CU. M )	TIME DATE TIME	I-131 (PCI/CU. M )
08/13	08/20	1.01E 04	CU. FT	1.9 +-0.3 E-02	3.4 +-1.9 E-03	08/24	L.T. 5. E-02
08/20	08/27	1.01E 04	CU. FT	1.9 +-0.3 E-02	1.3 +-1.1 E-03	08/31	L.T. 3. E-02
08/27	09/04	1.15E 04	CU. FT	3.0 +-0.3 E-02	2.7 +-1.6 E-03	09/09	L.T. 3. E-02
09/04	09/10	8.69E 03	CU. FT	2.2 +-0.3 E-02	2.6 +-1.8 E-03	09/14	L.T. 5. E-02
09/10	09/17	1.00E 04	CU. FT	1.8 +-0.3 E-02	3.7 +-1.8 E-03	09/20	L.T. 4. E-02
09/17	09/24	1.01E 04	CU. FT	1.4 +-0.2 E-02	3.5 +-1.6 E-03	09/29	L.T. 5. E-02
09/24	10/01	1.00E 04	CU. FT	1.9 +-0.3 E-02	1.8 +-1.4 E-03	10/05	L.T. 3. E-02
10/01	10/08	1.01E 04	CU. FT	2.0 +-0.3 E-02	2.1 +-1.5 E-03	10/12	L.T. 3. E-02
10/08	10/15	1.01E 04	CU. FT	2.2 +-0.3 E-02	4.3 +-1.9 E-03	10/19	L.T. 5. E-02
10/15	10/22	9.98E 03	CU. FT	2.5 +-0.3 E-02	3.1 +-1.6 E-03	10/26	L.T. 3. E-02
10/22	10/29	1.01E 04	CU. FT	2.8 +-0.3 E-02	9.0 +-2.7 E-03	11/01	L.T. 3. E-02
10/29	11/05	1.01E 04	CU. FT	4.2 +-0.4 E-02	4.2 +-1.9 E-03	11/09	L.T. 3. E-02
11/05	11/13	1.15E 04	CU. FT	3.1 +-0.3 E-02	2.6 +-1.4 E-03	11/20	L.T. 4. E-02
11/13	11/19	8.65E 03	CU. FT	2.9 +-0.4 E-02	2.6 +-1.6 E-03	11/25	L.T. 3. E-02
11/19	11/26	1.01E 04	CU. FT	2.3 +-0.3 E-02	3.2 +-1.6 E-03	11/30	L.T. 3. E-02
11/26	12/03	1.01E 04	CU. FT	1.9 +-0.3 E-02	L.T. 2. E-03	12/07	L.T. 3. E-02
12/03	12/10	1.01E 04	CU. FT	2.6 +-0.3 E-02	3.9 +-1.8 E-03	12/13	L.T. 3. E-02
12/10	12/17	1.01E 04	CU. FT	4.2 +-0.4 E-02	3.2 +-1.8 E-03	12/22	L.T. 5. E-02
12/17	12/24	1.01E 04	CU. FT	6.5 +-0.4 E-02	7.7 +-2.4 E-03	01/03	L.T. 6. E-02
12/24	12/31	1.01E 04	CU. FT	3.0 +-0.3 E-02	3.0 +-1.5 E-03	01/06	L.T. 3. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 07  
STATION 07 - 2.5 MI. 230 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER			AP FILTER			MID-COUNT		CHARCOAL FILTER		
START	STOP			GROSS BETA			GROSS ALPHA			TIME		I-131		
DATE	DATE			(PCI/CU. M )			(PCI/CU. M )			DATE	TIME	(PCI/CU. M )		
01/02	01/08	8.66E 03	CU. FT	3.3	+0.4	E-02	2.8	+1.6	E-03	01/12		L.T.	5.	E-02
01/08	01/15	1.02E 04	CU. FT	1.8	+0.3	E-02	2.1	+1.5	E-03	01/20		L.T.	4.	E-02
01/15	01/22	9.95E 03	CU. FT	3.1	+0.3	E-02	2.0	+1.3	E-03	01/26		L.T.	4.	E-02
01/22	01/29	1.01E 04	CU. FT	1.5	+0.3	E-02	1.8	+1.3	E-03	02/01		L.T.	4.	E-02
01/29	02/05	1.02E 04	CU. FT	2.8	+0.3	E-02	3.5	+1.9	E-03	02/09		L.T.	5.	E-02
02/05	02/12	1.01E 04	CU. FT	2.0	+0.3	E-02	5.8	+2.2	E-03	02/16		L.T.	4.	E-02
02/12	02/19	9.81E 03	CU. FT	2.7	+0.3	E-02	4.3	+1.9	E-03	02/21		L.T.	3.	E-02
02/19	02/26	1.03E 04	CU. FT	2.7	+0.3	E-02	4.0	+1.8	E-03	03/02		L.T.	2.	E-02
02/26	03/05	9.98E 03	CU. FT	1.9	+0.3	E-02	3.4	+1.6	E-03	03/09		L.T.	4.	E-02
03/05	03/12	9.94E 03	CU. FT	1.6	+0.3	E-02	L.T.	2.	E-03	03/15		L.T.	3.	E-02
03/12	03/19	1.01E 04	CU. FT	1.4	+0.3	E-02	1.5	+1.2	E-03	03/22		L.T.	4.	E-02
03/19	03/26	1.00E 04	CU. FT	2.1	+0.3	E-02	2.8	+1.5	E-03	03/30		L.T.	5.	E-02
03/26	04/02	1.01E 04	CU. FT	1.6	+0.3	E-02	2.1	+1.4	E-03	04/06		L.T.	4.	E-02
04/02	04/09	1.04E 04	CU. FT	1.8	+0.3	E-02	3.3	+1.6	E-03	04/13		L.T.	2.	E-02
04/09	04/16	9.95E 03	CU. FT	2.1	+0.3	E-02	3.9	+1.7	E-03	04/19		L.T.	3.	E-02
04/16	04/23	1.00E 04	CU. FT	9.7	+2.2	E-03	L.T.	1.	E-03	04/27		L.T.	4.	E-02
04/23	04/30	9.94E 03	CU. FT	1.2	+0.2	E-02	3.6	+1.9	E-03	05/03		L.T.	3.	E-02
04/30	05/07	1.02E 04	CU. FT	1.9	+0.3	E-02	1.9	+1.4	E-03	05/13		L.T.	3.	E-02
05/07	05/14	1.03E 04	CU. FT	1.1	+0.2	E-02	L.T.	2.	E-03	05/17		L.T.	4.	E-02
05/14	05/21	9.97E 03	CU. FT	8.4	+2.1	E-03	2.5	+1.4	E-03	05/24		L.T.	2.	E-02
05/21	05/29	1.15E 04	CU. FT	1.2	+0.2	E-02	1.6	+1.2	E-03	06/03		L.T.	3.	E-02
05/29	06/04	8.64E 03	CU. FT	1.4	+0.3	E-02	2.1	+1.5	E-03	06/09		L.T.	3.	E-02
06/04	06/11	1.02E 04	CU. FT	1.3	+0.2	E-02	1.9	+1.3	E-03	06/14		L.T.	2.	E-02
06/11	06/18	9.74E 03	CU. FT	8.2	+2.2	E-03	L.T.	2.	E-03	06/22		L.T.	4.	E-02
06/18	06/25	1.04E 04	CU. FT	1.3	+0.2	E-02	2.0	+1.4	E-03	06/29		L.T.	3.	E-02
06/25	07/02	1.01E 04	CU. FT	2.0	+0.3	E-02	3.4	+1.7	E-03	07/07		L.T.	2.	E-02
07/02	07/09	1.01E 04	CU. FT	1.4	+0.2	E-02	3.2	+1.6	E-03	07/12		L.T.	2.	E-02
07/09	07/16	1.01E 04	CU. FT	1.2	+0.2	E-02	3.6	+1.7	E-03	07/19		L.T.	4.	E-02
07/16	07/23	1.00E 04	CU. FT	1.0	+0.2	E-02	L.T.	2.	E-03	07/27		L.T.	5.	E-02
07/23	07/30	1.01E 04	CU. FT	2	+0.3	E-02	4.2	+1.9	E-03	08/02		L.T.	4.	E-02
07/30	08/06	1.01E 04	CU. FT	1	+0.3	E-02	L.T.	2.	E-03	08/09		L.T.	4.	E-02
08/06	08/13	1.01E 04	CU. FT	1.5	+0.3	E-02	2.6	+1.4	E-03	08/16		L.T.	3.	E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 07  
STATION 07 - 2.5 MI. 230 OFC. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP			GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU. M )		(PCI/CU. M )		DATE TIME		(PCI/CU. M )	
08/13	08/20	1.00E 04	CU. FT	1.7	+0.3 E-02	2.0	+1.6 E-03	08/24		L.T.	5. E-02
08/20	08/27	1.01E 04	CU. FT	1.6	+0.3 E-02	2.7	+1.5 E-03	08/31		L.T.	3. E-02
08/27	09/04	1.14E 04	CU. FT	2.6	+0.3 E-02	3.6	+1.7 E-03	09/09		L.T.	3. E-02
09/04	09/10	8.72E 03	CU. FT	1.9	+0.3 E-02	3.2	+1.9 E-03	09/14		L.T.	5. E-02
09/10	09/17	1.01E 04	CU. FT	2.0	+0.3 E-02	3.4	+1.7 E-03	09/20		L.T.	4. E-02
09/17	09/24	1.01E 04	CU. FT	1.3	+0.2 E-02	2.6	+1.4 E-03	09/29		L.T.	5. E-02
09/24	10/01	1.02E 04	CU. FT	1.7	+0.3 E-02	3.0	+1.7 E-03	10/05		L.T.	3. E-02
10/01	10/08	9.84E 03	CU. FT	1.9	+0.3 E-02	L.T.	2. E-03	10/12		L.T.	3. E-02
10/08	10/15	1.03E 04	CU. FT	2.6	+0.3 E-02	6.9	+2.3 E-03	10/19		L.T.	4. E-02
10/15	10/22	9.83E 03	CU. FT	2.2	+0.3 E-02	1.8	+1.3 E-03	10/26		L.T.	3. E-02
10/22	10/29	1.03E 04	CU. FT	3.6	+0.4 E-02	1.8	+0.4 E-02	11/01		L.T.	3. E-02
10/29	11/05	9.93E 03	CU. FT	2.6	+0.3 E-02	3.4	+1.8 E-03	11/09		L.T.	3. E-02
11/05	11/13	1.17E 04	CU. FT	3.3	+0.3 E-02	2.9	+1.4 E-03	11/20		L.T.	4. E-02
11/13	11/19	8.44E 03	CU. FT	2.5	+0.3 E-02	3.3	+1.8 E-03	11/25		L.T.	3. E-02
11/19	11/26	1.03E 04	CU. FT	2.4	+0.3 E-02	4.3	+1.8 E-03	11/30		L.T.	3. E-02
11/26	12/03	1.01E 04	CU. FT	2.0	+0.3 E-02	L.T.	2. E-03	12/07		L.T.	3. E-02
12/03	12/10	1.01E 04	CU. FT	2.5	+0.3 E-02	2.6	+1.5 E-03	12/13		L.T.	3. E-02
12/10	12/17	1.00E 04	CU. FT	3.9	+0.4 E-02	3.4	+1.8 E-03	12/22		L.T.	5. E-02
12/17	12/24	1.01E 04	CU. FT	4.7	+0.4 E-02	7.6	+2.3 E-03	01/03		L.T.	6. E-02
12/24	12/31	1.01E 04	CU. FT	3.9	+0.4 E-02	3.1	+1.5 E-03	01/06		L.T.	3. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 08  
STATION 08 - 2.5 MI. 260 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )		GROSS ALPHA (PCI/CU. M )		TIME DATE TIME		I-131 (PCI/CU. M )		
01/02	01/08	8.66E 03	CU. FT	2.9 +-0.4 E-02		1.7 +-1.4 E-03						
01/08	01/15	1.02E 04	CU. FT	1.9 +-0.3 E-02		1.9 +-1.4 E-03		01/12		L.T. 5.	E-02	
01/15	01/22	9.89E 03	CU. FT	3.4 +-0.4 E-02		3.6 +-1.7 E-03		01/20		L.T. 4.	E-02	
01/22	01/29	1.01E 04	CU. FT	1.6 +-0.3 E-02		1.5 +-1.2 E-03		01/26		L.T. 4.	E-02	
01/29	02/05	1.02E 04	CU. FT	2.8 +-0.3 E-02		2.4 +-1.7 E-03		02/01		L.T. 4.	E-02	
02/05	02/12	1.01E 04	CU. FT	1.7 +-0.3 E-02		3.2 +-1.8 E-03		02/09		L.T. 5.	E-02	
02/12	02/19	9.88E 03	CU. FT	2.9 +-0.3 E-02		3.0 +-1.7 E-03		02/16		L.T. 4.	E-02	
02/19	02/26	1.02E 04	CU. FT	2.8 +-0.3 E-02		4.0 +-1.8 E-03		02/21		L.T. 3.	E-02	
02/26	03/05	1.01E 04	CU. FT	2.6 +-0.3 E-02		7.4 +-1.4 E-03		03/02		L.T. 3.	E-02	
03/05	03/12	9.97E 03	CU. FT	1.5 +-0.3 E-02		L.T. 2.	E-03	03/09		L.T. 4.	E-02	
03/12	03/19	1.01E 04	CU. FT	1.1 +-0.2 E-02		2.1 +-1.3 E-03		03/15		L.T. 3.	E-02	
03/19	03/26	1.02E 04	CU. FT	2.4 +-0.3 E-02		3.5 +-1.6 E-03		03/22		L.T. 4.	E-02	
03/26	04/02	9.94E 03	CU. FT	1.6 +-0.3 E-02		L.T. 1.	E-03	03/30		L.T. 5.	E-02	
04/02	04/09	1.02E 04	CU. FT	2.2 +-0.3 E-02		3.2 +-1.6 E-03		04/06		L.T. 4.	E-02	
04/09	04/16	9.99E 03	CU. FT	2.0 +-0.3 E-02		4.1 +-1.8 E-03		04/13		L.T. 2.	E-02	
04/16	04/23	9.97E 03	CU. FT	2.0 +-0.3 E-02		3.4 +-1.7 E-03		04/19		L.T. 3.	E-02	
04/23	04/30	9.99E 03	CU. FT	1.4 +-0.2 E-02		2.4 +-1.7 E-03		04/27		L.T. 4.	E-02	
04/30	05/07	1.01E 04	CU. FT	1.9 +-0.3 E-02		2.9 +-1.6 E-03		05/03		L.T. 3.	E-02	
05/07	05/14	1.02E 04	CU. FT	1.2 +-0.2 E-02		L.T. 2.	E-03	05/13		L.T. 3.	E-02	
05/14	05/21	1.01E 04	CU. FT	1.1 +-0.2 E-02		1.6 +-1.2 E-03		05/17		L.T. 4.	E-02	
05/21	05/29	1.14E 04	CU. FT	1.3 +-0.2 E-02		1.7 +-1.2 E-03		05/24		L.T. 2.	E-02	
05/29	06/04	8.68E 03	CU. FT	1.5 +-0.3 E-02		1.9 +-1.4 E-03		06/03		L.T. 3.	E-02	
06/04	06/11	1.02E 04	CU. FT	1.1 +-0.2 E-02		1.4 +-1.2 E-03		06/09		L.T. 3.	E-02	
06/11	06/18	9.94E 03	CU. FT	1.2 +-0.2 E-02		L.T. 2.	E-03	06/14		L.T. 2.	E-02	
06/18	06/25	1.00E 04	CU. FT	1.2 +-0.2 E-02		L.T. 1.	E-03	06/22		L.T. 4.	E-02	
06/25	07/02	1.01E 04	CU. FT	2.3 +-0.3 E-02		3.4 +-1.7 E-03		06/29		L.T. 3.	E-02	
07/02	07/09	1.01E 04	CU. FT	2.0 +-0.3 E-02		3.6 +-1.6 E-03		07/07		L.T. 2.	E-02	
07/09	07/16	1.02E 04	CU. FT	1.8 +-0.3 E-02		2.7 +-1.5 E-03		07/12		L.T. 2.	E-02	
07/16	07/23	9.86E 03	CU. FT	1.6 +-0.3 E-02		1.8 +-1.5 E-03		07/19		L.T. 4.	E-02	
07/23	07/30	1.00E 04	CU. FT	1.7 +-0.3 E-02		2.8 +-1.7 E-03		07/27		L.T. 5.	E-02	
07/30	08/06	1.01E 04	CU. FT	1.8 +-0.3 E-02		2.2 +-1.8 E-03		08/02		L.T. 4.	E-02	
08/06	08/13	1.01E 04	CU. FT	2.1 +-0.3 E-02		2.3 +-1.4 E-03		08/09		L.T. 4.	E-02	
								08/16		L.T. 3.	E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 08  
STATION 08 - 2.5 MI. 260 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER	AP FILTER	MID-COUNT	CHARCOAL FILTER
START	STOP			GROSS BETA	GROSS ALPHA		TIME
DATE	DATE			(PCI/CU. M )	(PCI/CU. M )	DATE TIME	(PCI/CU. M )
08/13	08/20	1.00E 04	CU. FT	2.5 +-0.3 E-02	L.T. 2. E-03	08/24	L.T. 5. E-02
08/20	08/27	1.01E 04	CU. FT	2.0 +-0.3 E-02	1.9 +-1.3 E-03	08/31	L.T. 3. E-02
08/27	09/04	1.16E 04	CU. FT	3.1 +-0.3 E-02	2.9 +-1.6 E-03	09/09	L.T. 3. E-02
09/04	09/10	8.68E 03	CU. FT	2.1 +-0.3 E-02	3.2 +-1.9 E-03	09/14	L.T. 5. E-02
09/10	09/17	1.01E 04	CU. FT	2.4 +-0.3 E-02	2.4 +-1.5 E-03	09/20	L.T. 4. E-02
09/17	09/24	1.00E 04	CU. FT	1.8 +-0.3 E-02	2.3 +-1.4 E-03	09/29	L.T. 5. E-02
09/24	10/01	1.01E 04	CU. FT	1.8 +-0.3 E-02	2.6 +-1.6 E-03	10/05	L.T. 3. E-02
10/01	10/08	9.94E 03	CU. FT	2.2 +-0.3 E-02	2.0 +-1.5 E-03	10/12	L.T. 3. E-02
10/08	10/15	1.03E 04	CU. FT	2.7 +-0.3 E-02	4.4 +-1.9 E-03	10/19	L.T. 4. E-02
10/15	10/22	9.81E 03	CU. FT	2.2 +-0.3 E-02	2.3 +-1.4 E-03	10/26	L.T. 3. E-02
10/22	10/29	1.01E 04	CU. FT	3.4 +-0.4 E-02	9.6 +-2.7 E-03	11/01	L.T. 3. E-02
10/29	11/05	1.02E 04	CU. FT	3.5 +-0.4 E-02	6.4 +-2.2 E-03	11/09	L.T. 3. E-02
11/05	11/13	1.17E 04	CU. FT	3.1 +-0.3 E-02	3.9 +-1.6 E-03	11/20	L.T. 4. E-02
11/13	11/19	8.65E 03	CU. FT	2.8 +-0.4 E-02	4.1 +-1.9 E-03	11/25	L.T. 3. E-02
11/19	11/26	1.01E 04	CU. FT	2.5 +-0.3 E-02	3.5 +-1.7 E-03	11/30	L.T. 3. E-02
11/26	12/03	1.01E 04	CU. FT	2.0 +-0.3 E-02	L.T. 2. E-03	12/07	L.T. 3. E-02
12/03	12/10	9.92E 03	CU. FT	2.9 +-0.3 E-02	2.6 +-1.5 E-03	12/13	L.T. 3. E-02
12/10	12/17	1.02E 04	CU. FT	4.3 +-0.4 E-02	3.0 +-1.7 E-03	12/22	L.T. 5. E-02
12/17	12/24	9.88E 03	CU. FT	5.6 +-0.4 E-02	7.7 +-2.4 E-03	01/03	L.T. 6. E-02
12/24	12/31	1.03E 04	CU. FT	3.8 +-0.3 E-02	3.3 +-1.5 E-03	01/06	L.T. 3. E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 09  
STATION 09 - 7.25 MI. 235 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )		GROSS ALPHA (PCI/CU. M )		TIME DATE TIME		I-131 (PCI/CU. M )	
01/02	01/08	8.66E 03	CU. FT	2.4 +-0.3 E-02		2.3 +-1.5 E-03		01/12		L.T. 5. E-02	
01/08	01/15	1.02E 04	CU. FT	1.5 +-0.2 E-02		L.T. 1. E-03		01/20		L.T. 4. E-02	
01/15	01/22	9.97E 03	CU. FT	2.5 +-0.3 E-02		3.3 +-1.6 E-03		01/26		L.T. 4. E-02	
01/22	01/29	1.01E 04	CU. FT	1.3 +-0.2 E-02		1.9 +-1.3 E-03		02/01		L.T. 4. E-02	
01/29	02/05	1.02E 04	CU. FT	2.4 +-0.3 E-02		3.2 +-1.8 E-03		02/09		L.T. 5. E-02	
02/05	02/12	1.01E 04	CU. FT	1.8 +-0.3 E-02		4.3 +-2.0 E-03		02/16		L.T. 4. E-02	
02/12	02/19	1.00E 04	CU. FT	2.6 +-0.3 E-02		2.3 +-1.5 E-03		02/21		L.T. 3. E-02	
02/19	02/26	1.01E 04	CU. FT	2.3 +-0.3 E-02		5.8 +-2.1 E-03		03/02		L.T. 3. E-02	
02/26	03/05	1.03E 04	CU. FT	2.0 +-0.3 E-02		3.2 +-1.6 E-03		03/09		L.T. 4. E-02	
03/05	03/12	1.01E 04	CU. FT	1.3 +-0.2 E-02		L.T. 2. E-03		03/15		L.T. 3. E-02	
03/12	03/19	9.91E 03	CU. FT	1.1 +-0.2 E-02		2.0 +-1.3 E-03		03/22		L.T. 4. E-02	
03/19	03/26	1.02E 04	CU. FT	1.8 +-0.3 E-02		1.3 +-1.1 E-03		03/30		L.T. 5. E-02	
03/26	04/02	1.02E 04	CU. FT	1.5 +-0.2 E-02		1.6 +-1.3 E-03		04/06		L.T. 4. E-02	
04/02	04/09	9.92E 03	CU. FT	1.8 +-0.3 E-02		3.3 +-1.7 E-03		04/13		L.T. 2. E-02	
04/09	04/16	1.01E 04	CU. FT	1.7 +-0.3 E-02		2.3 +-1.4 E-03		04/19		L.T. 3. E-02	
04/16	04/23	9.97E 03	CU. FT	2.0 +-0.3 E-02		1.5 +-1.3 E-03		04/27		L.T. 4. E-02	
04/23	04/30	1.00E 04	CU. FT	1.2 +-0.2 E-02		L.T. 2. E-03		05/03		L.T. 3. E-02	
04/30	05/07	1.01E 04	CU. FT	2.0 +-0.3 E-02		3.9 +-1.8 E-03		05/13		L.T. 3. E-02	
05/07	05/14	1.02E 04	CU. FT	1.3 +-0.2 E-02		2.6 +-1.8 E-03		05/17		L.T. 4. E-02	
05/14	05/21	9.98E 03	CU. FT	9.5 +-2.2 E-03		1.8 +-1.3 E-03		05/24		L.T. 2. E-02	
05/21	05/27	1.15E 04	CU. FT	1.1 +-0.2 E-02		L.T. 1. E-03		06/03		L.T. 3. E-02	
05/27	06/04	8.65E 03	CU. FT	1.6 +-0.3 E-02		L.T. 1. E-03		06/09		L.T. 3. E-02	
06/04	06/11	1.00E 04	CU. FT	1.2 +-0.2 E-02		2.3 +-1.4 E-03		06/14		L.T. 2. E-02	
06/11	06/18	1.01E 04	CU. FT	9.2 +-2.2 E-03		L.T. 2. E-03		06/22		L.T. 3. E-02	
06/18	06/25	1.00E 04	CU. FT	1.1 +-0.2 E-02		2.3 +-1.5 E-03		06/29		L.T. 3. E-02	
06/25	07/02	1.01E 04	CU. FT	2.0 +-0.3 E-02		2.3 +-1.4 E-03		07/07		L.T. 2. E-02	
07/02	07/09	1.01E 04	CU. FT	1.8 +-0.3 E-02		2.3 +-1.4 E-03		07/12		L.T. 2. E-02	
07/09	07/16	1.02E 04	CU. FT	1.4 +-0.3 E-02		1.8 +-1.3 E-03		07/19		L.T. 4. E-02	
07/16	07/23	9.91E 03	CU. FT	1.5 +-0.3 E-02		L.T. 2. E-03		07/27		L.T. 5. E-02	
07/23	07/30	1.01E 04	CU. FT	2.2 +-0.3 E-02		2.7 +-1.7 E-03		08/02		L.T. 4. E-02	
07/30	08/06	1.01E 04	CU. FT	1.6 +-0.3 E-02		L.T. 2. E-03		08/09		L.T. 4. E-02	
08/06	08/13	1.01E 04	CU. FT	1.9 +-0.3 E-02		1.6 +-1.2 E-03		08/16		L.T. 3. E-02	

