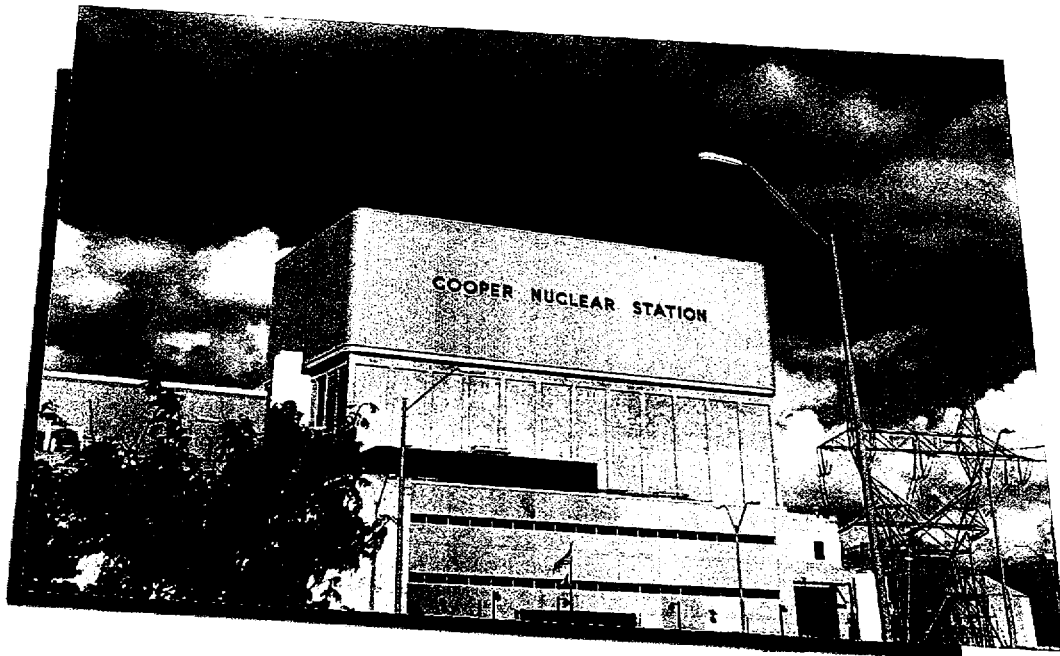


Cooper Nuclear Station

Annual Radiological Environmental Operating Report

Radiological Environmental Monitoring Program
January 1, 1999 - December 31, 1999



USNRC Docket Number 50-298



Nebraska Public Power District
Nebraska's Energy Leader

Prepared by

**TELEDYNE BROWN ENGINEERING
ENVIRONMENTAL SERVICES**



Nebraska Public Power District
Nebraska's Energy Leader

NLS2000055

May 15, 2000

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

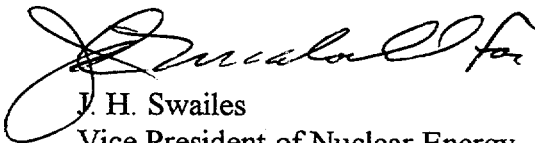
Subject: Annual Radiological Environmental Operating Report
Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46

In accordance with Cooper Nuclear Station Technical Specification 5.6.2, Nebraska Public Power District submits the Cooper Nuclear Station Annual Radiological Environmental Operating Report for the period of January 1, 1999, through December 31, 1999.

Per 10 CFR 50.4(b)(1), we are enclosing one copy of the report for your use, one copy to the Regional Office and one copy to the NRC Senior Resident Inspector.

Should you have any questions regarding this matter, please contact Sharon Mahler at (402) 825-5236.

Sincerely,



J. H. Swailes
Vice President of Nuclear Energy

/rlb
Enclosure

cc: Regional Administrator w/enclosure
USNRC - Region IV

Senior Project Manager w/enclosure
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector w/enclosure
USNRC - Cooper Nuclear Station

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ATTACHMENT 3 LIST OF NRC COMMITMENTSCorrespondence Number: NLS2000055

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
NONE.	

NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
Radiological Environmental Monitoring Program
1999 Annual Report
January 1, 1999 to December 31, 1999

Approved by:



Alan R. Latham
Laboratory Director

Prepared by
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PREFACE

This report covers the period of January 1 through December 31, 1999. Personnel of the Nebraska Public Power District made all sample collections. Analyses were performed and reports of analyses were prepared by Teledyne Brown Engineering - Environmental Services and forwarded to Nebraska Public Power District.

I. INTRODUCTION

I. INTRODUCTION

This report contains a complete tabulation of data collected during the period January through December 1999, for the operational Radiological Environmental Monitoring Program performed for the Cooper Nuclear Station (CNS) of the Nebraska Public Power District (NPPD) by Teledyne Brown Engineering - Environmental Services.

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 (net electrical) boiling water reactor. Initial criticality was attained on February 21, 1974. The reactor reached 50 percent power on June 25, 1974 and 100 percent 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. All 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 (now trading as Teledyne Brown Engineering - Environmental Services) again assumed responsibility for the analyses effective January 1, 1979 through December 31, 1999.

A. 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 Iodine-131 in milk were observed throughout most of the United States.

No atmospheric nuclear tests have been conducted since 1977, thus no short-lived fission products were detected in air particulate samples. Also no Iodine-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 Iodine-131 in charcoal filters and milk samples were measured. Additionally, in 1986, Cesium-137 and the short-lived isotopes iodine-131, Ruthenium-106, and Cesium-134 were detected in broadleaf vegetation. Similar results occurred in other areas of the United States and the entire Northern Hemisphere.

B. 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 (Berillium-7).
- (2) Terrestrial, primordial radionuclides from the environment (potassium-40, Radium-226, Thorium-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.

II. SUMMARY

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 1999.

A discussion of each type of sample analyzed and its impact, if any, on the environment is presented in Section IV. Included also are graphs of the isotopes of interest for the past several years and the statistical results for each quarter of the year.

Section VI is the Radiological Environmental Monitoring Program Summary. It contains the yearly summary of the program with the total number of samples of each type analyzed. It lists the yearly average and range for the control locations versus the indicator locations and the number of detections per total number of samples. It identifies the station with the highest yearly average, the distance and location of that station and provides the range of the detections.

The 1999 radiological environmental measurements for CNS indicate 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 the Cooper Nuclear Station.

III. SAMPLING AND ANALYSIS PROGRAM

III. SAMPLING AND ANALYSIS PROGRAM, STATIONS AND MAPS

The 1999 sampling and analysis program is described in Table 1. Teledyne Brown Engineering - Environmental Services has a comprehensive quality assurance/quality control program designed to assure the reliability of data obtained. The results for the 1999 Intercomparison Program conducted by the Analytic's, Inc., and Environmental Resource Associates are contained in Appendix B.

Sampling locations are indicated in the map labeled Figure 1. The sample types collected at each location and the approximate distance and direction from the reactor elevated release point are specified.

The annual land use census for 1999 is described in Appendix A. There were no milk animals found within three miles of CNS in 1999 and no evidence of potable water use from the river. The nearest garden to CNS is in sector E, 1.8 miles from CNS. Gardens were found in eight sectors during 1998 and in eight sectors during 1999. The nearest resident to CNS is in sector Q, 0.9 miles from CNS.

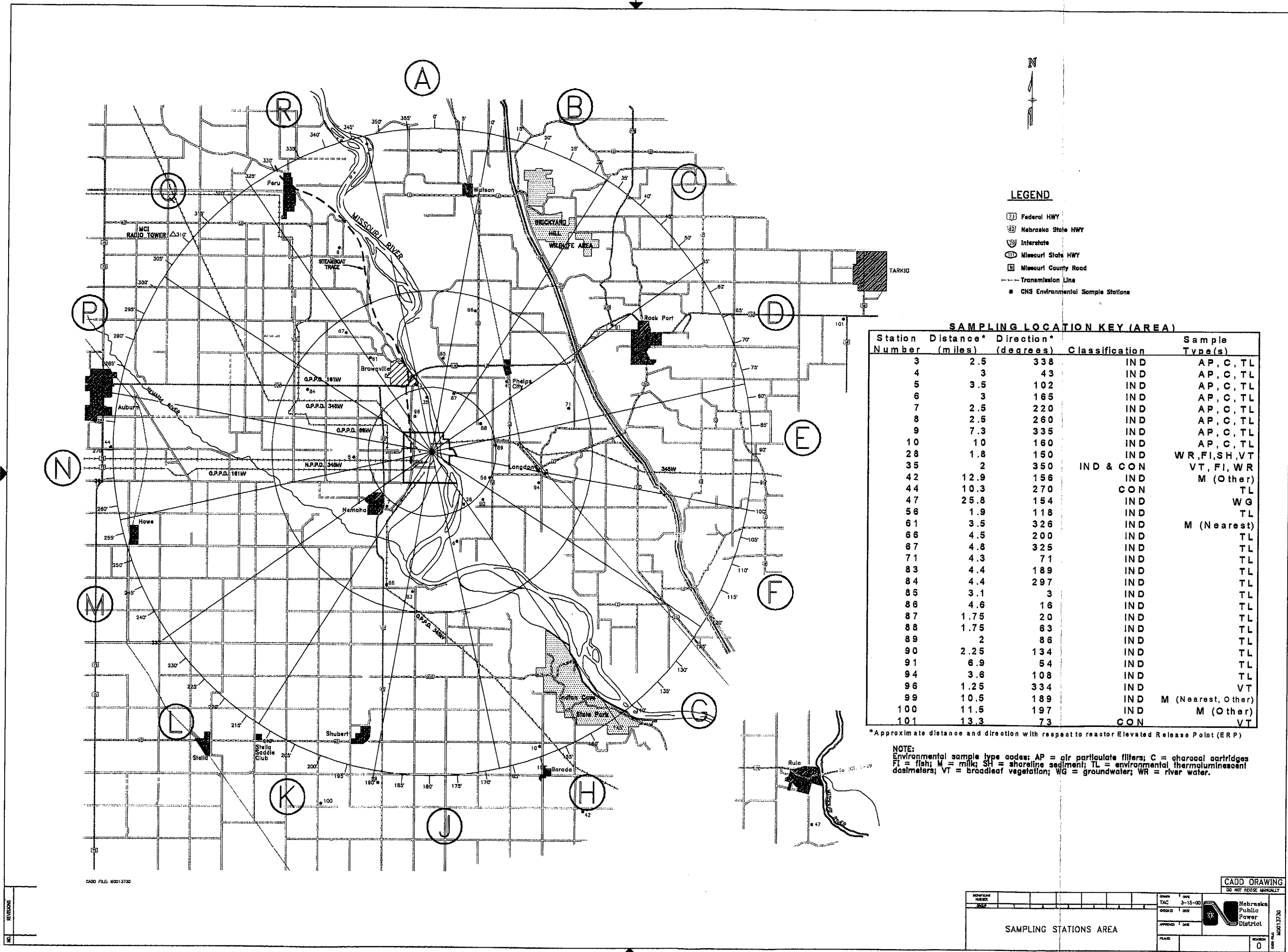
All of the required 1999 environmental monitoring, including sampling and analysis, was conducted as specified in Table D4.1-1 of the CNS Offsite Dose Assessment Manual (ODAM), except as noted in Appendix E, Exception Table.

TABLE 1

**NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
Environmental Radiation Surveillance Program
Sampling Schedule and Analysis**

Sample Type	Station	Frequency	Analyses
Airborne/ Particulate	1-10	Once per 7 days	Gross alpha, beta. Gamma Isotopic on quarterly composite of each station, and on each sample in which beta activity is > 10 times the yearly mean of control samples
Airborne/Iodine	1-10	Once per 7 days	I-131
Milk / Nearest Producer peak pasture only	61	Once per 15 days	I-131 (low level), Gamma Isotopic Sr-89, Sr-90, elem. Ca. on monthly composite
River Water	12, 28	Once per 31 days	Gross alpha, sus and dis Gross beta, sus and dis, Sr-89, Sr-90, Gamma Isotopic, Tritium on quarterly composite
Milk/ Nearest Producer Non-peak pasture	61, 99	Once per 31 days	I-131 (low level) Sr-89, Sr-90, elem. Ca., Gamma Isotopic
Food Products / Broadleaf Vegetation	28, 35, 96, 101	Monthly when available	I-131 (low level), Gamma Isotopic
Background Radiation Thermoluminescent Dosimeters	1-10, 20, 44, 56, 58, 59, 66, 67, 71, 79-91, 94	Once per 92 days	TLD Readout (gamma dose)
Groundwater	11, 47	Once per 92 days	Gross Alpha, Beta, Gamma Isotopic, Tritium
Milk Other Producers	42, 99, 100	Once per 92 days	I-131 (low level) Sr-89, Sr-90, elem. Ca., Gamma Isotopic
Fish (Summer and Fall)	28, 35	Two times per year	Gross Beta, Sr-89, Sr-90, Gamma Isotopic on edible portions
Shoreline Sediment	28	Two times per year	Gamma Isotopic

Figure 1



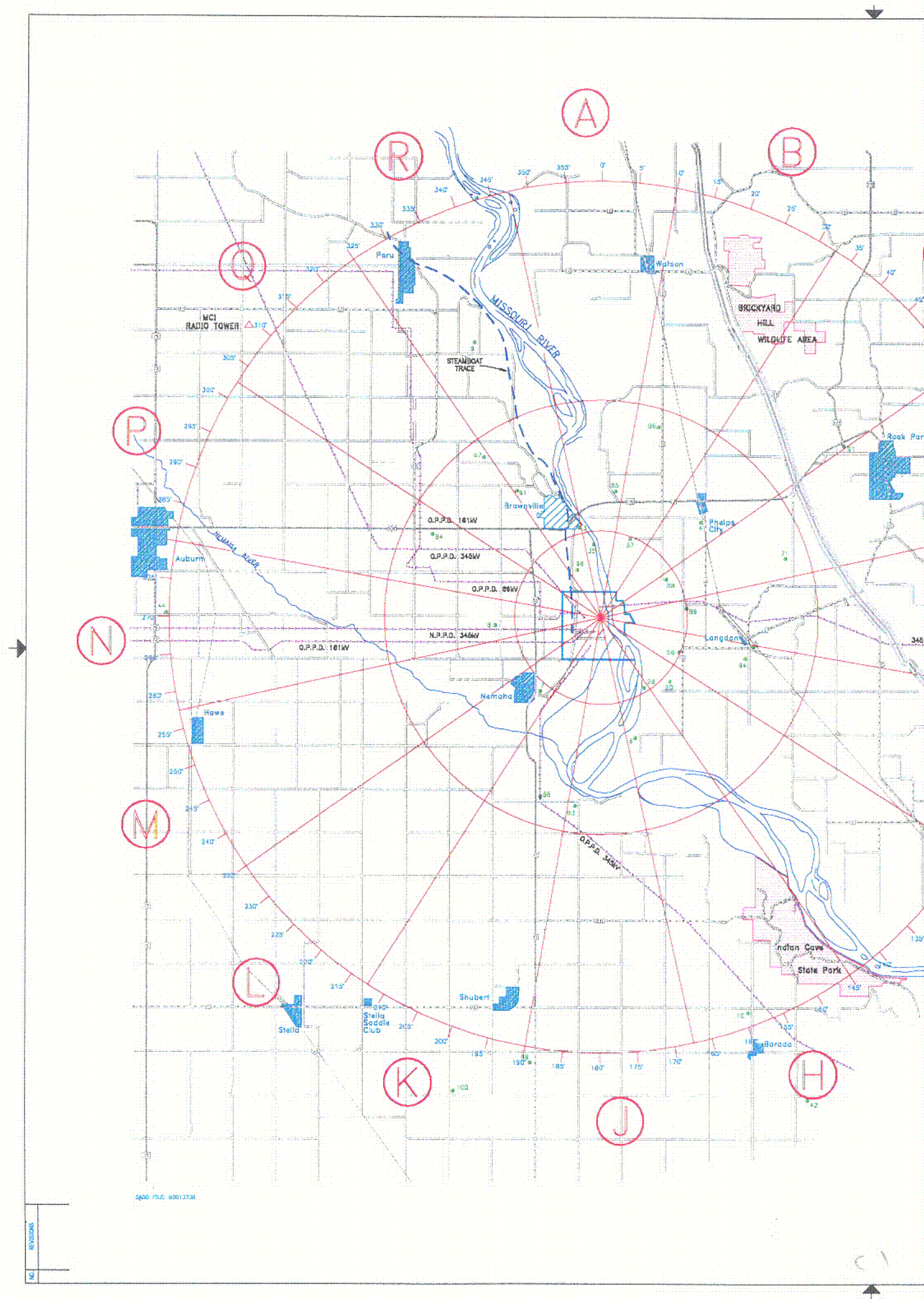
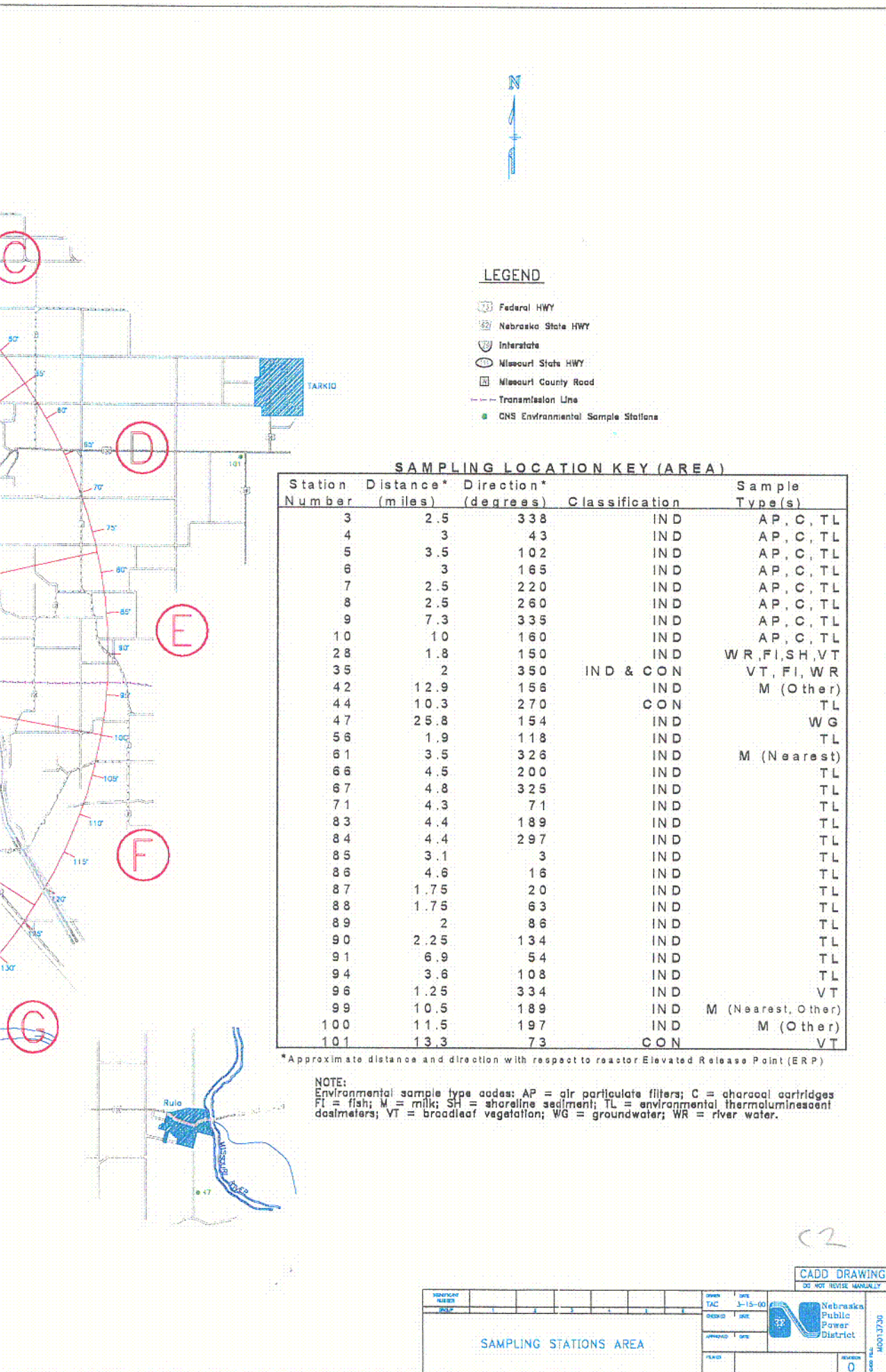


Figure 1



N

LEGEND

73 Federal HWY

62 Nebraska State HWY

29 Interstate

11 Missouri State HWY

W Missouri County Road

Transmission Line

● CNS Environmental Sample Stations

SAMPLING LOCATION KEY (SITE)

Station Number	Distance* (miles)	Direction* (degrees)	Classification	Sample Type(s)
1	0.1	230	IND	AP, C, TL
2	0.75	210	IND	AP, C, TL
11	0.15	275	IND	WG
12	0.1	355	CON	WR
20	0.96	315	IND	TL
58	1.1	234	IND	TL
59	1	170	IND	TL
79	0.85	299	IND	TL
80	0.75	280	IND	TL
81	0.8	255	IND	TL
82	0.8	185	IND	TL

*Approximate distance and direction with respect to reactor Elevated Release Point (ERP)

NOTE:

Environmental sample type codes: AP = air particulate filters; C = charcoal cartridges
FI = fish; M = milk; SH = shoreline sediment; TL = environmental thermoluminescent dosimeters; VT = broadleaf vegetation; WG = groundwater; WR = river water.C4
CADD DRAWING
DO NOT REVISE MANUALLY

SIGNIFICANT NUMBER							ORIGINATOR	DATE	 Nebraska Public Power District	REVISION 0	DWS FILE MOD1372B
GROUP	1	2	3	4	5	6	TAC	3-15-00			
MAP OF SAMPLING STATIONS SITE							CHECKED	DATE			
							APPROVED	DATE			
							FILMED				

IV. SUMMARY AND DISCUSSION OF 1999 ANALYTICAL RESULTS

IV. Summary and Discussion of 1999 Analytical Results

Data from the radiological analyses of environmental media collected during 1999 are tabulated and discussed below. The procedures and specifications followed in the laboratory for these analyses are as required in the Teledyne Brown Engineering Quality Assurance Manual and are explained in the Teledyne Brown Engineering Analytical Procedures. A synopsis of analytical procedures used for the environmental samples is provided in Appendix C. In addition to internal quality control measures performed by Teledyne, the laboratory also participates in an Interlaboratory Comparison Program. Participation in this program ensures that independent checks on the precision and accuracy of the measurements of radioactive material in environmental samples are performed. The results of the Interlaboratory Comparison are provided in Appendix B.

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods. The "less than" values in the data tables were calculated for each specific analysis and are dependent on sample size, detector efficiency, length of counting time, chemical yield, when appropriate, and the radioactive decay factor from time of counting to time of collection. Teledyne Brown Engineering's analytical methods meet the Lower Limit of Detection (LLD) requirements given in Table 2 of the USNRC Branch Technical Position, Radiological Monitoring Acceptable Program (November 1979, Revision 1). Section C contains a discussion of the LLD formulas.

The following is a discussion and summary of the results of the environmental measurements taken during the 1999 reporting period.

A. *Airborne Particulates*

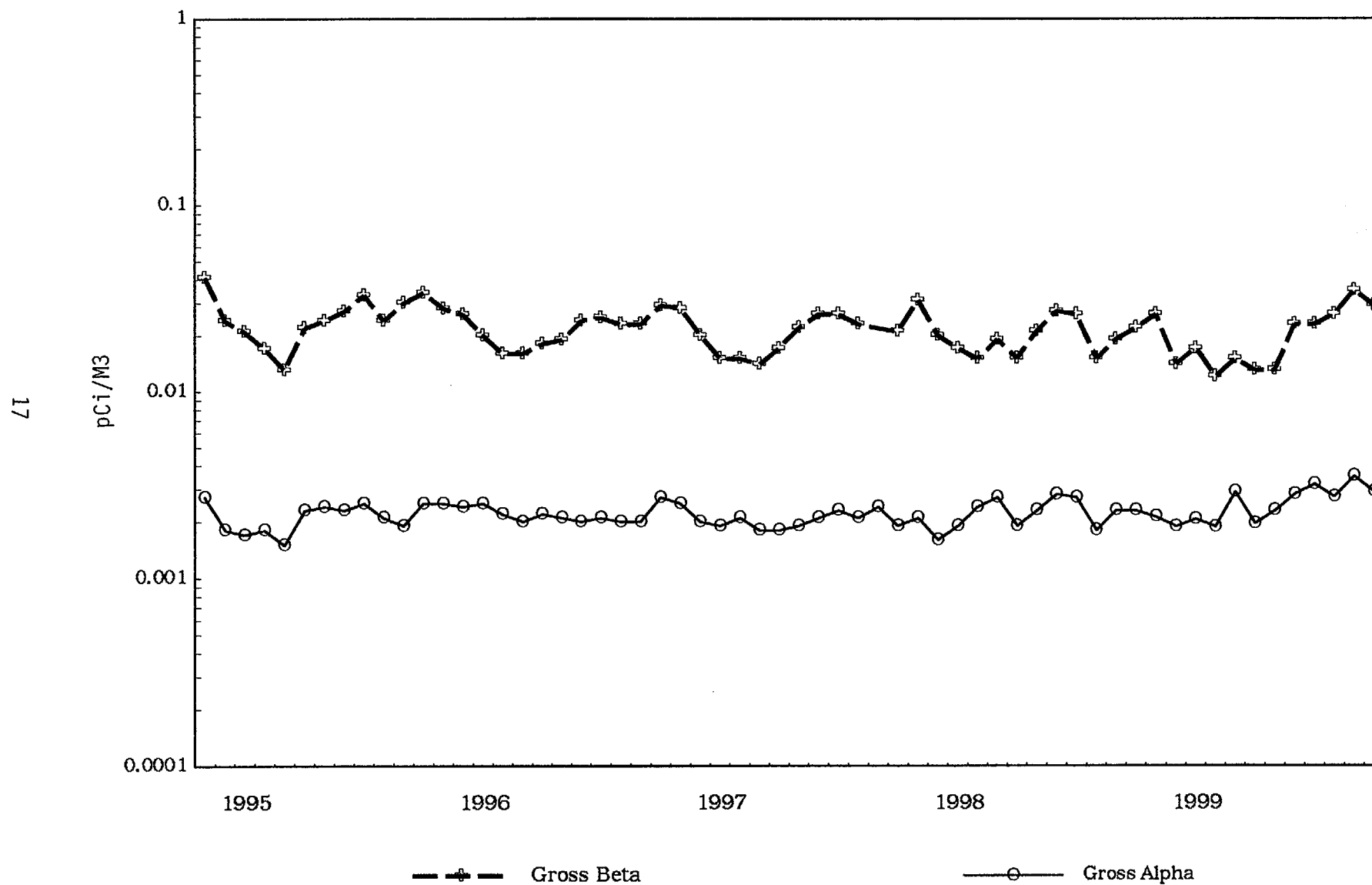
Gross beta activity was observed in 501 of the 504 indicator samples collected during 1999. The average concentration was 0.021 pCi/m³ and a range of 0.003 to 0.33 pCi/m³. The results of the gross beta activities are presented in Section VII-1 and Trending Graph 1. The gross beta activities for 1999 were comparable to levels measured in the previous several years. Prior to that period the gross beta activities were higher due to atmospheric nuclear weapons testing performed in other countries.

Air particulate filters were collected weekly and composited by locations on a quarterly basis. They were analyzed by gamma ray spectroscopy. The results are presented in Section VII-2. Beryllium-7, which is produced continuously in the upper atmosphere by

TRENDING GRAPH 1

GROSS ALPHA AND GROSS BETA IN AIR PARTICULATES

MONTHLY AVERAGE - ALL LOCATIONS



cosmic radiation, was measured in all 40 composite samples. The indicator locations had an average concentration of 0.096 pCi/m³ and a range of 0.030 to 0.168 pCi/m³. During the preoperational period, beryllium-7 was measured at comparable levels, as would be expected. Naturally occurring potassium-40 was detected in two samples with an average concentration of 0.006 pCi/m³ and a range of 0.006 to 0.007 pCi/m³. All other gamma emitters were below the detection limits. Several nuclides have been plotted. The Environmental Measurements Laboratory of the US Department of Energy no longer reports measurements of cerium-144 because the artificial nuclides such as cerium-144, have reached the limits of detection by the analytical techniques now used.

B. *Airborne Iodine*

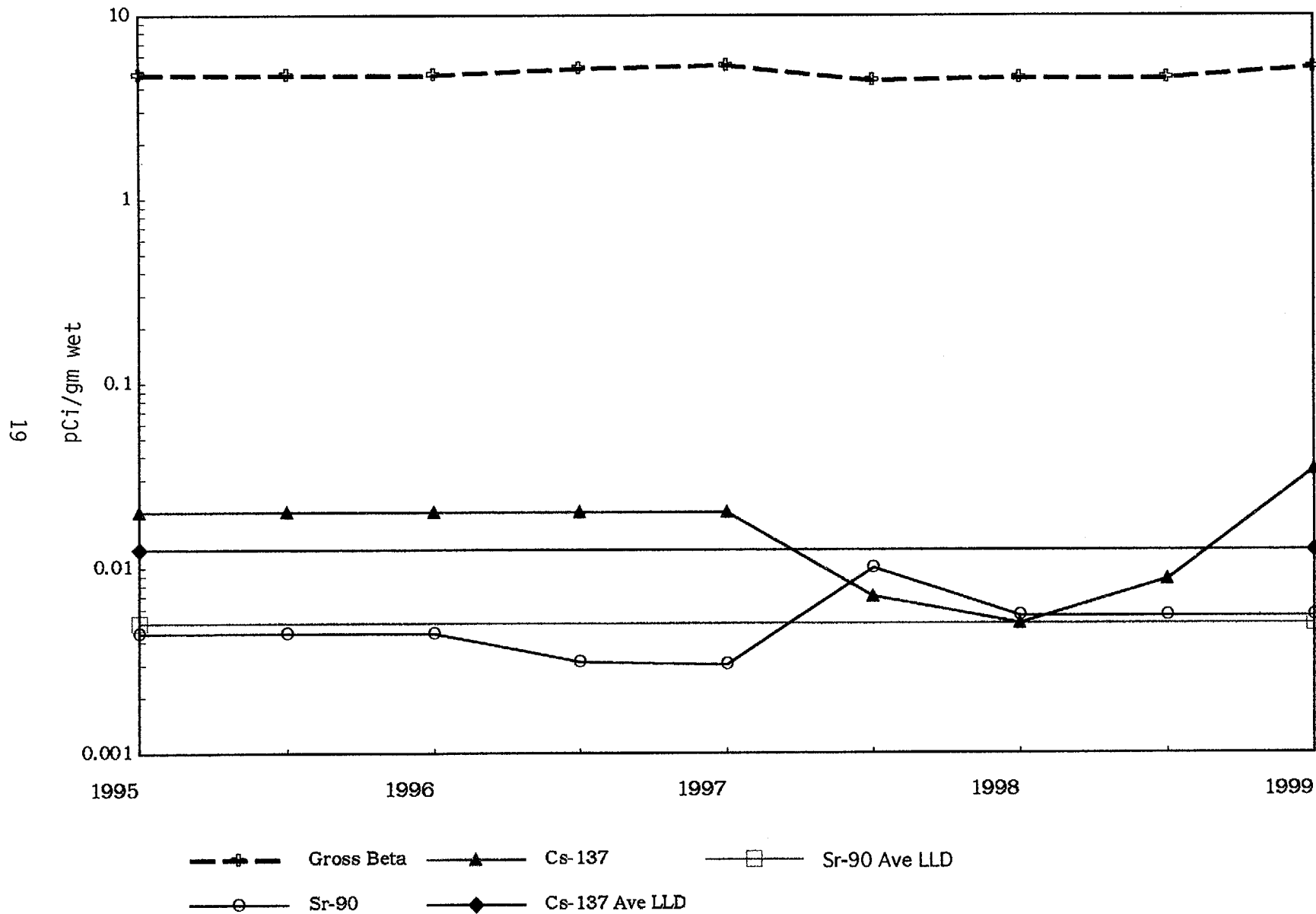
Charcoal cartridges used to collect airborne iodine were collected weekly and analyzed by gamma spectrometry for iodine-131. Stations 01 through 10 were monitored. The results are presented in Section VII-1. All results were below the required lower limit of detection.

C. *Fish*

Aquatic biota can be sensitive indicators of radionuclide accumulation in the environment because of their ability to concentrate certain chemical elements, which have radioactive isotopes. The results are presented in Table VII-3 and Trending Graph 2. Nine samples of fish were collected during the summer and fall of 1999. A middle-top feeding fish (carp) and a bottom feeding fish (catfish) were collected in June and October. These samples were analyzed for gross beta, strontium-89/90 and by gamma ray spectroscopy. As expected naturally occurring potassium-40 was detected in all samples. The average concentration at the control location was 2.80 pCi/gm (wet weight) and a range of 2.55 to 3.12 pCi/gm (wet weight). The average concentration for the three indicator samples was 3.00 pCi/gm (wet weight) with a range of 2.49 to 3.63 pCi/gm (wet weight). The fission product cesium-137 was measured in one sample at 0.026 pCi/gm (wet weight). Cobalt-60 was measured in one of the nine samples with a measurement of 0.013 pCi/gm (wet weight). Strontium-89 was not detected during 1999. Strontium-90 was measured in one indicator sample with a measurement of 0.12 pCi/gm (wet weight). All other gamma emitters were below their detection levels.