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 09  
STATION 09 - 7.25 MI. 335 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER	AP FILTER	MID-COUNT	CHARCOAL FILTER
START DATE	STOP DATE			GROSS BETA (PCI/CU. M)	GROSS ALPHA (PCI/CU. M)	TIME DATE TIME	I-131 (PCI/CU. M)
08/13	08/20	1.00E 04	CU. FT	1.8 +-0.3 E-02	L.T. 2. F-03	08/24	L.T. 5. E-02
08/20	08/27	1.01E 04	CU. FT	1.6 +-0.3 E-02	1.9 +-1.3 E-03	08/31	L.T. 3. E-02
08/27	09/04	1.15E 04	CU. FT	2.6 +-0.3 E-02	2.5 +-1.5 E-03	09/09	L.T. 3. E-02
09/04	09/10	8.68E 03	CU. FT	2.0 +-0.3 E-02	2.1 +-1.6 E-03	09/14	L.T. 5. E-02
09/10	09/17	1.01E 04	CU. FT	1.9 +-0.3 E-02	2.6 +-1.6 E-03	09/20	L.T. 4. E-02
09/17	09/24	1.01E 04	CU. FT	1.5 +-0.2 E-02	1.9 +-1.3 E-03	09/29	L.T. 5. E-02
09/24	10/01	1.02E 04	CU. FT	2.7 +-0.3 E-02	2.6 +-1.6 E-03	10/05	L.T. 3. E-02
10/01	10/08	9.98E 03	CU. FT	1.9 +-0.3 E-02	L.T. 2. F-03	10/12	L.T. 3. E-02
10/08	10/15	1.01E 04	CU. FT	2.0 +-0.3 E-02	5.1 +-1.7 E-03	10/19	L.T. 5. E-02
10/15	10/22	9.97E 03	CU. FT	2.0 +-0.3 E-02	2.9 +-1.5 E-03	10/26	L.T. 3. E-02
10/22	10/29	1.02E 04	CU. FT	2.1 +-0.3 E-02	7.0 +-2.4 E-03	11/01	L.T. 3. E-02
10/29	11/05	1.01E 04	CU. FT	1.7 +-0.3 E-02	3.2 +-1.7 E-03	11/09	L.T. 3. E-02
11/05	11/13	1.16E 04	CU. FT	2.6 +-0.3 E-02	3.2 +-1.5 E-03	11/20	L.T. 4. E-02
11/13	11/19	8.75E 03	CU. FT	2.5 +-0.3 E-02	2.8 +-1.6 E-03	11/25	L.T. 3. E-02
11/19	11/26	9.91E 03	CU. FT	2.1 +-0.3 E-02	1.5 +-1.3 E-03	11/30	L.T. 3. E-02
11/26	12/03	1.02E 04	CU. FT	1.7 +-0.3 E-02	L.T. 2. F-03	12/07	L.T. 3. E-02
12/03	12/10	1.01E 04	CU. FT	2.2 +-0.3 E-02	2.1 +-1.4 E-03	12/13	L.T. 3. E-02
12/10	12/17	1.00E 04	CU. FT	3.1 +-0.3 E-02	L.T. 2. E-03	12/22	L.T. 5. E-02
12/17	12/24	1.01E 04	CU. FT	3.5 +-0.4 E-02	5.6 +-2.1 E-03	01/03	L.T. 6. E-02
12/24	12/31	1.01E 04	CU. FT	3.0 +-0.3 E-02	2.0 +-1.3 E-03	01/06	L.T. 3. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 10  
STATION 10 - 10.0 MI. 160 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START DATE	STOP DATE			GROSS BETA	(PCI/CU. M )	GROSS ALPHA	(PCI/CU. M )	TIME	DATE TIME	I-131	(PCI/CU. M )
01/02	01/08	8.68E 03	CU. FT	2.9 +-0.4 E-02		2.1 +-1.5 F-03		01/12		L.T.	3. E-02
01/08	01/15	9.93E 03	CU. FT	1.5 +-0.3 E-02		1.6 +-1.4 F-03		01/20		L.T.	3. E-02
01/15	01/22	1.01E 04	CU. FT	3.5 +-0.4 E-02		4.0 +-1.7 F-03		01/26		L.T.	3. E-02
01/22	01/29	1.02E 04	CU. FT	1.6 +-0.3 E-02		1.4 +-1.2 F-03		02/01		L.T.	2. E-02
01/29	02/05	1.02E 04	CU. FT	2.4 +-0.3 E-02		1.9 +-1.6 F-03		02/09		L.T.	3. E-02
02/05	02/12	1.01E 04	CU. FT	1.7 +-0.3 E-02		3.1 +-1.8 F-03		02/16		L.T.	3. E-02
02/12	02/19	1.01E 04	CU. FT	2.6 +-0.3 E-02		3.1 +-1.7 F-03		02/21		L.T.	2. E-02
02/19	02/26	1.00E 04	CU. FT	2.0 +-0.3 E-02		4.9 +-2.0 E-03		03/02		L.T.	2. E-02
02/26	03/05	1.00E 04	CU. FT	2.0 +-0.3 E-02		1.6 +-1.2 F-03		03/09		L.T.	3. E-02
03/05	03/12	9.98E 03	CU. FT	1.3 +-0.2 E-02		2.3 +-1.6 F-03		03/15		L.T.	3. E-02
03/12	03/19	1.01E 04	CU. FT	1.0 +-0.2 E-02		L.T. 1. F-03		03/22		L.T.	2. E-02
03/19	03/26	1.00E 04	CU. FT	2.0 +-0.3 E-02		3.3 +-1.6 F-03		03/30		L.T.	3. E-02
03/26	04/02	1.01E 04	CU. FT	1.4 +-0.2 E-02		1.4 +-1.2 F-03		04/06		L.T.	3. E-02
04/02	04/09	1.03E 04	CU. FT	2.1 +-0.3 E-02		3.8 +-1.7 F-03		04/13		L.T.	2. E-02
04/09	04/16	9.82E 03	CU. FT	1.8 +-0.3 E-02		1.8 +-1.3 F-03		04/19		L.T.	2. E-02
04/16	04/23	1.02E 04	CU. FT	2.0 +-0.3 E-02		L.T. 1. F-03		04/27		L.T.	3. E-02
04/23	04/30	1.00E 04	CU. FT	1.3 +-0.2 E-02		L.T. 2. F-03		05/03		L.T.	3. E-02
04/30	05/07	1.01E 04	CU. FT	2.0 +-0.3 E-02		2.6 +-1.6 F-03		05/13		L.T.	3. E-02
05/07	05/14	1.02E 04	CU. FT	1.3 +-0.2 E-02		L.T. 2. F-03		05/17		L.T.	3. E-02
05/14	05/21	9.99E 03	CU. FT	1.0 +-0.2 E-02		2.1 +-1.3 F-03		05/24		L.T.	2. E-02
05/21	05/29	1.14E 04	CU. FT	L.T. 2. E-03		1.4 +-1.1 F-03		06/03		L.T.	2. E-02
05/29	06/04	8.54E 03	CU. FT	1.2 +-0.3 E-02		2.3 +-1.5 F-03		06/09		L.T.	2. E-02
06/04	06/11	1.02E 04	CU. FT	1.4 +-0.2 E-02		1.8 +-1.2 F-03		06/14		L.T.	1. E-02
06/11	06/18	9.79E 03	CU. FT	1.1 +-0.2 E-02		L.T. 2. F-03		06/22		L.T.	3. E-02
06/18	06/25	1.03E 04	CU. FT	1.5 +-0.3 E-02		1.7 +-1.3 F-03		06/29		L.T.	2. E-02
06/25	07/02	1.01E 04	CU. FT	2.0 +-0.3 E-02		2.7 +-1.5 F-03		07/07		L.T.	2. E-02
07/02	07/09	1.02E 04	CU. FT	2.1 +-0.3 E-02		3.7 +-1.7 F-03		07/12		L.T.	2. E-02
07/09	07/16	1.01E 04	CU. FT	1.8 +-0.3 E-02		2.4 +-1.5 F-03		07/19		L.T.	2. E-02
07/16	07/23	1.01E 04	CU. FT	1.6 +-0.3 E-02		L.T. 2. F-03		07/27		L.T.	3. E-02
07/23	07/30	1.01E 04	CU. FT	2.1 +-0.3 E-02		2.1 +-1.5 F-03		08/02		L.T.	2. E-02
07/30	08/06	1.01E 04	CU. FT	2.0 +-0.3 E-02		3.1 +-1.9 F-03		08/09		L.T.	2. E-02
08/06	08/13	1.01E 04	CU. FT	2.3 +-0.3 E-02		3.2 +-1.6 F-03		08/16		L.T.	2. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 10  
STATION 10 - 10.0 MI. 160 DEG. IND.

COLL. TIME		VOLUME	UNITS	AP FILTER	AP FILTER	MID-COUNT	CHARCOAL FILTER
START DATE	STOP DATE			GROSS BETA (PCI/CU. M )	GROSS ALPHA (PCI/CU. M )	TIME DATE TIME	I-131 (PCI/CU. M )
08/13	08/20	9.98E 03	CU. FT	2.3 +-0.3 E-02	4.1 +-2.0 E-03	08/24	L.T. 3. E-02
08/20	08/27	1.01E 04	CU. FT	2.1 +-0.3 E-02	2.9 +-1.5 E-03	08/31	L.T. 2. E-02
08/27	09/04	1.15E 04	CU. FT	3.4 +-0.3 E-02	3.7 +-1.7 E-03	09/09	L.T. 2. E-02
09/04	09/10	8.51E 03	CU. FT	2.6 +-0.4 E-02	3.2 +-1.9 E-03	09/14	L.T. 3. E-02
09/10	09/17	1.01E 04	CU. FT	2.2 +-0.3 E-02	3.1 +-1.7 E-03	09/20	L.T. 2. E-02
09/17	09/24	1.00E 04	CU. FT	1.7 +-0.3 E-02	3.2 +-1.6 E-03	09/29	L.T. 3. E-02
09/24	10/01	1.01E 04	CU. FT	2.3 +-0.3 E-02	2.6 +-1.6 E-03	10/05	L.T. 2. E-02
10/01	10/08	1.01E 04	CU. FT	2.3 +-0.3 E-02	3.1 +-1.7 E-03	10/12	L.T. 2. E-02
10/08	10/15	9.99E 03	CU. FT	1.9 +-0.3 E-02	4.4 +-1.9 E-03	10/19	L.T. 3. E-02
10/15	10/22	9.88E 03	CU. FT	2.5 +-0.3 E-02	3.3 +-1.6 E-03	10/26	L.T. 3. E-02
10/22	10/29	1.03E 04	CU. FT	2.5 +-0.3 E-02	6.5 +-2.3 E-03	11/01	L.T. 2. E-02
10/29	11/05	1.00E 04	CU. FT	3.7 +-0.4 E-02	5.5 +-2.1 E-03	11/09	L.T. 2. E-02
11/05	11/13	1.16E 04	CU. FT	3.0 +-0.3 E-02	2.8 +-1.4 E-03	11/20	L.T. 3. E-02
11/13	11/19	8.52E 03	CU. FT	2.8 +-0.4 E-02	4.8 +-2.1 E-03	11/25	L.T. 2. E-02
11/19	11/26	1.03E 04	CU. FT	1.9 +-0.3 E-02	2.2 +-1.4 E-03	11/30	L.T. 2. E-02
11/26	12/03	1.01E 04	CU. FT	2.0 +-0.3 E-02	L.T. 2. E-03	12/07	L.T. 3. E-02
12/03	12/10	1.01E 04	CU. FT	2.4 +-0.3 E-02	1.6 +-1.3 E-03	12/13	L.T. 2. E-02
12/10	12/17	1.01E 04	CU. FT	3.9 +-0.4 E-02	1.8 +-1.5 E-03	12/22	L.T. 4. E-02
12/17	12/24	9.98E 03	CU. FT	5.0 +-0.4 E-02	8.0 +-2.4 E-03	01/03	L.T. 4. E-02
12/24	12/31	1.01E 04	CU. FT	2.9 +-0.3 E-02	3.3 +-1.5 E-03	01/06	L.T. 2. E-02

D. QUARTERLY COMPOSITES OF AIR PARTICULATE FILTERS  
STATIONS 01-10



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS  
(PCI/CU. M )

STATION NUMBER 01

STATION 01 - 0.1 MI. 225 DEG. IND.

DATE COLLECTED 01/02-04/02 04/02-07/02 07/02-10/01 10/01-12/31

GAMMA SPECTRUM ANALYSIS

RE-7	9.54+-1.63E-02	1.07+-0.11E-01	1.13+-0.17E-01	8.48+-1.09E-02
K-40	L.T. 8. E-03	L.T. 8. F-03	L.T. 3. F-02	L.T. 8. E-03
MH-54	L.T. 5. E-04	L.T. 5. E-04	L.T. 7. E-04	L.T. 5. E-04
CO-58	L.T. 8. E-04	L.T. 7. E-04	L.T. 1. E-03	L.T. 8. E-04
FE-59	L.T. 2. E-03	L.T. 2. E-03	L.T. 4. E-03	L.T. 2. E-03
CO-60	L.T. 6. E-04	L.T. 4. E-04	L.T. 8. E-04	L.T. 6. E-04
ZN-65	L.T. 1. E-03	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03
ZR-95	L.T. 1. E-03	L.T. 8. E-04	L.T. 1. E-03	L.T. 8. E-04
RU-103	L.T. 2. E-03	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 5. E-03
I-131	L.T. 3. E-01	L.T. 1. E-01	L.T. 3. E-01	L.T. 1. E-01
CS-134	L.T. 5. E-04	L.T. 5. E-04	L.T. 7. E-04	L.T. 4. E-04
CS-137	L.T. 6. E-04	L.T. 4. E-04	L.T. 6. E-04	L.T. 5. E-04
BA-140	L.T. 3. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02
CE-141	L.T. 3. E-03	L.T. 2. E-03	L.T. 4. E-03	L.T. 2. E-03
CE-144	L.T. 3. E-03	L.T. 3. E-03	L.T. 5. E-03	L.T. 3. E-03
RA-226	L.T. 1. E-02	L.T. 7. E-03	L.T. 1. E-02	L.T. 1. E-02
TH-228	L.T. 8. E-04	L.T. 7. E-04	L.T. 1. E-03	L.T. 1. E-03



NEBRASKA PUBLIC POWER DISTRICT  
 CJOPEL NUCLEAR STATION  
 EXPOSURE PATHWAY - AIRBORNE  
 COMPOSITE AIR PARTICULATE FILTERS  
 (PCI/CU. M )  
 STATION NUMBER 02  
 STATION 02 - 0.75 MI. 275 DEG. IND.

DATE COLLECTED                      01/02-04/02                      04/02-07/02                      07/02-10/01                      10/01-12/31

GAMMA SPECTRUM ANALYSIS:

BE-7	8.18+-1.17E-02	1.18+-0.12E-01	1.11+-0.13E-01	8.67+-1.17E-02
K-40	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02
MN-54	L.T. 7. E-04	L.T. 6. E-04	L.T. 5. E-04	L.T. 6. E-04
CO-58	L.T. 1. E-03	L.T. 9. E-04	L.T. 7. E-04	L.T. 9. E-04
FE-59	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
CO-60	L.T. 7. E-04	L.T. 7. E-04	L.T. 5. E-04	L.T. 8. E-04
ZN-65	L.T. 2. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
IR-95	L.T. 1. E-03	L.T. 1. E-03	L.T. 8. E-04	L.T. 9. E-04
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03	L.T. 1. E-03
RU-106	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03
I-131	L.T. 3. E-01	L.T. 1. E-01	L.T. 2. E-01	L.T. 1. E-01
CS-134	L.T. 6. E-04	L.T. 6. E-04	L.T. 4. E-04	L.T. 7. E-04
CS-137	L.T. 6. E-04	L.T. 5. E-04	L.T. 4. E-04	L.T. 6. E-04
BA-140	L.T. 4. E-02	L.T. 1. E-02	L.T. 3. E-02	L.T. 2. E-02
CE-141	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
CE-144	L.T. 3. E-03	L.T. 4. E-03	L.T. 3. E-03	L.T. 3. E-03
RA-226	L.T. 9. E-03	L.T. 1. E-02	L.T. 8. E-03	L.T. 1. E-02
TH-228	L.T. 1. E-03	L.T. 9. E-04	L.T. 7. E-04	L.T. 1. E-03

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS  
(PCI/CU, M)  
STATION NUMBER 03  
STATION 03 - 2.5 MI. 330 DEG. INO.

DATE COLLECTED	01/02-04/02	04/02-07/02	07/02-10/01	10/01-12/31
GAMMA SPECTRUM ANALYSIS:				
BE-7	7.95+-1.08E-02	9.67+-1.12E-02	9.10+-1.27E-02	7.58+-1.09E-02
K-40	L.T. 1. E-02	L.T. 7. E-03	L.T. 2. F-02	L.T. 1. E-02
MN-54	L.T. 6. E-04	L.T. 4. E-04	L.T. 7. E-04	L.T. 6. E-04
CO-58	L.T. 9. E-04	L.T. 7. E-04	L.T. 1. E-03	L.T. 8. E-04
FE-59	L.T. 3. E-03	L.T. 2. E-03	L.T. 4. E-03	L.T. 3. E-03
CN-60	L.T. 6. E-04	L.T. 5. E-04	L.T. 7. F-04	L.T. 6. E-04
ZN-65	L.T. 1. E-03	L.T. 9. E-04	L.T. 2. E-03	L.T. 1. E-03
ZR-95	L.T. 1. E-03	L.T. 6. E-04	L.T. 1. E-03	L.T. 1. E-03
RU-103	L.T. 2. E-03	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 5. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 5. E-03
I-131	L.T. 3. E-01	L.T. 9. E-02	L.T. 2. F-01	L.T. 1. E-01
CS-134	L.T. 6. E-04	L.T. 4. E-04	L.T. 7. E-04	L.T. 6. E-04
CS-137	L.T. 5. E-04	L.T. 4. E-04	L.T. 7. F-04	L.T. 5. E-04
BA-140	L.T. 4. E-02	L.T. 1. E-02	L.T. 3. E-02	L.T. 2. E-02
CE-141	L.T. 3. E-03	L.T. 2. E-03	L.T. 3. E-03	L.T. 3. E-03
CE-144	L.T. 3. E-03	L.T. 3. E-03	L.T. 4. E-03	L.T. 4. E-03
RA-226	L.T. 9. E-03	L.T. 7. E-03	L.T. 9. E-03	L.T. 1. E-02
TH-228	L.T. 8. E-04	L.T. 8. E-04	L.T. 9. E-04	L.T. 9. E-04

NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - AIRBORNE  
 COMPOSITE AIR PARTICULATE FILTERS  
 (PCI/CU, M)  
 STATION NUMBER 04  
 STATION 04 - 3.0 MI. 43 DEG. IND.

DATE COLLECTED 01/02-04/02 04/02-07/02 07/02-10/01 10/01-12/31

GAMMA SPECTRUM ANALYSIS:

BE-7	8.22+-1.12E-02	1.03+-0.10E-01	1.02+-0.13E-01	7.83+-1.11E-02
K-40	L.T. 8. E-03	L.T. 5. E-03	L.T. 9. E-03	L.T. 8. E-03
MN-54	L.T. 4. E-04	L.T. 3. E-04	L.T. 6. E-04	L.T. 4. E-04
CO-58	L.T. 6. E-04	L.T. 5. E-04	L.T. 8. E-04	L.T. 6. E-04
FE-59	L.T. 2. E-03	L.T. 1. E-03	L.T. 3. E-03	L.T. 2. E-03
CO-60	L.T. 5. E-04	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04
ZN-65	L.T. 1. E-03	L.T. 9. E-04	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 8. E-04	L.T. 6. E-04	L.T. 1. E-03	L.T. 6. E-04
RU-103	L.T. 1. E-03	L.T. 8. E-04	L.T. 1. E-03	L.T. 1. E-03
RU-106	L.T. 3. E-03	L.T. 3. E-03	L.T. 5. E-03	L.T. 4. E-03
I-131	L.T. 2. E-01	L.T. 7. E-02	L.T. 2. E-01	L.T. 8. E-02
CS-134	L.T. 4. E-04	L.T. 3. E-04	L.T. 5. E-04	L.T. 4. E-04
CS-137	L.T. 4. E-04	L.T. 3. E-04	L.T. 4. E-04	L.T. 5. E-04
RA-140	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02
CE-141	L.T. 2. E-03	L.T. 1. E-03	L.T. 3. E-03	L.T. 2. E-03
CE-144	L.T. 2. E-03	L.T. 1. E-03	L.T. 3. E-03	L.T. 3. E-03
RA-226	L.T. 6. E-03	L.T. 5. E-03	L.T. 8. E-03	L.T. 6. E-03
YN-228	L.T. 6. E-04	L.T. 5. E-04	L.T. 9. E-04	L.T. 6. E-04

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS  
IPCI/CU. M 1

STATION NUMBER 05

STATION 05 - 3.5 MI. 102 DEG. IND.

DATE COLLECTED	01/02-04/02	06/02-07/02	07/02-10/01	10/01-12/31
GAMMA SPECTRUM ANALYSIS:				
BE-7	8.19+1.16E-02	1.79+0.18E-01	1.00+0.14E-01	1.10+0.13E-01
K-40	L.Y. 7. E-03	L.Y. 1. E-02	L.Y. 2. E-02	L.Y. 3. E-02
MN-54	L.Y. 4. E-04	L.Y. 5. E-04	L.Y. 7. E-04	L.Y. 8. E-04
CO-58	L.Y. 8. E-04	L.Y. 7. E-04	L.Y. 1. E-03	L.Y. 1. E-03
FE-59	L.Y. 2. E-03	L.Y. 3. E-03	L.Y. 3. E-03	L.Y. 3. E-03
CO-60	L.Y. 6. E-04	L.Y. 6. E-04	L.Y. 8. E-04	L.Y. 8. E-04
ZN-65	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 2. E-03	L.Y. 2. E-03
Zn-95	L.Y. 1. E-03	L.Y. 7. E-04	L.Y. 1. E-03	L.Y. 1. E-03
RU-103	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 2. E-03	L.Y. 2. E-03
RU-106	L.Y. 4. E-03	L.Y. 4. E-03	L.Y. 6. E-03	L.Y. 7. E-03
I-131	L.Y. 2. E-01	L.Y. 1. E-01	L.Y. 3. E-01	L.Y. 2. E-01
CS-134	L.Y. 5. E-04	L.Y. 5. E-04	L.Y. 7. E-04	L.Y. 8. E-04
CS-137	L.Y. 5. E-04	L.Y. 5. E-04	L.Y. 7. E-04	L.Y. 7. E-04
RA-140	L.Y. 3. E-02	L.Y. 2. E-02	L.Y. 3. E-02	L.Y. 2. E-02
CE-141	L.Y. 3. E-03	L.Y. 3. E-03	L.Y. 3. E-03	L.Y. 4. E-03
CE-144	L.Y. 3. E-03	L.Y. 3. E-03	L.Y. 4. E-03	L.Y. 5. E-03
RA-226	L.Y. 8. E-03	L.Y. 7. E-03	L.Y. 1. E-02	L.Y. 1. E-02
TH-228	L.Y. 7. E-04	L.Y. 7. E-04	L.Y. 1. E-03	L.Y. 1. E-03

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS  
(PCI/CU. M )  
STATION NUMBER 06  
STATION 06 - 3.0 MI. 165 DEG. IND.

DATE COLLECTED                      01/02-04/02                      04/02-07/02                      07/02-10/01                      10/01-12/31

GAMMA SPECTRUM ANALYSIS:

BE-7	9.00+-1.18E-02	1.00+-0.13E-01	9.37+-1.08E-02	8.76+-1.13E-02
K-40	L.T. 9. E-03	1.42+-0.61E-02	L.T. 9. F-03	L.T. 1. E-02
MN-54	L.T. 5. E-04	L.T. 8. E-04	L.T. 5. E-04	L.T. 5. E-04
CO-58	L.T. 7. E-04	L.T. 1. E-03	L.T. 7. F-04	L.T. 8. E-04
FE-59	L.T. 2. E-03	L.T. 4. E-03	L.T. 2. E-03	L.T. 2. E-03
CO-60	L.T. 6. E-04	L.T. 8. E-04	L.T. 7. E-04	L.T. 6. E-04
ZN-65	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 1. F-03	L.T. 1. E-03	L.T. 9. F-04	L.T. 9. E-04
PU-103	L.T. 2. F-03	L.T. 2. E-03	L.T. 1. E-03	L.T. 1. E-03
PU-106	L.T. 4. F-03	L.T. 7. F-03	L.T. 4. E-03	L.T. 4. E-03
I-131	L.T. 3. E-01	L.T. 1. E-01	L.T. 2. F-01	L.T. 1. E-01
CS-134	L.T. 5. E-04	L.T. 8. E-04	L.T. 5. E-04	L.T. 5. E-04
CS-137	L.T. 5. E-04	L.T. 7. E-04	L.T. 4. F-04	L.T. 4. E-04
BA-140	L.T. 4. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02
CE-141	L.T. 3. E-03	L.T. 3. E-03	L.T. 2. F-03	L.T. 2. E-03
CE-144	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. F-03	L.T. 3. E-03
RA-226	L.T. 8. E-03	L.T. 1. E-02	L.T. 8. E-03	L.T. 8. E-03
TH-228	L.T. 8. E-04	L.T. 1. E-03	L.T. 8. E-04	L.T. 8. E-04



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIP PARTICULATE FILTERS  
(PCT/CU. M.)

STATION NUMBER 07

STATION 07 - 2.5 MI. 230 DEG. IND.

DATE COLLECTED 01/02-04/02 04/02-07/02 07/02-10/01 10/01-12/31

GAMMA SPECTRUM ANALYSIS:

BE-7	7.84+-1.43E-02	9.64+-0.96E-02	7.11+-0.93E-02	8.38+-1.15E-02
K-40	L.Y. 2. E-02	L.Y. 4. E-03	L.Y. 6. F-03	L.Y. 9. E-03
MN-54	L.Y. 7. E-04	L.Y. 2. E-04	L.Y. 4. F-04	L.Y. 4. F-04
CO-58	L.Y. 1. E-03	L.Y. 4. E-04	L.Y. 6. F-04	L.Y. 8. F-04
FE-59	L.Y. 4. E-03	L.Y. 1. F-03	L.Y. 2. F-03	L.Y. 2. F-03
CO-60	L.Y. 9. E-04	L.Y. 2. E-04	L.Y. 5. F-04	L.Y. 6. F-04
ZN-65	L.Y. 2. F-03	L.Y. 5. E-04	L.Y. 1. F-03	L.Y. 1. F-03
ZR-95	L.Y. 1. F-03	L.Y. 4. E-04	L.Y. 7. F-04	L.Y. 8. F-04
RU-103	L.Y. 2. F-03	L.Y. 6. E-04	L.Y. 1. F-03	L.Y. 1. F-03
RU-106	L.Y. 6. F-03	L.Y. 2. E-03	L.Y. 4. F-03	L.Y. 5. F-03
I-131	L.Y. 4. F-03	L.Y. 6. F-02	L.Y. 1. F-01	L.Y. 1. F-01
CS-134	L.Y. 7. E-04	L.Y. 2. E-04	L.Y. 4. F-04	L.Y. 5. F-04
CS-137	L.Y. 6. E-04	L.Y. 9. E-03	L.Y. 2. F-04	L.Y. 5. F-04
BA-140	L.Y. 4. F-02	L.Y. 1. E-03	L.Y. 1. F-03	L.Y. 1. F-03
CE-141	L.Y. 5. E-03	L.Y. 2. F-03	L.Y. 2. F-03	L.Y. 3. F-03
CE-144	L.Y. 6. E-03	L.Y. 4. F-03	L.Y. 5. F-03	L.Y. 8. F-03
RA-226	L.Y. 1. E-02	L.Y. 4. F-04	L.Y. 5. F-04	L.Y. 8. F-04
YH-228	L.Y. 1. E-03	L.Y. 4. F-04	L.Y. 5. F-04	L.Y. 8. F-04

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS  
(PCI/CU, M )

STATION NUMBER 08  
STATION 08 - 2.5 MI. 260 DEG. INO.

DATE COLLECTED	01/02-04/02	04/02-07/02	07/02-10/01	10/01-12/31
GAMMA SPECTRUM ANALYSIS:				
BE-7	8.57+-1.13E-02	9.29+-1.04E-02	1.31+-0.13E-01	8.94+-1.22E-02
K-40	L.Y. 8. E-03	L.Y. 8. E-03	L.Y. 9. E-03	L.Y. 2. E-02
MN-54	L.Y. 4. E-04	L.Y. 5. E-04	L.Y. 4. E-04	L.Y. 7. E-04
CO-58	L.Y. 8. E-04	L.Y. 7. E-04	L.Y. 8. E-04	L.Y. 1. E-03
FE-59	L.Y. 2. E-03	L.Y. 2. E-03	L.Y. 2. E-03	L.Y. 3. E-03
CO-60	L.Y. 4. E-04	L.Y. 6. E-04	L.Y. 4. E-04	L.Y. 8. E-04
ZN-65	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 2. E-03
79-95	L.Y. 9. E-04	L.Y. 8. E-04	L.Y. 9. E-04	L.Y. 1. E-03
PU-103	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 1. E-03	L.Y. 2. E-03
PU-106	L.Y. 4. E-03	L.Y. 4. E-03	L.Y. 4. E-03	L.Y. 6. E-03
I-131	L.Y. 2. E-01	L.Y. 1. E-01	L.Y. 2. E-01	L.Y. 1. E-01
CS-134	L.Y. 5. E-04	L.Y. 5. E-04	L.Y. 4. E-04	L.Y. 7. E-04
CS-137	L.Y. 4. E-04	L.Y. 6. E-04	L.Y. 4. E-04	L.Y. 7. E-04
BA-140	L.Y. 4. E-02	L.Y. 2. E-02	L.Y. 2. E-02	L.Y. 2. E-02
CE-141	L.Y. 3. E-03	L.Y. 2. E-03	L.Y. 2. E-03	L.Y. 3. E-03
CE-144	L.Y. 3. E-03	L.Y. 2. E-03	L.Y. 3. E-03	L.Y. 4. E-03
RA-226	L.Y. 8. E-03	L.Y. 6. E-03	L.Y. 8. E-03	L.Y. 1. E-02
TH-228	L.Y. 8. E-04	L.Y. 6. E-04	L.Y. 8. E-04	L.Y. 1. E-03

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
COMPOSITE AIR PARTICULATE FILTERS

IPCI/CU. M 1

STATION NUMBER 09

STATION 09 - 7.25 MI. 335 DEG. IND.

DATE COLLECTED 01/02-04/02 04/02-07/02 07/02-10/01 10/01-12/31

GAMMA SPECTRUM ANALYSIS

BE-7	7.52+-1.14E-02	9.81+-0.98E-02	8.80+-1.89E-02	6.74+-1.09E-02
K-40	L.T. 7. E-03	L.T. 1. E-02	L.T. 3. E-02	L.T. 8. E-03
MN-54	L.T. 4. E-04	L.T. 4. E-04	L.T. 9. E-04	L.T. 5. E-04
CO-58	L.T. 7. E-04	L.T. 6. E-04	L.T. 2. E-03	L.T. 5. E-04
FE-59	L.T. 2. E-03	L.T. 2. E-03	L.T. 4. E-03	L.T. 2. E-03
CO-60	L.T. 3. E-04	L.T. 4. E-04	L.T. 9. E-04	L.T. 5. E-04
TM-65	L.T. 1. E-03	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03
Zr-95	L.T. 8. E-04	L.T. 7. E-04	L.T. 2. E-03	L.T. 9. E-04
RU-103	L.T. 1. E-03	L.T. 1. E-03	L.T. 2. E-03	L.T. 1. E-03
PU-106	L.T. 4. E-03	L.T. 4. E-03	L.T. 8. E-03	L.T. 4. E-03
I-131	L.T. 2. E-01	L.T. 9. E-02	L.T. 3. E-01	L.T. 9. E-02
CS-134	L.T. 4. E-04	L.T. 4. E-04	L.T. 9. E-04	L.T. 4. E-04
CS-137	L.T. 3. E-02	L.T. 4. E-04	L.T. 8. E-04	L.T. 5. E-04
PA-140	L.T. 2. E-03	L.T. 1. E-02	L.T. 4. E-02	L.T. 1. E-02
CE-141	L.T. 2. E-03	L.T. 2. E-03	L.T. 3. E-03	L.T. 2. E-03
CE-144	L.T. 2. E-03	L.T. 2. E-03	L.T. 4. E-03	L.T. 3. E-03
RA-226	L.T. 7. E-03	L.T. 6. E-03	L.T. 1. E-02	L.T. 8. E-03
TM-228	L.T. 7. E-04	L.T. 6. E-04	L.T. 1. E-03	L.T. 9. E-04

NEBRASKA PUBLIC POWER DISTRICT  
 JOOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - AIRBORNE  
 COMPOSITE AIR PARTICULATE FILTERS  
 (PCI/CU, M)  
 STATION NUMBER 10  
 STATION 10 - 10.0 MI. - 160 DEG. IND.

10/01-12/31

07/02-10/01

04/02-07/02

01/02-04/02

DATE COLLECTED

GAMMA SPECTRUM ANALYSIS:

BE-7	7.77*-0.95E-02	9.07*-1.03E-02	1.03*-0.11E-01	9.12*-0.93E-02
K-40	L-T. 6. F-03	L-T. 2. E-02	L-T. 6. E-03	L-T. 6. E-03
MN-54	L-T. 4. E-04	L-T. 5. E-04	L-T. 4. E-04	L-T. 4. E-04
CO-58	L-T. 6. E-04	L-T. 9. E-04	L-T. 7. E-04	L-T. 5. E-04
FE-59	L-T. 2. F-03	L-T. 3. E-03	L-T. 2. F-03	L-T. 2. F-03
CO-60	L-T. 4. E-04	L-T. 5. E-04	L-T. 3. F-04	L-T. 4. F-04
ZN-65	L-T. 9. E-04	L-T. 1. E-03	L-T. 2. F-03	L-T. 1. F-03
ZR-95	L-T. 6. E-04	L-T. 1. E-03	L-T. 7. F-04	L-T. 6. F-04
RU-103	L-T. 1. E-03	L-T. 1. E-03	L-T. 1. F-03	L-T. 9. F-04
RU-106	L-T. 3. F-03	L-T. 5. E-03	L-T. 3. F-03	L-T. 4. F-03
I-131	L-T. 2. F-01	L-T. 1. E-01	L-T. 2. F-01	L-T. 7. F-02
CS-134	L-T. 4. E-04	L-T. 6. E-04	L-T. 4. E-04	L-T. 4. E-04
CS-137	L-T. 3. F-02	L-T. 5. E-02	L-T. 3. F-02	L-T. 2. F-02
BA-140	L-T. 1. E-03	L-T. 2. E-03	L-T. 2. F-03	L-T. 1. F-03
CE-141	L-T. 1. E-03	L-T. 3. E-03	L-T. 2. F-03	L-T. 2. F-03
CE-144	L-T. 5. E-03	L-T. 8. E-03	L-T. 7. F-03	L-T. 5. F-03
RA-226	L-T. 5. E-04	L-T. 7. E-04	L-T. 7. F-04	L-T. 5. F-04
TH-228				

E. FISH



STATION 28 - 1.8 MI. 150 DEC. 1960.

136



F. MILK - NEAREST PRODUCERS

NEBRASKA PUBLIC POWER DISTRICT  
COOPFR NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK NEAREST PRODUCER  
(PCI/LITER)  
STATION NUMBER 61  
STATION 61 - 3.5 MI. 326 DEG. IND.

DATE COLLECTED	01/02	02/05	02/05	03/05	04/02
RADIOCHEMICAL ANALYSIS					
SR-89	L-T. 8. E-01	L-T. 1. F 00	L-T. 2. F 00	L-T. 2. F 00	L-T. 1. F 00
SP-90	1.6 +0.7 E 00	1.7 +0.7 F 00	1.4 +0.5 E 00	2.5 +0.8 E 00	3.4 +0.4 F 00
I-131	L-T. 3. E-01	L-T. 2. E-01	L-T. 2. F-01	L-T. 1. F-01	L-T. 2. E-01
CA	2.1 +0.2 E 00	2.0 +0.2 E 00	2.0 +0.2 E 00	2.1 +0.2 E 00	2.1 +0.2 E 00
GAMMA SPECTRUM ANALYSIS					
RF-7	L-T. 3. E 01	L-T. 3. F 01	L-T. 3. F 01	L-T. 3. E 01	L-T. 3. F 01
R-40	1.20+0.13E 03	1.19+0.12F 03	1.22+0.12F 03	1.24+0.12F 03	1.11+0.11E 03
MN-54	L-T. 3. F 00	L-T. 3. E 00	L-T. 4. E 00	L-T. 3. E 00	L-T. 3. E 00
CO-58	L-T. 4. F 00	L-T. 3. E 00	L-T. 4. E 00	L-T. 3. E 00	L-T. 3. E 00
FE-59	L-T. 8. E 00	L-T. 8. E 00	L-T. 9. E 00	L-T. 8. E 00	L-T. 7. E 00
CR-60	L-T. 5. E 00	L-T. 4. E 00	L-T. 5. E 00	L-T. 4. E 00	L-T. 3. E 00
TM-65	L-T. 9. E 00	L-T. 9. E 00	L-T. 9. E 00	L-T. 7. E 00	L-T. 7. E 00
TR-95	L-T. 4. F 00	L-T. 3. E 00	L-T. 4. F 00	L-T. 3. E 00	L-T. 3. E 00
RU-103	L-T. 4. F 00	L-T. 4. F 00	L-T. 4. F 00	L-T. 3. E 00	L-T. 3. E 00
RU-106	L-T. 3. F 01	L-T. 3. E 01	L-T. 3. F 01	L-T. 3. E 01	L-T. 3. E 01
I-131	L-T. 7. F 00	L-T. 6. F 00	L-T. 8. F 00	L-T. 4. E 00	L-T. 5. E 00
CS-134	L-T. 4. E 00	L-T. 3. E 00	L-T. 4. E 00	L-T. 3. E 00	L-T. 3. E 00
CS-137	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 3. E 00
RA-140	L-T. 6. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 3. E 00
CE-141	L-T. 6. F 00	L-T. 6. F 00	L-T. 6. F 00	L-T. 5. F 00	L-T. 4. E 00
CE-144	L-T. 2. E 01	L-T. 3. E 01	L-T. 3. E 01	L-T. 6. F 00	L-T. 6. E 00
RA-226	L-T. 7. F 01	L-T. 7. E 01	L-T. 8. F 01	L-T. 2. E 01	L-T. 3. E 01
TH-228	L-T. 6. F 00	L-T. 6. E 00	L-T. 7. E 00	L-T. 7. F 01	L-T. 7. E 01

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK NEAREST PRODUCER  
4 PCT/LITER 1  
STATION NUMBER 61  
STATION 61 - 3.5 MI. 326 DEG. INO.

DATE COLLECTED 05/07 06/04 06/18 06/18 QA

RADIOCHEMICAL ANALYSIS:

	05/07	06/04	06/18	06/18	QA
SR-89	L.T. 1. E 00	L.T. 5. E-01	L.T. 1. E 00	L.T. 2. E 01	L.T. 2. E 00
SR-90	2.8 +-0.8 E 00		L.T. 4. E-01		7.9 +-4.6 E-01
I-131	L.T. 3. E-01	L.T. 5. E-01		L.T. 2. E 01	L.T. 2. E-01
CA	2.1 +-0.2 E 00		2.1 +-0.2 E 00		2.1 +-0.2 E 00

GAMMA SPECTRUM ANALYSIS:

	05/07	06/04	06/18	06/18	QA
HF-7	L.T. 4. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	1.16+-0.12E 03	1.20+-0.12E 03	1.19+-0.12E 03	1.20+-0.12E 03	1.20+-0.12E 03
MN-54	L.T. 5. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
CO-58	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
FE-59	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01
CO-60	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
TH-65	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01
ZR-95	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
RU-103	L.T. 6. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
RU-106	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01
CS-134	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
CS-137	L.T. 6. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
BA-140	L.T. 8. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00
CF-144	L.T. 9. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00
CF-144	L.T. 4. E 01	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 9. E 01	L.T. 7. E 01	L.T. 7. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 8. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK NEAREST PRODUCER  
IPCI/LITER  
STATION NUMBER 61  
STATION 61 - 3.5 MI. 326 DEG. IND.