TRENDING GRAPH 2

GROSS BETA, STRONTIUM-90 AND CESIUM-137 IN FISH ALL LOCATIONS



D. Milk – Nearest Producers

Milk samples are collected once every 15 days in peak pasture season and once every 31 days the rest of the year. The results are presented in Table VII-4 and Trending Graphs 3 and 4. Six samples were collected from Station 99, located 10.5 miles from the plant, during the first quarter of 1999. When samples became available from station 61 in April, nineteen samples were collected from Station 61, located 3.5 miles, 326 degrees from the elevated release point of the Cooper Nuclear Station. As expected, naturally occurring potassium-40 was measured in all samples with an average of 1280 pCi/liter and a range of 1140 to 1490 pCi/liter.

The fission product cesium-137 was not detected during 1999. Strontium-89 was not detected in the 13 samples analyzed. Strontium-90 was detected in all samples monitored with an average level of 1.51 pCi/liter and a range of 1.0 to 2.7 pCi/liter. This is a normal environmental level. Elemental calcium was detected at an average concentration of 1.45 pCi/liter with a range of 1.1 to 2.0 pCi/liter. All other gamma emitters were below their detection levels

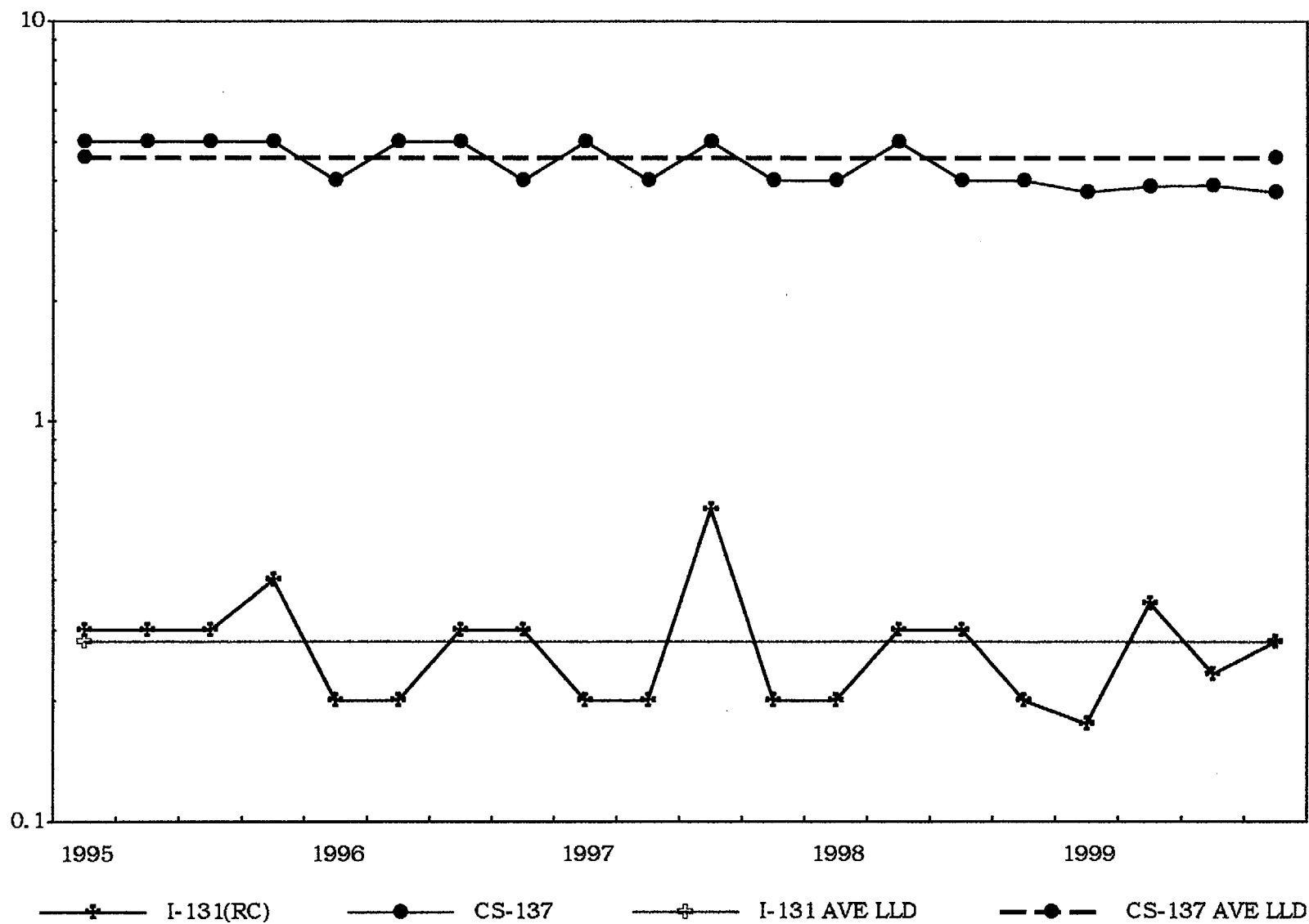
E. Milk – Other Producers

Seven milk samples were collected from three locations of other producers during 1999 and results are presented in Table VII-5 and Trending Graphs 5 and 6. Station 42 was sampled during the first and second quarter while station 99 was collected during the third and fourth quarters of 1999. Station 100 is located 11.5 miles from the plant and Station 42 is located 12.9 miles from the plant. Naturally occurring potassium-40 was detected in all samples with an average concentration of 1390 pCi/liter and a range of 1190 to 1540 pCi/liter. Strontium 89 was not detected during 1999. Strontium 90 was measured in the seven samples with an average concentration of 0.97 pCi/liter with a range of 0.58 to 1.3 pCi/liter. Elemental calcium was measured in the seven samples with an average concentration of 1.66 pCi/liter and a range of 1.4 to 2.0 pCi/liter. All other gamma emitters were below their detection levels

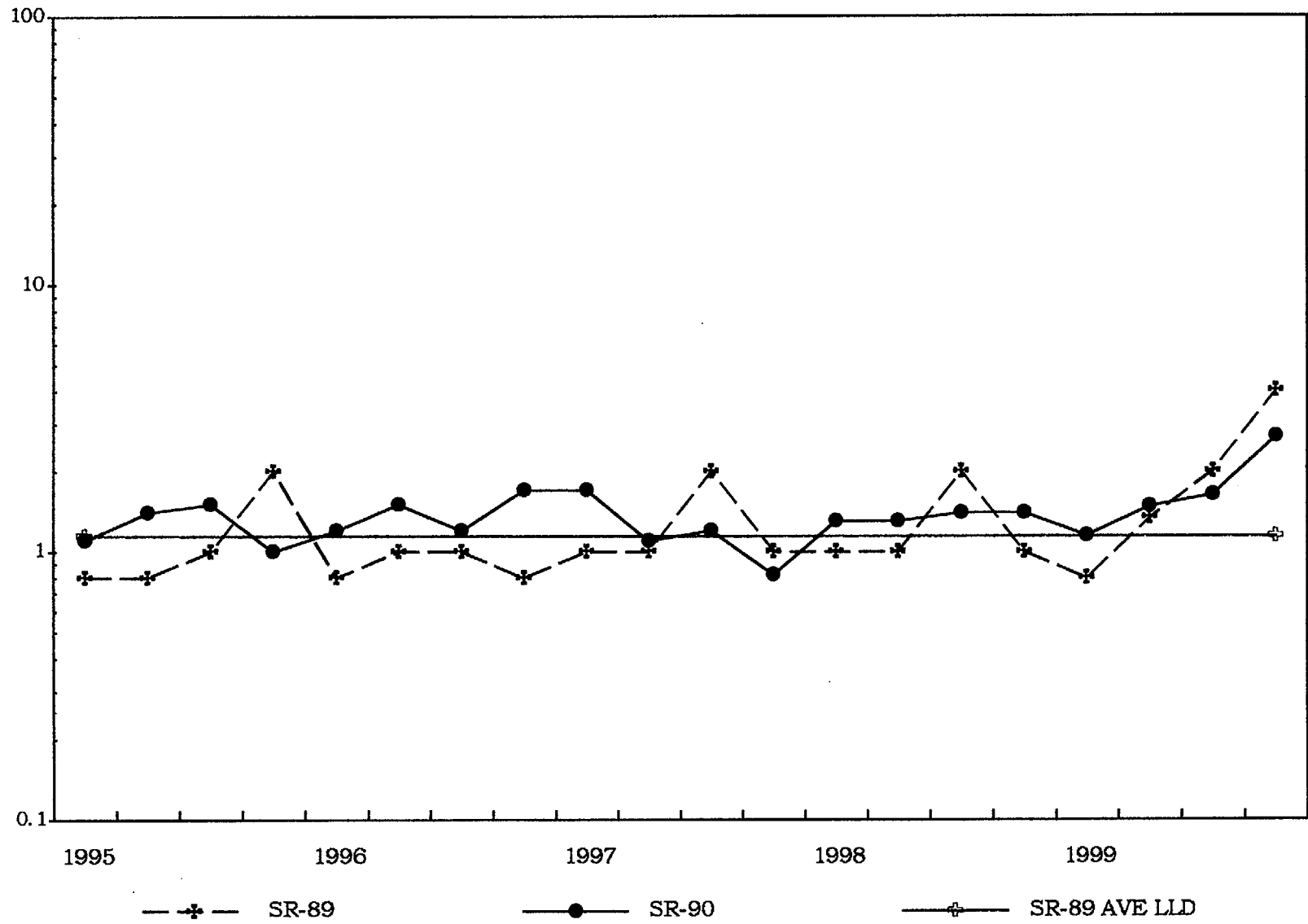
The levels of radioactivity of the nuclides iodine-131 and cesium-137 are plotted on Trending Graph 5. These graphs indicate there was no appreciable difference between the levels of activity of the nearest producer and the commercial producers. This

TRENDING GRAPH 3
IODINE-131 AND CESIUM-137 IN MILK- NEAREST PRODUCER
 STATION 61 OR 99

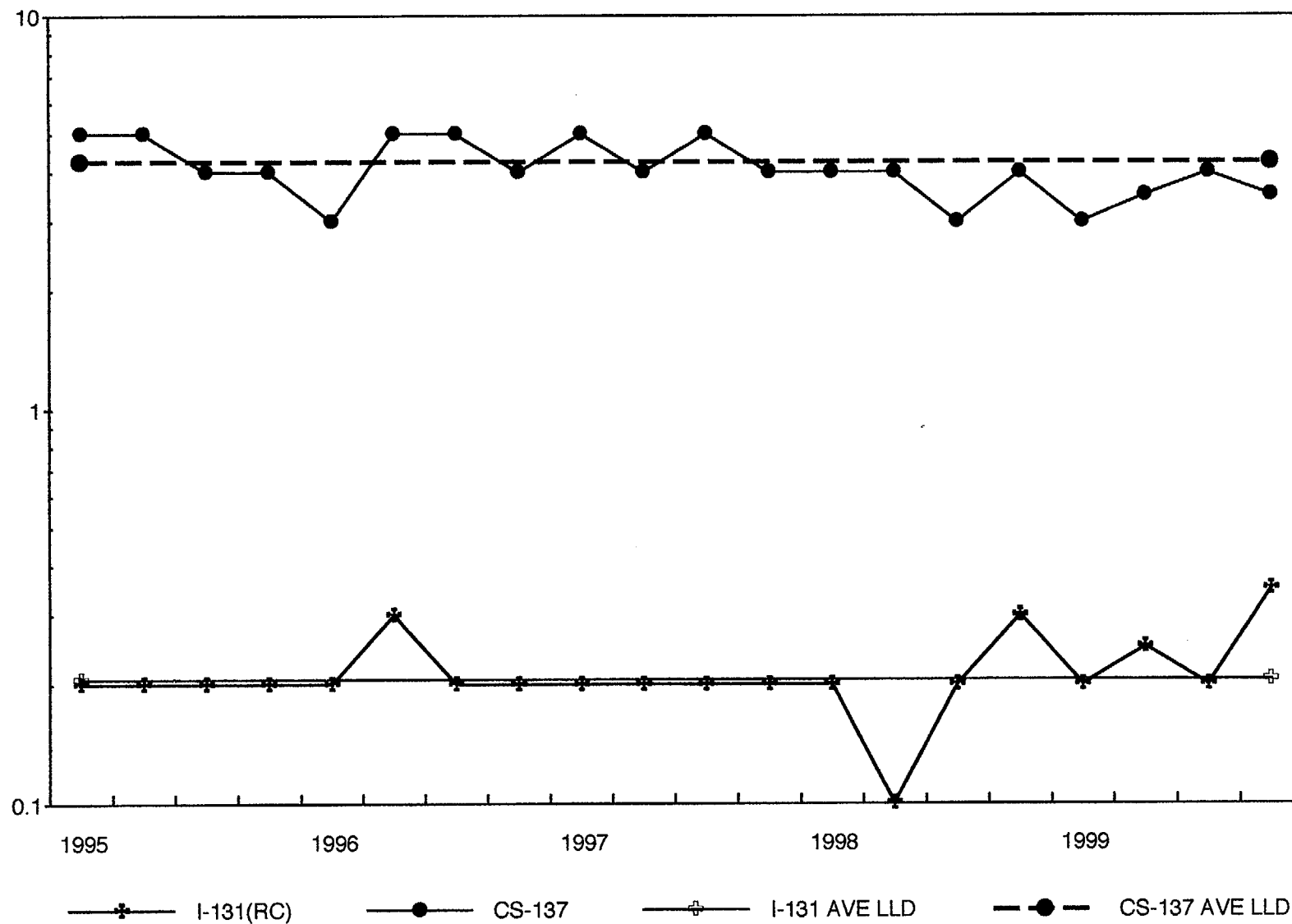
21



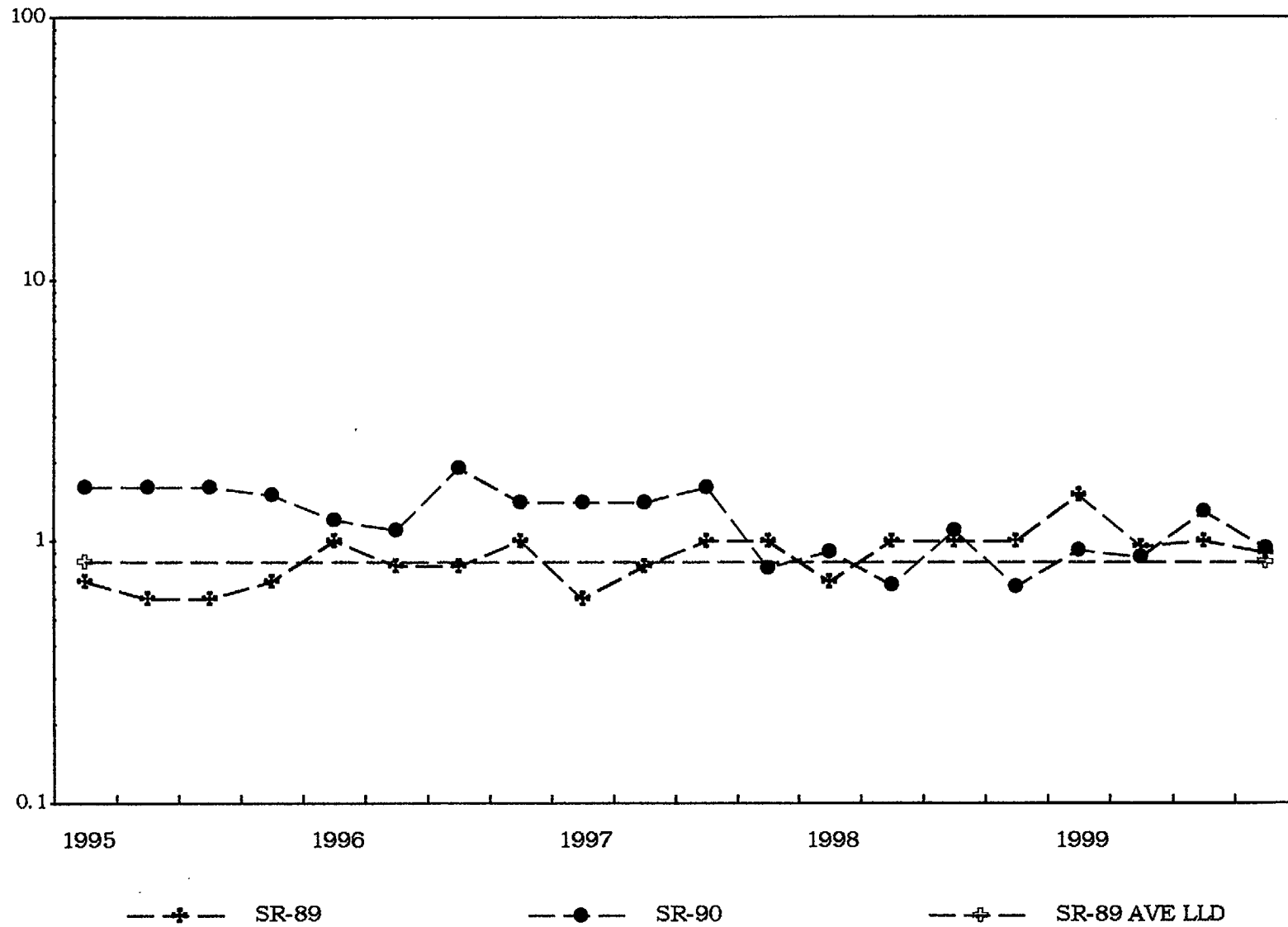
TRENDING GRAPH 4
STRONTIUM-89 AND 90 IN MILK- NEAREST PRODUCER
STATION 61 OR 99



TRENDING GRAPH 5
IODINE-131, AND CESIUM-137 IN MILK - OTHER PRODUCERS
 QUARTERLY AVERAGE - ALL LOCATIONS



TRENDING GRAPH 6
STRONTIUM-89 AND 90 IN MILK- OTHER PRODUCERS
 ALL LOCATIONS



indicates there is no effect on milk samples from the operation of the Cooper Nuclear Station.

F. Ground Water

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 located 0.15 miles from the plant and station 47 is 25.8 miles from the plant. The results are presented in Table VII-6 and Trending Graph 7.

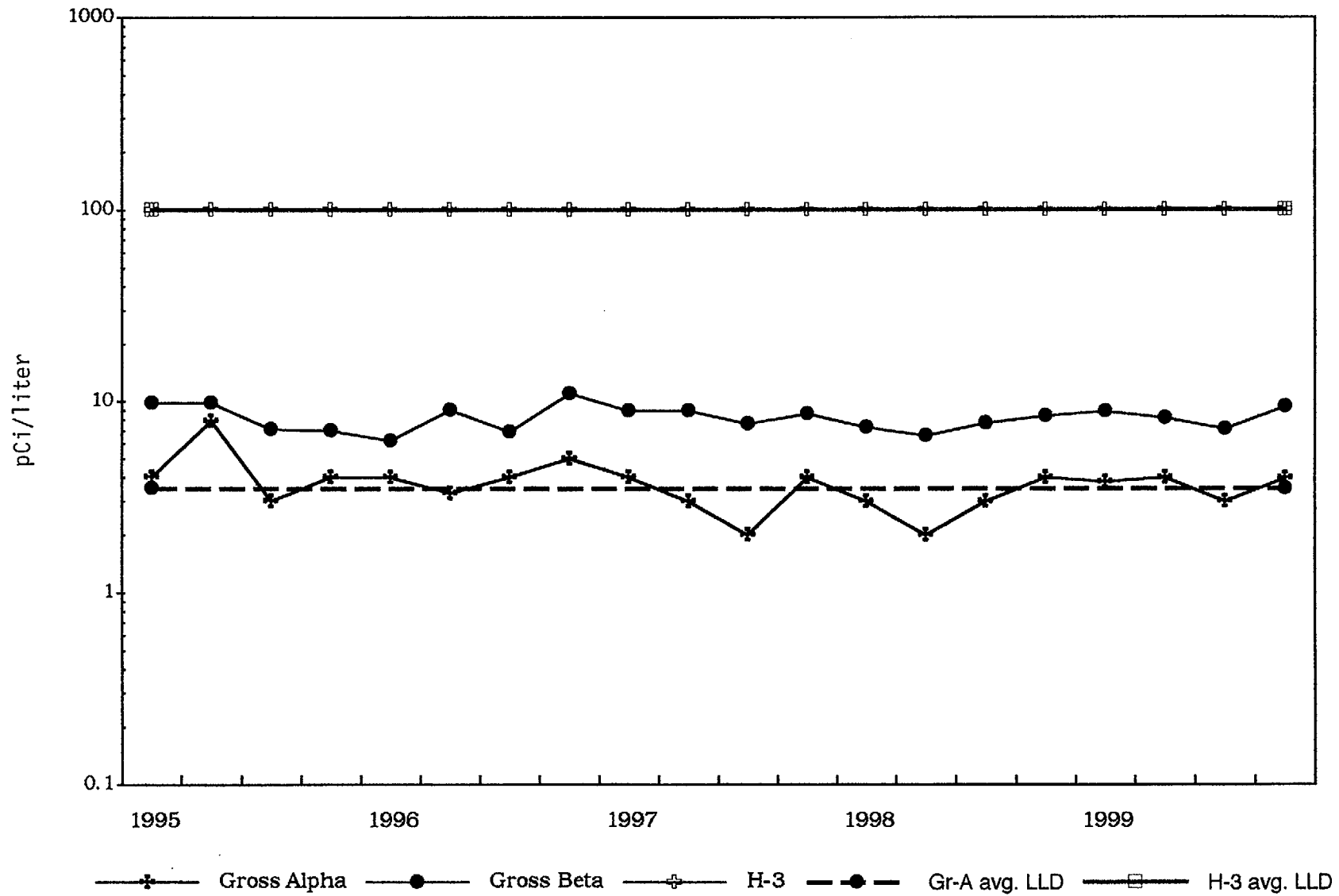
The gross beta activity for the eight indicator samples had an average concentration of 8.39 pCi/liter and a range of 5.4 to 11 pCi/liter. This is statistically similar to past years. Gross alpha was measured in two of the eight samples with an average detection of 3.95 pCi/liter and a range of 3.8 to 4.1 pCi/liter. There were no measurements of gamma emitters above their detection levels. Gross alpha/gross beta and tritium levels have been plotted in Figure H-1. The graphs indicate these activities have remained essentially unchanged.

G. River Water

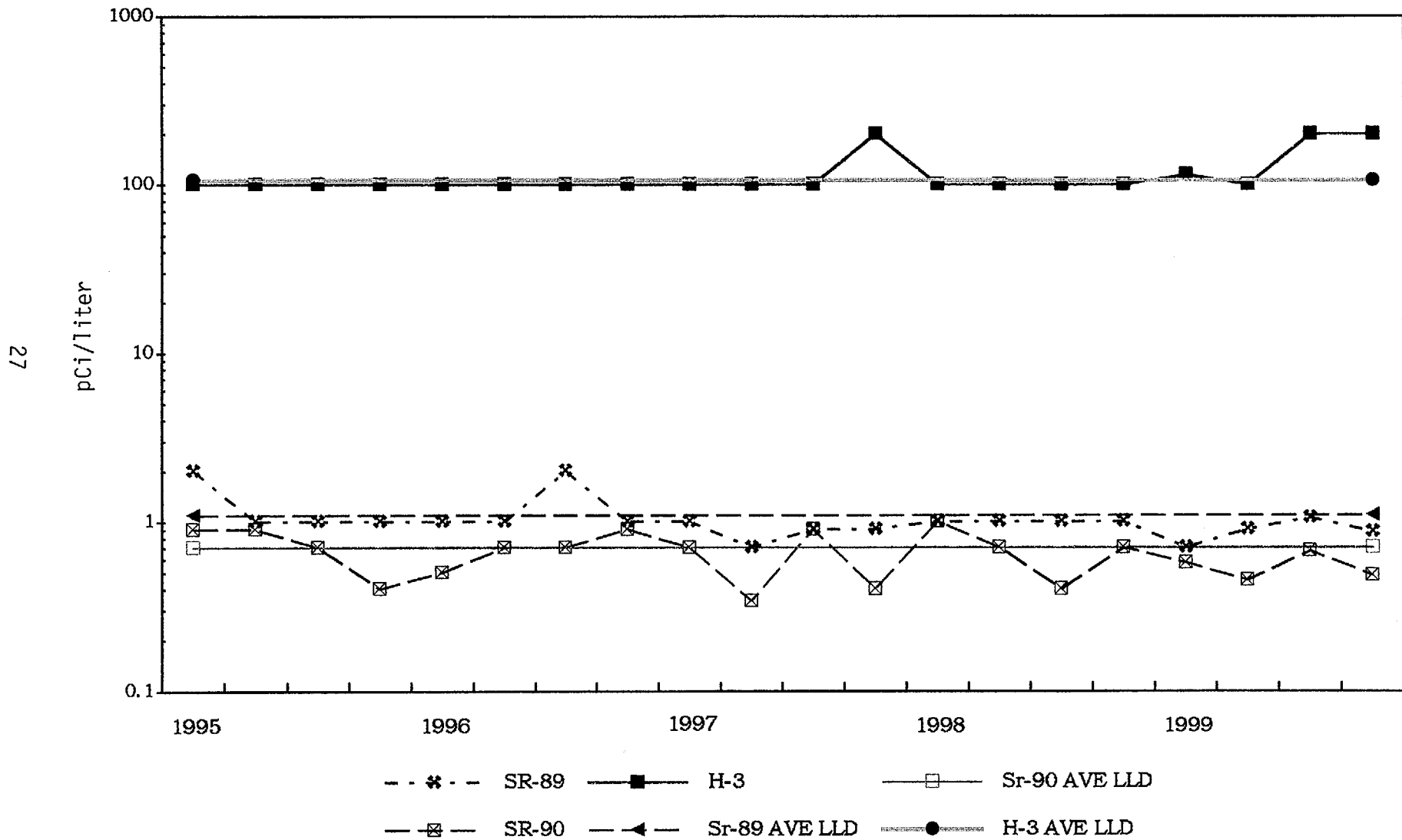
River water was collected monthly and monitored for gross beta and gross alpha, suspended and dissolved, strontium-89, strontium-90 plus gamma emitting isotopes. A quarterly composite was measured for tritium. The results are presented in table VII-7 and Trending Graph 8. There were no detections of potassium-40 above the normal level of detection. In fact, no gamma emitters were detected above their detection limits. Strontium-89 and strontium-90 were not measured during 1999.

Gross alpha (Dissolved) was measured in two of the nine control samples with an average concentration of 3.55 pCi/liter and a range of 3.4 to 3.7 pCi/liter. Gross Alpha (Dissolved) was measured in six of the fifteen indicator samples with an average concentration of 3.90 pCi/liter and a range of 2.2 to 7.4 pCi/liter. Gross Alpha (Suspended) was measured in five of the nine control samples with an average concentration of 1.62 pCi/liter and a range of 0.6 to 3.4 pCi/liter. Gross alpha (Suspended) was measured in nine indicator samples with an average concentration of 2.97 pCi/liter and a range of 0.5 to 10.0 pCi/liter. All nine of the control samples analyzed for gross beta (Dissolved) had measurable concentrations with an average of 11.0 pCi/liter and a range of 7.4 to 18 pCi/liter. The indicator locations had an average concentration of 10.3 pCi/liter and a range of 7.0 to 16 pCi/liter in all samples. Gross

TRENDING GRAPH 7
GROSS ALPHA, BETA, AND TRITIUM IN GROUND WATER
 QUARTERLY AVERAGE - ALL LOCATIONS



TRENDING GRAPH 8
STRONTIUM-89, 90 AND TRITIUM IN RIVER WATER
 QUARTERLY AVERAGE - ALL LOCATIONS



beta (Suspended) was measured in all nine control samples with an average concentration of 4.8 pCi/liter and a range of 2.0 to 12 pCi/liter. Gross beta (Suspended) was measured in all indicator samples with an average concentration of 6.7 pCi/liter and a range of 1.0 to 28 pCi/liter. Tritium was measured in one of the eight samples analyzed with a concentration of 130 pCi/liter. Below are a comparison of the 1998 and 1999 results for gross alpha and gross beta. The average readings were similar to previous years but are within normal yearly fluctuations.

	1998 Average pCi/liter	1999 Average pCi/liter
Gross Alpha Dissolved	4.5	3.81
Gross Alpha Suspended	2.7	2.39
Gross Beta Dissolved	9.4	10.5
Gross Beta Suspended	7.6	6.67

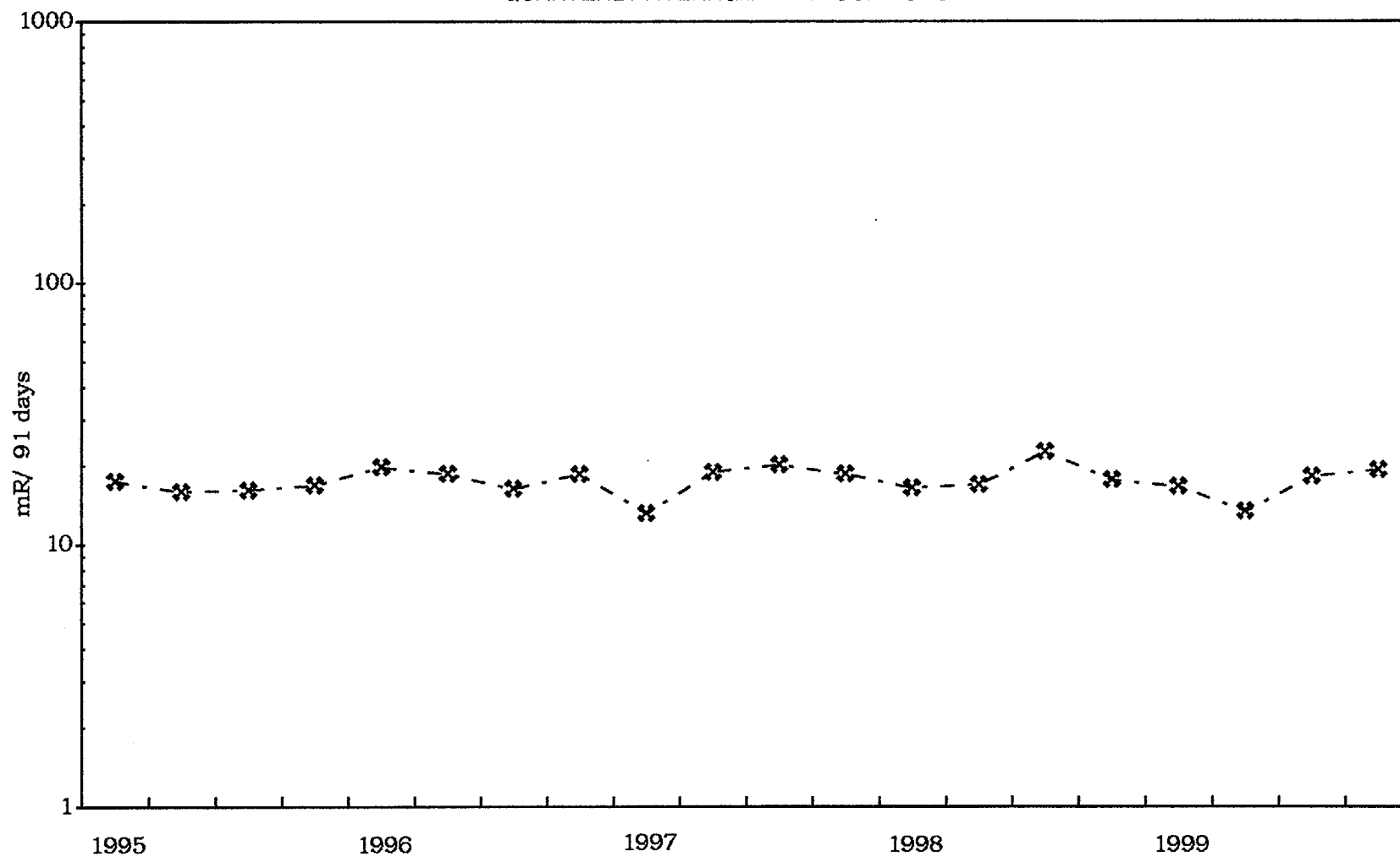
The levels of activity continued to rise and fall within statistical limits depending on water levels and turbulence and were probably due to naturally occurring isotopes. No fission or reactor activation products were detected. Trending Graph 8 illustrates the level of activity for tritium, Sr-89 and Sr-90.

H. Thermoluminescent Dosimeters

Thermoluminescent dosimeters (TLDs) determine environmental radiation doses and the results are presented in Table VII-8 and Trending Graph 9. Ambient radiation was monitored at 32 locations within a 10 mile radius of the Cooper Nuclear Station and collected quarterly. The quarterly averages for the indicator locations was 16.6 milliRoentgen/quarter and a range of 12.0 to 21.2 milliRoentgen/quarter. The control station 44, which is located 10.5 miles, 270 degrees had an average of 18.6 milliRoentgen/quarter and a range of 14.8 to 20.8 milliRoentgen/quarter. The highest station was Station 81 with an average of 18.8 milliRoentgen/quarter and a range of 16.0 to 21.1.

The gamma exposures monitored by thermoluminescent dosimeters from 1995 through 1999 are plotted. The data from year to year is in good agreement and indicates no adverse changes in radiation exposure to the population near the Cooper Nuclear Station.