DATE COLLECTED	07/02	07/02	QA	07/02-07/16	07/16	08/06-08/20
RADIOCHEMICAL ANALYSIS:						
SR-89		L.T. 1. E 00	L.T. 4. E 00	L.T. 4. E 00		L.T. 2. E 00
SR-90		1.7 +0.3 E 00	9.4 +3.0 E-01			9.1 +1.5 E-01
I-131		L.T. 2. E-01			L.T. 1. E-01	
CA		2.1 +0.2 E 00	2.1 +0.2 E 00			1.9 +0.1 E 00

GAMMA SPECTRUM ANALYSIS:

RF-7	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	1.21 +0.12 E 03	1.29 +0.13 E 03	1.29 +0.13 E 03	1.15 +0.12 E 03	1.15 +0.12 E 03	1.15 +0.12 E 03
MN-54	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
CO-58	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
FE-59	L.T. 9. E 00	L.T. 9. E 00	L.T. 9. E 00	L.T. 9. E 00	L.T. 9. E 00	L.T. 9. E 00
CO-60	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
ZN-65	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00
ZR-95	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
RU-103	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00
CS-134	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
CS-137	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
BA-140	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00
CE-141	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00
CE-144	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
RA-226	L.T. 8. E 01	L.T. 8. E 01	L.T. 8. E 01	L.T. 8. E 01	L.T. 8. E 01	L.T. 8. E 01
TH-228	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK NEAREST PRODUCER  
(PCI/LITER)  
STATION NUMBER 61  
STATION G1 - 3.5 MI. 326 DEG. IND.

DATE COLLECTED	08/06	08/20	08/20	09/04	09/04	09/04-09/17
RADIOCHEMICAL ANALYSIS:						
SR-89						
SR-90						
I-131						
CA						
	L.T. 2. F-01	L.T. 2. E-01	L.T. 8. F-01	L.T. 2. F-00	L.T. 2. F-00	L.T. 2. F-00
			1.9 +-0.2 F-00	1.8 +-0.2 F-00	1.8 +-0.2 F-00	L.T. 2. F-00
			L.T. 3. F-01	L.T. 2. F-01	L.T. 2. F-01	L.T. 5. F-01
			2.0 +-0.1 F-00	2.1 +-0.2 F-00	2.1 +-0.2 F-00	2.1 +-0.2 F-00

GAMMA SPECTRUM ANALYSIS:

RE-7	L.T. 3. F-01	L.T. 3. E-01	L.T. 4. F-01	L.T. 3. E-01	L.T. 3. E-01
K-40	1.18+-0.12E 03	1.29+-0.13E 03	1.22+-0.12E 03	1.18+-0.12E 03	1.18+-0.12E 03
MN-54	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 3. F-00	L.T. 3. F-00
CO-58	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 4. F-00	L.T. 4. F-00
FE-59	L.T. 9. E-00	L.T. 9. F-00	L.T. 1. F-01	L.T. 9. F-00	L.T. 9. F-00
CO-60	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 4. F-00	L.T. 4. F-00
ZN-65	L.T. 9. E-00	L.T. 9. E-00	L.T. 9. F-00	L.T. 9. F-00	L.T. 9. F-00
ZR-95	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 4. F-00	L.T. 4. F-00
RU-103	L.T. 4. E-00	L.T. 4. E-00	L.T. 5. F-00	L.T. 4. F-00	L.T. 4. F-00
RU-106	L.T. 3. E-01	L.T. 3. E-01	L.T. 4. F-01	L.T. 3. E-01	L.T. 3. E-01
I-131	L.T. 8. F-00	L.T. 9. F-00	L.T. 1. F-01	L.T. 9. F-00	L.T. 9. F-00
CS-134	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 4. F-00	L.T. 4. F-00
CS-137	L.T. 4. E-00	L.T. 4. E-00	L.T. 4. F-00	L.T. 4. F-00	L.T. 4. F-00
RA-140	L.T. 6. F-00	L.T. 7. F-00	L.T. 7. F-00	L.T. 5. F-00	L.T. 5. F-00
CE-141	L.T. 8. F-00	L.T. 8. F-00	L.T. 9. F-00	L.T. 7. F-00	L.T. 7. F-00
CE-144	L.T. 3. F-01	L.T. 3. F-01	L.T. 4. F-01	L.T. 3. F-01	L.T. 3. F-01
RA-226	L.T. 8. F-01	L.T. 9. F-01	L.T. 1. F-02	L.T. 9. F-01	L.T. 9. F-01
TH-228	L.T. 7. F-00	L.T. 7. F-00	L.T. 8. F-00	L.T. 7. F-00	L.T. 7. F-00

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK NEAREST PRODUCER  
1PCI/LITER 1  
STATION NUMBER 61  
STATION 61 - 3.5 MI. 326 DEG. 148.

DATE COLLECTED	09/04	09/17	10/08	11/05	12/03
<b>RADIOCHEMICAL ANALYSIS:</b>					
SR-89			L.T. 1. F 00	L.T. 1. F 00	L.T. 3. F 00
SR-90			1.5 +-0.2 F 00	1.9 +-0.2 F 00	L.T. 1. F 00
T-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 5. E-01	L.T. 1. E-01	L.T. 2. E-01
CA			2.1 +-0.2 F 00	2.1 +-0.2 E 00	2.1 +-0.2 E 00
<b>GAMMA SPECTRUM ANALYSIS:</b>					
RE-7	L.T. 3. F 01	L.T. 3. F 01	L.T. 3. F 01	L.T. 4. F 01	L.T. 4. F 01
K-40	1.23+-0.12E 03	1.16+-0.12E 03	1.25+-0.12E 03	1.38+-0.14E 03	1.22+-0.12E 03
MN-54	L.T. 3. F 00	L.T. 4. F 00	L.T. 3. F 00	L.T. 5. F 00	L.T. 4. F 00
CO-58	L.T. 3. F 00	L.T. 3. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00
FE-59	L.T. 8. F 00	L.T. 9. F 00	L.T. 9. F 00	L.T. 1. F 01	L.T. 9. F 00
CO-60	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 5. F 00	L.T. 4. F 00
ZN-65	L.T. 9. F 00	L.T. 9. F 00	L.T. 9. F 00	L.T. 1. F 01	L.T. 9. F 00
ZR-95	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 5. F 01	L.T. 4. F 00
RU-103	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 5. F 00	L.T. 4. F 00
RU-106	L.T. 3. F 01	L.T. 4. F 01	L.T. 4. F 01	L.T. 5. F 00	L.T. 4. F 00
T-131	L.T. 8. F 00	L.T. 8. F 00	L.T. 8. F 00	L.T. 4. F 01	L.T. 3. F 01
CS-134	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 9. F 00	L.T. 9. F 00
CS-137	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 5. F 00	L.T. 4. F 00
BA-140	L.T. 6. F 00	L.T. 7. F 00	L.T. 6. F 00	L.T. 5. F 00	L.T. 4. F 00
CE-141	L.T. 7. F 00	L.T. 7. F 00	L.T. 7. F 00	L.T. 7. F 00	L.T. 6. F 00
CE-144	L.T. 2. F 01	L.T. 2. F 01	L.T. 7. F 01	L.T. 9. F 01	L.T. 8. F 00
RA-226	L.T. 7. F 01	L.T. 7. F 01	L.T. 7. F 01	L.T. 1. F 02	L.T. 3. F 01
TH-228	L.T. 7. F 00	L.T. 7. F 00	L.T. 7. F 00	L.T. 8. F 00	L.T. 7. F 00

G. MILK - OTHER PRODUCERS

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK OTHER PRODUCERS  
1 PC/LITER  
STATION NUMBER 42  
STATION 42 - 12.85 MI. 156 DEG. IND

DATE COLLECTED	01/09	04/09	07/09	10/08
RADIOCHEMICAL ANALYSIS:				
SR-89	L-T. 9. E-01	L-T. 1. E 00	L-T. 2. F 00	L-T. 1. E 00
SR-90	1.3 +-0.7 E 00	1.9 +-0.3 E 00	3.3 +-0.3 E 00	1.1 +-0.3 F 00
I-131	L-T. 3. E-01	L-T. 2. E-01	L-T. 1. E-01	L-T. 4. F-01
CA	2.1 +-0.1 E 00	2.0 +-0.2 E 00	2.1 +-0.2 E 00	2.1 +-0.2 E 00
GAMMA SPECTRUM ANALYSIS:				
RF-7	L-T. 4. E 01	L-T. 4. E 01	L-T. 3. F 01	L-T. 3. E 01
K-40	1.50+-0.14E 03	1.21+-0.12E 03	1.19+-0.12E 03	1.17+-0.12E 03
MN-54	L-T. 4. F 00	L-T. 5. E 00	L-T. 4. F 00	L-T. 3. F 00
CO-58	L-T. 4. F 00	L-T. 4. F 00	L-T. 4. F 00	L-T. 4. F 00
FE-59	L-T. 9. F 00	L-T. 1. F 01	L-T. 9. F 00	L-T. 8. F 00
CO-60	L-T. 5. E 00	L-T. 5. E 00	L-T. 4. F 00	L-T. 4. F 00
TM-65	L-T. 1. F 01	L-T. 1. E 01	L-T. 8. F 00	L-T. 9. F 00
ZR-95	L-T. 5. E 00	L-T. 5. E 00	L-T. 4. F 00	L-T. 4. F 00
RU-103	L-T. 5. E 00	L-T. 5. E 00	L-T. 4. F 00	L-T. 4. F 00
RU-106	L-T. 4. E 01	L-T. 4. E 01	L-T. 3. F 01	L-T. 3. F 01
I-131	L-T. 6. E 00	L-T. 1. E 01	L-T. 5. F 00	L-T. 1. F 01
CS-134	L-T. 5. E 00	L-T. 5. F 00	L-T. 4. F 00	L-T. 4. F 00
CS-137	L-T. 5. E 00	L-T. 5. E 00	L-T. 4. F 00	L-T. 4. F 00
BA-140	L-T. 5. F 00	L-T. 7. F 00	L-T. 5. E 00	L-T. 6. F 00
CE-141	L-T. 7. E 00	L-T. 1. E 01	L-T. 7. F 00	L-T. 8. F 00
CE-144	L-T. 3. E 01	L-T. 4. E 01	L-T. 3. F 01	L-T. 3. E 01
RA-226	L-T. 9. E 01	L-T. 1. E 02	L-T. 8. F 01	L-T. 8. F 01
TH-232	L-T. 8. F 00	L-T. 9. E 00	L-T. 7. F 00	L-T. 7. F 00



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
MILK OTHER PRODUCERS  
IPC/LITER 1  
STATION NUMBER 95  
STATION 95 - 7.3 MI. 216 DEG. IND.

DATE COLLECTED 01/09 04/09 07/09 10/08

RADIOCHEMICAL ANALYSIS

SR-89 L-T 9. E-01 L-T 1. E 00 L-T 2. E 00 L-T 1. E 00  
SR-90 L-T 4. E-01 L-T 1.87E 00 8.5 +-2.9 E-01 1.0 +-0.3 E 00  
I-131 L-T 5. F-01 L-T 2. E-01 L-T 3. F-01 L-T 2. E-01  
CA 2.1 +-0.1 E 00 2.0 +-0.2 E 00 2.9 +-0.2 E 00 2.1 +-0.2 E 00

GAMMA SPECTRUM ANALYSIS

RE-7 L-T 3. E 01 L-T 5. E 01 L-T 4. E 01 L-T 3. E 01  
K-40 1.40+-0.16E 03 1.05+-0.11E 03 1.27+-0.13E 03 1.29+-0.13E 03  
MN-54 L-T 4. E 00 L-T 5. E 00 L-T 5. E 00 L-T 3. E 00  
CO-58 L-T 4. E 00 L-T 5. E 00 L-T 5. E 00 L-T 3. E 00  
FE-59 L-T 8. E 00 L-T 1. E 01 L-T 1. E 01 L-T 9. E 00  
CO-60 L-T 4. E 00 L-T 5. F 00 L-T 5. E 00 L-T 4. E 00  
ZN-65 L-T 1. E 01 L-T 1. E 01 L-T 1. E 01 L-T 9. E 00  
Zr-95 L-T 4. E 00 L-T 5. E 00 L-T 5. E 00 L-T 4. E 00  
RU-103 L-T 4. E 00 L-T 6. E 00 L-T 5. E 00 L-T 4. E 00  
RU-106 L-T 3. E 01 L-T 5. E 01 L-T 4. E 01 L-T 3. E 01  
I-131 L-T 5. E 00 L-T 1. E 01 L-T 6. E 00 L-T 7. E 00  
CS-134 L-T 4. E 00 L-T 6. E 00 L-T 5. E 00 L-T 4. E 00  
CS-137 L-T 4. E 00 L-T 9. E 00 L-T 5. E 00 L-T 4. E 00  
BA-140 L-T 5. E 00 L-T 1. E 01 L-T 8. F 00 L-T 7. E 00  
CE-141 L-T 8. F 00 L-T 1. E 01 L-T 8. F 00 L-T 7. E 00  
CE-144 L-T 3. E 01 L-T 5. E 01 L-T 3. E 01 L-T 3. E 01  
RA-226 L-T 9. E 01 L-T 1. E 02 L-T 9. E 01 L-T 8. E 01  
TH-228 L-T 7. E 00 L-T 1. E 01 L-T 8. E 00 L-T 7. E 00

H. GROUNDWATER

NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - WATERBORNE  
 WATER - GROUND  
 LPCI/LITER 1  
 STATION NUMBER 11  
 STATION 11 - 0.15 MI. 225 DEG. IND.

DATE COLLECTED	01/15	03/05	04/16	07/16	10/15
RADIOCHEMICAL ANALYSIS:					
GR-A					
GR-B					
GAMMA SPECTRUM ANALYSIS:					
BE-7	L.T. 3. E 01	L.T. 4. E 00	L.T. 3. F 00	L.T. 4. E 00	L.T. 4. E 00
K-40	L.T. 6. E 01	6.6 +-1.5 E 00	9.8 +-1.7 E 00	9.6 +-1.8 E 00	1.5 +-0.2 E 01
MN-54	L.T. 3. E 00				
CO-58	L.T. 3. E 00				
FE-59	L.T. 6. E 00				
CO-60	L.T. 3. E 00				
ZN-65	L.T. 7. E 00				
TP-95	L.T. 4. E 00				
RU-103	L.T. 4. E 00				
RU-106	L.T. 3. E 01				
I-131	L.T. 7. E 00				
CS-134	L.T. 3. E 00				
CS-137	L.T. 3. E 00				
BA-140	L.T. 5. E 00				
CE-141	L.T. 7. E 00				
CE-144	L.T. 3. E 01				
RA-226	L.T. 8. E 01				
TH-228	L.T. 7. E 00				
TRITIUM ANALYSIS:					
H-3	L.T. 1. E 02	L.T. 8. E 01	2.3 +-1.1 E 02	L.T. 1. E 02	L.T. 1. E 02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - GROUND  
1 PC2/LITER 1  
STATION NUMBER 47  
STATION 47 - 25.75 MI. 154 DEG. IND

DATE COLLECTED	01/15	03/05	04/16	07/16	10/15
<b>RADIOCHEMICAL ANALYSIS:</b>					
GR-A					
GR-B					
<b>GAMMA SPECTRUM ANALYSIS:</b>					
BE-7	L-T 3- F 01	L-T 4- F 00	L-T 3- F 00	L-T 4- F 00	L-T 3- F 00
K-40	L-T 5- F 01	1.1 +-0.2 E 01	5.0 +-1.6 F 00	8.5 +-1.7 E 00	1.0 +-0.2 E 01
MN-54	L-T 3- F 00				
CO-58	L-T 3- F 00				
FE-59	L-T 7- F 00				
CO-60	L-T 3- F 00				
ZN-65	L-T 6- F 00				
ZR-95	L-T 3- F 00				
RU-103	L-T 3- F 00				
RU-106	L-T 3- F 01				
Y-131	L-T 6- F 00				
CS-134	L-T 3- F 00				
CS-137	L-T 3- F 00				
BA-140	L-T 5- F 00				
CE-141	L-T 7- F 00				
CE-144	L-T 3- F 01				
RA-226	L-T 8- F 01				
TH-232	L-T 7- F 00				
<b>TRITIUM ANALYSIS:</b>					
H-3	L-T 1- F 02	9.1 +-4.1 F 01	L-T 1- F 02	L-T 1- F 02	L-T 1- F 02

I. RIVER WATER



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - RIVER  
IPCI/LITER 1  
STATION NUMBER 12  
STATION 12 - 0.1 MI. 360 DEG. CON.

DATE COLLECTED

01/15

01/15-03/12

02/12

03/12

RADIOCHEMICAL ANALYSIS:

SR-89  
SR-90  
GR-A DIS  
GR-A SUS  
GR-B DIS  
GR-B SUS

L-T 5\* E-01  
L-T 4\* E-01  
L-T 3\* E-01  
L-T 8\* E-01  
L-T 1\* E-01  
1.5 +-0.6 E 00

L-T 1\* E 00  
L-T 7\* E-01  
L-T 4\* F 00  
2.5 +-1.2 E 00  
1.0 +-0.2 E 01  
5.0 +-0.9 E 00  
L-T 1\* F 00  
L-T 6\* E-01  
L-T 3\* F 00  
2.5 +-1.5 F 00  
1.3 +-0.2 F 01  
9.8 +-1.3 F 00

GAMMA SPECTRUM ANALYSIS:

RE-7  
K-40  
MN-54  
CO-58  
FE-59  
CO-60  
ZN-65  
PB-95  
RU-103  
RU-106  
T-131  
CS-134  
CS-137  
BA-140  
CE-141  
CE-144  
RA-226  
TH-228

L-T 3\* E 01  
L-T 6\* E 01  
L-T 3\* E 00  
L-T 3\* E 00  
L-T 6\* F 00  
L-T 3\* F 00  
L-T 7\* F 00  
L-T 3\* F 00  
L-T 4\* E 00  
L-T 3\* E 01  
L-T 7\* E 00  
L-T 3\* E 00  
L-T 3\* E 00  
L-T 6\* E 00  
L-T 7\* F 00  
L-T 3\* E 01  
L-T 8\* F 01  
L-T 6\* E 00

L-T 3\* E 01  
L-T 5\* E 01  
L-T 3\* E 00  
L-T 3\* E 00  
L-T 6\* F 00  
L-T 3\* F 00  
L-T 6\* E 00  
L-T 3\* E 00  
L-T 3\* E 00  
L-T 2\* F 01  
L-T 8\* F 00  
L-T 3\* F 00  
L-T 3\* F 00  
L-T 6\* F 00  
L-T 6\* F 00  
L-T 2\* F 01  
L-T 7\* F 01  
L-T 5\* F 00  
L-T 2\* F 01  
L-T 3\* E 00  
L-T 4\* F 00  
L-T 3\* E 00  
L-T 4\* F 00  
L-T 5\* F 00  
L-T 2\* F 01  
L-T 6\* E 01  
L-T 5\* F 00

TRITIUM ANALYSIS:

H-3

1.7 +-0.5 F 02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - RIVER  
1 PCI/LITER  
STATION NUMBER 12  
STATION 12 - 0.1 MI. 360 DEG. CON.

07/10-09/11

05/11

05/07

04/09-06/11

04/09

# RADIOCHEMICAL ANALYSIS:

SR-89	L-T. 1. E 00	L-T. 1. E 00	L-T. 1. E 00	L-T. 9. E-01
SR-90	L-T. 7. E-01	L-T. 8. E-01	L-T. 7. E-01	L-T. 7. E-01
GP-A DIS	L-T. 4. F 00	L-T. 4. F 00	L-T. 4. F 00	L-T. 4. F 00
GR-A SUS	L-T. 1. E 00	L-T. 1. E 00	L-T. 1. E 00	L-T. 1. E 00
GR-R DIS	L-T. 1.1 +-0.2 E 01	L-T. 1.1 +-0.2 E 01	L-T. 1.1 +-0.2 E 01	L-T. 1.1 +-0.2 E 01
GR-B SUS	L-T. 4.5 +-0.9 E 00	L-T. 3.9 +-0.8 E 00	L-T. 3.9 +-0.8 E 00	L-T. 1.1 +-0.1 E 01

# GAMMA SPECTRUM ANALYSIS:

BE-7	L-T. 4. E 01	L-T. 4. E 01	L-T. 4. E 01	L-T. 4. E 01
K-40	L-T. 1. F 02	L-T. 9. F 01	L-T. 1. F 02	L-T. 1. F 02
MN-54	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00
CO-58	L-T. 5. E 00	L-T. 4. E 00	L-T. 4. E 00	L-T. 4. E 00
FE-59	L-T. 1. F 01	L-T. 8. F 00	L-T. 1. F 01	L-T. 1. F 01
CO-60	L-T. 5. E 00	L-T. 4. E 00	L-T. 5. E 00	L-T. 5. E 00
74-65	L-T. 1. E 01	L-T. 8. F 00	L-T. 9. E 00	L-T. 9. E 00
ZR-95	L-T. 5. E 00	L-T. 4. F 00	L-T. 5. E 00	L-T. 5. E 00
RU-103	L-T. 5. F 00	L-T. 4. F 00	L-T. 5. F 00	L-T. 5. F 00
RU-106	L-T. 4. E 01	L-T. 4. F 01	L-T. 4. F 01	L-T. 4. F 01
I-131	L-T. 1. E 01	L-T. 5. F 00	L-T. 8. F 00	L-T. 8. F 00
CS-134	L-T. 4. E 00	L-T. 5. F 00	L-T. 5. F 00	L-T. 5. F 00
CS-137	L-T. 5. E 00	L-T. 5. F 00	L-T. 5. F 00	L-T. 5. F 00
BA-140	L-T. 6. E 00	L-T. 4. E 00	L-T. 7. E 00	L-T. 7. E 00
CE-141	L-T. 9. F 00	L-T. 8. F 00	L-T. 8. F 00	L-T. 8. F 00
CE-144	L-T. 3. F 01	L-T. 4. F 01	L-T. 3. F 01	L-T. 3. F 01
RA-226	L-T. 9. F 01	L-T. 1. F 02	L-T. 9. F 01	L-T. 9. F 01
TH-228	L-T. 7. F 00	L-T. 8. F 00	L-T. 8. F 00	L-T. 8. F 00

# TRITIUM ANALYSIS:

L-T. 1. E 02

1.5 +-0.9 E 02

H-3

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - PIVER  
1 PC/LITER  
STATION NUMBER 12  
STATION 12 - 0.1 MI. 360 DEG. CON.

DATE COLLECTED 07/10 08/13 09/11 10/08 10/08-12/10

# RADIOCHEMICAL ANALYSIS:

SR-89	L-T 6. E-01	L-T 1. E 00	L-T 1. E 00	L-T 7. E-01
SR-90	L-T 5. E-01	L-T 4. E-01	L-T 5. E-01	L-T 3. E-01
CR-A DIS	L-T 4. E 00	L-T 3. E 00	L-T 4. E 00	L-T 4. E 00
CR-A SUS	L-T 2. E 00	6.7 +4.0 E 00	L-T 8. E-01	L-T 1. E 00
CR-M DIS	1.2 +0.2 E 01	9.8 +1.5 E 00	9.5 +1.7 E 00	1.1 +0.2 E 01
CR-B SUS	8.0 +1.2 E 00	2.4 +0.2 E 01	2.4 +0.8 E 00	3.4 +0.8 E 00

# GAMMA SPECTRUM ANALYSIS:

BE-7	L-T 3. E 01	L-T 4. E 01	L-T 3. E 01	L-T 4. E 01
K-40	5.82 +2.74 E 01	L-T 8. E 01	L-T 6. E 01	L-T 9. E 01
MN-54	L-T 2. E 00	L-T 4. E 00	L-T 3. E 00	L-T 4. E 00
CO-58	L-T 3. E 00	L-T 4. E 00	L-T 3. E 00	L-T 4. E 00
FE-59	L-T 6. E 00	L-T 9. E 00	L-T 7. E 00	L-T 8. E 00
CO-60	L-T 3. E 00	L-T 4. E 00	L-T 4. E 00	L-T 4. E 00
ZN-65	L-T 6. E 00	L-T 8. E 00	L-T 6. E 00	L-T 9. E 00
79-95	L-T 3. E 00	L-T 4. E 00	L-T 3. E 00	L-T 4. E 00
RU-103	L-T 3. E 00	L-T 5. E 00	L-T 3. E 00	L-T 4. E 00
RU-106	L-T 3. E 01	L-T 3. E 01	L-T 3. E 01	L-T 4. E 01
I-131	L-T 5. E 00	L-T 8. E 00	L-T 6. E 00	L-T 1. E 01
CS-134	L-T 3. E 00	L-T 4. E 00	L-T 4. E 00	L-T 4. E 00
CS-137	L-T 3. E 00	L-T 4. E 00	L-T 4. E 00	L-T 5. E 00
BA-140	L-T 5. E 00	L-T 6. E 00	L-T 5. E 00	L-T 5. E 00
CE-143	L-T 5. E 00	L-T 9. E 00	L-T 6. E 00	L-T 6. E 00
CE-144	L-T 2. E 01	L-T 4. E 01	L-T 2. E 01	L-T 4. E 01
RA-226	L-T 6. E 01	L-T 1. E 02	L-T 7. E 01	L-T 9. E 01
TH-228	L-T 6. E 00	L-T 8. E 00	L-T 6. E 00	L-T 8. E 00

# TRITIUM ANALYSIS:

H-3 L-T 1. E 02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - PIVEP  
IPCI/LITER 1  
STATION 12 - 0.3 MI. 360 DEG. CON.

DATE COLLECTED

11/13

12/10

RADIOCHEMICAL ANALYSIS:

SP-89	L-T	8	F-01	L-T	7	E-01
SR-90	L-T	8	E-01	L-T	7	E-01
GR-A DTS	L-T	3	E-00	L-T	3	E-00
GR-A SUS	2-0	+1.0	E-00	1-6	+0.9	E-00
GR-R DTS	1-1	+0.2	F-01	9-5	+1.6	E-00
GR-R SUS	3-5	+0.8	E-00	4-3	+0.9	E-00

GAMMA SPECTRUM ANALYSIS:

AF-7	L-T	3	E-01	L-T	4	F-01
K-40	L-T	5	F-01	L-T	1	E-02
MN-54	L-T	3	E-00	L-T	4	E-00
CO-58	L-T	3	F-00	L-T	4	E-00
FE-59	L-T	6	E-00	L-T	9	E-00
CO-60	L-T	3	E-00	L-T	4	E-00
ZN-65	L-T	6	E-00	L-T	9	E-00
ZR-95	L-T	3	E-00	L-T	5	E-00
RU-103	L-T	3	E-00	L-T	5	E-00
RU-106	L-T	2	F-01	L-T	4	E-01
I-131	L-T	7	F-00	L-T	1	E-01
CS-134	L-T	3	E-00	L-T	4	E-00
CS-137	L-T	4	E-00	L-T	5	E-00
BA-140	L-T	5	E-00	L-T	7	E-00
CE-141	L-T	6	F-00	L-T	1	E-01
CF-144	L-T	2	F-01	L-T	4	E-01
BR-226	L-T	6	F-01	L-T	2	E-02
YM-228	L-T	6	E-00	L-T	8	F-00

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - PIVER  
1 PC1/LITER  
STATION HUMPH 28  
STATION 28 - 1.8 MI. 150 DEG. INO.

DATE COLLECTED

01/15

01/15-03/12

02/12

03/12

RADIOCHEMICAL ANALYSIS

SR-89  
SR-90  
GR-A DIS  
GR-A SUS  
CP-R DIS  
GR-R SUS

L-T- 7- F-01  
L-T- 3- F-01  
L-T- 4- F-01  
L-T- 7- F-01  
L-T- 1- F-01  
1-1 +-0.6 E 00

L-T- 7- F-01  
L-T- 4- F-01  
L-T- 4- F-00  
L-T- 2- F-00  
9-5 +-1.7 F 00  
8-1 +-1.7 E 00

L-T- 9- F-01  
L-T- 5- F-01  
L-T- 2- F 00  
3-9 +-1.9 F 00  
1-2 +-0.2 E 01  
1-2 +-0.1 E 01

GAMMA SPECTRUM ANALYSIS

RE-7  
K-40  
MN-54  
CO-58  
FE-59  
CO-60  
ZN-65  
ZP-95  
RU-103  
RU-106  
I-131  
CS-134  
CS-137  
BA-140  
CE-141  
CE-144  
RA-226  
TH-232

L-T- 3- F-01  
L-T- 5- F-01  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 6- F-00  
L-T- 4- F-00  
L-T- 7- F-00  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 3- F-01  
L-T- 7- F-00  
L-T- 4- F-00  
L-T- 4- F-00  
L-T- 5- F-00  
L-T- 7- F-00  
L-T- 3- F-01  
L-T- 7- F-01  
L-T- 6- F-00

L-T- 3- F-01  
L-T- 5- F-01  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 6- F-00  
L-T- 3- F-00  
L-T- 6- F-00  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 2- F-01  
L-T- 8- F-00  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 6- F-00  
L-T- 6- F-00  
L-T- 7- F-01  
L-T- 6- F-01  
L-T- 5- F-00

L-T- 3- F-01  
L-T- 5- F-01  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 5- F-00  
L-T- 3- F-00  
L-T- 7- F-00  
L-T- 3- F-00  
L-T- 3- F-01  
L-T- 5- F-00  
L-T- 3- F-00  
L-T- 3- F-00  
L-T- 4- F-00  
L-T- 4- F-00  
L-T- 3- F-01  
L-T- 7- F-01  
L-T- 7- F-01  
L-T- 6- F-01

TRITIUM ANALYSIS

M-3

1-2 +-0.5 E 02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - RIVER  
(PCI/LITER)  
STATION NUMBER 28  
STATION 28 - 1.8 MI. 150 DEC. IND.

DATE COLLECTED 04/09 04/09-06/11 05/07 06/11 07/10-09/11

RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 1. F 00	L.T. 1. F 00	L.T. 1. F 00	L.T. 9. F-01	L.T. 9. F-01
SR-90	L.T. 5. F-01	L.T. 5. F-01	L.T. 9. F-01	L.T. 8. F-01	L.T. 8. F-01
GR-A DIS	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 3. F 00	L.T. 3. F 00
GR-A SUS	L.T. 1. F 00	L.T. 1. F 00	L.T. 1. F 00	2.7 +2.0 F 00	2.7 +2.0 F 00
GR-B DIS	5.5 +1.2 F 00	5.5 +1.2 F 00	1.1 +0.2 F 01	1.1 +0.1 F 01	1.1 +0.1 F 01
GR-B SUS	6.2 +1.0 F 00	6.2 +1.0 F 00	6.7 +0.9 F 00	1.1 +0.2 F 01	1.1 +0.2 F 01

GAMMA SPECTRUM ANALYSIS:

K-40	L.T. 4. F 01	L.T. 4. F 01	L.T. 4. F 01	L.T. 3. F 01	L.T. 3. F 01
RU-103	L.T. 1. F 02	L.T. 1. F 02	L.T. 7. F 01	L.T. 5. F 01	L.T. 5. F 01
RU-106	L.T. 4. F 00	L.T. 4. F 00	L.T. 3. F 00	L.T. 3. F 00	L.T. 3. F 00
CS-134	L.T. 1. F 01	L.T. 1. F 01	L.T. 7. F 00	L.T. 7. F 00	L.T. 7. F 00
CS-137	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00	L.T. 4. F 00
RA-140	L.T. 5. F 00	L.T. 5. F 00	L.T. 8. F 00	L.T. 7. F 00	L.T. 7. F 00
CE-143	L.T. 5. F 00	L.T. 5. F 00	L.T. 4. F 00	L.T. 3. F 00	L.T. 3. F 00
CE-144	L.T. 7. F 00	L.T. 7. F 00	L.T. 4. F 00	L.T. 3. F 00	L.T. 3. F 00
RA-226	L.T. 9. F 00	L.T. 9. F 00	L.T. 6. F 00	L.T. 6. F 00	L.T. 6. F 00
TH-228	L.T. 3. F 01	L.T. 3. F 01	L.T. 4. F 01	L.T. 2. F 01	L.T. 2. F 01
	L.T. 9. F 01	L.T. 9. F 01	L.T. 1. F 02	L.T. 6. F 01	L.T. 6. F 01
	L.T. 8. F 00	L.T. 8. F 00	L.T. 8. F 00	L.T. 6. F 00	L.T. 6. F 00

TRITIUM ANALYSIS:

H-3

L.T. 1. F 02

L.T. 1. F 02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - WATERBORNE  
WATER - RIVER  
4PCT/LITER  
STATION NUMBER 28  
STATION 28 - 1.8 MI. 150 DEG. IND.

DATE COLLECTED 07/10 08/13 09/11 10/08 10/08-12/10

RADIOCHEMICAL ANALYSIS:

SR-89	L-T- 5- E-01	L-T- 1- E 00	L-T- 1- F 00	L-T- 1- F 00
SR-90	L-T- 4- E-01	L-T- 3- E-01	L-T- 7- F-01	L-T- 4- E-01
GR-A DTS	L-T- 3- E 00	L-T- 4- E 00	L-T- 4- F 00	L-T- 4- F 00
GR-A SUS	L-T- 2- E 00	8-3 +4.5 E 00	L-T- 9- F-01	L-T- 9- F-01
GR-B DTS	1-2 +0.2 E 01	1-1 +0.2 E 01	1-0 +0.2 F 01	1-0 +0.2 E 01
GR-B SUS	8-8 +1.2 E 00	2-9 +0.3 E 01	3-0 +0.8 E 00	1-9 +0.6 E 00

GAMMA SPECTRUM ANALYSIS:

RF-7	L-T- 3- E 01	L-T- 3- E 01	L-T- 3- E 01	L-T- 3- E 01
R-40	L-T- 5- F 01	L-T- 1- F 02	L-T- 6- F 01	L-T- 6- F 01
MN-54	L-T- 3- F 00	L-T- 4- F 00	L-T- 3- F 00	L-T- 3- F 00
CO-58	L-T- 3- E 00	L-T- 1- F 00	L-T- 3- F 00	L-T- 3- F 00
FF-59	L-T- 6- E 00	L-T- 6- E 00	L-T- 7- F 00	L-T- 7- F 00
CO-60	L-T- 3- F 00	L-T- 4- F 00	L-T- 3- F 00	L-T- 3- F 00
ZN-65	L-T- 7- F 00	L-T- 9- F 00	L-T- 7- F 00	L-T- 7- F 00
ZR-95	L-T- 3- E 00	L-T- 4- E 00	L-T- 3- F 00	L-T- 3- F 00
RU-103	L-T- 3- E 00	L-T- 4- F 00	L-T- 4- F 00	L-T- 4- F 00
RU-106	L-T- 3- E 01	L-T- 3- E 01	L-T- 3- F 01	L-T- 3- F 01
I-131	L-T- 5- E 00	L-T- 8- E 00	L-T- 7- F 00	L-T- 1- F 01
CS-134	L-T- 3- F 00	L-T- 4- E 00	L-T- 4- F 00	L-T- 4- F 00
CS-137	L-T- 3- F 00	L-T- 4- E 00	L-T- 4- F 00	L-T- 4- F 00
BA-140	L-T- 4- E 00	L-T- 5- E 00	L-T- 6- F 00	L-T- 6- F 00
CE-141	L-T- 6- E 00	L-T- 9- F 00	L-T- 8- F 00	L-T- 8- F 00
CF-144	L-T- 3- F 01	L-T- 4- F 01	L-T- 3- F 01	L-T- 3- F 01
RA-226	L-T- 8- F 01	L-T- 9- F 01	L-T- 8- F 01	L-T- 8- F 01
TH-228	L-T- 6- F 00	L-T- 8- F 00	L-T- 7- F 00	L-T- 7- F 00

TRITIUM ANALYSIS:

H-3

1.5 +0.9 F 02

NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - WATERBORNE  
 WATER - RIVER  
 (PCI/LITER) 1  
 STATION NUMBER 28  
 STATION 28 - 1.8 MI. 150 DEG. IND.

DATE COLLECTED 11/13 12/10

# RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 8. F-01	L.T. 9. E-01
SR-90	L.T. 5. E-01	L.T. 8. E-01
GR-A DIS	L.T. 3. E 00	L.T. 3. E 00
GR-A SUS	1.3 +-0.8 E 00	1.5 +-1.1 E 00
GR-B DIS	1.2 +-0.2 E 01	1.1 +-0.2 E 01
GR-B SUS	3.6 +-0.8 E 00	5.5 +-1.0 E 00

# GAMMA SPECTRUM ANALYSIS:

RF-7	L.T. 4. F 01	L.T. 4. F 01
K-40	L.T. 1. E 02	L.T. 1. E 02
MN-54	L.T. 4. E 00	L.T. 4. E 00
CO-58	L.T. 4. E 00	L.T. 4. E 00
FE-59	L.T. 8. E 00	L.T. 8. E 00
CO-60	L.T. 4. E 00	L.T. 4. E 00
ZN-65	L.T. 9. F 00	L.T. 1. E 01
ZR-95	L.T. 4. E 00	L.T. 4. E 00
RU-103	L.T. 5. E 00	L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01
T-123	L.T. 1. E 01	L.T. 9. E 00
CS-134	L.T. 4. E 00	L.T. 4. E 00
CS-137	L.T. 4. E 00	L.T. 4. E 00
RA-140	L.T. 7. F 00	L.T. 6. E 00
CF-141	L.T. 8. E 00	L.T. 9. E 00
CF-144	L.T. 3. F 01	L.T. 3. E 01
RA-226	L.T. 8. E 01	L.T. 9. E 01
TH-228	L.T. 7. E 00	L.T. 7. E 00

J. THERMOLUMINESCENT DOSIMETRY - RADIATION DOSE

TABLE J-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/03-04/03	SECOND QUARTER 04/03-07/03	THIRD QUARTER 07/03-10/02	FOURTH QUARTER 10/02-01/02/91
TLD (Gamma)	01**	23.2 ± 3.1	26.6 ± 3.3	28.9 ± 4.4	29.2 ± 2.6
	02	14.1 ± 0.8	15.4 ± 0.8	14.6 ± 0.9	16.1 ± 0.8
	03	16.0 ± 0.8	14.2 ± 0.6	15.9 ± 0.8	15.3 ± 0.8
	04	15.3 ± 1.1	15.8 ± 1.0	15.4 ± 0.6	16.2 ± 0.6
	05	16.7 ± 1.2	17.0 ± 0.6	14.2 ± 0.8	16.5 ± 0.9
	06	16.2 ± 1.0	15.7 ± 1.1	16.9 ± 0.5	16.4 ± 0.7
	07	15.6 ± 0.3	16.1 ± 0.9	14.8 ± 0.9	15.3 ± 1.5
	08	16.2 ± 0.9	16.4 ± 0.5	15.2 ± 1.0	16.8 ± 0.9
	09	16.3 ± 0.4	14.3 ± 0.5	14.9 ± 0.6	15.9 ± 0.8
	10	13.7 ± 0.9	15.3 ± 0.6	17.6 ± 1.3	15.9 ± 1.4
	20	14.7 ± 0.9	15.7 ± 0.8	19.6 ± 1.2	16.3 ± 1.0
	44	16.0 ± 0.6	17.8 ± 0.5	22.1 ± 1.9	19.5 ± 1.2
	56	15.8 ± 0.4	18.6 ± 1.5	16.1 ± 1.1	18.3 ± 0.8
	58	16.8 ± 0.8	16.9 ± 0.9	19.3 ± 0.9	*
	59	15.5 ± 0.7	19.7 ± 1.2	17.2 ± 1.2	18.3 ± 1.0
	66	15.5 ± 1.0	18.4 ± 0.7	19.0 ± 1.2	19.6 ± 1.1
	67	15.0 ± 0.6	16.2 ± 0.8	17.2 ± 0.9	20.5 ± 0.5
	71	14.7 ± 1.1	19.6 ± 0.4	*	19.3 ± 1.5

\* TLD was lost.

\*\*The TLD from Station 01 was in the field from 10/02/90-01/03/91 for the fourth quarter 1990.

TABLE J-1  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/03-04/03	SECOND QUARTER 04/03-07/03	THIRD QUARTER 07/03-10/02	FOURTH QUARTER 10/02-01/02/91
TLD (Gamma)	79	14.1 ± 1.7	15.7 ± 0.7	16.7 ± 1.0	18.1 ± 2.2
	80	15.3 ± 0.7	18.9 ± 0.9	16.2 ± 1.1	24.3 ± 1.1
	81	15.6 ± 0.8	15.8 ± 0.5	16.2 ± 1.1	17.9 ± 0.8
	82	16.2 ± 0.8	15.7 ± 0.5	16.8 ± 0.9	18.8 ± 1.0
	83	17.1 ± 1.3	15.6 ± 0.8	18.7 ± 1.1	18.0 ± 0.8
	84	16.0 ± 0.9	16.5 ± 0.8	22.3 ± 1.4	18.7 ± 1.5
	85	14.3 ± 0.8	18.3 ± 0.6	16.9 ± 0.4	17.6 ± 0.8
	86	15.5 ± 0.7	16.0 ± 0.7	16.6 ± 1.0	17.4 ± 1.1
	87	15.1 ± 0.7	15.8 ± 0.6	15.6 ± 1.6	16.5 ± 0.8
	88	14.1 ± 0.7	15.7 ± 0.6	17.4 ± 1.5	17.0 ± 1.1
	89	13.6 ± 0.9	16.0 ± 0.4	15.9 ± 0.5	21.9 ± 1.0
	90	15.9 ± 1.2	16.1 ± 0.7	18.8 ± 0.3	18.2 ± 0.9
	91	14.0 ± 0.9	16.3 ± 0.4	16.3 ± 0.8	17.6 ± 1.4
	94	16.0 ± 1.0	16.1 ± 0.7	17.3 ± 1.3	21.2 ± 1.0
Average/Quarter		90 days 15.6 ± 1.52 mR/90 days	91 days 16.8 ± 2.3 mR/91 days	91 days 17.4 ± 2.9 mR/91 days	92 days 18.3 ± 2.9 mR/92 days
Average/Day		0.17 ± 0.02 mR/day	0.18 ± 0.03 mR/day	0.19 ± 0.03 mR/day	0.20 ± 0.03 mR/day
Range		(13.6-22.2)mR/90 days	(14.2-26.6)mR/91 days	(14.2-28.9)mR/91 days	(15.3-29.2)mR/92 days
Det./Total		32/32	32/32	31/31	31/31

TABLE J-2  
1990 QUARTERLY REPORT  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD  
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	Aver./Quarter	TOTAL mR/year 01/03-01/03/91
TLD (Gamma)	01	26.7 ± 3.2	107.0
	02	15.1 ± 0.9	60.2
	03	15.4 ± 0.8	61.4
	04	15.7 ± 0.4	62.7
	05	16.1 ± 1.3	64.4
	06	16.3 ± 0.5	65.2
	07	15.5 ± 0.5	61.8
	08	15.7 ± 0.8	64.6
	09	15.4 ± 0.9	61.4
	10	15.6 ± 1.6	62.5
	20	16.6 ± 2.1	66.3
	44	16.4 ± 7.1	75.4
	56	17.2 ± 1.5	68.8
	58 (a)	17.3 ± 1.4	53.0
	59	17.7 ± 1.8	70.7
	66	18.1 ± 1.8	72.5
	67	17.2 ± 2.4	68.9
	71 (b)	17.9 ± 2.7	53.6



TABLE J-2

1990 QUARTERLY REPORT

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD

milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	Aver./Quarter	TOTAL mR/year 01/03-01/03/91
TLD (Gamma)	79	16.2 ± 1.7	64.6
	80	18.7 ± 4.1	74.7
	81	16.4 ± 1.1	65.5
	82	16.9 ± 1.4	67.5
	83	17.4 ± 1.3	69.4
	84	18.4 ± 2.9	73.5
	85	16.8 ± 1.7	67.1
	86	16.4 ± 0.8	65.5
	87	15.8 ± 0.6	63.0
	88	16.1 ± 1.5	64.2
	89	16.9 ± 3.5	67.4
	90	17.3 ± 1.5	69.0
	91	16.1 ± 1.5	64.2
	94	17.7 ± 2.4	70.6
		17.0 ± 2.6 Average mR/Quarter	67.1 ± 8.9
		Range (13.6-29.2)	Aver. total mR/year. All stations Range (53.0-107.0)

- (a) The TLDs for the fourth quarter station 58 were reported as lost.  
 (b) The TLDs for the third quarter station 71 were reported as lost.