TRENDING GRAPH 9
AMBIENT RADIATION
THERMOLUMINESCENT DOSIMETRY
QUARTERLY AVERAGE - ALL LOCATIONS



-*- Exposure Pathway - Ambient Gamma Radiation: TLD

Food – Broadleaf Vegetation

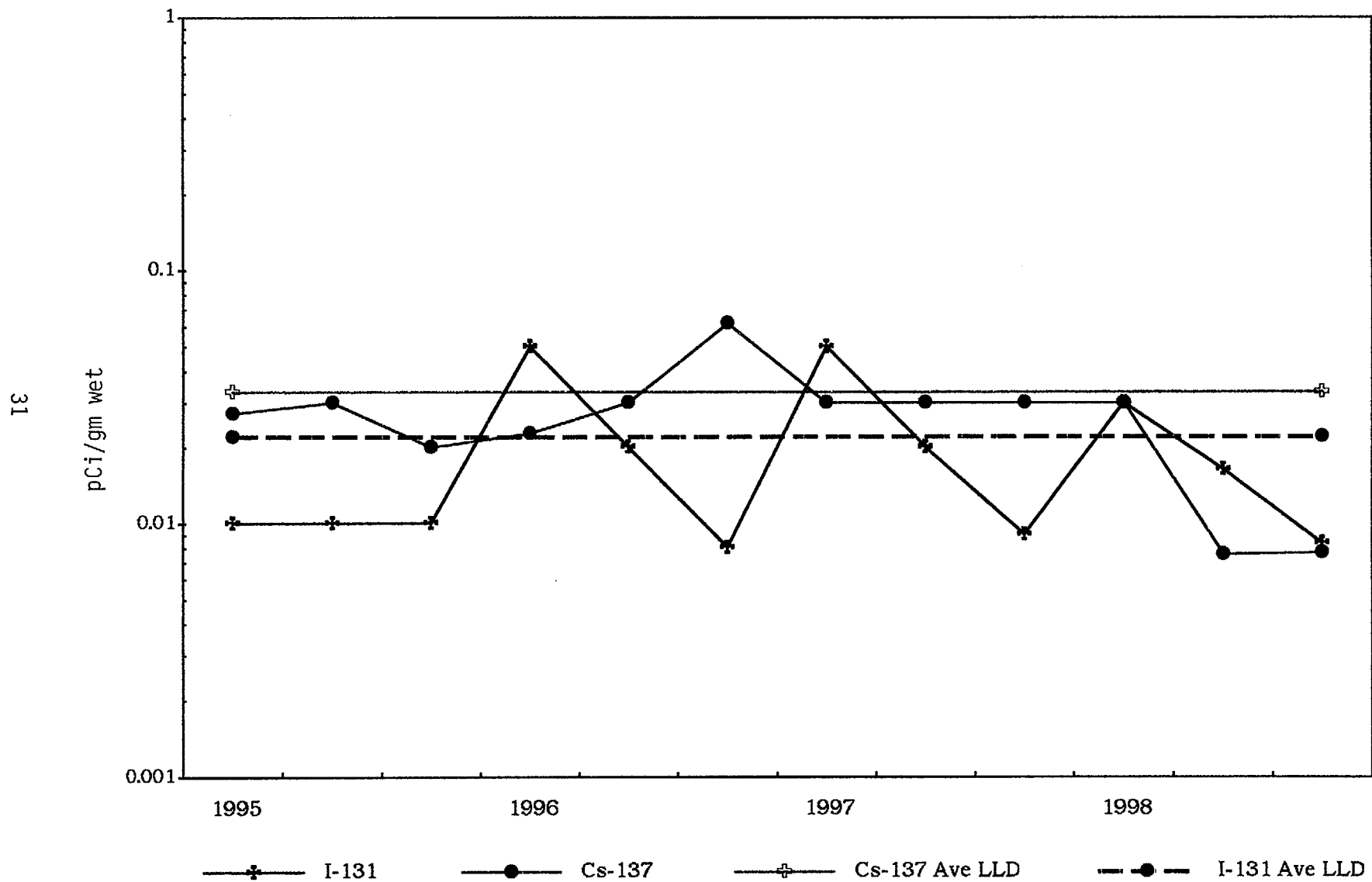
Thirty-three food samples were collected from four locations. They were analyzed for iodine-131 by chemical separation and by gamma spectrometry. The results are presented in Table VII-9 and Trending Graph 10. Iodine-131 was not measured above the detection limits in the thirty-three samples analyzed. As expected, naturally occurring potassium-40 was monitored in the seven control samples with an average activity level of 5.65 pCi/gm (wet weight) and a range of 3.74 to 7.53 pCi/gm (wet weight). Potassium-40 was detected in the twenty-six indicator samples with an average concentration of 5.29 pCi/gm (wet weight) and a range of 2.83 to 8.03 pCi/kg (wet weight). Cosmogenic beryllium-7 was detected in all seven control samples with an average concentration of 1.35 pCi/kg (wet weight) and a range of 0.62 to 2.86 pCi/gm (wet weight). The average at the indicator locations was 1.45 pCi/gm (wet weight) and a range of 0.16 to 4.06 pCi/gm (wet weight). All other gamma emitters were below the detection limits.

J. Shoreline Sediment

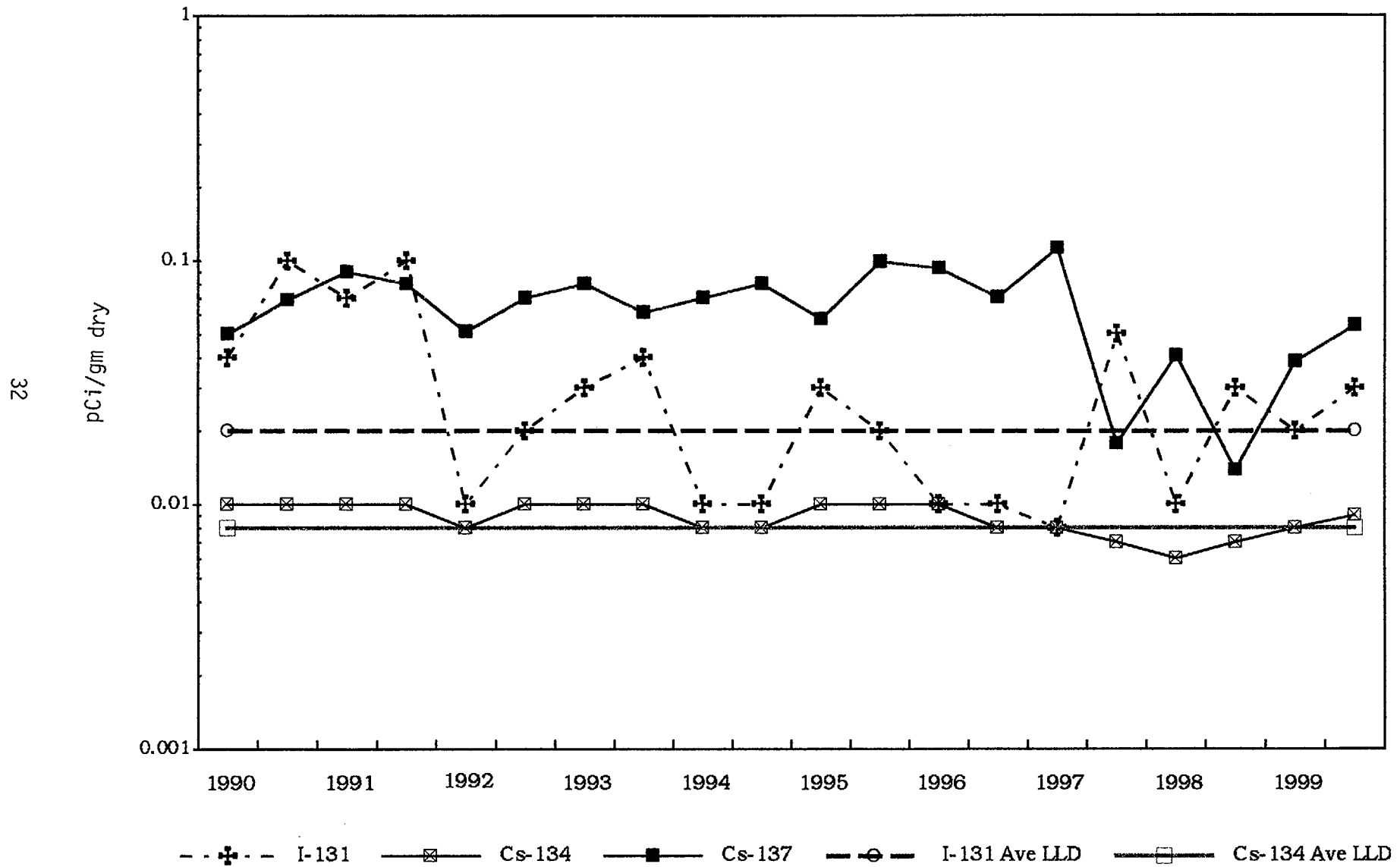
Sediment samples were collected during May and October from Station 28 and were analyzed by gamma spectrometry. The results are presented in Table VII-10 and Trending Graph 11. One man-made and a number of naturally occurring radioisotopes were detected in these samples. Cesium-137 was detected in both samples with an average activity of 0.046 pCi/gm (dry weight) and a range of 0.038 to 0.054 pCi/gm (dry weight). As expected, naturally occurring potassium-40 was observed in both samples with an average activity of 14.5 pCi/gm (dry weight) and a range from 14.0 to 15.0 pCi/gm (dry weight). Radium-226 was measured in both samples with an average concentration of 1.54 pCi/gm (dry weight) and a range of 1.43 to 1.65 pCi/gm (dry weight). Manganese-54 was measured in one sample with a concentration of 0.008 pCi/gm (dry weight). Also naturally occurring, thorium-228 was observed in both samples with an average concentration of 0.81 pCi/gm (dry weight) and a range of 0.77 to 0.85 pCi/gm (dry weight). All other gamma emitters were below their detection limits.

The results of the analyses have been presented. Based on the evidence of the Radiological Environmental Monitoring Program, the Nebraska Public Power District, Cooper Nuclear Station is operating within regulatory limits.

TRENDING GRAPH 10
IODINE-131, CESIUM-137 IN FOOD - BROADLEAF VEGETATION
 ALL STATIONS



TRENDING GRAPH 11
 IODINE-131, CESIUM-134, CESIUM-137 IN SHORELINE SEDIMENT
 STATION 28



V. CONCLUSIONS

V. CONCLUSIONS

The results of the 1999 Radiological Environmental Monitoring Program (REMP) for the Cooper Nuclear Station (CNS) of the Nebraska Public Power District (NPPD) have been presented. The report contains data tables, summaries, discussions of the data, and trending graphs.

Naturally occurring radioactivity was observed in sample media in the expected activity ranges. Occasional samples of a few media showed the presence of man-made isotopes. They have been discussed individually in the text. Observed activities were at very low concentrations and had no significant dose consequence.

Section IV is a discussion of each type of sample analyzed and its impact, if any, on the environment. Included also are graphs of the isotopes of interest for the past several years.

Section VI presents the yearly summary of the program with the total number of samples of each type analyzed, 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. This is followed by a complete tabulation of the data by sample type and station number in Section VII.

The 1999 radiological environmental measurements for the Cooper Nuclear Station 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 the Cooper Nuclear Station.

SECTION VI
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SUMMARY

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility Cooper Nuclear Station

Docket No. 50-298

Location of Facility Nemaha, Nebraska
(County, State)

Reporting Period January 1, 1999 to December 31, 1999

Medium of Pathway Sampled (Unit of Measurement)	Type & Total No. of Analyses Performed	Lower Limit of Detection (1) (LLD)	All Indicator Locations Mean (2) Range (2)	Location with Highest Annual Mean Name Distance and Direction	(Mean () (2) Range (2)	Control Locations Mean () (2) Range (2)	No. of Reportable Occurrences
Air Iodine (pCi/m ³)	I-131	504	0.07	-(0/504)		-(0/0)	0
Airborne Particulates (pCi/m ³)	Gross Beta (Weekly)	504	0.01	0.021(501/504) (0.003-0.33)	Sta-09 7.3 mi 0.03(52/52) (0.008-0.33)	-(0/0)	0
	Gross Alpha (Weekly)	504	-	0.003(367/504) (0.008-0.022)	Sta-09 7.3 mi 0.004(41/52) (0.0012-0.022)	-(0/0)	0
	Gamma	40					
	Be-7	40	-	0.096(40/40) (0.030-0.168)	Sta-09 7.3 mi 0.118(4/4) (0.079-0.164)	-(0/0)	0
	K-40	40	-	0.0063(2/40) (0.0062-0.0065)	Sta-07 2.5 mi 0.0065(1/4)	-(0/0)	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility Cooper Nuclear Station

Docket No. 50-298

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(County, State)

Reporting Period January 1, 1999 to December 31, 1999

Medium of Pathway Sampled (Unit of Measurement)	Type & Total No. of Analyses Performed	Lower Limit of Detection (1) (LLD)	All Indicator Locations Mean (2) Range (2)	Location with Highest Annual Mean Name Distance and Direction	(Mean () (2) Range (2)	Control Locations Mean () (2) Range (2)	No. of Reportable Occurrences	
Fish (pCi/gm wet)	Gr-Beta	9	-	5.07(3/3) (4.6-5.7)	Sta-28 1.8 mi	5.07(3/3) (4.6-5.7)	4.78(6/6) (3.8-5.2)	0
	Sr-89	9	-	-(0/3)			-(0/6)	0
	Sr-90	9	-	0.12(1/3)	Sta-28 1.8 mi	0.12(1/3)	-(0/6)	0
	Gamma	9						
	K-40	9	-	3.00(3/3) (2.49-3.63)	Sta-28 1.8 mi	3.00(3/3) (2.49-3.63)	2.80(6/6) (2.55-3.12)	0
	Co-60	9	0.13	0.013(1/3)	Sta-28 1.8 mi	0.013(1/3)	-(0/6)	0
	Cs-137	9	0.15	0.026(1/3)	Sta-28 1.8 mi	0.026(1/3)	-(0/6)	0
Milk Nearest Producers (pCi/liter)	Sr-89	13	-	-(0/13)			-(0/0)	0
	Sr-90	13	-	1.51(13/13) (1.0-2.7)	Sta-61 3.5 mi	1.77(7/7) (1.1-2.7)	-(0/0)	0
	Ca (gm/liter)	13	-	1.45(13/13) (1.1-2.0)	Sta-99 10.5 mi	1.50(6/6) (1.2-2.0)	-(0/0)	0
	Gamma	25						
	K-40	25	-	1280(25/25) (1140-1490)	Sta-99 10.5 mi	1316(7/7) (1180-1490)	-(0/0)	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility Cooper Nuclear Station
 Location of Facility Nemaha, Nebraska
 (County, State)

Docket No. 50-298
 Reporting Period January 1, 1999 to December 31, 1999

Medium of Pathway Sampled (Unit of Measurement)	Type & Total No. of Analyses Performed	Lower Limit of Detection (1) (LLD)		All Indicator Locations Mean (2) Range (2)	<u>Location with Highest Annual Mean</u> Name Distance and Direction		(Mean () (2) Range (2)	Control Locations Mean () (2) Range (2)	No. of Reportable Occurrences
Milk Other Producers (pCi/liter)	Sr-89	7	-	-(0/7) -				-(0/0) -	0
	Sr-90	7	-	0.97(7/7) (0.58-1.3)	Sta-99	10.5 mi	1.30(2/2) (1.3-1.3)	-(0/0) -	0
	Ca (gm/liter)	7	-	1.66(7/7) (1.4-2.0)	Sta-100	11.5 mi	1.73(3/3) (1.6-2.0)	-(0/0) -	0
	Gamma	7							
	K-40	7	-	1390(7/7) (1190-1540)	Sta-100	11.5 mi	1397(3/3) (1300-1540)	-(0/0) -	0
Groundwater (pCi/liter)	Gr-Alpha	8	-	3.95(2/8) (3.8-4.1)	Sta-47	25.8 mi	4.1(1/4) -	-(0/0) -	0
	Gr-Beta	8	4	8.39(8/8) (5.4-11)	Sta-11	0.15 mi	8.55(4/4) (7.8-9.0)	-(0/0)	0
	H-3	8	2000	-(0/8) -				-(0/0) -	0
	Gamma	8							
	K-40	8	-	-(0/8)				-(0/0)	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

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Docket No. 50-298

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(County, State)

Reporting Period January 1, 1999 to December 31, 1999

Medium of Pathway Sampled (Unit of Measurement)	Type & Total No. of Analyses Performed	Lower Limit of Detection (1) (LLD)	All Indicator Locations Mean (2) Range (2)	<u>Location with Highest Annual Mean</u>		(Mean () (2) Range (2)	Control Locations Mean () (2) Range (2)	No. of Reportable Occurrences
River Water (pCi/liter)	Gross Alpha (Dissolved)	24	-	3.90(6/15) (2.2-7.4)	35 2.0 mi.	5.85(2/3) (4.3-7.4)	3.55(2/9) (3.4-3.7)	0
	Gross Alpha (Suspended)	24	-	2.97(9/15) (0.5-10.0)	35 2.0 mi.	5.40(2/2) (0.8-10.0)	1.62(5/9) (0.6-3.4)	0
	Gross Beta (Dissolved)	24	4	10.3(15/15) (7.0-16)	35 2.0 mi.	13.0(3/3) (11-16)	11.0(9/9) (7.4-18)	0
	Gross Beta (Suspended)	24	4	6.7(15/15) (1.0-28)	35 2.0 mi.	10.3(3/3) (1.0-28)	4.8(9/9) (2.0-12)	0
	I-131	24	1	-(0/15)		N/A	-(0/9)	0
	Gamma	24		-(0/15)		N/A	-(0/9)	0
	H-3	8	2000	-(0/4)	12 0.1 mi.	130(1/4)	130(1/4)	0
	Sr-89	24	-	-(0/15)		N/A	-(0/9)	0
	Sr-90	24	-	-(0/15)		N/A	-(0/9)	0
Direct Radiation (mR/Standard Month)	Gamma Dose Quarterly	123	-	16.6(119/119) (12.0-21.2)	Sta-81 0.80 mi	18.8(3/3) (16.0-21.1)	18.6(4/4) (14.8-20.8)	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

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Docket No. 50-298

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(County, State)

Reporting Period January 1, 1999 to December 31, 1999

Medium of Pathway Sampled (Unit of Measurement)	Type & Total No. of Analyses Performed	Lower Limit of Detection (1) (LLD)	All Indicator Locations Mean (2) Range (2)	Location with Highest Annual Mean Name Distance and Direction	(Mean () (2) Range (2)	Control Locations Mean () (2) Range (2)	No. of Reportable Occurrences
Broadleaf/ Vegetation (pCi/gm wet)	Gamma	33					
	Be-7	33	-	1.45(26/26) (0.16-4.06)	Sta-28 1.8 mi 2.04(6/6) (0.93-3.68)	1.35(7/7) (0.62-2.86)	0
	K-40	33	-	5.29(26/26) (2.83-8.03)	Sta-101 13.3 mi 5.65(10/10) (3.74-7.53)	5.65(7/7) (3.74-7.53)	0
	Cs-137	33	0.08	-(0/26) -		-(0/7) -	0
	I-131	33	0.06	-(0/26) -		-(0/7) -	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

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Shoreline Sediment (pCi/gm dry)	Gamma	2						
	Be-7	2	-	0.30(2/2) (0.22-0.39)	Sta-28 1.8 mi	0.30(2/2) (0.22-0.39)	-(0/0) -	0
	K-40	2	-	14.5(2/2) (14.0-15.0)	Sta-28 1.8 mi	14.5(2/2) (14.0-15.0)	-(0/0) -	0
	Mn-54	2	-	0.008(1/2) -	Sta-28 1.8 mi	0.008(1/2) -	-(0/0) -	0
	Cs-137	2	0.18	0.046(2/2) (0.038-0.054)	Sta-28 1.8 mi	0.046(2/2) (0.038-0.054)	-(0/0) -	0
	Ce-141	2	-	0.021(1/2) -	Sta-28 1.8 mi	0.021(1/2) -	-(0/0) -	0
	Ra-226	2	-	1.54(2/2) (1.43-1.65)	Sta-28 1.8 mi	1.54(2/2) (1.43-1.65)	-(0/0) -	0
	Th-228	2	-	0.81(2/2) (0.77-0.85)	Sta-28 1.8 mi	0.81(2/2) (0.77-0.85)	-(0/0) -	0

(1) Nominal Lower Limit of Detection (LLD).

(2) Mean and Range based upon detectable measurements only. Fraction of detectable measurements at specified location indicated in brackets ().

SECTION VII
COMPLETE DATA TABLES

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 01

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
12/29	01/05	1.01E 04	CU. FT.	1.8 ± 0.3	E-02	1.8 ± 1.3	E-03	01/06		L.T.	2. E-02
01/05	01/12	9.98E 03	CU. FT.	3.3 ± 0.3	E-02	2.0 ± 1.4	E-03	01/13		L.T.	1. E-02
01/12	01/20	1.16E 04	CU. FT.	2.2 ± 0.3	E-02	1.8 ± 1.2	E-03	01/22		L.T.	2. E-02
01/20	01/25	8.58E 03	CU. FT.	2.1 ± 0.4	E-02	1.4 ± 1.3	E-03	01/28		L.T.	3. E-02
01/25	02/03	6.59E 03	CU. FT.	4.9 ± 0.5	E-02	8.2 ± 3.0	E-03	02/05		L.T.	2. E-02
02/03	02/08	7.12E 03	CU. FT.	1.9 ± 0.3	E-02	2.2 ± 1.6	E-03	02/11		L.T.	2. E-02
02/08	02/16	1.14E 04	CU. FT.	2.2 ± 0.3	E-02	3.9 ± 1.5	E-03	02/18		L.T.	1. E-02
02/16	02/22	8.54E 03	CU. FT.	1.2 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T.	1. E-02
02/22	03/02	1.16E 04	CU. FT.	1.4 ± 0.2	E-02	L.T. 2.	E-03	03/03		L.T.	1. E-02
03/02	03/10	1.18E 04	CU. FT.	1.1 ± 0.2	E-02	1.6 ± 1.0	E-03	03/12		L.T.	2. E-02
03/10	03/17	9.86E 03	CU. FT.	1.7 ± 0.3	E-02	2.7 ± 1.6	E-03	03/19		L.T.	2. E-02
03/17	03/23	8.89E 03	CU. FT.	1.3 ± 0.3	E-02	2.1 ± 1.5	E-03	03/25		L.T.	3. E-02
03/23	03/30	9.94E 03	CU. FT.	1.3 ± 0.2	E-02	2.3 ± 1.4	E-03	04/09		L.T.	3. E-02
03/30	04/06	1.00E 04	CU. FT.	1.2 ± 0.2	E-02	1.8 ± 1.3	E-03	04/08		L.T.	2. E-02
04/06	04/13	1.02E 04	CU. FT.	1.2 ± 0.2	E-02	2.9 ± 1.4	E-03	04/19		L.T.	2. E-02
04/13	04/21	1.13E 04	CU. FT.	1.6 ± 0.2	E-02	2.8 ± 1.4	E-03	04/22		L.T.	1. E-02
04/21	04/27	1.16E 04	CU. FT.	6.8 ± 1.8	E-03	L.T. 1.	E-03	04/29		L.T.	1. E-02
04/27	05/03	1.13E 04	CU. FT.	7.4 ± 1.8	E-03	L.T. 2.	E-03	05/05		L.T.	1. E-02
05/03	05/11	1.13E 04	CU. FT.	2.8 ± 0.6	E-02	4.6 ± 3.6	E-03	05/13		L.T.	1. E-02
05/11	05/18	1.04E 04	CU. FT.	1.1 ± 0.2	E-02	2.7 ± 1.3	E-03	05/20		L.T.	2. E-02
05/18	05/25	1.01E 04	CU. FT.	9.6 ± 2.3	E-03	1.3 ± 1.0	E-03	05/27		L.T.	2. E-02
05/25	06/01	9.92E 03	CU. FT.	1.9 ± 0.3	E-02	4.4 ± 1.7	E-03	06/03		L.T.	2. E-02
06/01	06/08	1.02E 04	CU. FT.	1.2 ± 0.3	E-02	2.0 ± 1.3	E-03	06/11		L.T.	2. E-02
06/08	06/15	9.78E 03	CU. FT.	1.1 ± 0.2	E-02	1.0 ± 1.0	E-03	06/17		L.T.	2. E-02
06/15	06/22	1.00E 04	CU. FT.	2.2 ± 0.3	E-02	L.T. 2.	E-03	06/25		L.T.	1. E-02
06/22	06/29	1.03E 04	CU. FT.	1.8 ± 0.3	E-02	4.7 ± 1.8	E-03	07/01		L.T.	1. E-02
06/29	07/06	9.93E 03	CU. FT.	1.3 ± 0.3	E-02	2.7 ± 1.6	E-03	07/08		L.T.	2. E-02
07/06	07/13	1.00E 04	CU. FT.	1.4 ± 0.3	E-02	L.T. 2.	E-03	07/20		L.T.	2. E-02
07/13	07/20	1.01E 04	CU. FT.	2.0 ± 0.3	E-02	3.8 ± 1.6	E-03	07/21		L.T.	1. E-02
07/20	07/27	9.82E 03	CU. FT.	2.2 ± 0.3	E-02	L.T. 1.	E-03	07/28		L.T.	1. E-02
07/27	08/03	1.02E 04	CU. FT.	2.1 ± 0.3	E-02	3.2 ± 1.8	E-03	08/06		L.T.	1. E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 01

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT	CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA	(PCI/CU.M.)	GROSS ALPHA	(PCI/CU.M.)	TIME	I-131		
DATE	DATE							DATE TIME			
08/03	08/10	9.76E 03	CU. FT.	2.5 ± 0.3	E-02	1.7 ± 1.4	E-03	08/11	L.T.	1.	E-02
08/10	08/17	1.00E 04	CU. FT.	2.2 ± 0.3	E-02	4.0 ± 1.6	E-03	08/19	L.T.	2.	E-02
08/17	08/24	9.92E 03	CU. FT.	2.1 ± 0.3	E-02	3.9 ± 1.7	E-03	08/26	L.T.	3.	E-02
08/24	08/31	1.00E 04	CU. FT.	3.5 ± 0.4	E-02	2.2 ± 1.4	E-03	09/01	L.T.	1.	E-02
08/31	09/07	1.02E 04	CU. FT.	2.8 ± 0.3	E-02	2.8 ± 1.4	E-03	09/09	L.T.	2.	E-02
09/07	09/14	1.00E 04	CU. FT.	2.0 ± 0.3	E-02	4.1 ± 1.7	E-03	09/16	L.T.	2.	E-02
09/14	09/21	9.96E 03	CU. FT.	2.9 ± 0.3	E-02	2.4 ± 1.4	E-03	09/23	L.T.	3.	E-02
09/21	09/29	1.13E 04	CU. FT.	1.5 ± 0.2	E-02	1.6 ± 1.2	E-03	09/30	L.T.	1.	E-02
09/29	10/05	8.70E 03	CU. FT.	9.1 ± 2.6	E-03	L.T. 2.	E-03	10/08	L.T.	2.	E-02
10/05	10/12	9.37E 03	CU. FT.	1.8 ± 0.3	E-02	3.0 ± 1.6	E-03	10/14	L.T.	2.	E-02
10/12	10/19	9.72E 03	CU. FT.	1.4 ± 0.2	E-02	L.T. 2.	E-03	10/21	L.T.	2.	E-02
10/19	10/26	1.00E 04	CU. FT.	1.4 ± 0.2	E-02	L.T. 1.	E-03	10/28	L.T.	3.	E-02
10/26	11/02	1.00E 04	CU. FT.	3.5 ± 0.3	E-02	4.7 ± 1.8	E-03	11/05	L.T.	2.	E-02
11/02	11/09	1.02E 04	CU. FT.	2.3 ± 0.3	E-02	2.5 ± 1.6	E-03	11/11	L.T.	1.	E-02
11/09	11/16	1.01E 04	CU. FT.	5.2 ± 0.4	E-02	4.6 ± 1.8	E-03	11/19	L.T.	3.	E-02
11/16	11/23	1.00E 04	CU. FT.	5.0 ± 0.4	E-02	4.4 ± 1.7	E-03	11/30	L.T.	4.	E-02
11/23	11/30	1.01E 04	CU. FT.	3.0 ± 0.3	E-02	L.T. 2.	E-03	12/03	L.T.	3.	E-02
11/30	12/08	1.12E 04	CU. FT.	2.9 ± 0.3	E-02	3.3 ± 1.7	E-03	12/09	L.T.	2.	E-02
12/08	12/15	1.04E 04	CU. FT.	4.2 ± 0.4	E-02	3.4 ± 1.6	E-03	12/18	L.T.	1.	E-02
12/15	12/21	8.52E 03	CU. FT.	2.5 ± 0.4	E-02	2.8 ± 1.8	E-03	12/24	L.T.	2.	E-02
12/21	12/28	1.01E 04	CU. FT.	3.1 ± 0.3	E-02	3.5 ± 1.5	E-03	12/30	L.T.	2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 02

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
12/29	01/05	1.01E 04	CU. FT.	3.1 ± 0.3	E-02	3.1 ± 1.5	E-03	01/06		L.T.	2. E-02
01/05	01/12	9.97E 03	CU. FT.	2.7 ± 0.3	E-02	1.6 ± 1.3	E-03	01/13		L.T.	1. E-02
01/12	01/20	1.16E 04	CU. FT.	3.4 ± 0.3	E-02	2.7 ± 1.3	E-03	01/22		L.T.	2. E-02
01/20	01/25	8.59E 03	CU. FT.	3.0 ± 0.4	E-02	1.4 ± 1.3	E-03	01/28		L.T.	3. E-02
01/25	02/03	1.17E 04	CU. FT.	3.0 ± 0.3	E-02	2.2 ± 1.3	E-03	02/05		L.T.	1. E-02
02/03	02/08	7.13E 03	CU. FT.	1.2 ± 0.3	E-02	L.T. 1.	E-03	02/11		L.T.	2. E-02
02/08	02/16	1.14E 04	CU. FT.	1.7 ± 0.3	E-02	2.0 ± 1.2	E-03	02/18		L.T.	1. E-02
02/16	02/22	8.53E 03	CU. FT.	1.9 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T.	1. E-02
02/22	03/02	1.16E 04	CU. FT.	2.1 ± 0.3	E-02	2.7 ± 1.5	E-03	03/03		L.T.	1. E-02
03/02	03/10	1.18E 04	CU. FT.	1.8 ± 0.2	E-02	1.8 ± 1.0	E-03	03/12		L.T.	2. E-02
03/10	03/17	9.88E 03	CU. FT.	2.0 ± 0.3	E-02	1.9 ± 1.5	E-03	03/19		L.T.	2. E-02
03/17	03/23	8.87E 03	CU. FT.	1.6 ± 0.3	E-02	2.2 ± 1.6	E-03	03/25		L.T.	3. E-02
03/23	03/30	9.61E 03	CU. FT.	2.6 ± 0.3	E-02	4.0 ± 1.7	E-03	04/09		L.T.	3. E-02
03/30	04/06	1.00E 04	CU. FT.	1.1 ± 0.2	E-02	2.3 ± 1.4	E-03	04/08		L.T.	2. E-02
04/06	04/13	1.02E 04	CU. FT.	1.3 ± 0.2	E-02	2.2 ± 1.3	E-03	04/19		L.T.	2. E-02
04/13	04/21	5.34E 03	CU. FT.	4.7 ± 0.6	E-02	7.1 ± 2.9	E-03	04/22		L.T.	3. E-02
04/21	04/27	1.16E 04	CU. FT.	1.4 ± 0.2	E-02	2.0 ± 1.3	E-03	04/29		L.T.	1. E-02
04/27	05/03	1.23E 04	CU. FT.	8.2 ± 1.7	E-03	L.T. 1.	E-03	05/05		L.T.	1. E-02
05/03	05/11	1.08E 04	CU. FT.	3.9 ± 0.7	E-02	4.5 ± 3.6	E-03	05/13		L.T.	1. E-02
05/11	05/18	1.04E 04	CU. FT.	1.2 ± 0.2	E-02	2.2 ± 1.2	E-03	05/20		L.T.	2. E-02
05/18	05/25	1.01E 04	CU. FT.	5.4 ± 2.0	E-03	2.1 ± 1.2	E-03	05/27		L.T.	2. E-02
05/25	06/01	9.92E 03	CU. FT.	6.2 ± 2.3	E-03	1.7 ± 1.2	E-03	06/03		L.T.	2. E-02
06/01	06/08	1.02E 04	CU. FT.	L.T. 3.	E-03	L.T. 1.	E-03	06/11		L.T.	2. E-02
06/08	06/15	9.78E 03	CU. FT.	3.9 ± 1.7	E-03	1.3 ± 1.0	E-03	06/17		L.T.	2. E-02
06/15	06/22	9.92E 03	CU. FT.	1.4 ± 0.3	E-02	4.1 ± 2.0	E-03	06/25		L.T.	1. E-02
06/22	06/29	1.03E 04	CU. FT.	1.7 ± 0.3	E-02	4.1 ± 1.7	E-03	07/01		L.T.	1. E-02
06/29	07/06	9.92E 03	CU. FT.	7.1 ± 2.1	E-03	L.T. 2.	E-03	07/08		L.T.	2. E-02
07/06	07/13	9.91E 03	CU. FT.	1.0 ± 0.2	E-02	L.T. 2.	E-03	07/20		L.T.	2. E-02
07/13	07/20	1.01E 04	CU. FT.	1.1 ± 0.2	E-02	2.8 ± 1.4	E-03	07/21		L.T.	1. E-02
07/20	07/27	1.01E 04	CU. FT.	1.8 ± 0.3	E-02	2.2 ± 1.5	E-03	07/28		L.T.	1. E-02
07/27	08/03	1.02E 04	CU. FT.	7.7 ± 2.1	E-03	L.T. 2.	E-03	08/06		L.T.	1. E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 02

COLL. TIME START STOP		SAMPLE		AP FILTER GROSS BETA		AP FILTER GROSS ALPHA		MID-COUNT TIME		CHARCOAL FILTER I-131	
DATE	DATE	VOLUME	UNITS	(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.95E 03	CU. FT.	2.6 ± 0.3	E-02	2.7 ± 1.5	E-03	08/11		L.T. 1.	E-02
08/10	08/17	1.03E 04	CU. FT.	2.8 ± 0.3	E-02	4.0 ± 1.6	E-03	08/19		L.T. 2.	E-02
08/17	08/24	9.92E 03	CU. FT.	2.6 ± 0.3	E-02	3.7 ± 1.7	E-03	08/26		L.T. 3.	E-02
08/24	08/31	9.69E 03	CU. FT.	4.6 ± 0.5	E-02	3.6 ± 1.7	E-03	09/01		L.T. 2.	E-02
08/31	09/07	9.08E 03	CU. FT.	2.5 ± 0.3	E-02	6.4 ± 2.1	E-03	09/09		L.T. 3.	E-02
09/07	09/14	1.00E 04	CU. FT.	2.3 ± 0.3	E-02	2.1 ± 1.4	E-03	09/16		L.T. 2.	E-02
09/14	09/21	9.92E 03	CU. FT.	3.5 ± 0.4	E-02	5.6 ± 2.0	E-03	09/23		L.T. 3.	E-02
09/21	09/29	1.10E 04	CU. FT.	2.7 ± 0.3	E-02	4.3 ± 1.7	E-03	09/30		L.T. 1.	E-02
09/29	10/05	8.93E 03	CU. FT.	2.3 ± 0.3	E-02	2.2 ± 1.7	E-03	10/08		L.T. 2.	E-02
10/05	10/12	9.18E 03	CU. FT.	4.9 ± 0.4	E-02	5.2 ± 2.0	E-03	10/14		L.T. 2.	E-02
10/12	10/19	9.53E 03	CU. FT.	3.3 ± 0.4	E-02	4.0 ± 1.8	E-03	10/21		L.T. 2.	E-02
10/19	10/26	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	1.8 ± 1.2	E-03	10/28		L.T. 3.	E-02
10/26	11/02	1.03E 04	CU. FT.	2.6 ± 0.3	E-02	2.1 ± 1.3	E-03	11/05		L.T. 2.	E-02
11/02	11/09	1.02E 04	CU. FT.	4.3 ± 0.4	E-02	4.6 ± 1.9	E-03	11/11		L.T. 1.	E-02
11/09	11/16	1.01E 04	CU. FT.	3.3 ± 0.3	E-02	4.1 ± 1.7	E-03	11/19		L.T. 3.	E-02
11/16	11/23	1.00E 04	CU. FT.	2.7 ± 0.3	E-02	3.1 ± 1.5	E-03	11/30		L.T. 4.	E-02
11/23	11/30	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	2.4 ± 1.5	E-03	12/03		L.T. 3.	E-02
11/30	12/08	9.84E 03	CU. FT.	4.8 ± 0.4	E-02	6.4 ± 2.3	E-03	12/09		L.T. 2.	E-02
12/08	12/15	1.04E 04	CU. FT.	2.7 ± 0.3	E-02	2.7 ± 1.4	E-03	12/18		L.T. 1.	E-02
12/15	12/21	8.53E 03	CU. FT.	3.5 ± 0.5	E-02	2.6 ± 1.7	E-03	12/24		L.T. 2.	E-02
12/21	12/28	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	3.1 ± 1.4	E-03	12/30		L.T. 2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 03

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131		
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)		
12/29	01/05	1.01E 04	CU. FT.	2.6 ± 0.3	E-02	2.0 ± 1.3	E-03	01/06		L.T.	2.	E-02
01/05	01/12	9.89E 03	CU. FT.	1.2 ± 0.2	E-02	L.T. 2.	E-03	01/13		L.T.	1.	E-02
01/12	01/20	1.17E 04	CU. FT.	1.3 ± 0.2	E-02	1.5 ± 1.1	E-03	01/22		L.T.	2.	E-02
01/20	01/25	8.68E 03	CU. FT.	2.9 ± 0.4	E-02	2.1 ± 1.5	E-03	01/28		L.T.	2.	E-02
01/25	02/03	1.16E 04	CU. FT.	2.3 ± 0.3	E-02	2.3 ± 1.3	E-03	02/05		L.T.	1.	E-02
02/03	02/08	7.16E 03	CU. FT.	1.5 ± 0.3	E-02	L.T. 1.	E-03	02/11		L.T.	2.	E-02
02/08	02/16	1.13E 04	CU. FT.	1.6 ± 0.2	E-02	L.T. 1.	E-03	02/18		L.T.	1.	E-02
02/16	02/22	8.49E 03	CU. FT.	1.8 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T.	1.	E-02
02/22	03/02	1.14E 04	CU. FT.	1.1 ± 0.2	E-02	L.T. 2.	E-03	03/03		L.T.	1.	E-02
03/02	03/10	1.18E 04	CU. FT.	1.5 ± 0.2	E-02	1.1 ± 0.9	E-03	03/12		L.T.	2.	E-02
03/10	03/17	9.67E 03	CU. FT.	1.9 ± 0.3	E-02	L.T. 2.	E-03	03/19		L.T.	2.	E-02
03/17	03/23	9.07E 03	CU. FT.	1.7 ± 0.3	E-02	2.0 ± 1.5	E-03	03/25		L.T.	3.	E-02
03/23	03/30	9.70E 03	CU. FT.	1.4 ± 0.3	E-02	1.7 ± 1.3	E-03	04/09		L.T.	3.	E-02
03/30	04/06	9.88E 03	CU. FT.	1.0 ± 0.2	E-02	L.T. 1.	E-03	04/08		L.T.	2.	E-02
04/06	04/13	1.03E 04	CU. FT.	1.5 ± 0.3	E-02	1.9 ± 1.2	E-03	04/19		L.T.	2.	E-02
04/13	04/21	1.12E 04	CU. FT.	1.6 ± 0.2	E-02	1.5 ± 1.2	E-03	04/22		L.T.	1.	E-02
04/21	04/27	1.12E 04	CU. FT.	8.1 ± 1.9	E-03	L.T. 1.	E-03	04/29		L.T.	1.	E-02
04/27	05/03	1.16E 04	CU. FT.	1.2 ± 0.2	E-02	2.0 ± 1.3	E-03	05/05		L.T.	1.	E-02
05/03	05/11	1.12E 04	CU. FT.	2.7 ± 0.6	E-02	7.2 ± 4.1	E-03	05/13		L.T.	1.	E-02
05/11	05/18	1.03E 04	CU. FT.	1.1 ± 0.2	E-02	2.5 ± 1.3	E-03	05/20		L.T.	2.	E-02
05/18	05/25	1.01E 04	CU. FT.	9.1 ± 2.2	E-03	1.7 ± 1.1	E-03	05/27		L.T.	2.	E-02
05/25	06/01	9.91E 03	CU. FT.	1.7 ± 0.3	E-02	4.7 ± 1.8	E-03	06/03		L.T.	2.	E-02
06/01	06/08	1.01E 04	CU. FT.	1.4 ± 0.3	E-02	1.3 ± 1.2	E-03	06/11		L.T.	2.	E-02
06/08	06/15	9.66E 03	CU. FT.	1.3 ± 0.2	E-02	2.0 ± 1.2	E-03	06/17		L.T.	2.	E-02
06/15	06/22	1.01E 04	CU. FT.	1.8 ± 0.3	E-02	L.T. 2.	E-03	06/25		L.T.	1.	E-02
06/22	06/29 (a)											
06/29	07/06 (a)											
06/22	07/13	2.98E 04	CU. FT.	1.4 ± 0.1	E-02	1.7 ± 0.7	E-03	07/20		L.T.	1.	E-02
07/13	07/20	1.01E 04	CU. FT.	1.7 ± 0.3	E-02	3.5 ± 1.5	E-03	07/21		L.T.	1.	E-02
07/20	07/27	9.97E 03	CU. FT.	2.4 ± 0.3	E-02	2.5 ± 1.5	E-03	07/28		L.T.	1.	E-02
07/27	08/03	1.05E 04	CU. FT.	1.8 ± 0.3	E-02	2.6 ± 1.6	E-03	08/06		L.T.	1.	E-02

(a) Sample not available due to Missouri River flood.

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 03

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.86E 03	CU. FT.	9.0 ± 2.3	E-03	L.T. 2.	E-03	08/11		L.T. 1.	E-02
08/10	08/17	1.03E 04	CU. FT.	4.6 ± 1.8	E-03	1.5 ± 1.1	E-03	08/19		L.T. 2.	E-02
08/17	08/24	1.01E 04	CU. FT.	2.8 ± 1.6	E-03	1.8 ± 1.3	E-03	08/26		L.T. 3.	E-02
08/24	08/31	9.95E 03	CU. FT.	3.0 ± 0.4	E-02	3.2 ± 1.6	E-03	09/01		L.T. 1.	E-02
08/31	09/07	1.01E 04	CU. FT.	2.3 ± 0.3	E-02	3.4 ± 1.5	E-03	09/09		L.T. 2.	E-02
09/07	09/14	1.02E 04	CU. FT.	6.3 ± 1.9	E-03	2.1 ± 1.3	E-03	09/16		L.T. 2.	E-02
09/14	09/21	9.92E 03	CU. FT.	2.7 ± 1.7	E-03	L.T. 1.	E-03	09/23		L.T. 3.	E-02
09/21	09/29	1.15E 04	CU. FT.	7.7 ± 1.8	E-03	L.T. 1.	E-03	09/30		L.T. 1.	E-02
09/29	10/05	8.87E 03	CU. FT.	4.8 ± 2.3	E-03	L.T. 2.	E-03	10/08		L.T. 2.	E-02
10/05	10/12	9.67E 03	CU. FT.	1.7 ± 0.3	E-02	L.T. 1.	E-03	10/14		L.T. 2.	E-02
10/12	10/19	1.02E 04	CU. FT.	1.4 ± 0.2	E-02	L.T. 1.	E-03	10/21		L.T. 1.	E-02
10/19	10/26	1.04E 04	CU. FT.	7.0 ± 1.9	E-03	L.T. 1.	E-03	10/28		L.T. 3.	E-02
10/26	11/02	1.00E 04	CU. FT.	6.7 ± 1.9	E-03	L.T. 1.	E-03	11/05		L.T. 2.	E-02
11/02	11/09	1.01E 04	CU. FT.	7.3 ± 2.0	E-03	L.T. 2.	E-03	11/11		L.T. 1.	E-02
11/09	11/16	1.01E 04	CU. FT.	6.7 ± 2.0	E-03	L.T. 1.	E-03	11/19		L.T. 3.	E-02
11/16	11/23	1.00E 04	CU. FT.	8.4 ± 2.1	E-03	2.0 ± 1.3	E-03	11/30		L.T. 4.	E-02
11/23	11/30	1.01E 04	CU. FT.	9.0 ± 2.1	E-03	L.T. 2.	E-03	12/03		L.T. 3.	E-02
11/30	12/08	1.13E 04	CU. FT.	2.2 ± 0.3	E-02	2.9 ± 1.6	E-03	12/09		L.T. 2.	E-02
12/08	12/15	1.04E 04	CU. FT.	2.5 ± 0.3	E-02	1.5 ± 1.2	E-03	12/18		L.T. 1.	E-02
12/15	12/21	8.56E 03	CU. FT.	2.0 ± 0.4	E-02	L.T. 2.	E-03	12/24		L.T. 2.	E-02
12/21	12/28	1.01E 04	CU. FT.	2.1 ± 0.3	E-02	1.8 ± 1.2	E-03	12/30		L.T. 2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 04

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
12/29	01/05	1.02E 04	CU. FT.	2.5 ± 0.3	E-02	1.8 ± 1.3	E-03	01/06		L.T.	2. E-02
01/05	01/12	9.97E 03	CU. FT.	2.1 ± 0.3	E-02	L.T. 1.	E-03	01/13		L.T.	1. E-02
01/12	01/20	1.17E 04	CU. FT.	1.5 ± 0.2	E-02	1.9 ± 1.2	E-03	01/22		L.T.	2. E-02
01/20	01/25	8.68E 03	CU. FT.	1.7 ± 0.3	E-02	1.7 ± 1.4	E-03	01/28		L.T.	2. E-02
01/25	02/03	1.16E 04	CU. FT.	1.3 ± 0.2	E-02	1.7 ± 1.2	E-03	02/05		L.T.	1. E-02
02/03	02/08	7.16E 03	CU. FT.	1.1 ± 0.3	E-02	L.T. 1.	E-03	02/11		L.T.	2. E-02
02/08	02/16	1.13E 04	CU. FT.	1.3 ± 0.2	E-02	2.0 ± 1.2	E-03	02/18		L.T.	1. E-02
02/16	02/22	8.50E 03	CU. FT.	9.0 ± 2.6	E-03	L.T. 2.	E-03	02/24		L.T.	1. E-02
02/22	03/02	1.16E 04	CU. FT.	1.1 ± 0.2	E-02	L.T. 2.	E-03	03/03		L.T.	1. E-02
03/02	03/10	1.18E 04	CU. FT.	1.4 ± 0.2	E-02	1.1 ± 0.9	E-03	03/12		L.T.	2. E-02
03/10	03/17	9.86E 03	CU. FT.	1.9 ± 0.3	E-02	L.T. 2.	E-03	03/19		L.T.	2. E-02
03/17	03/23	8.87E 03	CU. FT.	1.6 ± 0.3	E-02	L.T. 2.	E-03	03/25		L.T.	3. E-02
03/23	03/30	9.98E 03	CU. FT.	4.1 ± 1.9	E-03	L.T. 1.	E-03	04/09		L.T.	3. E-02
03/30	04/06	9.98E 03	CU. FT.	3.6 ± 1.8	E-03	L.T. 1.	E-03	04/08		L.T.	2. E-02
04/06	04/13	1.02E 04	CU. FT.	3.9 ± 1.7	E-03	2.2 ± 1.2	E-03	04/19		L.T.	2. E-02
04/13	04/21	1.12E 04	CU. FT.	3.0 ± 1.5	E-03	L.T. 1.	E-03	04/22		L.T.	1. E-02
04/21	04/27 *	1.12E 04	CU. FT.	L.T. 2.	E-03	L.T. 1.	E-03	04/29		L.T.	1. E-02
04/27	05/03	1.16E 04	CU. FT.	8.0 ± 1.8	E-03	1.6 ± 1.3	E-03	05/05		L.T.	1. E-02
05/03	05/11	1.13E 04	CU. FT.	1.3 ± 0.5	E-02	4.6 ± 3.6	E-03	05/13		L.T.	1. E-02
05/11	05/18	1.04E 04	CU. FT.	1.1 ± 0.2	E-02	2.6 ± 1.3	E-03	05/20		L.T.	2. E-02
05/18	05/25	1.01E 04	CU. FT.	6.8 ± 2.1	E-03	2.8 ± 1.4	E-03	05/27		L.T.	2. E-02
05/25	06/01	9.99E 03	CU. FT.	1.1 ± 0.2	E-02	2.0 ± 1.3	E-03	06/03		L.T.	2. E-02
06/01	06/08	1.01E 04	CU. FT.	1.4 ± 0.3	E-02	L.T. 1.	E-03	06/11		L.T.	2. E-02
06/08	06/15	9.74E 03	CU. FT.	4.2 ± 1.8	E-03	1.3 ± 1.0	E-03	06/17		L.T.	2. E-02
06/15	06/22	1.01E 04	CU. FT.	9.1 ± 2.6	E-03	L.T. 2.	E-03	06/25		L.T.	1. E-02
06/22	06/29 (a)										
06/22	07/06	2.02E 04	CU. FT.	5.5 ± 1.2	E-03	L.T. 8	E-04	07/08		L.T.	1. E-02
07/06	07/13	1.00E 04	CU. FT.	5.4 ± 2.0	E-03	L.T. 2.	E-03	07/20		L.T.	2. E-02
07/13	07/20	1.01E 04	CU. FT.	5.0 ± 2.1	E-03	1.4 ± 1.1	E-03	07/21		L.T.	1. E-02
07/20	07/27	9.98E 03	CU. FT.	9.8 ± 2.7	E-03	L.T. 1.	E-03	07/28		L.T.	1. E-02
07/27	08/03	1.05E 04	CU. FT.	6.4 ± 2.0	E-03	L.T. 2.	E-03	08/06		L.T.	1. E-02

* Low counts.

(a) Sample not available due to Missouri River flood.

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 04

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.79E 03	CU. FT.	8.8 ± 2.3	E-03	L.T. 2.	E-03	08/11		L.T. 1.	E-02
08/10	08/17	1.03E 04	CU. FT.	8.0 ± 2.0	E-03	1.4 ± 1.0	E-03	08/19		L.T. 2.	E-02
08/17	08/24	1.00E 04	CU. FT.	1.1 ± 0.2	E-02	4.7 ± 1.8	E-03	08/26		L.T. 2.	E-02
08/24	08/31	8.18E 03	CU. FT.	1.9 ± 0.4	E-02	2.7 ± 1.7	E-03	09/01		L.T. 2.	E-02
08/31	09/07	1.01E 04	CU. FT.	3.1 ± 1.8	E-03	2.7 ± 1.3	E-03	09/09		L.T. 3.	E-02
09/07	09/14	1.02E 04	CU. FT.	5.3 ± 1.8	E-03	2.2 ± 1.4	E-03	09/16		L.T. 2.	E-02
09/14	09/21	1.01E 04	CU. FT.	2.2 ± 0.3	E-02	2.4 ± 1.4	E-03	09/23		L.T. 3.	E-02
09/21	09/29	1.14E 04	CU. FT.	3.0 ± 0.3	E-02	3.9 ± 1.6	E-03	09/30		L.T. 1.	E-02
09/29	10/05	8.82E 03	CU. FT.	1.7 ± 0.3	E-02	2.7 ± 1.8	E-03	10/08		L.T. 2.	E-02
10/05	10/12	9.34E 03	CU. FT.	3.4 ± 0.4	E-02	3.5 ± 1.7	E-03	10/14		L.T. 2.	E-02
10/12	10/19	9.72E 03	CU. FT.	2.2 ± 0.3	E-02	2.6 ± 1.5	E-03	10/21		L.T. 2.	E-02
10/19	10/26	1.03E 04	CU. FT.	1.5 ± 0.2	E-02	1.9 ± 1.2	E-03	10/28		L.T. 3.	E-02
10/26	11/02	1.00E 04	CU. FT.	3.1 ± 0.3	E-02	2.7 ± 1.5	E-03	11/05		L.T. 2.	E-01
11/02	11/09	1.01E 04	CU. FT.	3.2 ± 0.3	E-02	4.1 ± 1.8	E-03	11/11		L.T. 1.	E-02
11/09	11/16	9.69E 03	CU. FT.	5.9 ± 0.4	E-02	4.1 ± 1.8	E-03	11/19		L.T. 3.	E-02
11/16	11/23	1.00E 04	CU. FT.	4.1 ± 0.4	E-02	4.7 ± 1.8	E-03	11/30		L.T. 4.	E-02
11/23	11/30	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	2.8 ± 1.6	E-03	12/03		L.T. 3.	E-02
11/30	12/08	1.12E 04	CU. FT.	2.6 ± 0.3	E-02	2.9 ± 1.6	E-03	12/09		L.T. 2.	E-02
12/08	12/15	1.04E 04	CU. FT.	3.3 ± 0.3	E-02	1.9 ± 1.3	E-03	12/18		L.T. 1.	E-02
12/15	12/21	8.54E 03	CU. FT.	1.8 ± 0.4	E-02	2.6 ± 1.7	E-03	12/24		L.T. 2.	E-02
12/21	12/28	1.01E 04	CU. FT.	1.8 ± 0.3	E-02	1.5 ± 1.1	E-03	12/30		L.T. 2.	E-02

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

STATION NUMBER 05

COLL. TIME		SAMPLE VOLUME	UNITS	AP FILTER GROSS BETA (PCI/CU.M.)		AP FILTER GROSS ALPHA (PCI/CU.M.)		MID-COUNT TIME DATE TIME		CHARCOAL FILTER I-131 (PCI/CU. M.)		
START DATE	STOP DATE											
12/29	01/05	1.02E 04	CU. FT.	2.0 ± 0.3	E-02	L.T. 1.	E-03	01/06		L.T. 2.	E-02	
01/05	01/12	9.97E 03	CU. FT.	3.0 ± 0.3	E-02	L.T. 1.	E-03	01/13		L.T. 1.	E-02	
01/12	01/20	1.17E 04	CU. FT.	1.6 ± 0.2	E-02	1.8 ± 1.2	E-03	01/22		L.T. 1.	E-02	
01/20	01/25	8.69E 03	CU. FT.	2.2 ± 0.4	E-02	1.9 ± 1.4	E-03	01/28		L.T. 1.	E-02	
01/25	02/03	1.16E 04	CU. FT.	2.1 ± 0.3	E-02	1.7 ± 1.2	E-03	02/05		L.T. 1.	E-02	
02/03	02/08	7.17E 03	CU. FT.	5.1 ± 2.5	E-03	L.T. 1.	E-03	02/11		L.T. 2.	E-02	
02/08	02/16	1.13E 04	CU. FT.	2.8 ± 1.6	E-03	L.T. 1.	E-03	02/18		L.T. 1.	E-02	
02/16	02/22	8.19E 03	CU. FT.	1.1 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T. 1.	E-02	
02/22	03/02	1.16E 04	CU. FT.	5.5 ± 1.8	E-03	L.T. 2.	E-03	03/03		L.T. 1.	E-02	
03/02	03/10 (a)											
03/10	03/17 (a)											
03/17	03/23 (a)											
03/23	03/30 (a)											
03/30	04/06 (a)											
04/06	04/13 (a)											
04/13	04/21 (a)											
04/21	04/27 (a)											
04/27	05/03 (a)											
05/03	05/11	1.13E 04	CU. FT.	2.8 ± 0.6	E-02	L.T. 4.	E-03	05/13		L.T. 1.	E-02	
05/11	05/18	1.04E 04	CU. FT.	1.2 ± 0.2	E-02	2.2 ± 1.2	E-03	05/20		L.T. 1.	E-02	
05/18	05/25	1.01E 04	CU. FT.	1.1 ± 0.2	E-02	2.0 ± 1.2	E-03	05/27		L.T. 1.	E-02	
05/25	06/01	9.98E 03	CU. FT.	1.7 ± 0.3	E-02	2.3 ± 1.3	E-03	06/03		L.T. 1.	E-02	
06/01	06/08	1.01E 04	CU. FT.	1.5 ± 0.3	E-02	L.T. 1.	E-03	06/11		L.T. 1.	E-02	
06/08	06/15	9.76E 03	CU. FT.	1.5 ± 0.2	E-02	1.9 ± 1.2	E-03	06/17		L.T. 1.	E-02	
06/15	06/22	1.01E 04	CU. FT.	1.9 ± 0.3	E-02	2.3 ± 1.6	E-03	06/25		L.T. 1.	E-02	
06/22	06/29	1.03E 04	CU. FT.	1.4 ± 0.2	E-02	1.7 ± 1.3	E-03	07/01		L.T. 1.	E-02	
06/29	07/06	9.89E 03	CU. FT.	1.4 ± 0.3	E-02	3.6 ± 1.7	E-03	07/08		L.T. 2.	E-02	
07/06	07/13	9.98E 03	CU. FT.	1.7 ± 0.3	E-02	L.T. 2.	E-03	07/20		L.T. 2.	E-02	
07/13	07/20	1.02E 04	CU. FT.	2.2 ± 0.3	E-02	3.9 ± 1.6	E-03	07/21		L.T. 9.	E-03	
07/20	07/27	9.98E 03	CU. FT.	2.4 ± 0.3	E-02	1.9 ± 1.4	E-03	07/28		L.T. 9.	E-03	
07/27	08/03	1.04E 04	CU. FT.	1.8 ± 0.3	E-02	2.6 ± 1.7	E-03	08/06		L.T. 1.	E-02	

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 05

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131		
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)		
08/03	08/10	9.80E 03	CU. FT.	2.6 ± 0.3	E-02	4.6 ± 1.9	E-03	08/11		L.T.	1.	E-02
08/10	08/17	1.03E 04	CU. FT.	2.1 ± 0.3	E-02	3.3 ± 1.5	E-03	08/19		L.T.	1.	E-02
08/17	08/24	1.00E 04	CU. FT.	2.6 ± 0.3	E-02	3.3 ± 1.6	E-03	08/26		L.T.	2.	E-02
08/24	08/31	9.89E 03	CU. FT.	3.6 ± 0.4	E-02	3.1 ± 1.6	E-03	09/01		L.T.	1.	E-02
08/31	09/07	9.60E 03	CU. FT.	2.7 ± 0.3	E-02	5.7 ± 1.9	E-03	09/09		L.T.	2.	E-02
09/07	09/14	1.02E 04	CU. FT.	2.1 ± 0.3	E-02	1.7 ± 1.2	E-03	09/16		L.T.	2.	E-02
09/14	09/21	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	3.4 ± 1.6	E-03	09/23		L.T.	2.	E-02
09/21	09/29	1.14E 04	CU. FT.	2.5 ± 0.3	E-02	3.2 ± 1.5	E-03	09/30		L.T.	9.	E-03
09/29	10/05	2.84E 03	CU. FT.	6.1 ± 1.0	E-02	7.0 ± 5.5	E-03	10/08		L.T.	4.	E-02
10/05	10/12	9.46E 03	CU. FT.	4.4 ± 0.4	E-02	4.9 ± 1.9	E-03	10/14		L.T.	1.	E-02
10/12	10/19	9.91E 03	CU. FT.	2.9 ± 0.3	E-02	2.4 ± 1.5	E-03	10/21		L.T.	1.	E-02
10/19	10/26	1.03E 04	CU. FT.	2.4 ± 0.3	E-02	3.2 ± 1.5	E-03	10/28		L.T.	2.	E-02
10/26	11/02	1.00E 04	CU. FT.	3.5 ± 0.3	E-02	4.7 ± 1.8	E-03	11/05		L.T.	1.	E-02
11/02	11/09	1.01E 04	CU. FT.	3.2 ± 0.3	E-02	3.1 ± 1.7	E-03	11/11		L.T.	1.	E-02
11/09	11/16	1.01E 04	CU. FT.	6.0 ± 0.4	E-02	4.6 ± 1.8	E-03	11/19		L.T.	2.	E-02
11/16	11/23	1.00E 04	CU. FT.	4.7 ± 0.4	E-02	6.2 ± 2.0	E-03	12/01		L.T.	3.	E-02
11/23	11/30	1.01E 04	CU. FT.	3.4 ± 0.3	E-02	2.8 ± 1.6	E-03	12/03		L.T.	2.	E-02
11/30	12/08	1.12E 04	CU. FT.	3.5 ± 0.3	E-02	4.6 ± 1.9	E-03	12/09		L.T.	1.	E-02
12/08	12/15	1.04E 04	CU. FT.	3.6 ± 0.3	E-02	3.9 ± 1.7	E-03	12/18		L.T.	1.	E-02
12/15	12/21	8.55E 03	CU. FT.	2.8 ± 0.4	E-02	2.4 ± 1.7	E-03	12/24		L.T.	1.	E-02
12/21	12/28	1.01E 04	CU. FT.	3.0 ± 0.3	E-02	1.4 ± 1.0	E-03	12/30		L.T.	1.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 06

COLL. TIME START STOP DATE DATE		SAMPLE VOLUME UNITS		AP FILTER GROSS BETA (PCI/CU.M.)		AP FILTER GROSS ALPHA (PCI/CU.M.)		MID-COUNT TIME DATE TIME	CHARCOAL FILTER I-131 (PCI/CU. M.)		
12/29	01/05	1.02E 04	CU. FT.	1.8 ± 0.3	E-02	1.4 ± 1.2	E-03	01/07	L.T.	3.	E-02
01/05	01/12	9.97E 03	CU. FT.	3.2 ± 0.3	E-02	2.2 ± 1.4	E-03	01/13	L.T.	2.	E-02
01/12	01/20	1.17E 04	CU. FT.	1.4 ± 0.2	E-02	1.3 ± 1.1	E-03	01/22	L.T.	1.	E-02
01/20	01/25	8.69E 03	CU. FT.	2.2 ± 0.4	E-02	1.9 ± 1.4	E-03	01/28	L.T.	1.	E-02
01/25	02/03	1.16E 04	CU. FT.	2.2 ± 0.3	E-02	2.7 ± 1.4	E-03	02/08	L.T.	2.	E-02
02/03	02/08	7.17E 03	CU. FT.	1.4 ± 0.3	E-02	L.T. 1.	E-03	02/11	L.T.	2.	E-02
02/08	02/16	1.13E 04	CU. FT.	1.2 ± 0.2	E-02	1.6 ± 1.1	E-03	02/18	L.T.	1.	E-02
02/16	02/22	8.50E 03	CU. FT.	1.5 ± 0.3	E-02	L.T. 2.	E-03	02/24	L.T.	2.	E-02
02/22	03/02	1.16E 04	CU. FT.	1.5 ± 0.2	E-02	L.T. 2.	E-03	03/03	L.T.	1.	E-02
03/02	03/10	1.18E 04	CU. FT.	1.2 ± 0.2	E-02	8.4 ± 7.9	E-04	03/12	L.T.	1.	E-02
03/10	03/17	9.86E 03	CU. FT.	1.3 ± 0.2	E-02	L.T. 2.	E-03	03/19	L.T.	1.	E-02
03/17	03/23	8.87E 03	CU. FT.	9.0 ± 2.4	E-03	L.T. 2	E-03	03/25	L.T.	1.	E-02
03/23	03/30	9.58E 03	CU. FT.	1.4 ± 0.3	E-02	2.5 ± 1.5	E-03	04/10	L.T.	3.	E-02
03/30	04/06	9.98E 03	CU. FT.	9.5 ± 2.3	E-03	L.T. 1.	E-03	04/08	L.T.	2.	E-02
04/06	04/13	1.00E 04	CU. FT.	1.1 ± 0.2	E-02	1.4 ± 1.1	E-03	04/19	L.T.	3.	E-02
04/13	04/21	1.12E 04	CU. FT.	1.2 ± 0.2	E-02	L.T. 1.	E-03	04/22	L.T.	2.	E-02
04/21	04/27	1.12E 04	CU. FT.	7.7 ± 1.9	E-03	L.T. 1.	E-03	04/29	L.T.	2.	E-02
04/27	05/03 (a)										
05/03	05/11	1.13E 04	CU. FT.	2.4 ± 0.6	E-02	L.T. 4.	E-03	05/13	L.T.	1.	E-02
05/11	05/18	1.04E 04	CU. FT.	1.3 ± 0.2	E-02	1.1 ± 0.9	E-03	05/20	L.T.	1.	E-02
05/18	05/25	1.01E 04	CU. FT.	8.8 ± 2.2	E-03	1.1 ± 1.0	E-03	05/27	L.T.	1.	E-02
05/25	06/01	9.98E 03	CU. FT.	1.3 ± 0.2	E-02	2.7 ± 1.4	E-03	06/03	L.T.	1.	E-02
06/01	06/08	1.00E 04	CU. FT.	1.5 ± 0.3	E-02	L.T. 1.	E-03	06/11	L.T.	2.	E-02
06/08	06/15	9.62E 03	CU. FT.	7.2 ± 2.0	E-03	1.2 ± 1.0	E-03	06/17	L.T.	2.	E-02
06/15	06/22	9.89E 03	CU. FT.	1.0 ± 0.3	E-02	L.T. 2.	E-03	06/25	L.T.	1.	E-02
06/22	06/29	1.03E 04	CU. FT.	1.3 ± 0.2	E-02	4.4 ± 1.8	E-03	07/01	L.T.	1.	E-02
06/29	07/06	9.89E 03	CU. FT.	8.4 ± 2.2	E-03	1.7 ± 1.4	E-03	07/08	L.T.	3.	E-02
07/06	07/13	9.81E 03	CU. FT.	8.2 ± 2.2	E-03	L.T. 2.	E-03	07/20	L.T.	3.	E-02
07/13	07/20	9.98E 03	CU. FT.	9.5 ± 2.4	E-03	2.6 ± 1.3	E-03	07/21	L.T.	2.	E-02
07/20	07/27	9.98E 03	CU. FT.	6.8 ± 2.5	E-03	L.T. 1.	E-03	07/28	L.T.	2.	E-02
07/27	08/03	1.04E 04	CU. FT.	5.7 ± 2.0	E-03	L.T. 2	E-03	08/06	L.T.	2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 06