K. FOOD - BROADLEAF VEGETATION

NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - INGESTION  
 VEGETATION - TERRESTRIAL BROADLEAF  
 IPC1/CM MFT 1  
 STATION NUMBER 6A  
 STATION 06 - 3.0 MI. 165 DEG. IND.

DATE COLLECTED: 05/15 BROADLEAF NO. 1 05/15 BROADLEAF NO. 2 05/15 BROADLEAF NO. 3 06/12 BROADLEAF NO. 3

RADIOCHEMICAL ANALYSIS:

I-131

GAMMA SPECTRUM ANALYSIS:

BE-7	5.02+-1.07E-01	L.T. 1. E-02	L.T. 7. E-03	L.T. 9. E-03	L.T. 6. E-03	L.T. 8. E-03
K-40	5.24+-0.52E-00	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 8. E-03	L.T. 2. E-02
MN-54	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 2. E-02
CO-58	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 6. E-02
FF-59	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 2. E-02
CO-60	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 5. E-02
ZN-65	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 3. E-02
TR-95	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 3. E-02
RU-103	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 7. E-02	L.T. 2. E-01
RU-106	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 1. E-01
I-131	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 2. E-02
CS-134	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 3. E-02
CS-137	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 6. E-02
KA-140	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 6. E-02
CE-141	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 6. E-02	L.T. 2. E-01
CE-144	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 2. E-01	L.T. 5. E-01
BA-226	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 4. E-02
TH-228	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 4. E-02

NEBRASKA PUBLIC POWER DISTRICT  
 COPPER NUCLEAR STATION  
 EXPOSURE PATHWAY - INGESTION  
 VEGETATION - TERRESTRIAL-BROADLEAF  
 IPCI/CM WET 1  
 STATION NUMBER 06  
 STATION 06 - 3.0 MI. 1.5 DEG. IND.

# DATE COLLECTED

06/12 06/12 07/09  
 BROADLEAF NO. 1 BROADLEAF NO. 2 BROADLEAF

## RADIOCHEMICAL ANALYSIS:

I-131

	06/12	06/12	07/09
	L.T. 7. E-03	L.T. 1. E-02	L.T. 2. E-02
	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02

## GAMMA SPECTRUM ANALYSIS:

	06/12	06/12	07/09
BE-7	1.62+-0.26E 00	8.16+-0.97E-01	1.62+-0.16E 00
K-40	7.27+-0.73E 00	4.53+-0.45E 00	8.09+-0.81E 00
MN-54	L.T. 3. E-02	L.T. 9. E-03	L.T. 7. E-03
CO-58	L.T. 3. E-02	L.T. 1. E-02	L.T. 8. E-03
PF-59	L.T. 7. E-02	L.T. 2. E-02	L.T. 2. E-02
CO-60	L.T. 3. E-02	L.T. 1. E-02	L.T. 8. E-03
ZH-65	L.T. 7. E-02	L.T. 2. E-02	L.T. 2. E-02
ZH-95	L.T. 3. E-02	L.T. 1. E-02	L.T. 8. E-03
RU-103	L.T. 3. E-02	L.T. 1. E-02	L.T. 8. E-03
RU-106	L.T. 2. E-01	L.T. 8. E-02	L.T. 6. E-02
I-131	L.T. 1. E-01	L.T. 4. E-02	L.T. 2. E-02
CS-134	L.T. 3. E-02	L.T. 9. E-03	L.T. 8. E-03
CS-137	L.T. 7. E-02	L.T. 2. E-02	L.T. 1. E-02
BA-140	L.T. 6. E-02	L.T. 2. E-02	L.T. 1. E-02
CE-141	L.T. 2. E-01	L.T. 7. E-02	L.T. 3. E-02
PA-226	L.T. 5. E-01	L.T. 2. E-01	L.T. 4. E-01
TH-228	L.T. 5. E-02	L.T. 2. E-02	L.T. 1. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL BROADLEAF  
IPCICM MET  
STATION NUMBER 06  
STATION 06 - 3.0 MI. 165 DEG. IND.

DATE COLLECTED	08/13 BROADLEAF	08/13 BROADLEAF	08/13 BROADLEAF	08/13 BROADLEAF	09/10 BROADLEAF NO. 1
<b>RADIOCHEMICAL ANALYSIS:</b>					
I-131	L.T. 9. E-03	L.T. 9. F-03	L.T. 1. F-02	L.T. 9. E-03	L.T. 1. E-02
<b>GAMMA SPECTRUM ANALYSIS:</b>					
RE-7	4.25+-0.43E 00	7.60+-1.22E-01	9.63+-1.30E-01	1.13+-0.11E 00	2.76+-0.23E 00
R-40	6.52+-0.65E 00	1.08+-0.11E 01	6.76+-0.68E 00	6.63+-0.66E 00	7.48+-0.75E 00
MM-54	L.T. 3. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 8. F-03	L.T. 1. F-02
CO-58	L.T. 3. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 9. F-03	L.T. 2. F-02
FF-59	L.T. 9. E-02	L.T. 4. E-02	L.T. 4. F-02	L.T. 3. F-02	L.T. 4. F-02
CO-60	L.T. 3. E-02	L.T. 1. E-02	L.T. 1. F-02	L.T. 9. F-03	L.T. 7. F-02
TM-65	L.T. 7. F-02	L.T. 3. E-02	L.T. 3. F-02	L.T. 2. F-02	L.T. 4. F-02
ZR-95	L.T. 4. E-02	L.T. 1. E-02	L.T. 1. F-02	L.T. 1. F-02	L.T. 2. F-02
PU-103	L.T. 4. E-02	L.T. 2. E-02	L.T. 2. F-02	L.T. 1. F-02	L.T. 2. F-02
RU-106	L.T. 3. E-01	L.T. 1. E-01	L.T. 1. F-01	L.T. 7. F-02	L.T. 1. F-01
I-131	L.T. 3. E-01	L.T. 1. E-01	L.T. 9. F-02	L.T. 7. F-02	L.T. 4. F-02
CS-134	L.T. 3. E-02	L.T. 1. E-02	L.T. 1. F-02	L.T. 8. F-03	L.T. 2. F-02
CS-137	L.T. 4. E-02	L.T. 1. E-02	L.T. 1. F-02	L.T. 9. F-03	L.T. 2. F-02
RA-140	L.T. 1. E-01	L.T. 1. E-01	L.T. 4. F-02	L.T. 3. F-02	L.T. 2. F-02
CF-141	L.T. 5. E-02	L.T. 3. E-02	L.T. 3. F-02	L.T. 2. F-02	L.T. 3. F-02
CF-144	L.T. 2. E-01	L.T. 7. F-02	L.T. 8. F-02	L.T. 6. F-02	L.T. 1. F-01
RA-226	L.T. 6. E-01	L.T. 2. E-01	L.T. 2. F-01	L.T. 2. F-01	L.T. 4. F-01
TM-228	L.T. 6. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 1. F-02	L.T. 3. F-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL BROADLEAF  
(PCT/CM NET 1)

STATION NUMBER 06

STATION 06 - 3.0 MI. 165 DEG. IND.

DATE COLLECTED	09/10		10/01		10/01	
	BROADLEAF NO. 2	BROADLEAF NO. 3	BROADLEAF NO. 1	BROADLEAF NO. 2	BROADLEAF NO. 3	BROADLEAF NO. 3
I-131	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02
RADIOCHEMICAL ANALYSIS:						
GAMMA SPECTRUM ANALYSIS:						
PE-7	2.51+-0.25E 00	1.31+-0.19E 00	1.19+-0.12E 00	9.37+-0.94E-01	1.01+-0.19E 00	1.01+-0.19E 00
K-40	3.73+-0.37E 00	5.40+-0.54E 00	1.26+-0.12E 01	6.47+-0.65E 00	7.70+-0.77E 00	7.70+-0.77E 00
MN-54	L.T. 1. E-02	L.T. 2. E-02	L.T. 7. E-03	L.T. 8. E-03	L.T. 2. E-02	L.T. 2. E-02
CO-58	L.T. 2. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 8. E-03	L.T. 2. E-02	L.T. 2. E-02
FE-59	L.T. 4. E-02	L.T. 5. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 6. E-02	L.T. 6. E-02
CO-60	L.T. 2. E-02	L.T. 2. E-02	L.T. 8. E-03	L.T. 8. E-03	L.T. 2. E-02	L.T. 2. E-02
ZN-65	L.T. 4. E-02	L.T. 5. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 5. E-02	L.T. 5. E-02
Zn-95	L.T. 2. E-02	L.T. 2. E-02	L.T. 9. E-03	L.T. 9. E-03	L.T. 2. E-02	L.T. 2. E-02
RU-103	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 3. E-02	L.T. 3. E-02
RU-106	L.T. 1. E-01	L.T. 2. E-01	L.T. 6. E-02	L.T. 6. E-02	L.T. 2. E-01	L.T. 2. E-01
I-131	L.T. 5. E-02	L.T. 6. E-02	L.T. 7. E-02	L.T. 6. E-02	L.T. 2. E-01	L.T. 2. E-01
CS-134	L.T. 2. E-02	L.T. 2. E-02	L.T. 8. E-03	L.T. 7. E-03	L.T. 2. E-02	L.T. 2. E-02
CS-137	L.T. 2. E-02	L.T. 2. E-02	L.T. 8. E-03	L.T. 8. E-03	L.T. 2. E-02	L.T. 2. E-02
BA-140	L.T. 3. E-02	L.T. 4. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 7. E-02	L.T. 7. E-02
CE-141	L.T. 1. E-01	L.T. 4. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 6. E-02	L.T. 6. E-02
CE-144	L.T. 1. E-01	L.T. 2. E-01	L.T. 5. E-02	L.T. 5. E-02	L.T. 2. E-01	L.T. 2. E-01
RA-226	L.T. 4. E-01	L.T. 4. E-01	L.T. 1. E-01	L.T. 1. E-01	L.T. 4. E-01	L.T. 4. E-01
TH-228	L.T. 4. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 4. E-02	L.T. 4. E-02



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL + BROADLEAF  
1 PC1/GM MEY 1  
STATION NUMBER 35  
STATION 35 - 2.0 MI. 350 DEG. COM.

DATE COLLECTED	05/15	05/15	05/15	06/12	06/12
	BROADLEAF NO. 1	BROADLEAF NO. 2	BROADLEAF NO. 3	BROADLEAF NO. 1	BROADLEAF NO. 3
I-131	L.T. 5. E-03	L.T. 1. E-02	L.T. 8. F-03	L.T. 5. E-03	L.T. 1. E-02
RADIOCHEMICAL ANALYSIS:					
GAMMA SPECTRUM ANALYSIS:					
RE-7	3.18+-0.74E-01	1.03+-0.16E 00	9.79+-1.72E-01	1.71+-0.18E 00	1.08+-0.17E 00
R-40	5.27+-0.53E 00	6.01+-0.60E 00	5.65+-0.57E 00	4.57+-0.46E 00	5.59+-0.56E 00
MS-54	L.T. 8. F-03	L.T. 1. E-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
CO-58	L.T. 9. F-03	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
FF-59	L.T. 2. F-02	L.T. 6. F-02	L.T. 4. F-02	L.T. 5. F-02	L.T. 4. F-02
CO-60	L.T. 1. E-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
7N-65	L.T. 2. F-02	L.T. 6. F-02	L.T. 4. F-02	L.T. 4. F-02	L.T. 4. F-02
7R-95	L.T. 9. F-03	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
RU-103	L.T. 1. E-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
RU-106	L.T. 8. F-02	L.T. 1. E-01	L.T. 2. F-01	L.T. 1. F-01	L.T. 1. F-01
I-131	L.T. 2. F-02	L.T. 4. F-02	L.T. 5. F-02	L.T. 8. F-02	L.T. 8. F-02
CS-134	L.T. 9. F-03	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
CS-137	L.T. 2. F-02	L.T. 1. E-02	L.T. 2. F-02	L.T. 2. F-02	L.T. 2. F-02
MB-140	L.T. 2. F-02	L.T. 2. F-02	L.T. 4. F-02	L.T. 5. F-02	L.T. 5. F-02
CF-141	L.T. 2. F-02	L.T. 3. F-02	L.T. 4. F-02	L.T. 4. F-02	L.T. 4. F-02
CE-144	L.T. 2. F-02	L.T. 1. E-01	L.T. 1. F-01	L.T. 1. F-01	L.T. 1. F-01
RA-226	L.T. 2. F-01	L.T. 3. E-01	L.T. 4. F-01	L.T. 4. E-01	L.T. 4. E-01
TH-228	L.T. 2. F-02	L.T. 3. F-02	L.T. 3. F-02	L.T. 3. F-02	L.T. 3. F-02

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NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL BROADLEAF  
(PCI/CM MET 1)  
STATION NUMBER 35  
STATION 35 - 2.0 MI. 350 DEG. CON.

DATE COLLECTED	08/13 BROADLEAF	08/13 BROADLEAF	09/13 BROADLEAF	09/16 BROADLEAF NO. 1	09/16 BROADLEAF NO. 2
RADIOCHEMICAL ANALYSTS					
I-131	L.T. 5. E-02	L.T. 1. F-02	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02
GAMMA SPECTRUM ANALYSTS					
RE-7	1.98+-0.53E 00	1.72+-0.27E 00	8.46+-1.76E-01	1.45+-0.16E 00	4.17+-0.42E 00
K-40	7.87+-0.79E 00	2.99+-0.30E 00	6.02+-0.60E 00	1.00+-0.10E 01	7.32+-0.73E 00
MN-54	L.T. 6. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02
CO-58	L.T. 6. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02
PF-59	L.T. 1. E-01	L.T. 5. E-02	L.T. 5. E-02	L.T. 4. E-02	L.T. 4. E-02
CO-60	L.T. 6. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
ZN-65	L.T. 1. E-01	L.T. 4. E-02	L.T. 6. E-02	L.T. 4. E-02	L.T. 4. E-02
ZR-95	L.T. 7. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
RU-103	L.T. 8. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 2. E-02	L.T. 2. E-02
RU-106	L.T. 5. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 1. E-01
I-131	L.T. 5. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 5. E-02	L.T. 4. E-02
CS-134	L.T. 6. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02
CS-137	L.T. 6. E-02	L.T. 2. E-02	L.T. 2. E-02	2.41+-1.33E-02	L.T. 2. E-02
NA-140	L.T. 2. E-01	L.T. 8. E-02	L.T. 7. E-02	L.T. 3. E-02	L.T. 2. E-02
CF-141	L.T. 2. E-01	L.T. 5. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 3. E-02
CF-144	L.T. 5. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01
RA-226	L.T. 1. E-00	L.T. 4. E-01	L.T. 3. E-01	L.T. 3. E-01	L.T. 3. E-01
TH-228	L.T. 1. E-01	L.T. 4. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL BROADLEAF  
IPCT/CM WET 1  
STATION NUMBER 55  
STATION 35 - 2.0 MI. 350 DEG. CON.

DATE COLLECTED

09/10  
BROADLEAF NO. 3 10/01  
BROADLEAF NO. 1 10/01  
BROADLEAF NO. 2 10/01  
BROADLEAF NO. 3 10/01  
QA

RADIOCHEMICAL ANALYSIS

I-131

GAMMA SPECTRUM ANALYSIS

BE-7  
K-40  
MN-54  
CO-58  
FE-59  
CO-60  
Zn-65  
Zr-95  
RU-103  
RU-106  
I-131  
CS-134  
CS-137  
RA-140  
CE-141  
CE-144  
RA-226  
TH-228

	09/10 BROADLEAF NO. 3	10/01 BROADLEAF NO. 1	10/01 BROADLEAF NO. 2	10/01 BROADLEAF NO. 3	10/01 QA
BE-7	3.35+-0.34E 00	2.30+-0.23E 00	7.61+-1.50E-01	8.42+-1.51E-01	8.19+-1.41E-01
K-40	8.43+-0.84E 00	4.49+-0.45E 00	9.48+-0.95E 00	6.70+-0.67E 00	7.48+-0.75E 00
MN-54	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02
CO-58	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02
FE-59	L.T. 5. E-02	L.T. 4. E-02	L.T. 5. E-02	L.T. 4. E-02	L.T. 2. E-02
CO-60	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 4. E-02
Zn-65	L.T. 5. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 2. E-02
Zr-95	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 4. E-02
RU-103	L.T. 3. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
RU-106	L.T. 2. E-01	L.T. 1. E-01	L.T. 1. E-01	L.T. 2. E-02	L.T. 2. E-02
I-131	L.T. 7. E-02	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01
CS-134	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-01	L.T. 1. E-01
CS-137	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02
RA-140	L.T. 3. E-02	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02
CE-141	L.T. 5. E-02	L.T. 5. E-02	L.T. 6. E-02	L.T. 5. E-02	L.T. 6. E-02
CE-144	L.T. 2. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 3. E-02
RA-226	L.T. 5. E-01	L.T. 9. E-02	L.T. 1. E-01	L.T. 8. E-02	L.T. 8. E-02
TH-228	L.T. 4. E-02	L.T. 2. E-01	L.T. 3. E-01	L.T. 2. E-01	L.T. 2. E-01

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL BROADLEAF  
SPECI/M NET 1  
STATION NUMBER 44  
STATION 44 - 10.25 MI. 270 DEG. CON

DATE COLLECTED	05/15		05/15		06/12		06/12	
	BROADLEAF NO. 1	BROADLEAF NO. 2	BROADLEAF NO. 3	BROADLEAF NO. 2	BROADLEAF NO. 2	BROADLEAF NO. 2	BROADLEAF NO. 3	QA
	L.T. 8. E-03	L.T. 4. E-03	L.T. 7. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 3. E-02		
PADIOCHEMICAL ANALYSIS:								
I-131								
GAMMA SPECTRUM ANALYSIS:								
RF-7	1.25+-0.15E 00	1.32+-0.16E 00	2.38+-0.34E 00	7.48+-1.18E-01	2.14+-0.28E 00			
K-40	7.49+-0.75E 00	6.18+-0.62E 00	6.76+-0.67E 00	4.21+-0.42E 00	1.40+-0.14E 01			
MB-54	L.T. 2. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 1. E-02	L.T. 3. E-02			
CS-58	L.T. 7. E-02	L.T. 7. E-02	L.T. 3. E-02	L.T. 1. E-02	L.T. 3. E-02			
CS-59	L.T. 4. E-02	L.T. 4. E-02	L.T. 8. E-02	L.T. 3. E-02	L.T. 8. E-02			
CO-60	L.T. 2. E-02	L.T. 2. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 3. E-02			
ZN-65	L.T. 4. E-02	L.T. 4. E-02	L.T. 7. E-02	L.T. 3. E-02	L.T. 6. E-02			
TR-95	L.T. 2. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 1. E-02	L.T. 3. E-02			
RU-103	L.T. 2. E-02	L.T. 2. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 4. E-02			
RU-106	L.T. 2. E-01	L.T. 1. E-01	L.T. 3. E-01	L.T. 1. E-01	L.T. 2. E-01			
T-131	L.T. 5. E-02	L.T. 5. E-02	L.T. 1. E-01	L.T. 6. E-02	L.T. 1. E-01			
CS-134	L.T. 2. E-02	L.T. 2. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 3. E-02			
CS-137	L.T. 2. E-02	L.T. 2. E-02	L.T. 4. E-02	L.T. 1. E-02	L.T. 3. E-02			
BA-140	L.T. 3. E-02	L.T. 3. E-02	L.T. 7. E-02	L.T. 3. E-02	L.T. 7. E-02			
CF-141	L.T. 3. E-02	L.T. 4. E-02	L.T. 7. E-02	L.T. 3. E-02	L.T. 7. E-02			
CF-144	L.T. 1. E-01	L.T. 1. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 2. E-01			
BA-226	L.T. 3. E-01	L.T. 4. E-01	L.T. 7. E-01	L.T. 3. E-01	L.T. 6. E-01			
TH-228	L.T. 3. E-02	L.T. 3. E-02	1.41+-0.51E-01	L.T. 2. E-02	L.T. 5. E-02			



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL+BROADLEAF  
IPCT/GM WET 1  
STATION NUMBER 44  
STATION 44 - 10.25 MI. 270 DEG. CON

DATE COLLECTED	06/12			07/09			07/09		
	BROADLEAF NO. 1			BROADLEAF NO. 3			BROADLEAF		
RADIOCHEMICAL ANALYSIS	I-131								
	L.T.	7.	E-03	L.T.	9.	E-03	L.T.	2.	E-02
RE-7	1.78+-0.24E 00			9.89+-2.38E-01			1.06+-0.15E 00		
K-40	7.40+-0.74E 00			5.89+-0.59E 00			5.60+-0.56E 00		
MN-54	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
CO-58	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
FF-59	L.T.	6.	E-02	L.T.	7.	E-02	L.T.	4.	E-02
CO-60	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
ZN-65	L.T.	5.	E-02	L.T.	7.	E-02	L.T.	4.	E-02
ZR-95	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
RU-103	L.T.	3.	E-02	L.T.	4.	E-02	L.T.	2.	E-02
RU-106	L.T.	2.	E-01	L.T.	2.	E-01	L.T.	2.	E-01
T-131	L.T.	1.	E-01	L.T.	1.	E-01	L.T.	2.	E-01
CS-134	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
CS-137	L.T.	2.	E-02	L.T.	3.	E-02	L.T.	2.	E-02
PA-140	L.T.	7.	E-02	L.T.	7.	E-02	L.T.	3.	E-02
CE-141	L.T.	6.	E-02	L.T.	6.	E-02	L.T.	4.	E-02
CE-144	L.T.	2.	E-01	L.T.	2.	E-01	L.T.	1.	E-01
RA-226	L.T.	5.	E-01	L.T.	5.	E-01	L.T.	4.	E-01
TH-228	L.T.	4.	E-02	L.T.	5.	E-02	L.T.	3.	E-02
GAMMA SPECTRUM ANALYSIS									
				</					



NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - INGESTION  
VEGETATION - TERRESTRIAL + BROADLEAF  
IPCI/CM MEY 3

STATION NUMBER 44

STATION 44 - 10.25 MI. 270 DEG. CON

DATE COLLECTED

08/13  
BROADLEAF

08/13  
BROADLEAF

08/13  
BROADLEAF

09/10  
BROADLEAF NO. 1

09/10  
BROADLEAF NO. 1

RADIOCHEMICAL ANALYSIS:

I-131

GAMMA SPECTRUM ANALYSIS:

RE-7

K-40

MO-94

CO-58

FE-59

RO-60

ZN-65

RU-95

RU-103

RU-106

I-131

CS-134

CS-137

MA-140

CE-141

CE-144

RA-226

TH-232

L.T.	9.	E-03	L.T.	9.	E-03	L.T.	1.	E-02	L.T.	1.	E-02	L.T.	9.	E-03
1.56E+0.27E 00			3.70E+0.37E 00			4.27E+0.44E 00			3.15E+0.31E 00			3.52E+0.35E 00		
4.75E+0.48E 00			4.53E+0.65E 00			3.25E+0.38E 00			6.95E+0.70E 00			7.83E+0.78E 00		
L.T. 2.	E-02		L.T. 3.	E-02		L.T. 4.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 3.	E-02		L.T. 3.	E-02		L.T. 6.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 7.	E-02		L.T. 9.	E-02		L.T. 1.	E-01		L.T. 4.	E-02		L.T. 4.	E-02	
L.T. 3.	E-02		L.T. 7.	E-02		L.T. 4.	E-02		L.T. 7.	E-02		L.T. 7.	E-02	
L.T. 6.	E-02		L.T. 8.	E-02		L.T. 9.	E-02		L.T. 4.	E-02		L.T. 4.	E-02	
L.T. 3.	E-02		L.T. 3.	E-02		L.T. 5.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 4.	E-02		L.T. 4.	E-02		L.T. 6.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 2.	E-01		L.T. 3.	E-01		L.T. 4.	E-01		L.T. 1.	E-01		L.T. 1.	E-01	
L.T. 2.	E-01		L.T. 3.	E-01		L.T. 4.	E-01		L.T. 5.	E-02		L.T. 5.	E-02	
L.T. 3.	E-02		L.T. 3.	E-02		L.T. 4.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 1.	E-01		L.T. 1.	E-01		L.T. 4.	E-02		L.T. 2.	E-02		L.T. 2.	E-02	
L.T. 7.	E-02		L.T. 8.	E-02		L.T. 1.	E-01		L.T. 3.	E-02		L.T. 3.	E-02	
L.T. 2.	E-01		L.T. 2.	E-01		L.T. 1.	E-01		L.T. 4.	E-02		L.T. 4.	E-02	
L.T. 6.	E-01		L.T. 6.	E-01		L.T. 9.	E-01		L.T. 1.	E-01		L.T. 1.	E-01	
L.T. 5.	E-02		L.T. 6.	E-02		L.T. 8.	E-02		L.T. 4.	E-02		L.T. 4.	E-02	

NEBRASKA PUBLIC POWER DISTRICT  
 COOPER NUCLEAR STATION  
 EXPOSURE PATHWAY - INGESTION  
 VEGETATION - TERRESTRIAL BROADLEAF  
 IPCI/GM NET 3  
 STATION NUMBER 44  
 STATION 44 - 10.25 MI, 270 DEG. COM

DATE COLLECTED	09/10 BROADLEAF NO. 2	09/10 BROADLEAF NO. 3	10/01 BROADLEAF 1	10/01 BROADLEAF 2	10/01 BROADLEAF 3
<b>RADIOCHEMICAL ANALYSIS:</b>					
I-131	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
<b>GAMMA SPECTRUM ANALYSIS:</b>					
ME-7	4.05+-0.40E 00	3.29+-0.33E 00	1.11+-0.12E 00	7.88+-1.20E-01	2.03+-0.20E 00
K-40	6.57+-0.66E 00	8.25+-0.82E 00	5.22+-0.52E 00	1.30+-0.13E 01	8.08+-0.81E 00
MN-54	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CO-58	L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
FF-59	L.T. 6. E-02	L.T. 5. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 3. E-02
CO-60	L.T. 3. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
ZN-65	L.T. 6. E-02	L.T. 5. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 3. E-02
ZR-95	L.T. 3. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
RU-103	L.T. 3. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
RU-106	L.T. 2. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01
I-131	L.T. 7. E-02	L.T. 6. E-02	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01
CS-134	L.T. 3. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CS-137	3.24+-1.81E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
RA-140	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02
CE-141	L.T. 6. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 4. E-02
CE-144	L.T. 2. E-01	L.T. 2. E-01	L.T. 9. E-02	L.T. 7. E-02	L.T. 1. E-01
RA-226	L.T. 6. E-01	L.T. 4. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01
TH-228	L.T. 5. E-02	L.T. 4. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02

L. SHORELINE SEDIMENT

NERRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
EXPOSURE PATHWAY - AIRBORNE  
SHORELINE SEDIMENT  
IPCT/GM DRY 1

STATION 28 - 1.8 MI. 150 DEG. INO.

DATE COLLECTED

05/07

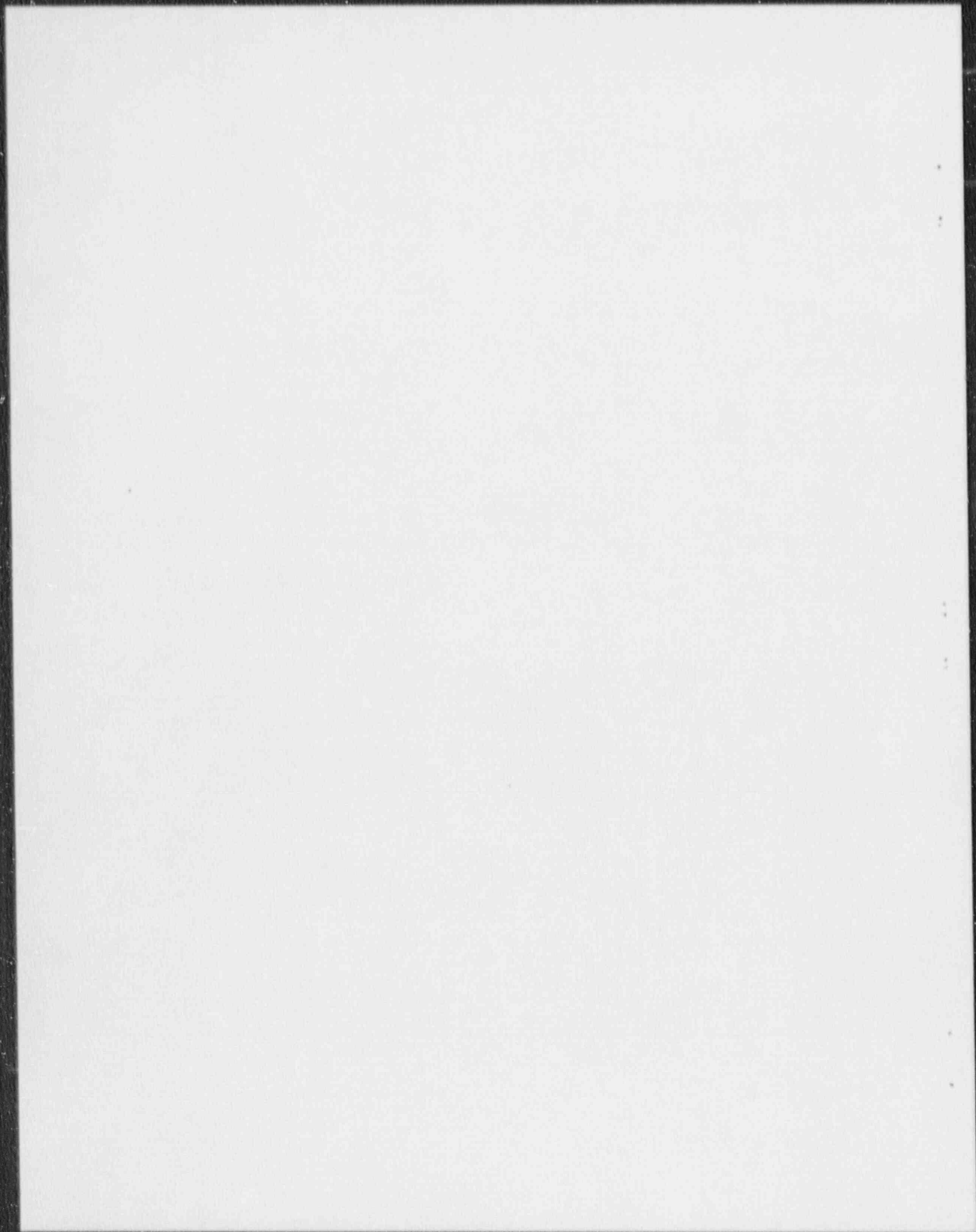
10/08

GAMMA SPECTRUM ANALYSIS

BE-7	L.T.	8.	E-02	L.T.	1.	E-01
K-40	1.52+-0.15E-01			1.64+-0.16E-01		
MN-54	L.T.	9.	E-03	1.98+-0.26E-02		
CO-58	L.T.	9.	E-03	L.T.	1.	E-02
FE-59	L.T.	3.	E-02	L.T.	4.	E-02
CO-60	3.39+-0.34E-01			4.15+-1.05E-02		
ZN-65	L.T.	3.	E-02	L.T.	4.	E-02
ZR-95	L.T.	1.	E-02	L.T.	2.	E-02
RU-103	L.T.	1.	F-02	L.T.	2.	E-02
RU-106	L.T.	7.	E-02	L.T.	1.	E-01
I-131	L.T.	4.	E-02	L.T.	1.	E-01
CS-134	L.T.	1.	E-02	L.T.	1.	E-02
CS-137	2.85+-0.29E-01			1.54+-0.15E-01		
BA-140	L.T.	2.	E-02	L.T.	4.	E-02
CE-141	L.T.	2.	E-02	L.T.	3.	E-02
CE-144	L.T.	6.	E-02	L.T.	9.	E-02
RA-226	1.64+-0.16E-00			1.62+-0.21E-00		
TM-228	8.05+-0.80E-01			9.09+-0.91E-01		

#### REFERENCES

1. Nebraska Public Power District, Cooper Nuclear Station Environmental Radiation Monitoring Program, Annual Report, January 1, 1982-December 31, 1982 (prepared by Teledyne Isotopes).
2. Nebraska Public Power District, Cooper Nuclear Station Environmental Radiation Monitoring Program, Annual Report, January 1, 1983-December 31, 1983 (prepared by Teledyne Isotopes).
3. Nebraska Public Power District Cooper Nuclear Station, Environmental Monitoring Program, Annual Report, January 1, 1984 to December 31, 1984. (Prepared by Teledyne Isotopes).
4. U. S. Department of Energy; EML 440 March 1985; EML-444 April 1989; Environmental Measurements Laboratory, US Department of Energy, New York, New York 10014.
5. U. S. Environmental Protection Agency; Environmental Radiation Data, Report 35, July -- September 1983; Report 39, July -- September 1985; Report 40, October -- December 1984; Report 41, January -- March 1985; Report 42, April -- June 1985; Report 43, July-September 1985; Report 44-45, October-March 1986; Report 46, April-June 1986; Report 47, July-September 1986; Report 48, October-December 1986; Report 49, January-March 1987. Environmental Radiation Facility, Montgomery, Alabama.
6. U. S. Department of Energy; EML 460, October 1, 1986; Environmental Measurements Laboratory, US Department of Energy, New York, New York 10014.
7. U. S. Nuclear Regulatory Commission, 1975, Regulatory Guide 4.8, Environmental Technical Specifications for Nuclear Power Plants.





## APPENDIX



Appendix A  
Land Use Census



# LAND USE CENSUS

June 28, 1990

0-3 Miles

Cooper Nuclear Station (CNS) Radiological Effluent Technical Specifications (RETS) require an annual land use census. This census identifies the location of the nearest garden that is greater than 500 square feet in area and yields edible leafy vegetables, the location of the nearest milk animal, and the location of the nearest resident in each of the 16 meteorological sectors within 3 miles of CNS.

In accordance with the CNS RETS, a land use census was performed on June 28, 1990. No changes have occurred in the nearest resident category since the 1989 land use census. The nearest resident to CNS is in Sector Q, 0.9 miles from CNS.

The number of gardens found in 1990 was more than the number found in 1989. Gardens were found in 10 sectors within 3 miles of CNS in 1989 while gardens were found in 11 sectors within 3 miles of CNS in 1990. Sector N did not contain a garden within 3 miles of CNS in 1989 but did contain a garden in 1990. The nearest garden to CNS is in Sector Q, 0.9 miles from CNS.

No milk animals (producing milk for human consumption) were found within 3 miles of CNS in 1990. This was also the case in 1989.

Land Use Census  
June 28, 1990  
0-3 Miles

<u>Sector</u>	<u>Nearest Resident</u>		<u>Nearest Garden</u>		<u>Nearest Milk Animal</u>
A	3.0 Miles	5.0 <sup>o</sup>	None		None
B	2.4 Miles	14.0 <sup>o</sup>	2.7 Miles	13.0 <sup>o</sup>	None
C	None		None		None
D	1.7 Miles	62.0 <sup>o</sup>	1.7 Miles	62.0 <sup>o</sup>	None
E	1.8 Miles	92.5 <sup>o</sup>	1.8 Miles	92.5 <sup>o</sup>	None
F	2.0 Miles	116.0 <sup>o</sup>	2.4 Miles	112.0 <sup>o</sup>	None
G	2.2 Miles	133.5 <sup>o</sup>	3.0 Miles	138.0 <sup>o</sup>	None
H	None		None		None
J	None		None		None
K	None		None		None
L	1.4 Miles	230.0 <sup>o</sup>	1.4 Miles	230.0 <sup>o</sup>	None
M	1.3 Miles	251.0 <sup>o</sup>	1.3 Miles	251.0 <sup>o</sup>	None
N	1.0 Mile	266.5 <sup>o</sup>	2.3 Miles	276.0 <sup>o</sup>	None
P	1.6 Miles	293.5 <sup>o</sup>	1.6 Miles	293.5 <sup>o</sup>	None
Q	0.9 Mile	307.0 <sup>o</sup>	0.9 Miles	307.0 <sup>o</sup>	None
R	1.9 Miles	335.0 <sup>o</sup>	1.9 Miles	335.0 <sup>o</sup>	None



APPENDIX B  
INTERLABORATORY COMPARISON PROGRAM



1990

A Summary of the Results of the Analyses by Teledyne Isotopes of the EPA  
Cross Check Samples

Compared with the Known Activity as reported by the Environmental Monitoring  
Systems Laboratory, Las Vegas, Nevada

All results which exceed three sigma deviation from the known are appended  
with a note giving the possible cause of the deviation and corrective action  
taken.

**US EPA INTERLABORATORY COMPARISON PROGRAM 1990**  
(ENVIRONMENTAL)

Collection Date	Media	Nuclide	EPA Result(a)		Teledyne Isotopes Result(b)	
10/31/89	Lab Perf. Water Sample A	Gr-Alpha	49.00 ±	12.00	42.33 ±	5.77
		Ra-226	8.40 ±	1.30	9.20 ±	0.46
		Ra-228	4.10 ±	0.60	4.00 ±	0.50
	Sample B	Gr-Beta	32.00 ±	5.00	30.33 ±	0.58
		Sr-89	15.00 ±	5.00	15.00 ±	3.46
		Sr-90	7.00 ±	1.50	7.00 ±	0.00
		Cs-134	5.00 ±	5.00	5.33 ±	1.15
		Cs-137	5.00 ±	5.00	7.00 ±	0.00
	Water	Ra-226	8.70 ±	1.30	8.47 ±	0.49
		Ra-228	8.57 ±	1.40	8.57 ±	1.46
01/12/90	Water	Sr-89	25.00 ±	5.00	24.00 ±	1.73
		Sr-90	20.00 ±	1.50	19.67 ±	2.52
01/26/90	Water	Gr-Alpha	12.0 ±	5.0	10.00 ±	1.73
		Gr-Beta	12.0 ±	5.0	12.33 ±	1.53
02/09/90	Water	Co-60	15.00 ±	5.00	15.00 ±	3.46
		Zn-65	139.00 ±	14.00	131.33 ±	9.07
		Ru-106	139.00 ±	14.00	113.67 ±	4.04
		Cs-134	18.00 ±	5.00	15.33 ±	2.31
		Cs-137	18.00 ±	5.00	19.33 ±	3.21
		Ba-133	74.00 ±	7.00	66.00 ±	3.46
02/23/90	Water	H-3	4976.00 ±	498.00	4900.00 ±	100.00
03/09/90	Water	Ra-226	4.9 ±	0.7	4.73 ±	0.47
		Ra-228	12.7 ±	1.9	13.00 ±	1.00
03/30/90	Air Filter	Gr-Alpha	5.0 ±	5.0	6.33 ±	0.58
		Gr-Beta	31.0 ±	5.0	31.67 ±	0.58
		Sr-90	10.0 ±	1.5	9.33 ±	0.58
		Cs-137	10.0 ±	5.0	10.67 ±	1.15
04/17/90	Water (Lab Perf) Sample A Sample B	Gr-Alpha	90.0 ±	23.0	79.33 ±	2.89
		Ra-226	3.0 ±	0.8	5.67 ±	0.15
		Ra-228	10.2 ±	1.5	9.37 ±	1.44
		Gr-Beta	52.0 ±	5.0	53.33 ±	1.53
		Sr-89	10.0 ±	5.0	10.67 ±	1.15
		Sr-90	10.0 ±	1.5	9.67 ±	0.58
		Cs-134	15.0 ±	5.0	12.67 ±	1.53
		Cs-137	15.0 ±	5.0	16.33 ±	1.15

Footnotes at end of table.

# US EPA INTERLABORATORY COMPARISON PROGRAM 1990 (Cont.)

## (ENVIRONMENTAL)

Collection Date	Media	Nuclide	EPA Result(a)		Teledyne Isotopes Result(b)	
04/27/90	Milk	Sr-89	23.0 ±	5.0	24.67 ±	1.53
		Sr-90	23.0 ±	5.0	24.00 ±	0.00
		I-131	99.0 ±	10.0	89.67 ±	3.21
		Cs-137	24.0 ±	5.0	27.33 ±	2.52
		K	1550.0 ±	78.0	1483.33 ±	75.06
05/04/90	Water	Sr-89	7.0 ±	5.0	6.67 ±	0.58
		Sr-90	7.0 ±	5.0	6.67 ±	0.58
05/11/90	Water	Gr-Alpha	22.0 ±	6.0	16.00 ±	1.00
		Gr-Beta	15.0 ±	5.0	17.00 ±	1.00
06/08/90	Water	Co-60	24.0 ±	5.0	25.33 ±	2.52
		Zn-65	148.0 ±	15.0	148.67 ±	3.06
		Ru-106	210.0 ±	21.0	196.00 ±	20.66
		Cs-134	24.0 ±	5.0	23.67 ±	2.89
		Cs-137	25.0 ±	5.0	24.67 ±	2.08
		Ba-133	99.0 ±	10.0	93.00 ±	6.08
06/22/90	Water	H-3	2933.0 ±	358.0	2900 ±	100.00
07/13/90	Water	Ra-226	12.1 ±	1.8	11.37 ±	0.60
		Ra-228	5.1 ±	1.3	4.20 ±	0.75
08/10/90	Water	I-131	39.0 ±	6.0	36.00 ±	3.00
08/31/90	Water	Gr-Alpha	10.0 ±	5.0	16.00 ±	1.00
		Gr-Beta	62.0 ±	5.0	63.33 ±	1.53
		Sr-90	20.0 ±	5.0	18.00 ±	1.00
		Cs-137	20.0 ±	5.0	18.33 ±	3.21
09/14/90	Water	Sr-89	10.0 ±	5.0	8.67 ±	0.58
		Sr-90	9.0 ±	5.0	9.0 ±	1.00
09/21/90	Water	Gr-Alpha	10.0 ±	5.0	11.00 ±	1.00
		Gr-Beta	10.0 ±	5.0	11.00 ±	1.00

(d)

Footnotes at end of table.



**US EPA INTERLABORATORY COMPARISON PROGRAM 1990 (Cont.)**

**(ENVIRONMENTAL)**

Collection Date	Media	Nuclide	EPA Result(a)		Teledyne Isotopes Result(b)		
09/28/90	Milk	Sr-89	16.0 ±	5.0	9.0 ±	2.65	(d)
		Sr-90	20.0 ±	5.0	15.33 ±	0.58	
		I-131	58.0 ±	6.0	54.67 ±	1.53	
		Cs-137	20.0 ±	5.0	23.00 ±	1.73	
		K	1700.0 ±	85.0	1710.00 ±	65.51	
10/15/90	Water	Co-60	20.0 ±	5.0	21.00 ±	1.00	(d)
		Zn-65	115.0 ±	12.0	115.00 ±	11.53	
		Ru-106	151.0 ±	15.0	142.00 ±	8.66	
		Cs-134	12.0 ±	5.0	11.00 ±	0.00	
		Cs-137	12.0 ±	5.0	16.33 ±	2.52	
		Ba-133	110.0 ±	11.0	94.67 ±	5.13	
10/19/90	Water	H-3	7203.0 ±	720.0	7133.33 ±	251.66	
11/09/90	Water	Ra-226	7.4 ±	1.1	7.27 ±	0.38	
		Ra-228	7.7 ±	1.9	7.57 ±	0.32	

**Footnotes:**

- (a) EPA Results-Expected laboratory precision (1 sigma). Units are pCi/liter for water, and milk except K is in mg/liter. Units are total pCi for air particulate filters.
- (b) Teledyne Results - Average ± one sigma. Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.
- (c) No apparent cause for the low results were found. Three aliquots of the sample were counted on three separate detectors. The results of all three were similar. The calibration curve fit is good (0.997). Ruthenium-106 will be obtained from the EPA to further investigate the matter and future mixed gamma in water EPA intercomparisons will be monitored to identify continuing trends.
- (d) An investigation is being conducted and the results will be available shortly.