COLL. TIME START STOP DATE DATE		SAMPLE VOLUME UNITS		AP FILTER GROSS BETA (PCI/CU.M.)		AP FILTER GROSS ALPHA (PCI/CU.M.)		MID-COUNT TIME DATE TIME		CHARCOAL FILTER I-131 (PCI/CU. M.)		
08/03	08/10	9.80E 03	CU. FT.	7.4 ± 2.2	E-03	2.0 ± 1.4	E-03	08/12		L.T.	2.	E-02
08/10	08/17	1.03E 04	CU. FT.	L.T. 2.	E-03	1.1 ± 1.0	E-03	08/19		L.T.	2.	E-02
08/17	08/24	1.00E 04	CU. FT.	4.6 ± 1.8	E-03	L.T. 1.	E-03	08/27		L.T.	1.	E-02
08/24	08/31	8.27E 03	CU. FT.	5.5 ± 0.5	E-02	5.1 ± 2.2	E-03	09/01		L.T.	3.	E-02
08/31	09/07	8.46E 03	CU. FT.	3.6 ± 0.4	E-02	4.5 ± 1.9	E-03	09/10		L.T.	3.	E-02
09/07	09/14	1.02E 04	CU. FT.	2.1 ± 0.3	E-02	2.5 ± 1.4	E-03	09/17		L.T.	2.	E-02
09/14	09/21	1.01E 04	CU. FT.	2.3 ± 0.3	E-02	3.0 ± 1.5	E-03	09/23		L.T.	2.	E-02
09/21	09/29	1.14E 04	CU. FT.	3.5 ± 0.3	E-02	4.4 ± 1.7	E-03	09/30		L.T.	2.	E-02
09/29	10/05	8.86E 03	CU. FT.	1.6 ± 0.3	E-02	L.T. 2.	E-03	10/08		L.T.	3.	E-02
10/05	10/12	9.16E 03	CU. FT.	5.4 ± 0.4	E-02	4.2 ± 1.8	E-03	10/14		L.T.	3.	E-02
10/12	10/19	9.59E 03	CU. FT.	2.6 ± 0.3	E-02	2.9 ± 1.6	E-03	10/21		L.T.	2.	E-02
10/19	10/26	1.03E 04	CU. FT.	2.5 ± 0.3	E-02	1.4 ± 1.1	E-03	10/29		L.T.	2.	E-02
10/26	11/02	9.81E 03	CU. FT.	3.9 ± 0.4	E-02	4.8 ± 1.9	E-03	11/06		L.T.	2.	E-02
11/02	11/09	1.01E 04	CU. FT.	3.1 ± 0.3	E-02	3.5 ± 1.8	E-03	11/11		L.T.	2.	E-02
11/09	11/16	1.01E 04	CU. FT.	5.2 ± 0.4	E-02	3.8 ± 1.7	E-03	11/20		L.T.	3.	E-02
11/16	11/23	1.00E 04	CU. FT.	4.1 ± 0.4	E-02	5.2 ± 1.9	E-03	12/01		L.T.	3.	E-02
11/23	11/30	1.01E 04	CU. FT.	2.9 ± 0.3	E-02	2.7 ± 1.6	E-03	12/03		L.T.	2.	E-02
11/30	12/08	1.09E 04	CU. FT.	4.0 ± 0.4	E-02	5.7 ± 2.1	E-03	12/10		L.T.	3.	E-02
12/08	12/15	1.01E 04	CU. FT.	3.7 ± 0.4	E-02	2.7 ± 1.5	E-03	12/18		L.T.	2.	E-02
12/15	12/21	8.56E 03	CU. FT.	3.2 ± 0.4	E-02	L.T. 2.	E-03	12/24		L.T.	2.	E-02
12/21	12/28	1.01E 04	CU. FT.	3.5 ± 0.4	E-02	2.8 ± 1.4	E-03	12/30		L.T.	2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 07

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131		
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)		
12/29	01/05	8.63E 03	CU. FT.	6.2 ± 0.5	E-02	5.4 ± 2.1	E-03	01/07		L.T.	3.	E-02
01/05	01/12	9.98E 03	CU. FT.	5.0 ± 0.4	E-02	3.4 ± 1.6	E-03	01/13		L.T.	2.	E-02
01/12	01/20	1.05E 04	CU. FT.	3.7 ± 0.4	E-02	2.2 ± 1.3	E-03	01/22		L.T.	1.	E-02
01/20	01/25	6.41E 03	CU. FT.	5.1 ± 0.6	E-02	3.7 ± 2.2	E-03	01/28		L.T.	1.	E-02
01/25	02/03	9.91E 03	CU. FT.	7.6 ± 0.5	E-02	3.9 ± 2.0	E-03	02/08		L.T.	2.	E-02
02/03	02/08	6.81E 03	CU. FT.	2.6 ± 0.4	E-02	3.3 ± 1.8	E-03	02/11		L.T.	2.	E-02
02/08	02/16	1.11E 04	CU. FT.	2.9 ± 0.3	E-02	2.4 ± 1.3	E-03	02/18		L.T.	2.	E-02
02/16	02/22	8.86E 03	CU. FT.	2.4 ± 0.3	E-02	3.8 ± 1.9	E-03	02/24		L.T.	2.	E-02
02/22	03/02	1.08E 04	CU. FT.	1.9 ± 0.3	E-02	2.0 ± 1.5	E-03	03/03		L.T.	1.	E-02
03/02	03/10	1.18E 04	CU. FT.	3.5 ± 0.3	E-02	4.1 ± 1.5	E-03	03/12		L.T.	1.	E-02
03/10	03/17	9.09E 03	CU. FT.	3.8 ± 0.4	E-02	3.3 ± 1.8	E-03	03/19		L.T.	1.	E-02
03/17	03/23	8.47E 03	CU. FT.	3.2 ± 0.4	E-02	5.2 ± 2.1	E-03	03/25		L.T.	2.	E-02
03/23	03/30	9.61E 03	CU. FT.	2.4 ± 0.3	E-02	2.4 ± 1.4	E-03	04/10		L.T.	3.	E-02
03/30	04/06	9.52E 03	CU. FT.	1.7 ± 0.3	E-02	2.5 ± 1.5	E-03	04/08		L.T.	2.	E-02
04/06	04/13	9.51E 03	CU. FT.	1.5 ± 0.3	E-02	4.3 ± 1.8	E-03	04/19		L.T.	3.	E-02
04/13	04/21	5.41E 03	CU. FT.	3.4 ± 0.5	E-02	5.2 ± 2.6	E-03	04/22		L.T.	4.	E-02
04/21	04/27	1.15E 04	CU. FT.	1.4 ± 0.2	E-02	1.6 ± 1.2	E-03	04/29		L.T.	2.	E-02
04/27	05/03	1.13E 04	CU. FT.	9.6 ± 1.9	E-03	2.0 ± 1.4	E-03	05/05		L.T.	1.	E-02
05/03	05/11	1.13E 04	CU. FT.	2.2 ± 0.6	E-02	7.1 ± 4.0	E-03	05/13		L.T.	1.	E-02
05/11	05/18	1.04E 04	CU. FT.	7.5 ± 1.9	E-03	1.6 ± 1.1	E-03	05/20		L.T.	1.	E-02
05/18	05/25	1.01E 04	CU. FT.	8.6 ± 2.2	E-03	1.4 ± 1.0	E-03	05/27		L.T.	2.	E-02
05/25	06/01	9.88E 03	CU. FT.	8.8 ± 2.2	E-03	L.T. 1.	E-03	06/03		L.T.	1.	E-02
06/01	06/08	1.02E 04	CU. FT.	8.8 ± 2.4	E-03	1.3 ± 1.1	E-03	06/11		L.T.	2.	E-02
06/08	06/15	9.78E 03	CU. FT.	7.9 ± 2.1	E-03	2.3 ± 1.3	E-03	06/17		L.T.	2.	E-02
06/15	06/22	1.00E 04	CU. FT.	1.3 ± 0.3	E-02	2.5 ± 1.7	E-03	06/25		L.T.	1.	E-02
06/22	06/29	1.03E 04	CU. FT.	8.7 ± 2.1	E-03	2.6 ± 1.5	E-03	07/01		L.T.	1.	E-02
06/29	07/06	9.92E 03	CU. FT.	5.3 ± 2.0	E-03	L.T. 2.	E-03	07/08		L.T.	3.	E-02
07/06	07/13	1.00E 04	CU. FT.	7.0 ± 2.1	E-03	L.T. 2.	E-03	07/20		L.T.	3.	E-02
07/13	07/20	1.01E 04	CU. FT.	7.6 ± 2.2	E-03	2.1 ± 1.2	E-03	07/21		L.T.	2.	E-02
07/20	07/27	1.01E 04	CU. FT.	7.2 ± 2.5	E-03	1.8 ± 1.4	E-03	07/28		L.T.	2.	E-02
07/27	08/03	1.03E 04	CU. FT.	6.2 ± 2.0	E-03	L.T. 2.	E-03	08/06		L.T.	2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 07

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.95E 03	CU. FT.	9.3 ± 2.3	E-03	L.T. 1.	E-03	08/12		L.T. 2.	E-02
08/10	08/17	1.03E 04	CU. FT.	4.9 ± 1.8	E-03	L.T. 9.	E-04	08/19		L.T. 2.	E-02
08/17	08/24	9.94E 03	CU. FT.	4.0 ± 1.8	E-03	1.7 ± 1.3	E-03	08/27		L.T. 1.	E-02
08/24	08/31	9.98E 03	CU. FT.	3.5 ± 0.4	E-02	1.7 ± 1.3	E-03	09/01		L.T. 2.	E-02
08/31	09/07	1.02E 04	CU. FT.	3.4 ± 0.3	E-02	4.0 ± 1.6	E-03	09/10		L.T. 2.	E-02
09/07	09/14	9.72E 03	CU. FT.	3.0 ± 0.3	E-02	1.5 ± 1.2	E-03	09/17		L.T. 2.	E-02
09/14	09/21	9.56E 03	CU. FT.	3.7 ± 0.4	E-02	4.3 ± 1.8	E-03	09/23		L.T. 2.	E-02
09/21	09/29	1.09E 04	CU. FT.	1.4 ± 0.2	E-02	2.5 ± 1.4	E-03	09/30		L.T. 2.	E-02
09/29	10/05	8.48E 03	CU. FT.	2.3 ± 0.3	E-02	3.7 ± 2.1	E-03	10/08		L.T. 3.	E-02
10/05	10/12	9.09E 03	CU. FT.	2.4 ± 0.3	E-02	3.7 ± 1.8	E-03	10/14		L.T. 3.	E-02
10/12	10/19	9.44E 03	CU. FT.	2.6 ± 0.3	E-02	2.2 ± 1.5	E-03	10/21		L.T. 2.	E-02
10/19	10/26	1.01E 04	CU. FT.	1.5 ± 0.2	E-02	2.1 ± 1.3	E-03	10/29		L.T. 2.	E-02
10/26	11/02	1.01E 04	CU. FT.	2.4 ± 0.3	E-02	2.5 ± 1.4	E-03	11/06		L.T. 2.	E-02
11/02	11/09	9.52E 03	CU. FT.	1.4 ± 0.3	E-02	L.T. 2.	E-03	11/11		L.T. 2.	E-02
11/09	11/16	9.85E 03	CU. FT.	2.9 ± 0.3	E-02	3.4 ± 1.7	E-03	11/20		L.T. 3.	E-02
11/16	11/23	9.57E 03	CU. FT.	7.0 ± 0.5	E-02	4.9 ± 1.8	E-03	12/01		L.T. 3.	E-02
11/23	11/30	9.88E 03	CU. FT.	4.1 ± 0.4	E-02	3.0 ± 1.7	E-03	12/03		L.T. 2.	E-02
11/30	12/08	1.10E 04	CU. FT.	4.5 ± 0.4	E-02	2.3 ± 1.5	E-03	12/10		L.T. 3.	E-02
12/08	12/15	1.04E 04	CU. FT.	3.7 ± 0.4	E-02	3.1 ± 1.5	E-03	12/18		L.T. 2.	E-02
12/15	12/21	8.25E 03	CU. FT.	2.5 ± 0.4	E-02	2.2 ± 1.7	E-03	12/24		L.T. 2.	E-02
12/21	12/28	1.01E 04	CU. FT.	5.0 ± 0.4	E-02	4.1 ± 1.6	E-03	12/30		L.T. 2.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 08

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME	DATE	I-131		
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)				(PCI/CU. M.)		
12/29	01/05	1.01E 04	CU. FT.	9.5 ± 2.2	E-03	1.8 ± 1.3	E-03		01/07	L.T.	3.	E-02
01/05	01/12	9.97E 03	CU. FT.	1.7 ± 0.3	E-02	L.T. 1.	E-03		01/13	L.T.	2.	E-02
01/12	01/20	1.17E 04	CU. FT.	1.5 ± 0.2	E-02	1.7 ± 1.1	E-03		01/22	L.T.	1.	E-02
01/20	01/25	8.53E 03	CU. FT.	1.9 ± 0.4	E-02	1.8 ± 1.4	E-03		01/28	L.T.	1.	E-02
01/25	02/03	1.17E 04	CU. FT.	1.9 ± 0.3	E-02	2.1 ± 1.3	E-03		02/08	L.T.	2.	E-02
02/03	02/08	7.13E 03	CU. FT.	7.4 ± 2.7	E-03	L.T. 1.	E-03		02/11	L.T.	2.	E-02
02/08	02/16	1.13E 04	CU. FT.	1.2 ± 0.2	E-02	2.0 ± 1.2	E-03		02/18	L.T.	1.	E-02
02/16	02/22	8.54E 03	CU. FT.	1.4 ± 0.3	E-02	L.T. 2.	E-03		02/24	L.T.	2.	E-02
02/22	03/02	1.16E 04	CU. FT.	1.2 ± 0.2	E-02	L.T. 2.	E-03		03/03	L.T.	1.	E-02
03/02	03/10	1.18E 04	CU. FT.	5.7 ± 1.6	E-03	1.3 ± 0.9	E-03		03/12	L.T.	1.	E-02
03/10	03/17	9.85E 03	CU. FT.	1.3 ± 0.2	E-02	L.T. 2.	E-03		03/19	L.T.	9.	E-03
03/17	03/23	8.85E 03	CU. FT.	5.1 ± 2.1	E-03	L.T. 2.	E-03		03/25	L.T.	2.	E-02
03/23	03/30	9.94E 03	CU. FT.	7.5 ± 2.1	E-03	L.T. 1.	E-03		04/10	L.T.	3.	E-02
03/30	04/06	1.02E 04	CU. FT.	5.4 ± 1.9	E-03	L.T. 1.	E-03		04/08	L.T.	2.	E-02
04/06	04/13	1.01E 04	CU. FT.	1.1 ± 0.2	E-02	1.8 ± 1.2	E-03		04/19	L.T.	3.	E-02
04/13	04/21	1.12E 04	CU. FT.	4.3 ± 1.6	E-03	L.T. 1.	E-03		04/22	L.T.	2.	E-02
04/21	04/27 (a)											
04/27	05/03 (b)(c)			2.0 ± 0.5	E 00	L.T. 5.	E-01		05/05	L.T.	4.	E 00
05/03	05/11	1.13E 04	CU. FT.	2.4 ± 0.6	E-02	L.T. 4.	E-03		05/13	L.T.	1.	E-02
05/11	05/18	1.04E 04	CU. FT.	9.3 ± 2.0	E-03	2.4 ± 1.3	E-03		05/20	L.T.	1.	E-02
05/18	05/25	1.01E 04	CU. FT.	8.3 ± 2.2	E-03	2.0 ± 1.2	E-03		05/27	L.T.	2.	E-02
05/25	06/01	9.88E 03	CU. FT.	1.0 ± 0.2	E-02	L.T. 1.	E-03		06/03	L.T.	1.	E-02
06/01	06/08	1.02E 04	CU. FT.	9.5 ± 2.5	E-03	L.T. 1.	E-03		06/11	L.T.	2.	E-02
06/08	06/15	9.78E 03	CU. FT.	7.8 ± 2.0	E-03	L.T. 1.	E-03		06/17	L.T.	2.	E-02
06/15	06/22	1.01E 04	CU. FT.	1.2 ± 0.3	E-02	L.T. 2.	E-03		06/25	L.T.	1.	E-02
06/22	06/29	1.03E 04	CU. FT.	7.5 ± 2.0	E-03	2.1 ± 1.4	E-03		07/01	L.T.	1.	E-02
06/29	07/06	9.88E 03	CU. FT.	4.7 ± 2.0	E-03	L.T. 2.	E-03		07/08	L.T.	3.	E-02
07/06	07/13	9.98E 03	CU. FT.	3.1 ± 1.8	E-03	L.T. 2.	E-03		07/20	L.T.	3.	E-02
07/13	07/20	1.02E 04	CU. FT.	7.5 ± 2.2	E-03	2.5 ± 1.3	E-03		07/21	L.T.	2.	E-02
07/20	07/27	9.86E 03	CU. FT.	1.1 ± 0.3	E-02	L.T. 1.	E-03		07/28	L.T.	2.	E-02
07/27	08/03	1.04E 04	CU. FT.	5.5 ± 2.0	E-03	L.T. 2.	E-03		08/06	L.T.	2.	E-02

(a) Volume could not be determined due to meter malfunction. Sample not analyzed.
 (b) Volume could not be determined due to meter malfunction. Results not used in totals.
 (c) Results reported in total pCi.

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS
 STATION NUMBER 08

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP			GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE	VOLUME	UNITS	(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.96E 03	CU. FT.	2.7 ± 0.3	E-02	3.3 ± 1.6	E-03	08/12		L.T.	2. E-02
08/10	08/17	1.03E 04	CU. FT.	2.0 ± 0.3	E-02	2.3 ± 1.3	E-03	08/19		L.T.	2. E-02
08/17	08/24	9.72E 03	CU. FT.	2.2 ± 0.3	E-02	3.1 ± 1.6	E-03	08/27		L.T.	1. E-02
08/24	08/31	9.61E 03	CU. FT.	4.4 ± 0.5	E-02	2.6 ± 1.5	E-03	09/01		L.T.	2. E-02
08/31	09/07	9.82E 03	CU. FT.	1.8 ± 0.3	E-02	3.3 ± 1.5	E-03	09/10		L.T.	2. E-02
09/07	09/14	1.00E 04	CU. FT.	1.5 ± 0.2	E-02	1.7 ± 1.3	E-03	09/17		L.T.	2. E-02
09/14	09/21	9.96E 03	CU. FT.	1.9 ± 0.3	E-02	3.0 ± 1.5	E-03	09/23		L.T.	2. E-02
09/21	09/29	1.16E 04	CU. FT.	2.3 ± 0.3	E-02	2.7 ± 1.4	E-03	09/30		L.T.	2. E-02
09/29	10/05	8.95E 03	CU. FT.	1.4 ± 0.3	E-02	L.T. 2.	E-03	10/08		L.T.	3. E-02
10/05	10/12	9.72E 03	CU. FT.	2.5 ± 0.3	E-02	3.5 ± 1.6	E-03	10/14		L.T.	3. E-02
10/12	10/19	1.02E 04	CU. FT.	1.7 ± 0.3	E-02	1.9 ± 1.4	E-03	10/21		L.T.	2. E-02
10/19	10/26	1.02E 04	CU. FT.	1.9 ± 0.3	E-02	1.8 ± 1.2	E-03	10/29		L.T.	2. E-02
10/26	11/02	1.01E 04	CU. FT.	3.2 ± 0.3	E-02	2.0 ± 1.3	E-03	11/06		L.T.	2. E-02
11/02	11/09	1.02E 04	CU. FT.	1.9 ± 0.3	E-02	2.1 ± 1.5	E-03	11/11		L.T.	2. E-02
11/09	11/16	1.01E 04	CU. FT.	3.5 ± 0.3	E-02	2.0 ± 1.4	E-03	11/20		L.T.	3. E-02
11/16	11/23 (a)										
11/16	11/30	2.02E 04	CU. FT.	1.1 ± 0.1	E-02	1.4 ± 0.8	E-03	12/03		L.T.	9. E-03
11/30	12/08	1.12E 04	CU. FT.	1.5 ± 0.2	E-02	L.T. 2.	E-03	12/10		L.T.	3. E-02
12/08	12/15	1.04E 04	CU. FT.	1.2 ± 0.2	E-02	L.T. 1.	E-03	12/18		L.T.	2. E-02
12/15	12/21	8.54E 03	CU. FT.	6.7 ± 3.1	E-03	L.T. 2.	E-03	12/24		L.T.	2. E-02
12/21	12/28	1.01E 04	CU. FT.	6.9 ± 2.0	E-03	1.5 ± 1.1	E-03	12/30		L.T.	2. E-02

(a) Station not accessible due to poor road conditions.

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 09

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
12/29	01/05	1.01E 04	CU. FT.	2.9 ± 0.3	E-02	3.1 ± 1.5	E-03	01/07		L.T.	3. E-02
01/05	01/12	9.96E 03	CU. FT.	3.0 ± 0.3	E-02	L.T. 2.	E-03	01/13		L.T.	2. E-02
01/12	01/20	1.17E 04	CU. FT.	2.0 ± 0.3	E-02	1.6 ± 1.1	E-03	01/22		L.T.	1. E-02
01/20	01/25	8.55E 03	CU. FT.	2.2 ± 0.4	E-02	1.6 ± 1.4	E-03	01/28		L.T.	1. E-02
01/25	02/03	1.17E 04	CU. FT.	2.8 ± 0.3	E-02	2.7 ± 1.4	E-03	02/08		L.T.	2. E-02
02/03	02/08	7.18E 03	CU. FT.	1.2 ± 0.3	E-02	2.4 ± 1.6	E-03	02/11		L.T.	2. E-02
02/08	02/16	1.13E 04	CU. FT.	1.4 ± 0.2	E-02	L.T. 1.	E-03	02/18		L.T.	1. E-02
02/16	02/22	8.50E 03	CU. FT.	1.5 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T.	2. E-02
02/22	03/02	1.17E 04	CU. FT.	1.4 ± 0.2	E-02	L.T. 2.	E-03	03/03		L.T.	1. E-02
03/02	03/10	1.18E 04	CU. FT.	1.5 ± 0.2	E-02	1.2 ± 0.9	E-03	03/12		L.T.	1. E-02
03/10	03/17	9.85E 03	CU. FT.	1.6 ± 0.2	E-02	L.T. 2.	E-03	03/19		L.T.	9. E-03
03/17	03/23	8.85E 03	CU. FT.	1.7 ± 0.3	E-02	L.T. 2.	E-03	03/25		L.T.	1. E-02
03/23	03/30	9.93E 03	CU. FT.	1.6 ± 0.3	E-02	2.8 ± 1.5	E-03	04/10		L.T.	3. E-02
03/30	04/06	1.01E 04	CU. FT.	9.1 ± 2.2	E-03	L.T. 1.	E-03	04/08		L.T.	2. E-02
04/06	04/13	1.01E 04	CU. FT.	1.4 ± 0.3	E-02	L.T. 1.	E-03	04/19		L.T.	3. E-02
04/13	04/21	1.12E 04	CU. FT.	1.4 ± 0.2	E-02	1.8 ± 1.2	E-03	04/22		L.T.	2. E-02
04/21	04/27	1.12E 04	CU. FT.	9.0 ± 2.0	E-03	L.T. 1.	E-03	04/29		L.T.	2. E-02
04/27	05/03	1.16E 04	CU. FT.	7.7 ± 1.8	E-03	2.7 ± 1.5	E-03	05/05		L.T.	1. E-02
05/03	05/11	1.13E 04	CU. FT.	2.7 ± 0.6	E-02	6.4 ± 3.9	E-03	05/13		L.T.	1. E-02
05/11	05/18	1.04E 04	CU. FT.	1.2 ± 0.2	E-02	2.9 ± 1.4	E-03	05/20		L.T.	1. E-02
05/18	05/25	1.01E 04	CU. FT.	1.2 ± 0.2	E-02	2.5 ± 1.3	E-03	05/27		L.T.	2. E-02
05/25	06/01	9.93E 03	CU. FT.	1.6 ± 0.3	E-02	2.7 ± 1.4	E-03	06/03		L.T.	1. E-02
06/01	06/08	1.02E 04	CU. FT.	1.5 ± 0.3	E-02	1.8 ± 1.3	E-03	06/11		L.T.	2. E-02
06/08	06/15	9.80E 03	CU. FT.	1.3 ± 0.2	E-02	2.0 ± 1.2	E-03	06/17		L.T.	2. E-02
06/15	06/22	1.01E 04	CU. FT.	1.7 ± 0.3	E-02	L.T. 2.	E-03	06/25		L.T.	1. E-02
06/22	06/29	1.03E 04	CU. FT.	1.6 ± 0.3	E-02	2.8 ± 1.5	E-03	07/01		L.T.	1. E-02
06/29	07/06	9.88E 03	CU. FT.	8.0 ± 2.2	E-03	2.0 ± 1.5	E-03	07/08		L.T.	3. E-02
07/06	07/13	9.99E 03	CU. FT.	1.2 ± 0.2	E-02	2.4 ± 1.6	E-03	07/20		L.T.	3. E-02
07/13	07/20	1.02E 04	CU. FT.	2.1 ± 0.3	E-02	4.2 ± 1.6	E-03	07/21		L.T.	2. E-02
07/20	07/27	9.98E 03	CU. FT.	2.7 ± 0.4	E-02	4.0 ± 1.8	E-03	07/28		L.T.	2. E-02
07/27	08/03	1.04E 04	CU. FT.	2.1 ± 0.3	E-02	3.0 ± 1.7	E-03	08/06		L.T.	2. E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 09

COLL. TIME START STOP DATE DATE		SAMPLE VOLUME UNITS		AP FILTER GROSS BETA (PCI/CU.M.)		AP FILTER GROSS ALPHA (PCI/CU.M.)		MID-COUNT TIME DATE TIME		CHARCOAL FILTER I-131 (PCI/CU. M.)		
08/03	08/10	9.85E 03	CU. FT.	2.6 ± 0.3	E-02	6.1 ± 2.1	E-03	08/12	L.T.	2.	E-02	
08/10	08/17	1.03E 04	CU. FT.	2.5 ± 0.3	E-02	1.4 ± 1.0	E-03	08/19	L.T.	2.	E-02	
08/17	08/24	9.93E 03	CU. FT.	2.5 ± 0.3	E-02	5.0 ± 1.9	E-03	08/27	L.T.	7.	E-02	
08/24	08/31	9.73E 03	CU. FT.	4.2 ± 0.4	E-02	3.8 ± 1.8	E-03	09/01	L.T.	2.	E-02	
08/31	09/07	5.93E 03	CU. FT.	4.4 ± 0.5	E-02	4.8 ± 2.3	E-03	09/10	L.T.	2.	E-02	
09/07	09/14 (a)	6.36E 02	CU. FT.	3.3 ± 0.4	E-01	2.2 ± 1.9	E-02	09/17	L.T.	3.	E-01	
09/14	09/21	9.97E 03	CU. FT.	2.7 ± 0.3	E-02	3.1 ± 1.6	E-03	09/23	L.T.	2.	E-02	
09/21	09/29	1.16E 04	CU. FT.	2.8 ± 0.3	E-02	2.7 ± 1.4	E-03	09/30	L.T.	2.	E-02	
09/29	10/05	8.95E 03	CU. FT.	1.7 ± 0.3	E-02	L.T. 2.	E-03	10/08	L.T.	3.	E-02	
10/05	10/12	9.71E 03	CU. FT.	4.2 ± 0.4	E-02	5.2 ± 1.9	E-03	10/14	L.T.	3.	E-02	
10/12	10/19	1.02E 04	CU. FT.	2.7 ± 0.3	E-02	2.1 ± 1.4	E-03	10/21	L.T.	2.	E-02	
10/19	10/26	1.03E 04	CU. FT.	2.4 ± 0.3	E-02	2.1 ± 1.3	E-03	10/29	L.T.	2.	E-02	
10/26	11/02	1.01E 04	CU. FT.	3.9 ± 0.4	E-02	3.5 ± 1.6	E-03	11/06	L.T.	2.	E-02	
11/02	11/09	1.02E 04	CU. FT.	3.6 ± 0.4	E-02	5.0 ± 2.0	E-03	11/11	L.T.	2.	E-02	
11/09	11/16	1.01E 04	CU. FT.	7.0 ± 0.5	E-02	5.3 ± 1.9	E-03	11/20	L.T.	3.	E-02	
11/16	11/23	1.00E 04	CU. FT.	5.1 ± 0.4	E-02	6.9 ± 2.1	E-03	12/01	L.T.	3.	E-02	
11/23	11/30	1.01E 04	CU. FT.	3.7 ± 0.4	E-02	4.4 ± 1.8	E-03	12/03	L.T.	2.	E-02	
11/30	12/08	9.84E 03	CU. FT.	4.0 ± 0.4	E-02	5.3 ± 2.1	E-03	12/10	L.T.	3.	E-02	
12/08	12/15	1.04E 04	CU. FT.	3.7 ± 0.4	E-02	4.1 ± 1.7	E-03	12/18	L.T.	2.	E-02	
12/15	12/21	8.54E 03	CU. FT.	3.2 ± 0.4	E-02	1.8 ± 1.5	E-03	12/24	L.T.	2.	E-02	
12/21	12/28	1.01E 04	CU. FT.	3.4 ± 0.3	E-02	2.9 ± 1.4	E-03	12/30	L.T.	2.	E-02	

(a) Results invalid due to low sample volume.

VII-1
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 10

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER		
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131		
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)		
12/29	01/05	1.01E 04	CU. FT.	2.9 ± 0.3	E-02	2.0 ± 1.3	E-03	01/07		L.T.	2.	E-02
01/05	01/12	9.97E 03	CU. FT.	3.3 ± 0.3	E-02	L.T. 1.	E-03	01/13		L.T.	1.	E-02
01/12	01/20	1.16E 04	CU. FT.	2.1 ± 0.3	E-02	L.T. 1.	E-03	01/22		L.T.	8.	E-03
01/20	01/25	8.60E 03	CU. FT.	2.2 ± 0.4	E-02	L.T. 1.	E-03	01/28		L.T.	1.	E-02
01/25	02/03	1.17E 04	CU. FT.	2.0 ± 0.3	E-02	2.2 ± 1.3	E-03	02/08		L.T.	2.	E-02
02/03	02/08	7.12E 03	CU. FT.	1.4 ± 0.3	E-02	L.T. 1.	E-03	02/11		L.T.	2.	E-02
02/08	02/16	1.13E 04	CU. FT.	1.3 ± 0.2	E-02	1.4 ± 1.0	E-03	02/18		L.T.	1.	E-02
02/16	02/22	8.54E 03	CU. FT.	1.3 ± 0.3	E-02	L.T. 2.	E-03	02/24		L.T.	2.	E-02
02/22	03/02	1.16E 04	CU. FT.	1.2 ± 0.2	E-02	L.T. 2.	E-03	03/03		L.T.	9.	E-03
03/02	03/10	1.18E 04	CU. FT.	1.5 ± 0.2	E-02	1.4 ± 1.0	E-03	03/12		L.T.	8.	E-03
03/10	03/17	9.85E 03	CU. FT.	1.5 ± 0.2	E-02	L.T. 2.	E-03	03/19		L.T.	9.	E-03
03/17	03/23	8.86E 03	CU. FT.	1.2 ± 0.3	E-02	L.T. 2.	E-03	03/25		L.T.	1.	E-02
03/23	03/30	9.94E 03	CU. FT.	1.1 ± 0.2	E-02	L.T. 1.	E-03	04/10		L.T.	2.	E-02
03/30	04/06	1.03E 04	CU. FT.	7.7 ± 2.1	E-03	L.T. 1.	E-03	04/08		L.T.	1.	E-02
04/06	04/13	9.98E 03	CU. FT.	1.1 ± 0.2	E-02	1.7 ± 1.2	E-03	04/19		L.T.	2.	E-02
04/13	04/21	1.13E 04	CU. FT.	1.1 ± 0.2	E-02	1.9 ± 1.3	E-03	04/22		L.T.	1.	E-02
04/21	04/27	1.15E 04	CU. FT.	6.8 ± 1.8	E-03	L.T. 1.	E-03	04/29		L.T.	1.	E-02
04/27	05/03	1.13E 04	CU. FT.	1.1 ± 0.2	E-02	2.6 ± 1.5	E-03	05/05		L.T.	9.	E-03
05/03	05/11	1.13E 04	CU. FT.	2.9 ± 0.6	E-02	5.0 ± 3.6	E-03	05/13		L.T.	1.	E-02
05/11	05/18	1.04E 04	CU. FT.	1.2 ± 0.2	E-02	1.2 ± 1.0	E-03	05/20		L.T.	1.	E-02
05/18	05/25	1.01E 04	CU. FT.	9.7 ± 2.3	E-03	1.4 ± 1.0	E-03	05/27		L.T.	1.	E-02
05/25	06/01	9.92E 03	CU. FT.	1.6 ± 0.3	E-02	2.1 ± 1.3	E-03	06/03		L.T.	1.	E-02
06/01	06/08	1.02E 04	CU. FT.	1.7 ± 0.3	E-02	L.T. 1.	E-03	06/11		L.T.	1.	E-02
06/08	06/15	9.78E 03	CU. FT.	1.2 ± 0.2	E-02	L.T. 1.	E-03	06/17		L.T.	1.	E-02
06/15	06/22	1.00E 04	CU. FT.	2.6 ± 0.4	E-02	2.0 ± 1.6	E-03	06/25		L.T.	1.	E-02
06/22	06/29	1.03E 04	CU. FT.	1.6 ± 0.3	E-02	1.9 ± 1.4	E-03	07/01		L.T.	1.	E-02
06/29	07/06	9.86E 03	CU. FT.	1.5 ± 0.3	E-02	2.4 ± 1.6	E-03	07/08		L.T.	2.	E-02
07/06	07/13	1.00E 04	CU. FT.	1.5 ± 0.3	E-02	L.T. 2.	E-03	07/20		L.T.	2.	E-02
07/13	07/20	1.01E 04	CU. FT.	2.1 ± 0.3	E-02	3.1 ± 1.4	E-03	07/21		L.T.	1.	E-02
07/20	07/27	1.01E 04	CU. FT.	2.1 ± 0.3	E-02	1.7 ± 1.3	E-03	07/28		L.T.	1.	E-02
07/27	08/03	1.03E 04	CU. FT.	1.9 ± 0.3	E-02	2.5 ± 1.7	E-03	08/06		L.T.	1.	E-02

VII-1
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
AIR PARTICULATE & CHARCOAL FILTERS

STATION NUMBER 10

COLL. TIME		SAMPLE		AP FILTER		AP FILTER		MID-COUNT		CHARCOAL FILTER	
START	STOP	VOLUME	UNITS	GROSS BETA		GROSS ALPHA		TIME		I-131	
DATE	DATE			(PCI/CU.M.)		(PCI/CU.M.)		DATE	TIME	(PCI/CU. M.)	
08/03	08/10	9.94E 03	CU. FT.	3.1 ± 0.3	E-02	L.T. 1.	E-03	08/12		L.T. 1.	E-02
08/10	08/17	1.03E 04	CU. FT.	2.5 ± 0.3	E-02	2.9 ± 1.4	E-03	08/19		L.T. 2.	E-02
08/17	08/24	9.97E 03	CU. FT.	2.9 ± 0.3	E-02	3.6 ± 1.6	E-03	08/27		L.T. 1.	E-02
08/24	08/31	9.97E 03	CU. FT.	4.6 ± 0.5	E-02	3.5 ± 1.7	E-03	09/01		L.T. 1.	E-02
08/31	09/07	1.02E 04	CU. FT.	3.2 ± 0.3	E-02	4.6 ± 1.7	E-03	09/10		L.T. 2.	E-02
09/07	09/14	1.00E 04	CU. FT.	2.0 ± 0.3	E-02	3.1 ± 1.6	E-03	09/17		L.T. 1.	E-02
09/14	09/21	1.02E 04	CU. FT.	2.1 ± 0.3	E-02	3.3 ± 1.6	E-03	09/23		L.T. 1.	E-02
09/21	09/29	1.13E 04	CU. FT.	3.0 ± 0.3	E-02	2.9 ± 1.4	E-03	09/30		L.T. 1.	E-02
09/29	10/05	8.93E 03	CU. FT.	2.0 ± 0.3	E-02	L.T. 2.	E-03	10/08		L.T. 2.	E-02
10/05	10/12	9.73E 03	CU. FT.	4.7 ± 0.4	E-02	3.5 ± 1.6	E-03	10/14		L.T. 2.	E-02
10/12	10/19	1.01E 04	CU. FT.	2.8 ± 0.3	E-02	2.0 ± 1.4	E-03	10/21		L.T. 2.	E-02
10/19	10/26	1.02E 04	CU. FT.	2.3 ± 0.3	E-02	1.2 ± 1.1	E-03	10/29		L.T. 1.	E-02
10/26	11/02	1.02E 04	CU. FT.	3.6 ± 0.3	E-02	2.4 ± 1.4	E-03	11/06		L.T. 1.	E-02
11/02	11/09	1.02E 04	CU. FT.	3.1 ± 0.3	E-02	2.9 ± 1.6	E-03	11/11		L.T. 2.	E-02
11/09	11/16	1.01E 04	CU. FT.	4.9 ± 0.4	E-02	5.2 ± 1.9	E-03	11/20		L.T. 2.	E-02
11/16	11/23 (a)										
11/16	11/30	2.02E 04	CU. FT.	2.9 ± 0.2	E-02	2.7 ± 1.0	E-03	12/03		L.T. 6.	E-03
11/30	12/08	1.08E 04	CU. FT.	3.0 ± 0.3	E-02	5.5 ± 2.0	E-03	12/10		L.T. 2.	E-02
12/08	12/15	1.04E 04	CU. FT.	3.0 ± 0.3	E-02	3.7 ± 1.6	E-03	12/18		L.T. 2.	E-02
12/15	12/21	8.53E 03	CU. FT.	2.6 ± 0.4	E-02	L.T. 2.	E-03	12/24		L.T. 1.	E-02
12/21	12/28	1.01E 04	CU. FT.	2.6 ± 0.3	E-02	2.1 ± 1.2	E-03	12/30		L.T. 1.	E-02

(a) Sample not accessible due to poor road condition.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
COMPOSITE AIR PARTICULATE FILTERS
(PCI/CU. M.)
STATION NUMBER 01

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	7.76±1.39 E-02	1.14±0.14 E-01	1.25±0.15 E-01	9.27±1.23 E-02
K-40	L.T. 8. E-03	6.16 ± 3.43 E-03	L.T. 9. E-03	L.T. 8. E-03
MN-54	L.T. 6. E-04	L.T. 6. E-04	L.T. 6. E-04	L.T. 6. E-04
CO-58	L.T. 9. E-04	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
FE-59	L.T. 4. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
CO-60	L.T. 5. E-04	L.T. 4. E-04	L.T. 4. E-04	L.T. 5. E-04
ZN-65	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
RU-103	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03
RU-106	L.T. 4. E-03	L.T. 3. E-03	L.T. 5. E-03	L.T. 5. E-03
I-131	L.T. 2. E 00 (a)	L.T. 8. E-01 (a)	L.T. 6. E-01	L.T. 2. E-01
CS-134	L.T. 5. E-04	L.T. 4. E-04	L.T. 6. E-04	L.T. 4. E-04
CS-137	L.T. 5. E-04	L.T. 4. E-04	L.T. 6. E-04	L.T. 6. E-04
BA-140	L.T. 8. E-02	L.T. 5. E-02	L.T. 6. E-02	L.T. 2. E-02
CE-141	L.T. 4. E-03	L.T. 4. E-03	L.T. 4. E-03	L.T. 3. E-03
CE-144	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
RA-226	L.T. 8. E-03	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02
TH-228	L.T. 7. E-04	L.T. 8. E-04	L.T. 9. E-04	L.T. 9. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 02

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	9.92±1.40 E-02	1.01±0.13 E-01	1.28±0.15 E-01	9.39±1.19 E-02
K-40	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 9. E-03
MN-54	L.T. 3. E-04	L.T. 6. 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. 8. E-04	L.T. 8. E-04
FE-59	L.T. 3. E-03	L.T. 5. E-03	L.T. 3. E-03	L.T. 3. E-03
CO-60	L.T. 4. E-04	L.T. 6. E-04	L.T. 5. 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. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 9. E-04
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 4. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03
I-131	L.T. 1. E 00 (a)	L.T. 1. E 00 (a)	L.T. 5. E-01	L.T. 2. E-01
CS-134	L.T. 4. E-04	L.T. 6. E-04	L.T. 5. E-04	L.T. 5. E-04
CS-137	L.T. 4. E-04	L.T. 6. E-04	L.T. 5. E-04	L.T. 6. E-04
BA-140	L.T. 7. E-02	L.T. 8. E-02	L.T. 6. E-02	L.T. 2. E-02
CE-141	L.T. 5. E-03	L.T. 3. E-03	L.T. 4. E-03	L.T. 3. E-03
CE-144	L.T. 4. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 4. E-03
RA-226	L.T. 1. E-02	L.T. 8. 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. 9. E-04	L.T. 9. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 03

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	9.35±1.24 E-02	1.07±0.13 E-01	6.17±0.92 E-02	4.84±1.02 E-02
K-40	L.T. 1. E-02	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02
MN-54	L.T. 5. E-04	L.T. 5. E-04	L.T. 6. E-04	L.T. 6. E-04
CO-58	L.T. 1. E-03	L.T. 9. E-04	L.T. 9. E-04	L.T. 1. E-03
FE-59	L.T. 4. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
CO-60	L.T. 5. E-04	L.T. 5. E-04	L.T. 6. E-04	L.T. 6. E-04
ZN-65	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03
RU-106	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 6. E-03
I-131	L.T. 1. E 00 (a)	L.T. 8. E-01 (a)	L.T. 5. E-01	L.T. 2. E-01
CS-134	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04	L.T. 5. E-04
CS-137	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04	L.T. 6. E-04
BA-140	L.T. 8. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 3. E-02
CE-141	L.T. 3. E-03	L.T. 4. E-03	L.T. 3. E-03	L.T. 3. E-03
CE-144	L.T. 2. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 3. E-03
RA-226	L.T. 6. E-03	L.T. 1. E-02	L.T. 6. E-03	L.T. 1. E-02
TH-228	L.T. 6. E-04	L.T. 9. E-04	L.T. 6. E-04	L.T. 1. E-03

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
COMPOSITE AIR PARTICULATE FILTERS
(PCI/CU. M.)
STATION NUMBER 04

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	5.82±1.18 E-02	5.19±0.97 E-02	6.28±1.07 E-02	7.60±1.07 E-02
K-40	L.T. 8. E-03	L.T. 1. E-02	L.T. 2. E-02	L.T. 2. E-02
MN-54	L.T. 5. E-04	L.T. 5. E-04	L.T. 6. E-04	L.T. 6. E-04
CO-58	L.T. 8. E-04	L.T. 8. E-04	L.T. 1. E-03	L.T. 1. E-03
FE-59	L.T. 3. E-03	L.T. 3. E-03	L.T. 4. E-03	L.T. 3. 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. 1. E-03	L.T. 2. E-03	L.T. 2. E-03
ZR-95	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03
RU-106	L.T. 4. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 6. E-03
I-131	L.T. 2. E 00 (a)	L.T. 7. E-01 (a)	L.T. 6. E-01	L.T. 2. E-01
CS-134	L.T. 5. E-04	L.T. 5. E-04	L.T. 6. E-04	L.T. 6. E-04
CS-137	L.T. 6. E-04	L.T. 4. E-04	L.T. 5. E-04	L.T. 6. E-04
BA-140	L.T. 7. E-02	L.T. 5. E-02	L.T. 5. E-02	L.T. 2. E-02
CE-141	L.T. 4. E-03	L.T. 2. E-03	L.T. 3. E-03	L.T. 2. E-03
CE-144	L.T. 3. E-03	L.T. 2. E-03	L.T. 3. E-03	L.T. 3. E-03
RA-226	L.T. 8. E-03	L.T. 5. E-03	L.T. 8. E-03	L.T. 8. E-03
TH-228	L.T. 7. E-04	L.T. 6. E-04	L.T. 7. E-04	L.T. 8. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 05

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	3.02±1.28 E-02	1.68±0.21 E-01	1.47±0.15 E-01	1.25±0.13 E-01
K-40	L.T. 1. E-02	L.T. 1. E-02	L.T. 7. E-03	L.T. 9. E-03
MN-54	L.T. 8. E-04	L.T. 8. E-04	L.T. 5. E-04	L.T. 6. E-04
CO-58	L.T. 1. E-03	L.T. 1. E-03	L.T. 8. E-04	L.T. 6. E-04
FE-59	L.T. 5. E-03	L.T. 6. E-03	L.T. 2. E-03	L.T. 2. E-03
CO-60	L.T. 7. E-04	L.T. 8. E-04	L.T. 4. E-04	L.T. 6. E-04
ZN-65	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 2. E-03	L.T. 2. E-03	L.T. 9. E-04	L.T. 1. E-03
RU-103	L.T. 3. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 6. E-03	L.T. 7. E-03	L.T. 4. E-03	L.T. 4. E-03
I-131	L.T. 2. E 00 (a)	L.T. 1. E 00 (a)	L.T. 6. E-01	L.T. 1. E-01
CS-134	L.T. 7. E-04	L.T. 8. E-04	L.T. 4. E-04	L.T. 5. E-04
CS-137	L.T. 6. E-04	L.T. 9. E-04	L.T. 4. E-04	L.T. 5. E-04
BA-140	L.T. 1. E-01	L.T. 1. E-01	L.T. 4. E-02	L.T. 2. E-02
CE-141	L.T. 4. E-03	L.T. 6. E-03	L.T. 3. E-03	L.T. 2. E-03
CE-144	L.T. 3. E-03	L.T. 5. E-03	L.T. 3. E-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. 9. E-03
TH-228	L.T. 9. E-04	L.T. 1. E-03	L.T. 8. E-04	L.T. 9. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 06

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	6.70±1.07 E-02	9.96±1.11 E-02	1.11±0.11 E-01	9.35±0.94 E-02
K-40	L.T. 8. E-03	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02
MN-54	L.T. 5. E-04	L.T. 5. E-04	L.T. 5. E-04	L.T. 5. E-04
CO-58	L.T. 8. E-04	L.T. 1. E-03	L.T. 8. E-04	L.T. 7. E-04
FE-59	L.T. 3. E-03	L.T. 3. 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. 4. E-04
ZN-65	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
ZR-95	L.T. 9. E-04	L.T. 1. E-03	L.T. 1. E-03	L.T. 8. E-04
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 4. E-03	L.T. 4. E-03	L.T. 4. E-03	L.T. 4. E-03
I-131	L.T. 1. E 00 (a)	L.T. 8. E-01 (a)	L.T. 5. E-01	L.T. 1. E-01
CS-134	L.T. 5. E-04	L.T. 5. E-04	L.T. 5. E-04	L.T. 4. E-04
CS-137	L.T. 5. E-04	L.T. 5. E-04	L.T. 4. E-04	L.T. 4. E-04
BA-140	L.T. 8. E-02	L.T. 7. E-02	L.T. 4. E-02	L.T. 1. E-02
CE-141	L.T. 3. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03
CE-144	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03
RA-226	L.T. 7. E-03	L.T. 6. E-03	L.T. 7. E-03	L.T. 6. E-03
TH-228	L.T. 7. E-04	L.T. 7. E-04	L.T. 7. E-04	L.T. 6. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 07

DATE COLLECTED: 12/29-03/30 03/30-06/29 06/29-09/29 09/29-12/28

GAMMA SPECTRUM ANALYSIS:

BE-7	1.40±0.19	E-01	8.87±1.15	E-02	8.38±1.23	E-02	8.98±1.20	E-02
K-40	L.T. 2.	E-02	L.T. 8.	E-03	6.47±3.19	E-03	L.T. 9.	E-03
MN-54	L.T. 8.	E-04	L.T. 5.	E-04	L.T. 5.	E-04	L.T. 5.	E-04
CO-58	L.T. 1.	E-03	L.T. 9.	E-04	L.T. 9.	E-04	L.T. 7.	E-04
FE-59	L.T. 6.	E-03	L.T. 3.	E-03	L.T. 3.	E-03	L.T. 2.	E-03
CO-60	L.T. 7.	E-04	L.T. 4.	E-04	L.T. 4.	E-04	L.T. 6.	E-04
ZN-65	L.T. 2.	E-03	L.T. 1.	E-03	L.T. 1.	E-03	L.T. 1.	E-03
ZR-95	L.T. 2.	E-03	L.T. 9.	E-04	L.T. 1.	E-03	L.T. 8.	E-04
RU-103	L.T. 3.	E-03	L.T. 2.	E-03	L.T. 2.	E-03	L.T. 1.	E-03
RU-106	L.T. 7.	E-03	L.T. 4.	E-03	L.T. 4.	E-03	L.T. 4.	E-03
I-131	L.T. 2.	E 00 (a)	L.T. 7.	E-01 (a)	L.T. 5.	E-01	L.T. 1.	E-01
CS-134	L.T. 7.	E-04	L.T. 4.	E-04	L.T. 5.	E-04	L.T. 5.	E-04
CS-137	L.T. 7.	E-04	L.T. 5.	E-04	L.T. 4.	E-04	L.T. 5.	E-04
BA-140	L.T. 1.	E-01	L.T. 5.	E-02	L.T. 5.	E-02	L.T. 2.	E-02
CE-141	L.T. 5.	E-03	L.T. 3.	E-03	L.T. 3.	E-03	L.T. 2.	E-03
CE-144	L.T. 4.	E-03	L.T. 3.	E-03	L.T. 3.	E-03	L.T. 3.	E-03
RA-226	L.T. 1.	E-02	L.T. 7.	E-03	L.T. 8.	E-03	L.T. 9.	E-03
TH-228	L.T. 1.	E-03	L.T. 7.	E-04	L.T. 8.	E-04	L.T. 8.	E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 COMPOSITE AIR PARTICULATE FILTERS
 (PCI/CU. M.)
 STATION NUMBER 08

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	6.67±1.39 E-02	8.74±1.54 E-02	9.26±1.03 E-02	5.36±0.90 E-02
K-40	L.T. 7. E-03	L.T. 2. E-02	L.T. 7. E-03	L.T. 9. E-03
MN-54	L.T. 6. E-04	L.T. 9. E-04	L.T. 5. E-04	L.T. 5. E-04
CO-58	L.T. 8. E-04	L.T. 2. E-03	L.T. 8. E-04	L.T. 8. E-04
FE-59	L.T. 4. E-03	L.T. 5. E-03	L.T. 2. E-03	L.T. 3. E-03
CO-60	L.T. 5. E-04	L.T. 8. E-04	L.T. 4. E-04	L.T. 6. E-04
ZN-65	L.T. 1. E-03	L.T. 2. E-03	L.T. 6. E-04	L.T. 1. E-03
ZR-95	L.T. 1. E-03	L.T. 2. E-03	L.T. 8. E-04	L.T. 9. E-04
RU-103	L.T. 2. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03
RU-106	L.T. 4. E-03	L.T. 8. E-03	L.T. 4. E-03	L.T. 4. E-03
I-131	L.T. 2. E 00 (a)	L.T. 1. E 00 (a)	L.T. 5. E-01	L.T. 2. E-01
CS-134	L.T. 5. E-04	L.T. 9. E-04	L.T. 4. E-04	L.T. 6. E-04
CS-137	L.T. 4. E-04	L.T. 7. E-04	L.T. 4. E-04	L.T. 6. E-04
BA-140	L.T. 9. E-02	L.T. 9. E-02	L.T. 4. E-02	L.T. 2. E-02
CE-141	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. 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. 1. E-02	L.T. 1. E-02
TH-228	L.T. 8. E-04	L.T. 1. E-03	L.T. 8. E-04	L.T. 9. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
COMPOSITE AIR PARTICULATE FILTERS
(PCI/CU. M.)
STATION NUMBER 09

DATE COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
GAMMA SPECTRUM ANALYSIS:				
BE-7	7.88±1.26 E-02	1.19±0.14 E-01	1.64±0.16 E-01	1.12±0.11 E-01
K-40	L.T. 6. E-03	L.T. 2. E-02	L.T. 1. E-02	L.T. 9. E-03
MN-54	L.T. 4. E-04	L.T. 6. E-04	L.T. 6. E-04	L.T. 4. E-04
CO-58	L.T. 8. E-04	L.T. 1. E-03	L.T. 9. E-04	L.T. 7. E-04
FE-59	L.T. 3. E-03	L.T. 4. E-03	L.T. 4. E-03	L.T. 2. E-03
CO-60	L.T. 5. E-04	L.T. 5. E-04	L.T. 5. E-04	L.T. 5. 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. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
RU-103	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03
RU-106	L.T. 4. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03
I-131	L.T. 2. E 00 (a)	L.T. 1. E 00 (a)	L.T. 6. E-01	L.T. 1. E-01
CS-134	L.T. 4. E-04	L.T. 6. E-04	L.T. 6. E-04	L.T. 5. E-04
CS-137	L.T. 4. E-04	L.T. 6. E-04	L.T. 7. E-04	L.T. 6. E-04
BA-140	L.T. 9. E-02	L.T. 9. E-02	L.T. 6. E-02	L.T. 2. E-02
CE-141	L.T. 5. E-03	L.T. 4. 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. 4. E-03	L.T. 3. E-03
RA-226	L.T. 9. E-03	L.T. 8. E-03	L.T. 9. E-03	L.T. 8. E-03
TH-228	L.T. 8. E-04	L.T. 8. E-04	L.T. 9 E-04	L.T. 9. E-04

(a) The detection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for I-131 in these samples.

VII-2
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AIRBORNE
COMPOSITE AIR PARTICULATE FILTERS
(PCI/CU. M.)
STATION NUMBER 10

COLLECTED:	12/29-03/30	03/30-06/29	06/29-09/29	09/29-12/28
1. SPECTRUM ANALYSIS:				
	6.11±1.24 E-02	1.36±0.15 E-01	1.52±0.15 E-01	8.95±0.91 E-02
	L.T. 8. E-03	L.T. 7. E-03	L.T. 9. E-03	L.T. 9. E-03
	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04	L.T. 5. E-04
	L.T. 1. E-03	L.T. 8. E-04	L.T. 8. E-04	L.T. 7. E-04
	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03	L.T. 3. E-03
	L.T. 4. E-04	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04
	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03	L.T. 1. E-03
	L.T. 1. E-03	L.T. 1. E-03	L.T. 9. E-04	L.T. 9. E-04
	L.T. 2. E-03	L.T. 2. E-03	L.T. 2. E-03	L.T. 1. E-03
	L.T. 4. E-03	L.T. 4. E-03	L.T. 4. E-03	L.T. 4. E-03
	L.T. 2. E 00 (a)	L.T. 8. E-01 (a)	L.T. 5. E-01	L.T. 1. E-01
	L.T. 5. E-04	L.T. 4. E-04	L.T. 5. E-04	L.T. 4. E-04
	L.T. 6. E-04	L.T. 4. E-04	L.T. 4. E-04	L.T. 5. E-04
	L.T. 8. E-02	L.T. 6. E-02	L.T. 5. E-02	L.T. 2. E-02
	L.T. 4. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03
	L.T. 3. E-03	L.T. 3. E-03	L.T. 2. E-03	L.T. 2. E-03
	L.T. 8. E-03	L.T. 8. E-03	L.T. 6. E-03	L.T. 5. E-03
	L.T. 8. E-04	L.T. 8. E-04	L.T. 6. E-04	L.T. 6. E-04

etection limits for I-131 may be higher due to a longer interval between collection and compositing at lab. No detection limits have been established for in these samples.

VII-3
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
FISH
(PCI/GM WET)
STATION NUMBER 28

DATE COLLECTED:	06/23 CARP	06/23 CATFISH	10/12 CARP	10/12 CATFISH
RADIOCHEMICAL ANALYSIS:				
GR-B	4.6 ± 0.2 E 00	(a)	4.9 ± 0.2 E 00	5.7 ± 0.3 E 00
SR-89	L.T. 2. E-02		L.T. 1. E-02	L.T. 1. E-02
SR-90	L.T. 7. E-03		1.2 ± 0.1 E-01	L.T. 2 E-02
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 4. E-02		L.T. 3. E-02	L.T. 5 E-02
K-40	2.89±0.29 E 00		2.49±0.25 E 00	3.63±0.36 E 00
MN-54	L.T. 4. E-03		L.T. 3. E-03	L.T. 6. E-03
CO-58	L.T. 4. E-03		L.T. 3. E-03	L.T. 6. E-03
FE-59	L.T. 1. E-02		L.T. 8. E-03	L.T. 1. E-02
CO-60	L.T. 5. E-03		L.T. 4. E-03	1.25±0.47 E-02
ZN-65	L.T. 1. E-02		L.T. 9. E-03	L.T. 2. E-02
ZR-95	L.T. 4. E-03		L.T. 3. E-03	L.T. 6. E-03
RU-103	L.T. 4. E-03		L.T. 3. E-03	L.T. 7. E-03
RU-106	L.T. 4. E-02		L.T. 3. E-02	L.T. 5. E-02
I-131	L.T. 7. E-03		L.T. 6. E-03	L.T. 1. E-02
CS-134	L.T. 5. E-03		L.T. 3. E-03	L.T. 6. E-03
CS-137	L.T. 4. E-03		L.T. 4. E-03	2.63±0.60 E-02
BA-140	L.T. 6. E-03		L.T. 4. E-03	L.T. 7. E-03
CE-141	L.T. 6. E-03		L.T. 5. E-03	L.T. 1. E-02
CE-144	L.T. 2. E-02		L.T. 2. E-02	L.T. 4. E-02
RA-226	L.T. 7. E-02		L.T. 6. E-02	L.T. 1. E-01
TH-228	L.T. 6. E-03		L.T. 5. E-03	L.T. 9. E-03

(a) Bottom feeder not available.

VII-3
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
FISH
(PCI/GM WET)
STATION NUMBER 35

DATE COLLECTED:	06/23 CARP	06/23 CATFISH	06/23 CARP QA	10/12 CARP	10/12 CATFISH	10/12 CARP QA
RADIOCHEMICAL ANALYSIS:						
GR-B	3.8 ± 0.2 E 00	4.5 ± 0.2 E 00	5.2 ± 0.2 E 00	5.2 ± 0.2 E 00	5.1 ± 0.2 E 00	4.9 ± 0.2 E 00
SR-89	L.T. 2. E-02	L.T. 1. E-02	L.T. 6. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
SR-90	L.T. 7. E-03	L.T. 5. E-03	L.T. 3. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
GAMMA SPECTRUM ANALYSIS:						
BE-7	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 3. E-02
K-40	2.77±0.28 E 00	2.76±0.28 E 00	2.96±0.30 E 00	2.64±0.26 E 00	3.12±0.31 E 00	2.55±0.26 E 00
MN-54	L.T. 4. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 3. E-03	L.T. 5. E-03	L.T. 3. E-03
CO-58	L.T. 4. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 3. E-03	L.T. 5. E-03	L.T. 4. E-03
FE-59	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 9. E-03	L.T. 1. E-02	L.T. 9. E-03
CO-60	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
ZN-65	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 9. E-03	L.T. 1. E-02	L.T. 9. E-03
ZR-95	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
RU-103	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
RU-106	L.T. 4. E-02	L.T. 4. E-02	L.T. 4. E-02	L.T. 3. E-02	L.T. 4. E-02	L.T. 3. E-02
I-131	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 7. E-03	L.T. 9. E-03	L.T. 7. E-03
CS-134	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
CS-137	L.T. 5. E-03	L.T. 5. E-03	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
BA-140	L.T. 5. E-03	L.T. 7. E-03	L.T. 7. E-03	L.T. 5. E-03	L.T. 6. E-03	L.T. 5. E-03
CE-141	L.T. 7. E-03	L.T. 8. E-03	L.T. 8. E-03	L.T. 5. E-03	L.T. 8. E-03	L.T. 6. E-03
CE-144	L.T. 3. E-02	L.T. 3. E-02	L.T. 3. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02
RA-226	L.T. 8. E-02	L.T. 8. E-02	L.T. 9. E-02	L.T. 6. E-02	L.T. 9. E-02	L.T. 6. E-02
TH-228	L.T. 7. E-03	L.T. 7. E-03	L.T. 8. E-03	L.T. 5. E-03	L.T. 8. E-03	L.T. 5. E-03

VII-4
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK NEAREST PRODUCER
 (PCI/LITER)
 STATION NUMBER 61

DATE COLLECTED:	04/06/99	05/04/99	06/01/99	06/01/99 QA	06/15/99
RADIOCHEMICAL ANALYSIS:					
SR-89	L.T. 9. E-01	L.T. 1. E 00			L.T. 3. E 00 (a)
SR-90	1.1 ± 0.2 E 00	2.4 ± 0.3 E 00			1.3 ± 0.2 E 00 (a)
I-131	L.T. 3. E-01	L.T. 2. E-01	L.T. 3. E-01	L.T. 4. E-01	L.T. 2. E-01
CA (gm/liter)	1.6 ± 0.2 E 00	1.1 ± 0.1 E 00			1.4 ± 0.1 E 00 (a)
GAMMA SPECTRUM ANALYSIS:					
BE-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
K-40	1.14±0.11 E 03	1.25±0.12 E 03	1.20±0.12 E 03	1.23±0.12 E 03	1.24±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. 3. E 00
CO-58	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. 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. 9. E 00	L.T. 7. 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
ZN-65	L.T. 9. E 00	L.T. 9. E 00	L.T. 9. E 00	L.T. 1. E 01	L.T. 8. E 00
ZR-95	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. 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
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
I-131	L.T. 6. E 00	L.T. 4. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 4. 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. 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. 4. E 00
BA-140	L.T. 5. E 00	L.T. 5. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 5. E 00
CE-141	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 8. E 00	L.T. 6. E 00
CE-144	L.T. 2. E 01	L.T. 3. E 01	L.T. 2. E 01	L.T. 3. E 01	L.T. 3. E 01
RA-226	L.T. 7. E 01	L.T. 7. E 01	L.T. 7. E 01	L.T. 8. E 01	L.T. 8. E 01
TH-228	L.T. 6. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00

VII-4
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK NEAREST PRODUCER
 (PCI/LITER)
 STATION NUMBER 61

DATE COLLECTED:	06/29/99	07/13/99	07/13/99 QA	07/27/99	08/10/99
RADIOCHEMICAL ANALYSIS:					
SR-89				L.T. 2. E 00 (a)	
SR-90				1.5 ± 0.2 E 00 (a)	
I-131	L.T. 9. E-01	L.T. 3. E-01	L.T. 3. E-01	L.T. 2. E-01	L.T. 2. E-01
CA (gm/liter)				1.2 ± 0.1 E 00 (a)	
GAMMA SPECTRUM ANALYSIS:					
BE-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
K-40	1.16 ± 0.12 E 03	1.35 ± 0.13 E 03	1.35 ± 0.13 E 03	1.28 ± 0.13 E 03	1.18 ± 0.12 E 03
MN-54	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 9. E 00	L.T. 7. E 00	L.T. 8. E 00	L.T. 6. E 00	L.T. 8. E 00
CO-60	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
ZN-65	L.T. 9. 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. 3. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00
RU-103	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
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
I-131	L.T. 8. E 00	L.T. 6. E 00	L.T. 7. E 00	L.T. 4. E 00	L.T. 4. 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. 4. E 00
CS-137	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
BA-140	L.T. 6. E 00	L.T. 5. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 4. E 00
CE-141	L.T. 6. E 00	L.T. 6. E 00	L.T. 5. E 00	L.T. 5. E 00	L.T. 5. E 00
CE-144	L.T. 2. 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. 7. E 01	L.T. 8. E 01	L.T. 7. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 7. E 00	L.T. 6. E 00

VII-4
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK NEAREST PRODUCER
 (PCI/LITER)
 STATION NUMBER 61

DATE COLLECTED:	08/10/99	08/24/99	09/07/99	09/07/99	09/21/99
	QA			QA	
RADIOCHEMICAL ANALYSIS:					
SR-89		L.T. 2. E 00 (a)			L.T. 6. E 00 (b)
SR-90		1.5 ± 0.2 E 00 (a)			1.9 ± 0.2 E 00 (b)
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 3. E-01	L.T. 2. E-01
CA (gm/liter)		1.3 ± 0.1 E 00 (a)			1.4 ± 0.1 E 00 (b)
GAMMA SPECTRUM ANALYSIS:					
BE-7	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	1.39±0.14 E 03	1.39±0.14 E 03	1.26±0.13 E 03	1.30±0.13 E 03	1.31±0.13 E 03
MN-54	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 6. E 00	L.T. 1. E 01	L.T. 8. E 00	L.T. 7. E 00	L.T. 7. E 00
CO-60	L.T. 3. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00
ZN-65	L.T. 7. E 00	L.T. 1. E 01	L.T. 8. E 00	L.T. 7. E 00	L.T. 8. E 00
ZR-95	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. 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. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 4. E 00	L.T. 8. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00
CS-134	L.T. 3. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
CS-137	L.T. 3. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
BA-140	L.T. 3. E 00	L.T. 7. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00
CE-141	L.T. 5. E 00	L.T. 7. E 00	L.T. 8. E 00	L.T. 6. E 00	L.T. 5. E 00
CE-144	L.T. 2. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 6. E 01	L.T. 9. E 01	L.T. 8. E 01	L.T. 7. E 01	L.T. 6. E 01
TH-228	L.T. 6. E 00	L.T. 8. E 00	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00

(a) Composite from 08/10/99 - 08/24/99.
 (b) Composite from 09/07/99 - 09/21/00.