2/1/91



STATISTICAL NOTES

APPENDIX C

## APPENDIX C

### STATISTICAL NOTES

1. Each activity is reported in one of two forms:

$$x \pm s \text{ or}$$

$$<L,$$

where

$x$  = value of measurement;

$s$  = counting error at the 95% confidence level (2 sigma error);

$L$  = detection limit based on 4.66 sigma error for counter background

2. All activities are corrected to collection time except for gross alpha and gross beta.
3. Computation of means:

(a) In any statistical table, the values are entered as

$$\bar{x} \pm \bar{s}$$

or  $<L$

where

$$\bar{x} = \text{sample mean} = \frac{\sum x}{n};$$

$n$  = number of data points averaged;

$$\bar{s} = \text{average of the 2 sigma counting errors} = \frac{\sum s}{n}$$

- (b) For gross beta and gross alpha results in air particulates, averaging includes values which are less than the lower limits of detection. The detection limit is used as the sample activity in these cases.
- (c) In all cases, if all values in an averaging group are below detection limits, the highest of the detection limits is reported as a "less than" value without an associated tolerance. If some values are above detection limits and some are below, then:

- (1) The mean of the positive results is reported and the number of positives is listed in parentheses.
- (d) Means are reported on a quarterly basis except for air particulate and airborne iodine data which are reported monthly. For air particulate and charcoal filters, data for samples collected on the 1st, 2nd, and 3rd day of a month are assigned to the previous month.
- (e) In rounding off, numbers followed by a 5 or higher digit are rounded upwards.

Appendix D  
Notification Levels

NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
ENVIRONMENTAL RADIATION SURVEILLANCE PROGRAM  
NOTIFICATION LEVELS

Media and Nuclide		Notification Level	
Air			
Gross Alpha			
Gross Beta		0.1	pCi/m <sup>3</sup>
I-131		1.0	pCi/m <sup>3</sup>
Cs-134		0.31	pCi/m <sup>3</sup>
Cs-137		3.3	pCi/m <sup>3</sup>
		6.7	pCi/m <sup>3</sup>
Milk			
I-131 (low level)			
Sr-89		1.09	pCi/l
Sr-90		6.04	pCi/l
Cs-134		14.82	pCi/l
Cs-137		20.0	pCi/l
		23.0	pCi/l
Groundwater			
Gross Alpha			
Gross Beta		12.0	pCi/l
H-3		33.8	pCi/l
Mn-54		6700	pCi/l
Fe-59		330	pCi/l
Co-58		130	pCi/l
Co-60		330	pCi/l
Zn-65		100	pCi/l
Zr-Nb-95		100	pCi/l
I-131		67	pCi/l
Cs-134		0.67	pCi/l
Cs-137		10	pCi/l
Ba-La-140		17	pCi/l
		67	pCi/l
Food Products			
I-131			
Cs-134		0.1	pCi/g wet
Cs-137		0.33	pCi/g wet
		0.66	pCi/g wet
Fish			
Gross Beta			
Sr-89		10.8	pCi/g wet
Sr-90		3.3	pCi/g wet
Mn-54		1.2	pCi/g wet
		10	pCi/g wet



Media and NuclideNotification Level

## Fish (Continued)

Fe-59 . . . . .	3.3	pCi/g wet
Co-58 . . . . .	10	pCi/g wet
Co-60 . . . . .	3.3	pCi/g wet
Zn-65 . . . . .	6.7	pCi/g wet
Cs-134 . . . . .	0.33	pCi/g wet
Cs-137 . . . . .	0.67	pCi/g wet

## River Water

Gross Alpha Sus . . . . .	22.0	pCi/l
Gross Alpha Dis . . . . .	27.6	pCi/l
Gross Beta Sus . . . . .	58.8	pCi/l
Gross Beta Dis . . . . .	88.6	pCi/l
Sr-89 . . . . .	1000.0	pCi/l
Sr-90 . . . . .	100.0	pCi/l
H-3 . . . . .	6700	pCi/l
Mn-54 . . . . .	330	pCi/l
Fe-59 . . . . .	130	pCi/l
Co-58 . . . . .	330	pCi/l
Co-60 . . . . .	100	pCi/l
Zn-65 . . . . .	100	pCi/l
Zr-Nb-95 . . . . .	67	pCi/l
I-131 . . . . .	0.67	pCi/l
Cs-134 . . . . .	10	pCi/l
Cs-137 . . . . .	17	pCi/l
Ba-La-140 . . . . .	67	pCi/l

## Shoreline Sediment

Co-60 . . . . .	0.1	pCi/g dry
Cs-134 . . . . .	0.75	pCi/g dry
Cs-137 . . . . .	0.75	pCi/g dry



Appendix E  
Conventions Used  
In  
Data Trend Graphs

## APPENDIX E

### Conventions Used in Data Trend Graphs

1. The data trend plots are based on the statistical summaries of Section VI.
2. Monthly or quarterly averages are plotted.
3. The conventions used to determine if a "less than" (<) value or detectable result is plotted are those given in Appendix C.
4. Less-than-value data points are tagged with a downward-pointing arrow as indicated below:



5. A typical less-than value arising from delayed counting of short-lived isotopes (such as I-131 or Ba-140) or reduced sample size are omitted.

Appendix F  
Detection Capabilities

DETECTION CAPABILITIES  
FOR  
ENVIRONMENTAL SAMPLE ANALYSIS  
Radiochemical Methods  
Lower Limit of Detection

LLD\*

	Water (pCi/l)	Milk (pCi/l)	Air Part (pCi/m <sup>3</sup> )	Food Products <u>Broadleaf Vegetation</u> <sup>b</sup> (pCi/g wet)	Fish (pci/g wet)
Quantity <sup>c</sup>	0.4 l	-	280 m <sup>3</sup>		0.1 g ash
Ash Wt. % <sup>d</sup>	-	-	-		4
$\alpha^e$	4.0	-	0.002		-
$\beta^e$	1.4	-	0.003		0.25
Quantity	2 l	1 l	-		3 g ash
Ash Wt. %	-	-	-		4
Sr-89	1.08	2.02	-		0.03
Sr-90	0.93	1.39	-		0.03
Quantity	-	1 l	280 m <sup>3</sup>	20 g	-
I-131	-	0.78	0.05 <sup>f</sup>	0.05	-
H-3	140	-	-	-	-

\*LLD = lower limit of detection based on  $4.66s_b$ ; where  $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute), specified for listed quantity and ash weight percentage.

<sup>b</sup>The minimum sensitivity will vary with the weight reduction achieved by ashing the sample. Minimum sensitivities for three typical ash weight percentages are specified.

<sup>c</sup>Typical analysis quantity.

<sup>d</sup>Typical ash weight percentage of wet weight.

<sup>e</sup>Listed  $\alpha$  and  $\beta$  LLD's are for weightless sample. Self-absorption in sample will increase these LLD's. Typical increases will be factors in the range 1 to 1.3 for  $\beta$  analysis and 1-5 for  $\alpha$  analysis.

<sup>f</sup>Iodine collected Charcoal Cartridge air filter.

<sup>a</sup>LLD = lower limit of detection based on  $4.66s_b$  ; & where  $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute). The LLD is at counting time and must be corrected to collection time. The LLDs given above are based on the quantities indicated and the background count rate in the absence of any radionuclides in the sample. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contributions of other radio-nuclides normally present in the samples (e.g., potassium-40 in milk samples).

Occasionally background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLD's unachievable. In such cases, the contributing factors will be identified and described in the Environmental Radiation Monitoring Program Annual Report.

Note: All LLD's which we require are listed in this table for Ge(Li) Gamma Spectroscopy. If any nuclide is detected, it shall be reported quantitatively whether or not it is one of the 20 nuclides listed above.



LOWER LIMITS OF DETECTION (LLD)  
OF  
ANALYSE FOR Ge (Li) DETECTOR

LLD<sup>a</sup>

		Milk, Water (pCi/l)	Air Part (pCi/m <sup>3</sup> )	Fish, (pCi/kg wet)	Food Products (pCi/kg wet)	Shoreline Sediment (pCi/kg dry)
Quantity:		3.5 l	3600 m <sup>3</sup>	400 g wet	200 g wet	600 g dry
Isotope	Half-life					
Be-7	53.2 d	78	0.05	311	1243	233
K-40	1.26x10 <sup>9</sup> y	140	0.06	466	932	466
Mn-54	313 d	8	0.003	31	124	31
Co-58	70.8 d	8	0.003	31	124	16
Fe-59	45 d	30	0.006	260	311	31
Co-60	5.26 y	8	0.005	31	124	47
Zn-65	245 d	30	0.003	260	311	31
Nb-95	35.2 d	9	0.003	31	124	31
Zr-95	65 d	9	0.005	47	93	78
Ru-103	39.4 d	8	0.003	31	124	47
Ru-106	368 d	62	0.03	311	1243	233
I-131	8.04 d	9	0.003	31	60	31
Cs-134	2.06 y	9	0.003	31	60	47
Cs-137	30.2 y	9	0.003	31	80	31
Ba-140	12.8 d	15	0.09	109	621	233
La-140	40.2 h	15	0.09	109	621	233
Ce-141	32.5 d	16	0.003	47	155	47
Ce-144	284 d	78	0.01	155	621	233
Ra-226	1600 y	100	0.08	200	800	109
Th-228	1.91 y	31	0.01	93	466	109

<sup>a</sup>LLD = lower limit of detection based on  $4.66s_b$ ; and where  $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute). The LLD is at counting time and must be corrected to collection time. The LLDs given above are based on the quantities indicated and the background count rate in the absence of any radionuclides in the sample. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contributions of other radio-nuclides normally present in the samples (e.g., potassium-40 in milk samples).

Occasionally background fluctuations, unavoidable small sample size, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLD's unachievable. In such cases, the contributing factors will be identified and described in the Environmental Radiation Monitoring Program Annual Report.

Note: All LLD's which we require are listed in this table for Ge(Li) Gamma Spectroscopy. If any nuclide is detected, it shall be reported quantitatively whether or not it is one of the 20 nuclides listed above.



Appendix G

Sample Station Locations and Sample Types

<u>Sample Station</u>	<u>Sample Description - Type and Location</u>
No. 1	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry</p> <p>Location: Sample (1) is taken on top of the Material Storage Warehouse on Site. Sample (2) is taken approximately 130 feet south of the Materials Warehouse, NW1/4, S32, T5N, R16E, Nemaha County, Nebraska.</p>
No. 2	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry</p> <p>Location: On north side of county road access to the "former Jefferson Broady" farmstead approximately 275 feet west of the former Jefferson Broady farmstead, SW1/4, S32, T5N, R16E, Nemaha County, Nebraska.</p>
No. 3	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry</p> <p>Location: Located on the north side of the Brownville State Recreation Park access road near water gauging station, SE1/4, S18, T5N, R16E, Nemaha County, Nebraska.</p>
No. 4	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry</p> <p>Location: Located 1/2 mile south of Phelps City, Missouri, on west side of Highway "U", NE1/4, S2, T64N, R42W, Atchison County, Missouri.</p>
No. 5	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry</p> <p>Location: One-fourth mile south and one-fourth mile east of Langdon, Missouri, on north side of road, west of railroad tracks, SW1/4, S18, T64N, R41W, Atchison County, Missouri.</p>
No. 6	<p>Type: (1) Air Particulate &amp; Charcoal Filters (2) Environmental Thermoluminescent Dosimetry (3) Food Products - Broadleaf Vegetation</p> <p>Location: One mile west of the end of Missouri State Highway "U", south side of road, SW corner of the intersection, NW1/4, S34, T64N, R42W, Atchison County, Missouri.</p>

Sample Station	Sample Description - Type and Location
No. 7	Type: (1) Air Particulate & Charcoal Filters (2) Environmental Thermoluminescent Dosimetry  Location: 300 yards east of Highway 67 at Nemaha on north side of road, SW1/4, S6, T4N, R16E, Nemaha County, Nebraska.
No. 8	Type: (1) Air Particulate & Charcoal Filters (2) Environmental Thermoluminescent Dosimetry  Location: One-half mile north, 3/4 mile west and 3/4 mile north of Nemaha on west side of road adjacent to the Mark T. Moore Transmission Line, NE1/4, S35, T5N, R15E, Nemaha County, Nebraska.
No. 9	Type: (1) Air Particulate & Charcoal Filters (2) Environmental Thermoluminescent Dosimetry  Location: Four miles north of Highway #136 on Highway #67. One mile east of Highway #67 and 1/2 mile north on west side of road, SW1/4, S26, T6N, R15E, Nemaha County, Nebraska.
No. 10	Type: (1) Air Particulate & Charcoal Filters (2) Environmental Thermoluminescent Dosimetry  Location: One mile north of Barada, Nebraska, in SW corner of intersection, NE1/4, S14, T3N, R16E, Richardson County, Nebraska.
No. 11	Type: (1) Water - Ground  Location: Plant well water supply header at well pits, NW1/4, S32, T5N, R16E, Nemaha County, Nebraska.
No. 12	Type: (1) Water - River  Location: Sample (1) will be taken (monthly) from the Missouri River immediately upstream from the Plant Intake Structure (River Mile 532.5).
No. 20	Type: (1) Environmental Thermoluminescent Dosimetry  Location: On NNW boundary of NPPD property, approximately 20 yards east of county road, SE1/4, S30, T5N, R16E, Nemaha County, Nebraska.

Sample Station	Sample Description - Type and Location
No. 28	<p>Type: (1) Water - River (2) Fish (3) Sediment from Shoreline</p> <p>Location: Sample (1) will be taken below Plant Discharge Flume Outfall (River Mile 530). Sample (2) will be taken from the river at about River Mile 530. Sample (3) will be taken from the Nebraska bank of the river one-half to three miles downstream from the plant site.</p>
No. 35	<p>Type: (1) Fish (2) Food Products - Broadleaf Vegetation</p> <p>Location: Sample (1) will be taken twice a year from the Missouri River about one to three miles above intake structure. Sample (2) will be taken approximately 1/4 mile south of the Brownville State Recreation Area in Sector A.</p>
No. 42	<p>Type: (1) Milk (Other Producer)</p> <p>Location: One mile south, 1-1/4 miles east of Barada, Nebraska, south side of road, Meinert Wissman farm, NW1/4, S30, T3N, R17E, Richardson County, Nebraska.</p>
No. 44	<p>Type: (1) Environmental Thermoluminescent Dosimetry (2) Food Products - Broadleaf Vegetation</p> <p>Location: Two miles south of Auburn stoplight, 1/4 mile south of Auburn Country Club on Highway #73-75, 1/2 mile east of Highway #73-75 at fenceline north of county road, SE1/4, S27, T5N, R14E, Nemaha County, Nebraska.</p>
No. 47	<p>Type: (1) Water - Ground</p> <p>Location: At Falls City Municipal Water Supply Wells south of Rulo, Nebraska (out of Main Header Flow Meter), SW1/4, S20, T1N, R18E, Richardson County, Nebraska.</p>
No. 56	<p>Type: (1) Environmental Thermoluminescent Dosimetry</p> <p>Location: One and one-fourth mile south and west of Langdon, Missouri, on Highway "U", on the right side of the highway, Bill Gebheart farm, NW1/4, S23, T64N, R42W, Atchison County, Missouri.</p>



Sample Station	Sample Description - Type and Location
No. 58	Type: (1) Environmental Thermoluminescent Dosimetry Location: Three miles south of Brownville, Nebraska, on county road, at the southeast corner of the intersection, with the farm road leading to Sample Station No. 2, SE1/4, S31, T5N, R16E, Nemaha County, Nebraska.
No. 59	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile SSE of the CNS Elevated Release Point, 50 yards west of the levee at the south boundary of NPPD property, SE1/4, S32, T5N, R16E, Nemaha County, Nebraska.
No. 61	Type: (1) Milk (Nearest Producer) Location: One mile west of Brownville, Nebraska, on U.S. Highway #136, one mile north of highway, on county road. Turn to right and proceed approximately 1/2 mile east on south side of the road, Raymond Gentart farm, NW1/4, S13, T5N, R15E, Nemaha County, Nebraska.
No. 66	Type: (1) Environmental Thermoluminescent Dosimetry Location: Two miles south of Nemaha, Nebraska, on Highway 67 - east side of highway. Mrs. Lola Kennedy farm, NW1/4, S19, T4N, R16E, Nemaha County, Nebraska.
No. 67	Type: (1) Environmental Thermoluminescent Dosimetry Location: Two miles west of Brownville, Nebraska, on U.S. Highway #136, then north 1-1/2 miles on county road, then east 1/2 mile, on north side of road, Walter Parkhurst farm, NE1/4, S11, T5N, R15E, Nemaha County, Nebraska.
No. 71	Type: (1) Environmental Thermoluminescent Dosimetry Location: Two miles east of Phelps City, Missouri, on U.S. Highway #136, then south 1-1/2 miles on county road, then west 1/4 mile, Tom Boatman farm, SE1/4, S6, T64N, R41W, Atchison County, Missouri.
No. 79	Type: (1) Environmental Thermoluminescent Dosimetry Location: 1-7/8 miles south of Brownville, Nebraska, on the east side of the paved road. NPPD property, SE1/4, S30, T5N, R16E, Nemaha County, Nebraska.

Sample Station	Sample Description - Type and Location
No. 80	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/8 miles south of Brownville, Nebraska, on the east side of the paved road. NPPD property, NE1/4, S31, T5N, R16E, Nemaha County, Nebraska.
No. 81	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-3/8 miles south of Brownville, Nebraska, in the northeast corner of the intersection of the paved county road and the CNS access road. NPPD property, NE1/4, S31, T5N, R16E, Nemaha County, Nebraska.
No. 82	Type: (1) Environmental Thermoluminescent Dosimetry Location: 7/8 mile south of Cooper Nuclear Station in a field. NPPD property, SW1/4, S32, T5N, R16E, Nemaha County, Nebraska.
No. 83	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/4 miles south of Nemaha, Nebraska, on Highway 67, then east one mile to the junction of the driveway and county road on the east side of the driveway. Leroy Kennedy. NE1/4, S19, T4N, R16E, Nemaha County, Nebraska.
No. 84	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/2 miles west of Brownville, Nebraska, on the south side of U.S. Highway 136, west of Locust Grove School. Bruce L. Solie. NW1/4, S22, T5N, R15E, Nemaha County, Nebraska.
No. 85	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile east of Brownville, Nebraska, on U.S. Highway 136, then north 1/4 mile on the east side of the county road. Scott Leseberg. NE1/4, S33, T65N, R42W, Atchison County, Missouri.
No. 86	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on U.S. Highway 136, then north 1-1/2 miles on Highway "D" - on the west side of Highway "D". Mrs. Olin (Mildred) Harmes. SE1/4, S22, T65N, R42W, Atchison County, Missouri.



Sample Station	Sample Description - Type and Location
No. 87	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on U.S. Highway 136, then south 1/2 mile on a county road and then 3/4 mile west on a county road to the end of the road. Robert Graf. SW1/4, S3, T64N, R42W, Atchison County, Missouri.
No. 88	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on U.S. Highway 136, then south two miles at the end of the county road. David MeyerKorth. NW1/4, S11, T64N, R42W, Atchison County, Missouri.
No. 89	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/2 miles south of Phelps City, Missouri, on Highway "U", then 1/2 mile west in the southeast corner of the county road intersection. Gertrude Rosenbohm. NE1/4, S14, T64N, R42W, Atchison County, Missouri.
No. 90	Type: (1) Environmental Thermoluminescent Dosimetry Location: 1-1/2 miles west and 3/4 mile south of Langdon, Missouri, on Highway "U", then 1/4 mile west. Garth Green. SW1/4, S23, T64N, R42W, Atchison County, Missouri.
No. 91	Type: (1) Environmental Thermoluminescent Dosimetry Location: 1/2 mile west of Rock Port, Missouri, on the south side of the intersection of U.S. Highway 136 and U.S. Highway 275 at the water tower. Mildred Cook. NW1/4, S28, T65N, R41W, Atchison County, Missouri.
No. 94	Type: (1) Environmental Thermoluminescent Dosimetry Location: 1/4 mile south of Langdon, Missouri, on the west side of the road. Max Peeler. NE1/4, S24, T64N, R42W, Atchison County, Missouri.
No. 95	Type: (1) Milk (Other Producer) Location: 4 miles south of Nemaha, Nebraska, on Highway 67, then 3 miles west, then 1/8 mile north. Shanks Dairy. SW1/4, S27, T4N, R15E, Nemaha County, Nebraska.

NOTE: (a) Numbers missing from sequences of Sample Station Numbers  
are discontinued Sample Stations.

Appendix H

Summary of Doses to a Member of the  
Public Off-Site

DOSES TO MAXIMUM INDIVIDUAL (MREM), JANUARY-DECEMBER 1990

COOPER NUCLEAR STATION JANUARY-DECEMBER 1990  
SPECIAL LOCATION # 1 SITE BOUNDARY  
AT 0.69 MILES NW

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.38E-02	3.23E-02	6.47E-02
TEEN	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.46E-02	3.23E-02	6.47E-02
CHILD	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.70E-02	3.23E-02	6.47E-02
INFANT	3.19E-02	3.19E-02	3.19E-02	3.19E-02	3.19E-02	4.28E-02	3.23E-02	6.47E-02

COOPER NUCLEAR STATION JANUARY-DECEMBER 1990  
SPECIAL LOCATION # 2 NEAR RESIDENCE  
AT 0.90 MILES NW

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	9.40E-03	9.40E-03	9.41E-03	9.41E-03	9.41E-03	1.15E-02	9.53E-03	1.98E-02
TEEN	9.41E-03	9.40E-03	9.41E-03	9.41E-03	9.42E-03	1.23E-02	9.53E-03	1.98E-02
CHILD	9.41E-03	9.40E-03	9.42E-03	9.42E-03	9.43E-03	1.50E-02	9.53E-03	1.98E-02
INFANT	9.42E-03	9.40E-03	9.43E-03	9.44E-03	9.44E-03	2.11E-02	9.53E-03	1.98E-02