VII-4
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK NEAREST PRODUCER
 (PCI/LITER)
 STATION NUMBER 61

DATE COLLECTED:	10/05/99	10/05/99	11/02/99	12/07/99
		QA		
RADIOCHEMICAL ANALYSIS:				
SR-89				L.T. 2. E 00
SR-90				2.7 ± 0.4 E 00
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 3. E-01
CA (gm/liter)				1.5 ± 0.2 E 00
GAMMA SPECTRUM ANALYSIS:				
BE-7	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	1.20±0.12 E 03	1.35±0.14 E 03	1.31±0.13 E 03
MN-54	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 8. E 00	L.T. 7. E 00	L.T. 8. E 00	L.T. 7. E 00
CO-60	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
ZN-65	L.T. 8. E 00	L.T. 7. E 00	L.T. 9. E 00	L.T. 7. E 00
ZR-95	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
RU-103	L.T. 4. E 00	L.T. 3. 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
I-131	L.T. 7. E 00	L.T. 5. E 00	L.T. 6. E 00	L.T. 6. E 00
CS-134	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. 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. 3. E 00
BA-140	L.T. 5. E 00	L.T. 5. E 00	L.T. 5. E 00	L.T. 4. E 00
CE-141	L.T. 7. E 00	L.T. 6. E 00	L.T. 8. E 00	L.T. 5. E 00
CE-144	L.T. 3. E 01	L.T. 2. E 01	L.T. 3. E 01	L.T. 2. E 01
RA-226	L.T. 7. E 01	L.T. 7. E 01	L.T. 8. E 01	L.T. 6. E 01
TH-228	L.T. 7. E 00	L.T. 6. E 00	L.T. 7. E 00	L.T. 6. E 00

VII-4
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK NEAREST PRODUCER
 (PCI/LITER)
 STATION NUMBER 99

DATE COLLECTED:	01/05/99	02/03/99	03/02/99	03/02/99 QA	04/06/99
RADIOCHEMICAL ANALYSIS:					
SR-89	L.T. 8. E-01	L.T. 1. E 00	L.T. 7. E-01	L.T. 7 E-01	L.T. 1. E 00
SR-90	1.2 ± 0.2 E 00	1.3 ± 0.3 E 00	1.0 ± 0.2 E 00	1.1 ± 0.2 E 00	1.4 ± 0.2 E 00
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 3. E-01
CA (gm/liter)	1.4 ± 0.1 E 00	1.7 ± 0.2 E 00	1.4 ± 0.1 E 00	1.2 ± 0.1 E 00	1.6 ± 0.2 E 00
GAMMA SPECTRUM ANALYSIS:					
BE-7	L.T. 3. E 01	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	1.34±0.13 E 03	1.19±0.12 E 03	1.39±0.14 E 03	1.49±0.15 E 03	1.18±0.12 E 03
MN-54	L.T. 3. E 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. 3. E 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. 6. E 00	L.T. 7. E 00	L.T. 1. E 01	L.T. 7. E 00	L.T. 7. E 00
CO-60	L.T. 3. E 00	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
ZN-65	L.T. 7. E 00	L.T. 7. E 00	L.T. 1. E 01	L.T. 7. E 00	L.T. 7. E 00
ZR-95	L.T. 3. E 00	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
RU-103	L.T. 3. E 00	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 4. E 00	L.T. 4. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 6. E 00
CS-134	L.T. 3. E 00	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
CS-137	L.T. 3. E 00	L.T. 3. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00
BA-140	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
CE-141	L.T. 6. E 00	L.T. 5. E 00	L.T. 7. E 00	L.T. 5. E 00	L.T. 6. E 00
CE-144	L.T. 2. E 01	L.T. 2. E 01	L.T. 3. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 7. E 01	L.T. 6. E 01	L.T. 8. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 6. E 00	L.T. 5. E 00	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00

VII-4
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
MILK NEAREST PRODUCER
(PCI/LITER)
STATION NUMBER 99

DATE COLLECTED: 05/04/99
RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 8.	E-01
SR-90	1.2 ± 0.2	E 00
I-131	L.T. 2.	E-01
CA (gm/liter)	1.3 ± 0.1	E 00

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 3.	E 01
K-40	1.43±0.14	E 03
MN-54	L.T. 3.	E 00
CO-58	L.T. 3.	E 00
FE-59	L.T. 7.	E 00
CO-60	L.T. 3.	E 00
ZN-65	L.T. 7.	E 00
ZR-95	L.T. 3.	E 00
RU-103	L.T. 3.	E 00
RU-106	L.T. 3.	E 01
I-131	L.T. 4.	E 00
CS-134	L.T. 3.	E 00
CS-137	L.T. 3.	E 00
BA-140	L.T. 3.	E 00
CE-141	L.T. 5.	E 00
CE-144	L.T. 2.	E 01
RA-226	L.T. 6.	E 01
TH-228	L.T. 5.	E 00

VII-5
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK OTHER PRODUCERS
 (PCI/LITER)
 STATION NUMBER 42

DATE COLLECTED: 01/20/99 04/13/99

RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 1.	E 00	L.T. 1.	E 00
SR-90	6.4 ± 2.6	E-01	8.9 ± 2.0	E-01
I-131	L.T. 2.	E-01	L.T. 2.	E-01
CA (gm/liter)	1.5 ± 0.2	E 00	1.5 ± 0.2	E 00

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 2.	E 01	L.T. 3.	E 01
K-40	1.47±0.15	E 03	1.29±0.13	E 03
MN-54	L.T. 3.	E 00	L.T. 3.	E 00
CO-58	L.T. 2.	E 00	L.T. 3.	E 00
FE-59	L.T. 6.	E 00	L.T. 7.	E 00
CO-60	L.T. 3.	E 00	L.T. 3.	E 00
ZN-65	L.T. 6.	E 00	L.T. 7.	E 00
ZR-95	L.T. 3.	E 00	L.T. 3.	E 00
RU-103	L.T. 3.	E 00	L.T. 3.	E 00
RU-106	L.T. 2.	E 01	L.T. 3.	E 01
I-131	L.T. 3.	E 00	L.T. 5.	E 00
CS-134	L.T. 3.	E 00	L.T. 3.	E 00
CS-137	L.T. 3.	E 00	L.T. 4.	E 00
BA-140	L.T. 3.	E 00	L.T. 4.	E 00
CE-141	L.T. 4.	E 00	L.T. 6.	E 00
CE-144	L.T. 2.	E 01	L.T. 2.	E 01
RA-226	L.T. 5.	E 01	L.T. 7.	E 01
TH-228	L.T. 5.	E 00	L.T. 6.	E 00

VII-5
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK OTHER PRODUCER
 (PCI/LITER)
 STATION NUMBER 99

DATE COLLECTED: 07/06/99 10/12/99

RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 1. E 00	L.T. 1. E 00
SR-90	1.3 ± 0.2 E 00	1.3 ± 0.3 E 00
I-131	L.T. 2. E-01	L.T. 4. E-01
CA (gm/liter)	1.4 ± 0.1 E 00	2.0 ± 0.2 E 00

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 3. E 01	L.T. 3. E 01
K-40	1.32±0.13 E 03	1.19±0.12 E 03
MN-54	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 4. E 00	L.T. 4. E 00
FE-59	L.T. 7. E 00	L.T. 9. E 00
CO-60	L.T. 4. E 00	L.T. 4. E 00
ZN-65	L.T. 8. E 00	L.T. 9. E 00
ZR-95	L.T. 3. E 00	L.T. 4. E 00
RU-103	L.T. 4. E 00	L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 5. E 00	L.T. 8. 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
BA-140	L.T. 4. E 00	L.T. 6. E 00
CE-141	L.T. 6. E 00	L.T. 8. E 00
CE-144	L.T. 3. E 01	L.T. 3. E 01
RA-226	L.T. 8. E 01	L.T. 8. E 01
TH-228	L.T. 7. E 00	L.T. 7. E 00

VII-5
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 MILK OTHER PRODUCERS
 (PCI/LITER)
 STATION NUMBER 100

DATE COLLECTED:	01/20/99	04/13/99	07/06/99	10/12/99
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RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 2. E 00	L.T. 9. E-01		L.T. 8. E-01
SR-90	1.2 ± 0.2 E 00	8.5 ± 1.8 E-01	(a)	5.8 ± 1.8 E-01
I-131	L.T. 2. E-01	L.T. 3. E-01		L.T. 3. E-01
CA (gm/liter)	1.6 ± 0.2 E 00	1.6 ± 0.2 E 00		2.0 ± 0.2 E 00

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 2. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	1.30±0.13 E 03	1.54±0.15 E 03	1.35±0.13 E 03
MN-54	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 7. E 00	L.T. 7. E 00	L.T. 8. E 00
CO-60	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
ZN-65	L.T. 8. E 00	L.T. 7. E 00	L.T. 7. E 00
ZR-95	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
RU-103	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 4. E 00	L.T. 5. E 00	L.T. 7. E 00
CS-134	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CS-137	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
BA-140	L.T. 3. E 00	L.T. 4. E 00	L.T. 5. E 00
CE-141	L.T. 5. E 00	L.T. 6. E 00	L.T. 6. E 00
CE-144	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 6. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00

(a) Sample not available from producer.

VII-6
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - WATERBORNE
 WATER - GROUND
 (PCI/LITER)
 STATION NUMBER 11

DATE COLLECTED:	01/20/99	04/27/99	07/20/99	10/19/99
RADIOCHEMICAL ANALYSIS:				
GR-A	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	3.8 ± 2.8. E 00
GR-B	9.0 ± 1.7 E 00	8.5 ± 1.9 E 00	8.9 ± 1.7 E 00	7.8 ± 1.5 E 00
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 1. E-01	L.T. 2. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 5. E 01	L.T. 6. E 01	L.T. 5. E 01	L.T. 5. E 01
MN-54	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
FE-59	L.T. 7. E 00	L.T. 6. E 00	L.T. 7. E 00	L.T. 8. E 00
CO-60	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00
ZN-65	L.T. 8. E 00	L.T. 6. E 00	L.T. 8. E 00	L.T. 8. E 00
ZR-95	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
RU-103	L.T. 3. E 00	L.T. 4. 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. 3. E 01
I-131	L.T. 6. E 00	L.T. 6. E 00	L.T. 4. E 00	L.T. 1. E 01
CS-134	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. 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
BA-140	L.T. 5. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 8. E 00
CE-141	L.T. 6. E 00	L.T. 5. E 00	L.T. 6. E 00	L.T. 7. E 00
CE-144	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 7. E 01	L.T. 6. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00
TRITIUM ANALYSIS:				
H-3	L.T. 1. E 02	L.T. 1. E 02	L.T. 1. E 02	L.T. 1. E 02

VII-6
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - WATERBORNE
 WATER - GROUND
 (PCI/LITER)
 STATION NUMBER 47

DATE COLLECTED:	01/20/99	04/27/99	07/20/99	10/19/99
RADIOCHEMICAL ANALYSIS:				
GR-A	L.T. 4. E 00	L.T. 3. E 00	L.T. 2. E 00	4.1 ± 3.2 E 00
GR-B	8.7 ± 1.6 E 00	7.8 ± 1.8 E 00	5.4 ± 1.3 E 00	1.1 ± 0.2 E 01
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 4. E 01
K-40	L.T. 5. E 01	L.T. 4. E 01	L.T. 6. E 01	L.T. 6. E 01
MN-54	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
CO-58	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 8. E 00
CO-60	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
ZN-65	L.T. 6. E 00	L.T. 5. E 00	L.T. 7. E 00	L.T. 8. E 00
ZR-95	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
RU-103	L.T. 4. E 00	L.T. 3. 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. 3. E 01
I-131	L.T. 6. E 00	L.T. 5. E 00	L.T. 5. E 00	L.T. 1. E 01
CS-134	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. 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. 3. E 00
BA-140	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 9. E 00
CE-141	L.T. 7. E 00	L.T. 5. E 00	L.T. 6. E 00	L.T. 8. E 00
CE-144	L.T. 3. E 01	L.T. 2. E 01	L.T. 3. E 01	L.T. 3. E 01
RA-226	L.T. 7. E 01	L.T. 6. E 01	L.T. 8. E 01	L.T. 8. E 01
TH-228	L.T. 7. E 00	L.T. 5. E 00	L.T. 7. E 00	L.T. 7. E 00
TRITIUM ANALYSIS:				
H-3	L.T. 1. E 02	L.T. 1. E 02	L.T. 1. E 02	L.T. 1. E 02

VII-7
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - WATERBORNE
WATER - RIVER
(PCI/LITER)
STATION NUMBER 12

DATE COLLECTED:	01/20/99	02/03/99	03/02/99	04/07/99
RADIOCHEMICAL ANALYSIS:				
SR-89	L.T. 1. E 00	(a)	L.T. 6. E-01	L.T. 8. E-01
SR-90	L.T. 4. E-01		L.T. 3. E-01	L.T. 3. E-01
GR-A (Dissolved)	3.4 ± 2.8 E 00		L.T. 4. E 00	L.T. 3. E 00
GR-A (Suspended)	L.T. 7. E-01		1.1 ± 0.8 E 00	2.1 ± 1.6 E 00
GR-B (Dissolved)	1.0 ± 0.2 E 01		9.6 ± 1.6 E 00	8.6 ± 1.5 E 00
GR-B (Suspended)	2.1 ± 0.7 E 00		2.6 ± 0.7 E 00	1.2 ± 0.1 E 01
I-131	L.T. 2. E-01		L.T. 2. E-01	L.T. 3. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 3. E 01		L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 1. E 02		L.T. 6. E 01	L.T. 7. E 01
MN-54	L.T. 4. E 00		L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00		L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 8. E 00		L.T. 6. E 00	L.T. 7. E 00
CO-60	L.T. 4. E 00		L.T. 4. E 00	L.T. 3. E 00
ZN-65	L.T. 7. E 00		L.T. 7. E 00	L.T. 7. E 00
ZR-95	L.T. 4. E 00		L.T. 3. E 00	L.T. 3. E 00
RU-103	L.T. 4. E 00		L.T. 3. E 00	L.T. 3. E 00
RU-106	L.T. 3. E 01		L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 6. E 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. 3. E 00
CS-137	L.T. 4. E 00		L.T. 4. E 00	L.T. 4. E 00
BA-140	L.T. 5. E 00		L.T. 4. E 00	L.T. 5. E 00
CE-141	L.T. 6. E 00		L.T. 6. E 00	L.T. 5. E 00
CE-144	L.T. 2. E 01		L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 7. E 01		L.T. 7. E 01	L.T. 6. E 01
TH-228	L.T. 6. E 00		L.T. 7. E 00	L.T. 5. E 00
TRITIUM ANALYSIS:			01/20-03/02	
H-3			1.3 ± 0.7 E 02	

(a) Upstream sample collected from Station 35.

VII-7
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - WATERBORNE
WATER - RIVER
(PCI/LITER)
STATION NUMBER 12

DATE COLLECTED:	05/04/99	06/01/99	07/06/99	08/03/99
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RADIOCHEMICAL ANALYSIS:

SR-89	L.T. 2. E 00	L.T. 8. E-01	(a)	L.T. 9. E-01
SR-90	L.T. 1. E 00	L.T. 3. E-01		L.T. 6. E-01
GR-A (Dissolved)	L.T. 4. E 00	L.T. 3. E 00		L.T. 4. E 00
GR-A (Suspended)	3.4 ± 1.5 E 00	L.T. 2. E 00		L.T. 9. E-01
GR-B (Dissolved)	1.1 ± 0.2 E 01	8.9 ± 1.5 E 00		1.2 ± 0.2 E 01
GR-B (Suspended)	6.8 ± 1.1 E 00	8.3 ± 1.2 E 00		3.5 ± 0.7 E 00
I-131	L.T. 3. E-01	L.T. 2. E-01		L.T. 2. E-01

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 3. E 01	L.T. 2. E 01		L.T. 3. E 01
K-40	L.T. 6. E 01	L.T. 5. E 01		L.T. 5. E 01
MN-54	L.T. 3. E 00	L.T. 3. E 00		L.T. 2. E 00
CO-58	L.T. 3. E 00	L.T. 2. E 00		L.T. 3. E 00
FE-59	L.T. 7. E 00	L.T. 5. E 00		L.T. 6. E 00
CO-60	L.T. 3. E 00	L.T. 3. E 00		L.T. 3. E 00
ZN-65	L.T. 6. E 00	L.T. 5. E 00		L.T. 5. E 00
ZR-95	L.T. 3. E 00	L.T. 3. E 00		L.T. 3. E 00
RU-103	L.T. 4. E 00	L.T. 3. E 00		L.T. 3. E 00
RU-106	L.T. 3. E 01	L.T. 2. E 01		L.T. 2. E 01
I-131	L.T. 6. E 00	L.T. 7. E 00		L.T. 6. E 00
CS-134	L.T. 4. E 00	L.T. 2. E 00		L.T. 3. E 00
CS-137	L.T. 4. E 00	L.T. 3. E 00		L.T. 3. E 00
BA-140	L.T. 5. E 00	L.T. 5. E 00		L.T. 4. E 00
CE-141	L.T. 5. E 00	L.T. 6. E 00		L.T. 6. E 00
CE-144	L.T. 2. E 01	L.T. 2. E 01		L.T. 2. E 01
RA-226	L.T. 6. E 01	L.T. 7. E 01		L.T. 7. E 01
TH-228	L.T. 6. E 00	L.T. 6. E 00		L.T. 6. E 00

TRITIUM ANALYSIS:
H-3

04/07-06/01
L.T. 1. E 02

(a) Instream sample collected from Station 35.

VII-7
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - WATERBORNE
 WATER - RIVER
 (PCI/LITER)
 STATION NUMBER 12

DATE COLLECTED:	09/07/99	10/05/99	11/02/99	12/08/99
RADIOCHEMICAL ANALYSIS:				
SR-89	L.T. 1. E 00	L.T. 7. E-01	(a)	L.T. 1. E 00
SR-90	L.T. 6. E-01	L.T. 3. E-01		L.T. 5. E-01
GR-A (Dissolved)	3.7 ± 2.3 E 00	L.T. 3. E 00		L.T. 3. E 00
GR-A (Suspended)	1.0 ± 0.6 E 00	8.9 ± 6.0 E-01		5.9 ± 5.0 E-01
GR-B (Dissolved)	1.8 ± 0.2 E 01	1.2 ± 0.2 E 01		7.5 ± 1.4 E 00
GR-B (Suspended)	3.5 ± 0.8 E 00	2.0 ± 0.7 E 00		2.5 ± 0.7 E 00
I-131	L.T. 2. E-01	L.T. 2. E-01		L.T. 3. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 3. E 01	L.T. 4. E 01		L.T. 4. E 01
K-40	L.T. 5. E 01	L.T. 1. E 02		L.T. 6. E 01
MN-54	L.T. 3. E 00	L.T. 4. E 00		L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 4. E 00		L.T. 3. E 00
FE-59	L.T. 6. E 00	L.T. 8. E 00		L.T. 7. E 00
CO-60	L.T. 3. 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
ZR-95	L.T. 3. E 00	L.T. 4. E 00		L.T. 4. E 00
RU-103	L.T. 3. E 00	L.T. 5. E 00		L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 3. E 01		L.T. 3. E 01
I-131	L.T. 7. E 00	L.T. 1. E 01		L.T. 1. E 01
CS-134	L.T. 3. 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
BA-140	L.T. 5. E 00	L.T. 8. E 00		L.T. 8. E 00
CE-141	L.T. 4. E 00	L.T. 7. E 00		L.T. 9. E 00
CE-144	L.T. 2. E 01	L.T. 2. E 01		L.T. 3. E 01
RA-226	L.T. 5. E 01	L.T. 7. E 01		L.T. 9. E 01
TH-228	L.T. 4. E 00	L.T. 6. E 00		L.T. 7. E 00
TRITIUM ANALYSIS:				
H-3	07/06-09/07 L.T. 2. E 02			10/05-12/08 L.T. 2 E 02

(a) Upstream sample collected from Station 35.

VII-7
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - WATERBORNE
WATER - RIVER
(PCI/LITER)
STATION NUMBER 28

DATE COLLECTED:	01/20/99	02/03/99	03/02/99	04/07/99
RADIOCHEMICAL ANALYSIS:				
SR-89	L.T. 4. E-01	L.T. 7. E-01	L.T. 9. E-01	L.T. 8. E-01
SR-90	L.T. 7. E-01	L.T. 8. E-01	L.T. 9. E-01	L.T. 3. E-01
GR-A (Dissolved)	L.T. 3. E 00	2.2 ± 1.5 E 00	L.T. 4. E 00	L.T. 3. E 00
GR-A (Suspended)	L.T. 5. E-01	5.1 ± 4.1 E-01	L.T. 1. E 00	3.5 ± 2.0 E 00
GR-B (Dissolved)	7.6 ± 1.4 E 00	7.0 ± 1.3 E 00	8.8 ± 1.6 E 00	7.3 ± 1.3 E 00
GR-B (Suspended)	2.1 ± 0.6 E 00	2.9 ± 0.7 E 00	4.0 ± 0.9 E 00	1.1 ± 0.1 E 01
I-131	L.T. 2. E-01	L.T. 3. E-01	L.T. 2. E-01	L.T. 3. E-01

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 1. E 02	L.T. 1. E 02	L.T. 9. E 01	L.T. 5. E 01
MN-54	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
CO-58	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 2. E 00
FE-59	L.T. 1. E 01	L.T. 7. E 00	L.T. 7. E 00	L.T. 5. E 00
CO-60	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00	L.T. 2. E 00
ZN-65	L.T. 9. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 6. E 00
ZR-95	L.T. 4. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
RU-103	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
RU-106	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 2. E 01
I-131	L.T. 7. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00
CS-134	L.T. 5. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
CS-137	L.T. 5. 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. 4. E 00	L.T. 4. E 00	L.T. 4. E 00
CE-141	L.T. 8. E 00	L.T. 6. E 00	L.T. 5. E 00	L.T. 5. E 00
CE-144	L.T. 3. E 01	L.T. 3. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 8. E 01	L.T. 7. E 01	L.T. 7. E 01	L.T. 6. E 01
TH-228	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 5. E 00

TRITIUM ANALYSIS:

H-3

01/20-03/02
L.T. 1. E 02

VII-7
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - WATERBORNE
WATER - RIVER
(PCI/LITER)
STATION NUMBER 28

DATE COLLECTED:	05/04/99	06/01/99	07/06/99	08/03/99
RADIOCHEMICAL ANALYSIS:				
SR-89	L.T. 6. E-01	L.T. 7. E-01	L.T. 2. E 00	L.T. 9. E-01
SR-90	L.T. 5. E-01	L.T. 3. E-01	L.T. 8. E-01	L.T. 5. E-01
GR-A (Dissolved)	L.T. 4. E 00	L.T. 4. E 00	3.0 ± 2.3 E 00	L.T. 4. E 00
GR-A (Suspended)	L.T. 1. E 00	2.9 ± 1.7 E 00	5.9 ± 3.3 E 00	L.T. 1. E 00
GR-B (Dissolved)	1.2 ± 0.2 E 01	9.4 ± 1.5 E 00	8.1 ± 1.5 E 00	1.0 ± 0.2 E 01
GR-B (Suspended)	5.5 ± 1.0 E 00	9.5 ± 1.3 E 00	2.3 ± 0.2 E 01	3.4 ± 0.7 E 00
I-131	L.T. 2. E-01	L.T. 2. E-01	L.T. 6. E-01	L.T. 2. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 1. E 02	L.T. 9. E 01	L.T. 5. E 01	L.T. 9. E 01
MN-54	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
CO-58	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 1. E 01	L.T. 8. E 00	L.T. 8. E 00	L.T. 8. E 00
CO-60	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00	L.T. 4. E 00
ZN-65	L.T. 8. E 00	L.T. 7. E 00	L.T. 6. E 00	L.T. 7. E 00
ZR-95	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
RU-103	L.T. 5. 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
I-131	L.T. 9. E 00	L.T. 9. E 00	L.T. 8. E 00	L.T. 7. E 00
CS-134	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
CS-137	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 4. E 00
BA-140	L.T. 7. E 00	L.T. 5. E 00	L.T. 6. E 00	L.T. 5. E 00
CE-141	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00
CE-144	L.T. 3. E 01	L.T. 2. E 01	L.T. 2. E 01	L.T. 2. E 01
RA-226	L.T. 8. E 01	L.T. 6. E 01	L.T. 7. E 01	L.T. 7. E 01
TH-228	L.T. 7. E 00	L.T. 6. E 00	L.T. 6. E 00	L.T. 6. E 00
TRITIUM ANALYSIS:				
H-3		04/07-06/01 L.T. 1. E 02		

VII-7
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - WATERBORNE
 WATER - RIVER
 (PCI/LITER)
 STATION NUMBER 28

DATE COLLECTED:	09/07/99	10/05/99	11/02/99	12/08/99
RADIOCHEMICAL ANALYSIS:				
SR-89	L.T. 2. E 00	L.T. 9. E-01	L.T. 6. E-01	L.T. 1. E 00
SR-90	L.T. 1. E 00	L.T. 4. E-01	L.T. 8. E-01	L.T. 4. E-01
GR-A (Dissolved)	2.5 ± 1.9 E 00	4.0 ± 2.7 E 00	L.T. 4. E 00	L.T. 3. E 00
GR-A (Suspended)	1.3 ± 0.7 E 00	1.1 ± 0.6 E 00	L.T. 7. E-01	6.9 ± 5.4 E-01
GR-B (Dissolved)	9.7 ± 1.5 E 00	1.2 ± 0.2 E 01	1.2 ± 0.2 E 01	1.1 ± 0.2 E 01
GR-B (Suspended)	3.3 ± 0.7 E 00	1.1 ± 0.6 E 00	1.4 ± 0.6 E 00	1.8 ± 0.6 E 00
I-131	L.T. 3. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 3. E-01
GAMMA SPECTRUM ANALYSIS:				
BE-7	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 6. E 01	L.T. 1. E 02	L.T. 6. E 01	L.T. 5. E 01
MN-54	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00	L.T. 3. E 00
CO-58	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
FE-59	L.T. 7. E 00	L.T. 1. E 01	L.T. 8. E 00	L.T. 6. E 00
CO-60	L.T. 3. E 00	L.T. 4. E 00	L.T. 4. E 00	L.T. 3. E 00
ZN-65	L.T. 6. E 00	L.T. 1. E 01	L.T. 7. E 00	L.T. 6. E 00
ZR-95	L.T. 4. E 00	L.T. 5. E 00	L.T. 4. E 00	L.T. 3. E 00
RU-103	L.T. 4. E 00	L.T. 5. E 00	L.T. 5. E 00	L.T. 4. E 00
RU-106	L.T. 3. E 01	L.T. 4. E 01	L.T. 3. E 01	L.T. 3. E 01
I-131	L.T. 7. E 00	L.T. 1. E 01	L.T. 1. E 01	L.T. 1. E 01
CS-134	L.T. 4. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
CS-137	L.T. 3. E 00	L.T. 5. E 00	L.T. 3. E 00	L.T. 3. E 00
BA-140	L.T. 5. E 00	L.T. 8. E 00	L.T. 8. E 00	L.T. 6. E 00
CE-141	L.T. 8. E 00	L.T. 9. E 00	L.T. 9. E 00	L.T. 7. E 00
CE-144	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01	L.T. 2. E 01
RA-226	L.T. 8. E 01	L.T. 9. E 01	L.T. 9. E 01	L.T. 7. E 01
TH-228	L.T. 7. E 00	L.T. 7. E 00	L.T. 7. E 00	L.T. 6. E 00
TRITIUM ANALYSIS:				
H-3	07/06-09/07 L.T. 2. E 02			10/05-12/08 L.T. 2. E 02

VII-7
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - WATERBORNE
 WATER - RIVER
 (PCI/LITER)
 STATION NUMBER 35

DATE COLLECTED:
 RADIOCHEMICAL ANALYSIS:

02/03/99

07/06/99

11/02/99

SR-89	L.T. 6. E-01	L.T. 1. E 00	L.T. 1. E 00
SR-90	L.T. 3. E-01	L.T. 5. E-01	L.T. 5. E-01
GR-A (Dissolved)	4.3 ± 2.5 E 00	7.4 ± 3.8 E 00	L.T. 4. E 00
GR-A (Suspended)	8.0 ± 4.7 E-01	1.0 ± 0.4 E 01	L.T. 7. E-01
GR-B (Dissolved)	1.1 ± 0.2 E 01	1.2 ± 0.2 E 01	1.6 ± 0.2 E 01
GR-B (Suspended)	2.0 ± 0.6 E 00	2.8 ± 0.3 E 01	1.0 ± 0.6 E 00
I-131	L.T. 3. E-01	L.T. 6. E-01	L.T. 3. E-01

GAMMA SPECTRUM ANALYSIS:

BE-7	L.T. 3. E 01	L.T. 3. E 01	L.T. 3. E 01
K-40	L.T. 8. E 01	L.T. 6. E 01	L.T. 5. E 01
MN-54	L.T. 3. E 00	L.T. 3. E 00	L.T. 2. E 00
CO-58	L.T. 3. E 00	L.T. 3. E 00	L.T. 3. E 00
FE-59	L.T. 6. E 00	L.T. 7. E 00	L.T. 7. E 00
CO-60	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
ZN-65	L.T. 6. E 00	L.T. 7. E 00	L.T. 5. E 00
ZR-95	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
RU-103	L.T. 3. 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
I-131	L.T. 4. E 00	L.T. 9. E 00	L.T. 1. E 00
CS-134	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
CS-137	L.T. 3. E 00	L.T. 4. E 00	L.T. 3. E 00
BA-140	L.T. 4. E 00	L.T. 7. E 00	L.T. 8. E 00
CE-141	L.T. 5. E 00	L.T. 7. E 00	L.T. 7. E 00
CE-144	L.T. 2. E 01	L.T. 3. E 01	L.T. 2. E 01
RA-226	L.T. 6. E 01	L.T. 8. E 01	L.T. 7. E 01
TH-228	L.T. 5. E 00	L.T. 7. E 00	L.T. 8. E 00

NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/26-04/27	SECOND QUARTER 04/27-07/07	THIRD QUARTER 07/07-10/06	FOURTH QUARTER 10/06-01/05
TLD (Gamma)	01	16.4 ± 1.3	12.3 ± 0.6	16.7 ± 0.9	18.5 ± 1.3
	02	18.0 ± 0.6	14.0 ± 0.5	19.2 ± 0.2	20.8 ± 0.6
	03	16.9 ± 0.5	(b)	18.4 ± 0.7	18.6 ± 1.0
	04	15.6 ± 0.8	13.1 ± 0.8	16.6 ± 1.1	18.0 ± 1.2
	05	16.6 ± 1.1	12.7 ± 0.6	17.1 ± 1.3	17.9 ± 1.0
	06	16.1 ± 0.6	12.7 ± 0.5	17.1 ± 0.8	18.2 ± 0.9
	07	16.0 ± 0.5	13.1 ± 0.5	17.0 ± 0.2	17.9 ± 0.8
	08	15.6 ± 1.1	13.3 ± 0.7	18.5 ± 1.1	19.2 ± 0.9
	09	15.1 ± 0.4	12.0 ± 0.3	17.0 ± 0.9	17.5 ± 0.6
	10	15.8 ± 0.4	12.9 ± 0.5	16.9 ± 1.4	17.3 ± 0.6
	20	16.4 ± 0.6	12.1 ± 2.1	18.3 ± 0.5	18.4 ± 0.5
	44	18.0 ± 1.3	14.8 ± 0.3	20.8 ± 1.0	20.6 ± 1.6
	56	16.4 ± 0.7	13.3 ± 0.9	18.2 ± 0.8	19.7 ± 1.3
	58	16.7 ± 1.7	12.5 ± 1.2	18.2 ± 0.6	19.2 ± 0.8
	59	(a)	13.9 ± 1.1	18.4 ± 1.0	19.1 ± 1.4
	66	17.8 ± 0.4	15.1 ± 0.5	19.9 ± 1.3	20.8 ± 0.8
	67	17.6 ± 1.4	13.4 ± 0.6	20.5 ± 1.6	19.6 ± 0.5
	71	16.7 ± 0.9	14.1 ± 0.8	17.7 ± 1.9	21.2 ± 0.4
	79	16.7 ± 1.2	14.0 ± 0.7	17.7 ± 1.2	19.5 ± 0.9

(a) Post destroyed.

(b) Sample not available due to Missouri River flood.

VII-8
1999 QUARTERLY REPORT
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - AMBIENT GAMMA RADIATION: TLD
milliRoentgen/Quarter

SAMPLE NUCLIDE	STATION NUMBER	FIRST QUARTER 01/26-04/27	SECOND QUARTER 04/27-07/07	THIRD QUARTER 07/07-10/06	FOURTH QUARTER 10/06-01/05
	80	16.9 ± 0.9	12.7 ± 0.7	17.4 ± 2.1	19.4 ± 1.3
	81	16.0 ± 0.9	(a)	19.2 ± 0.4	21.1 ± 1.6
	82	15.7 ± 0.7	14.2 ± 1.0	18.4 ± 0.7	19.8 ± 0.9
	83	18.1 ± 1.2	14.0 ± 1.3	19.0 ± 1.5	19.2 ± 1.5
	84	17.4 ± 0.3	14.5 ± 0.4	19.3 ± 2.0	20.4 ± 1.0
	85	16.7 ± 0.3	13.9 ± 0.9	16.6 ± 1.7	18.4 ± 0.8
	86	17.5 ± 0.6	13.0 ± 0.5	18.5 ± 1.7	20.0 ± 1.3
	87	15.6 ± 0.5	13.3 ± 0.6	17.7 ± 0.7	19.3 ± 1.1
	88	16.6 ± 0.6	(a)	16.3 ± 0.9	18.8 ± 0.8
	89	17.5 ± 0.9	(a)	18.2 ± 0.7	19.5 ± 1.4
	90	15.9 ± 0.5	12.7 ± 0.4	18.9 ± 1.0	19.5 ± 1.3
	91	15.9 ± 0.6	12.0 ± 1.3	15.7 ± 0.6	16.8 ± 0.7
	94	17.4 ± 0.9	13.3 ± 0.4	18.5 ± 1.6	20.2 ± 1.1
Average/Quarter		16.6 ± 0.83 mR/92 days	13.3 ± 0.83 mR/72 days	18.1 ± 1.2 mR/92 days	19.2 ± 1.1 mR/91 days
Average/Day		0.18 ± 0.009 mR/day	0.18 ± 0.009 mR/day	0.20 ± 0.01 mR/day	0.21 ± 0.01 mR/day
Range		(15.1-18.1) mR/92 days	(12-15.1) mR/72 days	(15.7-20.8) mR/92 days	(17-21) mR/92 days
Detection/Total		31/31	28/28	32/32	32/32

(c) Sample missing.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 VEGETATION - TERRESTRIAL, BROADLEAF
 (PCI/GM WET)
 STATION NUMBER 28

DATE COLLECTED:	05/25/99 (a) VT1-28		05/25/99 VT2-28		05/25/99 VT-QA28		06/15/99 (a) Milkweed	
RADIOCHEMICAL ANALYSIS:								
I-131	L.T. 2.	E-02	L.T. 2.	E-02	L.T. 2.	E-02	L.T. 1.	E-02
GAMMA SPECTRUM ANALYSIS:								
BE-7	1.41±0.14	E 00	1.61±0.31	E-01	9.38±0.94	E-01	1.99±0.20	E 00
K-40	5.96±0.60	E 00	5.19±0.52	E 00	4.42±0.44	E 00	5.46±0.55	E 00
MN-54	L.T. 8.	E-03	L.T. 4.	E-03	L.T. 5.	E-03	L.T. 9.	E-03
CO-58	L.T. 8.	E-03	L.T. 4.	E-03	L.T. 5.	E-03	L.T. 1.	E-02
FE-59	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 1.	E-02	L.T. 2.	E-02
CO-60	L.T. 8.	E-03	L.T. 5.	E-03	L.T. 6.	E-03	L.T. 1.	E-02
ZN-65	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 1.	E-02	L.T. 2.	E-02
ZR-95	L.T. 8.	E-03	L.T. 5.	E-03	L.T. 5.	E-03	L.T. 1.	E-02
RU-103	L.T. 9.	E-03	L.T. 4.	E-03	L.T. 6.	E-03	L.T. 1.	E-02
RU-106	L.T. 7.	E-02	L.T. 4.	E-02	L.T. 5.	E-02	L.T. 9.	E-02
I-131	L.T. 1.	E-02	L.T. 6.	E-03	L.T. 8.	E-03	L.T. 2.	E-02
CS-134	L.T. 9.	E-03	L.T. 5.	E-03	L.T. 6.	E-03	L.T. 1.	E-02
CS-137	L.T. 9.	E-03	L.T. 5.	E-03	L.T. 6.	E-03	L.T. 1.	E-02
BA-140	L.T. 9.	E-03	L.T. 5.	E-03	L.T. 7.	E-03	L.T. 1.	E-02
CE-141	L.T. 1.	E-02	L.T. 6.	E-03	L.T. 1.	E-02	L.T. 1.	E-02
CE-144	L.T. 5.	E-02	L.T. 3.	E-02	L.T. 4.	E-02	L.T. 6.	E-02
RA-226	L.T. 2.	E-01	L.T. 8.	E-02	L.T. 1.	E-01	L.T. 2.	E-01
TH-228	L.T. 2.	E-02	L.T. 8.	E-03	L.T. 1.	E-02	L.T. 2.	E-02

(a) Insufficient vegetation: partial or no sample at some sites

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 28

DATE COLLECTED:	06/15/99 (a) Swampweed	08/18/99 VT1-28	08/18/99 VT2-28
RADIOCHEMICAL ANALYSIS:			
I-131	L.T. 1. E-02	L.T. 5. E-03	L.T. 6. E-03
GAMMA SPECTRUM ANALYSIS:			
BE-7	1.50±0.15 E 00	3.68±0.37 E 00	9.31±0.93 E 01
K-40	4.12±0.41 E 00	6.25±0.62 E 00	5.97±0.60 E 00
MN-54	L.T. 8. E-03	L.T. 1. E-02	L.T. 7. E-03
CO-58	L.T. 8. E-03	L.T. 1. E-02	L.T. 8. E-03
FE-59	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
CO-60	L.T. 8. E-03	L.T. 1. E-02	L.T. 8. E-03
ZN-65	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02
ZR-95	L.T. 8. E-03	L.T. 1. E-02	L.T. 7. E-03
RU-103	L.T. 9. E-03	L.T. 1. E-02	L.T. 8. E-03
RU-106	L.T. 8. E-02	L.T. 9. E-02	L.T. 7. E-02
I-131	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02
CS-134	L.T. 9. E-03	L.T. 1. E-02	L.T. 8. E-03
CS-137	L.T. 1. E-02	L.T. 1. E-02	L.T. 8. E-03
BA-140	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02
CE-141	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CE-144	L.T. 6. E-02	L.T. 6. E-02	L.T. 4. E-02
RA-226	L.T. 2. E-01	L.T. 2. E-01	L.T. 1. E-01
TH-228	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02

(a) Insufficient vegetation available; partial sample.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 VEGETATION - TERRESTRIAL, BROADLEAF
 (PCI/GM WET)
 STATION NUMBER 35

DATE COLLECTED:	05/25/99 (a) VT1-35		06/15/99 (b) Bullweed		06/15/99 (b) Mild		07/13/99 VT1-35	
RADIOCHEMICAL ANALYSIS:								
I-131	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 1.	E-02	L.T. 1.	E-02
GAMMA SPECTRUM ANALYSIS:								
BE-7	6.18±0.62	E-01	1.64±0.16	E 00	9.47±0.95	E-01	1.33±0.13	E 00
K-40	6.28±0.63	E 00	4.35±0.43	E 00	5.68±0.57	E 00	5.44±0.54	E 00
MN-54	L.T. 6.	E-03	L.T. 7.	E-03	L.T. 8.	E-03	L.T. 5.	E-03
CO-58	L.T. 6.	E-03	L.T. 7.	E-03	L.T. 8.	E-03	L.T. 5.	E-03
FE-59	L.T. 1.	E-02	L.T. 2.	E-02	L.T. 2.	E-02	L.T. 1.	E-02
CO-60	L.T. 7.	E-03	L.T. 7.	E-03	L.T. 9.	E-03	L.T. 5.	E-03
ZN-65	L.T. 1.	E-02	L.T. 2.	E-02	L.T. 2.	E-02	L.T. 1.	E-02
ZR-95	L.T. 6.	E-03	L.T. 7	E-03	L.T. 8.	E-03	L.T. 5.	E-03
RU-103	L.T. 6.	E-03	L.T. 7.	E-03	L.T. 8.	E-03	L.T. 5.	E-03
RU-106	L.T. 6.	E-02	L.T. 6	E-02	L.T. 8.	E-02	L.T. 4.	E-02
I-131	L.T. 8.	E-03	L.T. 9	E-03	L.T. 1.	E-02	L.T. 1.	E-02
CS-134	L.T. 7.	E-03	L.T. 8	E-03	L.T. 9.	E-03	L.T. 5.	E-03
CS-137	L.T. 7.	E-03	L.T. 8	E-03	L.T. 9.	E-03	L.T. 5.	E-03
BA-140	L.T. 7.	E-03	L.T. 7	E-03	L.T. 1.	E-02	L.T. 6.	E-03
CE-141	L.T. 8.	E-03	L.T. 1	E-02	L.T. 1.	E-02	L.T. 7.	E-03
CE-144	L.T. 3.	E-02	L.T. 4	E-02	L.T. 5.	E-02	L.T. 3.	E-02
RA-226	L.T. 1.	E-01	L.T. 1	E-01	L.T. 2.	E-01	L.T. 8.	E-02
TH-228	L.T. 1.	E-02	L.T. 1	E-02	L.T. 1.	E-02	L.T. 7.	E-03

(a) Insufficient vegetation; partial or no sample at some sites.
 (b) Insufficient vegetation available; partial sample.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 35

DATE COLLECTED:	07/13/99 VT2-35	07/13/99 VT3-35	08/18/99	09/15/99 (b) VT1-35
RADIOCHEMICAL ANALYSIS:				
I-131	L.T. 1. E-02	L.T. 1 E-02	(a)	L.T. 6. E-03
GAMMA SPECTRUM ANALYSIS:				
BE-7	2.86±0.29 E 00	1.41±0.14 E 00		6.21±1.16 E-01
K-40	3.02±0.30 E 00	7.41±0.74 E 00		8.03±0.80 E 00
MN-54	L.T. 1. E-02	L.T. 8. E-03		L.T. 1. E-02
CO-58	L.T. 1. E-02	L.T. 8. E-03		L.T. 1. E-02
FE-59	L.T. 3. E-02	L.T. 2. E-02		L.T. 3. E-02
CO-60	L.T. 1. E-02	L.T. 9. E-03		L.T. 2. E-02
ZN-65	L.T. 3. E-02	L.T. 2. E-02		L.T. 4. E-02
ZR-95	L.T. 1. E-02	L.T. 8. E-03		L.T. 1. E-02
RU-103	L.T. 1. E-02	L.T. 9. E-03		L.T. 2. E-02
RU-106	L.T. 1. E-01	L.T. 8. E-02		L.T. 1. E-01
I-131	L.T. 3. E-02	L.T. 2. E-02		L.T. 2. E-02
CS-134	L.T. 1. E-02	L.T. 9. E-03		L.T. 2. E-02
CS-137	L.T. 1. E-02	L.T. 9. E-03		L.T. 2. E-02
BA-140	L.T. 2. E-02	L.T. 1. E-02		L.T. 2. E-02
CE-141	L.T. 2. E-02	L.T. 1. E-02		L.T. 2. E-02
CE-144	L.T. 8. E-02	L.T. 5. E-02		L.T. 8. E-02
RA-226	L.T. 2. E-01	L.T. 2. E-01		L.T. 2. E-01
TH-228	L.T. 2. E-02	L.T. 1. E-02		L.T. 2. E-02

(a) Insufficient vegetation; partial sample.

(b) Insufficient vegetation; partial or no sample at some sites.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 96

DATE COLLECTED:	05/25/99 (a) VT1-96		05/25/99 VT2-96		07/13/99 VT1-96		07/13/99 VT2-96	
RADIOCHEMICAL ANALYSIS:								
I-131	L.T. 2.	E-02	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 1.	E-02
GAMMA SPECTRUM ANALYSIS:								
BE-7	8.25±0.82	E-01	1.12±0.11	E 00	1.41±0.14	E 00	1.53±0.15	E 00
K-40	5.06±0.51	E 00	3.29±0.33	E 00	5.36±0.54	E 00	7.00±0.70	E 00
MN-54	L.T. 5.	E-03	L.T. 9.	E-03	L.T. 5.	E-03	L.T. 8.	E-03
CO-58	L.T. 5.	E-03	L.T. 1.	E-02	L.T. 5.	E-03	L.T. 8.	E-03
FE-59	L.T. 1.	E-02	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 2.	E-02
CO-60	L.T. 5.	E-03	L.T. 1.	E-02	L.T. 6.	E-03	L.T. 8.	E-03
ZN-65	L.T. 1.	E-02	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 2.	E-02
ZR-95	L.T. 5.	E-03	L.T. 1.	E-02	L.T. 5.	E-03	L.T. 8.	E-03
RU-103	L.T. 5.	E-03	L.T. 1.	E-02	L.T. 5.	E-03	L.T. 9.	E-03
RU-106	L.T. 5.	E-02	L.T. 9.	E-02	L.T. 4.	E-02	L.T. 7.	E-02
I-131	L.T. 9.	E-03	L.T. 2.	E-02	L.T. 1.	E-02	L.T. 2.	E-02
CS-134	L.T. 6.	E-03	L.T. 1.	E-02	L.T. 5.	E-03	L.T. 9.	E-03
CS-137	L.T. 5.	E-03	L.T. 1.	E-02	L.T. 5.	E-03	L.T. 9.	E-03
BA-140	L.T. 6.	E-03	L.T. 1.	E-02	L.T. 6.	E-03	L.T. 1.	E-02
CE-141	L.T. 8.	E-03	L.T. 2.	E-02	L.T. 8.	E-03	L.T. 1.	E-02
CE-144	L.T. 3.	E-02	L.T. 7.	E-02	L.T. 3.	E-02	L.T. 5.	E-02
RA-226	L.T. 9.	E-02	L.T. 2.	E-01	L.T. 8.	E-02	L.T. 2.	E-01
TH-228	L.T. 8.	E-03	L.T. 2.	E-02	L.T. 8.	E-03	L.T. 1.	E-02

(a) Insufficient vegetation; partial or no sample at some sites.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 96

DATE COLLECTED:	07/13/99 VT3-96	08/18/99 (a) VT1-96	08/18/99 VT2-96	09/15/99 (b) VT1-96
RADIOCHEMICAL ANALYSIS:				
I-131	L.T. 1. E-02	L.T. 5 E-03	L.T. 5. E-03	L.T. 7. E-03
GAMMA SPECTRUM ANALYSIS:				
BE-7	2.93±0.29 E 00	1.62±0.16 E 00	4.06±0.41 E 00	1.48±0.15 E 00
K-40	3.81±0.38 E 00	4.89±0.49 E 00	2.83±0.28 E 00	3.91±0.39 E 00
MN-54	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CO-58	L.T. 8. E-03	L.T. 1. E-02	L.T. 9. E-03	L.T. 1. E-02
FE-59	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02	L.T. 3. E-02
CO-60	L.T. 8. E-03	L.T. 1. E-02	L.T. 9. E-03	L.T. 1. E-02
ZN-65	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 3. E-02
ZR-95	L.T. 8. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
RU-103	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
RU-106	L.T. 7. E-02	L.T. 1. E-01	L.T. 9. E-02	L.T. 1. E-01
I-131	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
CS-134	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CS-137	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
BA-140	L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02	L.T. 2. E-02
CE-141	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
CE-144	L.T. 6. E-02	L.T. 7. E-02	L.T. 6. E-02	L.T. 8. E-02
RA-226	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01	L.T. 2. E-01
TH-228	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02

(a) Insufficient vegetation; partial sample.
(b) Insufficient vegetation; partial or no sample at some sites.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 96

DATE COLLECTED: 09/15/99 (a)
 VT2-96

RADIOCHEMICAL ANALYSIS:

I-131 L.T. 9. E-03

GAMMA SPECTRUM ANALYSIS:

BE-7	1.22±0.12 E 00
K-40	7.31±0.73 E 00
MN-54	L.T. 1. E-02
CO-58	L.T. 1. E-02
FE-59	L.T. 3. E-02
CO-60	L.T. 1. E-02
ZN-65	L.T. 3. E-02
ZR-95	L.T. 1. E-02
RU-103	L.T. 1. E-02
RU-106	L.T. 1. E-01
I-131	L.T. 2. E-02
CS-134	L.T. 1. E-02
CS-137	L.T. 1. E-02
BA-140	L.T. 2. E-02
CE-141	L.T. 2. E-02
CE-144	L.T. 7. E-02
RA-226	L.T. 2. E-01
TH-228	L.T. 2. E-02

(a) Insufficient vegetation; partial or no sample at some sites.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 101

DATE COLLECTED:	05/25/99	06/15/99 Mild	06/15/99 Milkweed	06/15/99 Swampweed
RADIOCHEMICAL ANALYSIS:				
I-131	(a)	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
GAMMA SPECTRUM ANALYSIS:				
BE-7		9.90±0.99 E-01	1.44±0.14 E 00	2.08±0.21 E 00
K-40		4.68±0.47 E 00	5.24±0.52 E 00	3.74±0.37 E 00
MN-54		L.T. 8. E-03	L.T. 8. E-03	L.T. 7. E-03
CO-58		L.T. 8. E-03	L.T. 9. E-03	L.T. 7. E-03
FE-59		L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
CO-60		L.T. 8. E-03	L.T. 9. E-03	L.T. 7. E-03
ZN-65		L.T. 2. E-02	L.T. 2. E-02	L.T. 1. E-02
ZR-95		L.T. 8. E-03	L.T. 9. E-03	L.T. 7. E-03
RU-103		L.T. 8. E-03	L.T. 1. E-02	L.T. 8. E-03
RU-106		L.T. 7. E-02	L.T. 8. E-02	L.T. 6. E-02
I-131		L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02
CS-134		L.T. 8. E-03	L.T. 1. E-02	L.T. 7. E-03
CS-137		L.T. 9. E-03	L.T. 1. E-02	L.T. 7. E-03
BA-140		L.T. 1. E-02	L.T. 1. E-02	L.T. 9. E-03
CE-141		L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CE-144		L.T. 5. E-02	L.T. 5. E-02	L.T. 5. E-02
RA-226		L.T. 1. E-01	L.T. 2. E-01	L.T. 2. E-01
TH-228		L.T. 1. E-02	L.T. 2. E-02	L.T. 1. E-02

(a) Insufficient vegetation; partial or no sample at some sites.

VII-9
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - INGESTION
 VEGETATION - TERRESTRIAL, BROADLEAF
 (PCI/GM WET)
 STATION NUMBER 101

DATE COLLECTED:	07/13/99 VT1-101	07/13/99 VT2-101	07/13/99 VT3-101	07/13/99 VT-QA101
RADIOCHEMICAL ANALYSIS:				
I-131	L.T. 2. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
GAMMA SPECTRUM ANALYSIS:				
BE-7	1.37±0.14 E 00	4.05±0.41 E-01	1.03±0.10 E 00	1.32±0.13 E 00
K-40	7.53±0.75 E 00	5.31±0.53 E 00	5.11±0.51 E 00	5.96±0.60 E 00
MN-54	L.T. 5. E-03	L.T. 4. E-03	L.T. 5. E-03	L.T. 4. E-03
CO-58	L.T. 5. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
FE-59	L.T. 1. E-02	L.T. 9. E-03	L.T. 1. E-02	L.T. 1. E-02
CO-60	L.T. 6. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
ZN-65	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
ZR-95	L.T. 5. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
RU-103	L.T. 5. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
RU-106	L.T. 4. E-02	L.T. 3. E-02	L.T. 5. E-02	L.T. 4. E-02
I-131	L.T. 9. E-03	L.T. 4. E-03	L.T. 1. E-02	L.T. 9. E-03
CS-134	L.T. 6. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
CS-137	L.T. 5. E-03	L.T. 4. E-03	L.T. 6. E-03	L.T. 4. E-03
BA-140	L.T. 6. E-03	L.T. 3. E-03	L.T. 8. E-03	L.T. 6. E-03
CE-141	L.T. 7. E-03	L.T. 5. E-03	L.T. 9. E-03	L.T. 7. E-03
CE-144	L.T. 3. E-02	L.T. 2. E-02	L.T. 3. E-02	L.T. 2. E-02
RA-226	L.T. 8. E-02	L.T. 6. E-02	L.T. 1. E-01	L.T. 8. E-02
TH-228	L.T. 8. E-03	L.T. 5. E-03	L.T. 8. E-03	L.T. 7. E-03

VII-9
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
EXPOSURE PATHWAY - INGESTION
VEGETATION - TERRESTRIAL, BROADLEAF
(PCI/GM WET)
STATION NUMBER 101

DATE COLLECTED:	08/18/99 (a) VT1-101	08/18/99 VT2-101	08/18/99 VT/QA101	09/15/99 (b)
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RADIOCHEMICAL ANALYSIS:

I-131	L.T. 5. E-03	L.T. 6. E-03	L.T. 7. E-03
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GAMMA SPECTRUM ANALYSIS:

BE-7	1.10±0.11 E 00	4.83±0.57 E-01	6.62±0.67 E-01
K-40	6.14±0.61 E 00	6.99±0.70 E 00	5.84±0.58 E 00
MN-54	L.T. 8. E-03	L.T. 7. E-03	L.T. 7. E-03
CO-58	L.T. 8. E-03	L.T. 7. E-03	L.T. 6. E-03
FE-59	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
CO-60	L.T. 8. E-03	L.T. 8. E-03	L.T. 7. E-03
ZN-65	L.T. 2. E-02	L.T. 2. E-02	L.T. 2. E-02
ZR-95	L.T. 8. E-03	L.T. 7. E-03	L.T. 6. E-03
RU-103	L.T. 8. E-03	L.T. 8. E-03	L.T. 7. E-03
RU-106	L.T. 7. E-02	L.T. 6. E-02	L.T. 6. E-02
I-131	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CS-134	L.T. 9. E-03	L.T. 8. E-03	L.T. 7. E-03
CS-137	L.T. 8. E-03	L.T. 8. E-03	L.T. 7. E-03
BA-140	L.T. 9. E-03	L.T. 1. E-02	L.T. 8. E-03
CE-141	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02
CE-144	L.T. 5. E-02	L.T. 4. E-02	L.T. 5. E-02
RA-226	L.T. 1. E-01	L.T. 1. E-01	L.T. 1. E-01
TH-228	L.T. 1. E-02	L.T. 1. E-02	L.T. 1. E-02

(a) Insufficient vegetation; partial sample.
(b) Insufficient vegetation; partial or no sample at some sites.

VII-10
NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION
 EXPOSURE PATHWAY - AIRBORNE
 SHORELINE SEDIMENT
 (PCI/GM DRY)
 STATION NUMBER 28

DATE COLLECTED:

05/04/99

10/05/99

GAMMA SPECTRUM ANALYSIS:

BE-7	2.21±0.46 E-01	3.85±0.57 E-01
K-40	1.40±0.14 E 01	1.50±0.15 E 01
MN-54	L.T. 6. E-03	7.58±4.17 E-03
CO-58	L.T. 6. E-03	L.T. 7. E-03
FE-59	L.T. 2. E-02	L.T. 2. E-02
CO-60	L.T. 6. E-03	L.T. 7. E-03
ZN-65	L.T. 2. E-02	L.T. 2. E-02
ZR-95	L.T. 8. E-03	L.T. 1. E-02
RU-103	L.T. 7. E-03	L.T. 8. E-03
RU-106	L.T. 5. E-02	L.T. 6. E-02
I-131	L.T. 2. E-02	L.T. 3. E-02
CS-134	L.T. 8. E-03	L.T. 9. E-03
CS-137	3.84±0.43 E-02	5.39±0.54 E-02
BA-140	L.T. 1. E-02	L.T. 2. E-02
CE-141	2.05±0.98 E-02	L.T. 2. E-02
CE-144	L.T. 4. E-02	L.T. 5. E-02
RA-226	1.43±0.14 E-00	1.65±0.16 E 00
TH-228	7.73±0.77 E-01	8.54±0.85 E-01

VIII. REFERENCES

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).
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APPENDIX A
LAND USE CENSUS

ANNUAL CNS LAND USE CENSUS

Conducted July 6 & 7, 1999
0-3 miles

Cooper Nuclear Station (CNS) Offsite Dose Assessment Manual (ODAM) requires 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 leafy green vegetables, 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 ODAM, a land use census was performed on July 6 and 7, 1999. The nearest residence was found in sector Q, 0.9 miles from CNS, and the nearest garden was found in sector E, 1.8 miles from CNS.

No milk animals were found within 3 miles of CNS in 1999 and there was no evidence of potable water use from the Missouri River within three miles downstream of CNS.

ANNUAL CNS LAND USE CENSUS

July 6 & 7, 1999

0-3 Miles

SECTOR	NEAREST RESIDENT Distance	Direction in Degrees	NEAREST GARDEN Distance	Direction in Degrees	NEAREST MILK ANIMAL
A	3.0 Miles	1.0°	3.0 Miles	1.0°	NONE
B	2.7 Miles	13.0°	NONE	--	NONE
C	NONE	--	NONE	--	NONE
D	1.7 Miles	62.0°	2.8 Miles	69.0°	NONE
E	1.8 Miles	94.0°	1.8 Miles	94.0°	NONE
F	2.3 Miles	112.0°	2.8 Miles	108.0°	NONE
G	NONE	--	NONE	--	NONE
H	NONE	--	NONE	--	NONE
J	NONE	--	NONE	--	NONE
K	2.2 Miles	210.0°	NONE	--	NONE
L	1.3 Miles	221.0°	2.4 Miles	229.0°	NONE
M	1.2 Miles	253.0°	NONE	--	NONE
N	1.0 Miles	267.0°	NONE	--	NONE
P	1.6 Miles	294.0°	2.4 Miles	293.0°	NONE
Q	0.9 Miles	307.0°	2.9 Miles	314.0°	NONE
R	1.9 Miles	338.0°	1.9 Miles	338.0°	NONE

APPENDIX B
SUMMARY OF INTERLABORATORY COMPARISONS

INTERLABORATORY COMPARISON PROGRAM

The US Environmental Protection Agency (EPA) discontinued their Interlaboratory Comparison Program in December 1998.

Since the EPA is no longer involved in the program, there are no "approved" laboratories for Intercomparison Studies, however, Teledyne Brown Engineering participates in the Analytics, Inc. and Environmental Resource Associates (ERA) programs to the fullest extent possible. That is we participate in the program for all radioactive isotopes prepared and at the maximum frequency of availability.

The National Institute of Standards and Technology (NIST) is the approval authority for laboratory providers participating in Intercomparison Study Programs, however, at this time, there are no approved laboratories for environmental and/or radiochemical isotope analyses.

The EPA Interlaboratory Comparison table for 1998 has been included with this report since there were investigations still in progress when the REMP report for 1998 was submitted to the NRC.

EPA INTERLABORATORY COMPARISON PROGRAM 1998
Environmental

Collection Date	Media	Nuclide	EPA Result(a)		Teledyne Brown Engineering Result(b)		Normal Dev. Known(c)
01/16/98	Water	Sr-89	8.0 ±	5.0	5.00 ±	1.73	-1.04
		Sr-90	32.0 ±	5.0	31.67 ±	0.58	-0.12
01/30/98	Water	Gr-Alpha	30.5 ±	7.6	33.00 ±	2.65	0.57
		Gr-Beta	3.9 ±	5.0	5.60 ±	0.90	0.59
02/06/98	Water	I-131	104.9 ±	10.5	110.00 ±	0.00	0.84
02/13/98	Water	Ra-226	16.0 ±	2.4	14.67 ±	0.58	-0.96
		Ra-228	33.3 ±	8.3	32.00 ±	2.00	-0.27
03/13/98	Water	H-3	2155.0 ±	348.0	1833.33 ±	57.74	-1.60
04/21/98	Water	Gr-Alpha	54.4 ±	13.6	50.00 ±	1.73	-0.56
		Ra-226	15.0 ±	2.3	15.00 ±	0.00	0.00
		Ra-228	9.3 ±	2.3	8.50 ±	0.20	-0.60
		Gr-Beta	94.7 ±	10.0	102.00 ±	6.56	1.26
		Sr-89	6.0 ±	5.0	4.67 ±	1.15	-0.46
		Sr-90	18.0 ±	5.0	21.67 ±	1.15	1.27
		Co-60	50.0 ±	5.0	52.33 ±	1.53	0.81
		Cs-134	22.0 ±	5.0	21.00 ±	1.00	-0.35
		Cs-137	10.0 ±	5.0	11.67 ±	0.58	0.58
06/05/98	Water	Co-60	12.0 ±	5.0	13.00 ±	1.00	0.35
		Zn-65	104.0 ±	10.0	111.67 ±	2.52	1.33
		Cs-134	31.0 ±	5.0	32.33 ±	0.58	0.46
		Cs-137	35.0 ±	5.0	37.67 ±	2.08	0.92
		Ba-133	40.0 ±	5.0	35.00 ±	2.65	-1.73
06/12/98	Water	Ra-226	4.9 ±	0.7	4.47 ±	0.85	-1.07
		Ra-228	2.1 ±	0.5	1.93 ±	0.21	-0.58
07/17/98	Water	Sr-89	21.0 ±	5.0	21.00 ±	1.00	0.00
		Sr-90	7.0 ±	5.0	6.33 ±	0.58	-0.23
07/24/98	Water	Gr-Alpha	7.2 ±	5.0	5.43 ±	0.64	-0.61
		Gr-Beta	12.8 ±	5.0	14.67 ±	2.08	0.65
08/07/98	Water	H-3	17996.0 ±	1800.0	16000.00 ±	0.00	-1.92
09/11/98	Water	I-131	6.1 ±	2.0	5.93 ±	0.55	-0.14
09/18/98	Water	Ra-226	1.7 ±	0.3	1.53 ±	0.46	-0.96
		Ra-228	5.7 ±	1.4	6.70 ±	0.35	1.24
10/20/98	Water	Gr-Beta	94.0 ±	10.0	74.67 ±	7.64	-3.35 (d)
		Sr-89	19.0 ±	5.0	18.33 ±	1.53	-0.23
		Sr-90	8.0 ±	5.0	8.33 ±	1.15	0.12
		Co-60	21.0 ±	5.0	22.33 ±	1.15	0.46
		Cs-134	6.0 ±	5.0	6.67 ±	0.58	0.23
		Cs-137	50.0 ±	5.0	56.33 ±	3.79	2.19 (e)

EPA INTERLABORATORY COMPARISON PROGRAM 1998
Environmental

Collection Date	Media	Nuclide	EPA Result(a)		Teledyne Brown Engineering Result(b)		Normal Dev. Known(c)
10/20/98		Gr-Alpha	30.1 ±	7.5	21.67 ±	2.31	-1.95
		Ra-226	4.5 ±	0.7	4.67 ±	0.25	0.41
		Ra-228	1.5 ±	0.4	1.9 ±	0.20	1.73
11/06/98	Water	Co-60	38.0 ±	5.0	39.67 ±	2.52	0.58
		Zn-65	131.0 ±	13.0	140.67 ±	10.97	1.29
		Cs-134	105.0 ±	5.0	103.00 ±	2.00	-0.69
		Cs-137	111.0 ±	6.0	115.33 ±	1.53	1.25
		Ba-133	56.0 ±	6.0	46.33 ±	2.52	-2.79 (f)

Footnotes:

- (a) EPA Results-Expected laboratory precision (1 sigma). Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.
- (b) Teledyne Results - Average ± one sigma. Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.
- (c) Normalized deviation from the known.
- (d) The special EPA instructions concerning multiple evaporation with concentrated nitric acid (to purge chlorides derived from HCl preservative) were omitted by oversight. The chlorides cause greater self absorption and lead to lower results. Two additional aliquots using two evaporations with concentrated nitric acid were analyzed. The results, when corrected for decay of Gr-Beta, were 87 and 83 pCi/liter which compare favorably with the EPA result.
- (e) Weekly efficiency checks for the sample collect date (10/20/98) counted in December 1998, indicate that detectors were in compliance during that period of time. All detectors are calibrated using NIST traceable mixed gamma standards containing Cs137. The Branching Intensity value used in the calculation by the EPA is not available for cross-reference checks.
- (f) The results of the EPA Interlaboratory Comparison Program, sample collect date 11/06/98, indicate a low bias for the Ba-133 result. Weekly efficiency counts for our detectors were found to be in compliance during that period of time. One possible cause for the low bias may be the Branching Intensity value used in the calculation. The EPA does not supply their values used to calculate activity. If the Brookhaven or RadDecay Data Tables are used to supply the B.I. and Half-Life, the calculated results will fall within the acceptable range:

TBES (Atomic Data and Nuclear Data Tables Vol 13 Nos 2-3 1974)

	Branching Intensity	Half-Life	Calculated Activity
TBES	0.670	10.9 years	46.33
Brookhaven Tables	0.6205	10.52 years	50.04
RadDecay Tables	0.605	10.5 years	51.31

ANALYTICS CROSS CHECK COMPARISON PROGRAM 1998

Sample ID	Media	Nuclide	Teledyne Brown Engineering Result (a)		Analytics Result		Ratio (b)
E1346-396 TI #71657 03/12/98	Milk	I-131	87 ±	9	82 ±	4	1.06
		Ce-141	66 ±	7	70 ±	4	0.94
		Cr-51	220 ±	30	201 ±	10	1.09
		Cs-134	85 ±	9	84 ±	4	1.01
		Cs-137	180 ±	20	161 ±	8	1.12
		Mn-54	130 ±	10	133 ±	7	0.98
		Fe-59	110 ±	10	95 ±	5	1.16
		Zn-65	160 ±	20	142 ±	7	1.13
		CO-60	82 ±	8	85 ±	4	0.96
E1460-396 TI #78921 06/11/98	Milk	I-131	68 ±	7	67 ±	3	1.01
		Ce-141	94 ±	9	99 ±	5	0.95
		Cr-51	97 ±	31	132 ±	7	0.73
		Cs-134	101 ±	10	95 ±	5	1.06
		Cs-137	79 ±	8	70 ±	4	1.13
		Mn-54	112 ±	11	106 ±	5	1.06
		Fe-59	58 ±	9	45 ±	2	1.29
		Zn-65	143 ±	14	122 ±	6	1.17
		CO-60	157 ±	16	143 ±	7	1.10
E1630-396 TI #94881 12/14/98	Milk	I-131	65 ±	1	71 ±	4	0.92
		Ce-141	647 ±	65	746 ±	37	0.87
		Cr-51	900 ±	90	979 ±	49	0.92
		Cs-134	200 ±	20	220 ±	11	0.91
		Cs-137	177 ±	18	183 ±	9	0.97
		Mn-54	136 ±	14	142 ±	7	0.96
		Fe-59	156 ±	16	148 ±	7	1.05
		Zn-65	132 ±	14	140 ±	7	0.94
		CO-60	169 ±	17	178 ±	9	0.95
		Sr-89	20 ±	2	69 ±	3	0.29 (c)
		Sr-90	16 ±	1	41 ±	2	0.39 (c)
E1631-396 TI #94882 12/14/98	Filter	Ce-141	566 ±	57	524 ±	26	1.08
		Cr-51	800 ±	80	687 ±	49	1.16
		Cs-134	147 ±	15	154 ±	8	0.95
		Cs-137	158 ±	16	128 ±	6	1.23
		Mn-54	122 ±	12	100 ±	5	1.22
		Fe-59	134 ±	13	104 ±	5	1.29
		Zn-65	129 ±	13	98 ±	5	1.32
		CO-60	134 ±	13	125 ±	6	1.07
E1632-396 TI #94883 12/14/98	Water	H-3	5500 ±	200	5980 ±	299	0.92
E1633-396 TI #94884 12/14/98	Water	Am-241	8.3 ±	1.5	7.9 ±	0.4	1.05
		Pu-239	9.8 ±	1.8	8.9 ±	0.4	1.10

Footnotes:

- (a) Teledyne Results - counting error is two standard deviations. Units are pCi/liter for water and milk. For gamma results, if two standard deviations are less than 10%, then a 10% error is reported. Units are total pCi for air particulate filters.
- (b) Ratio of Teledyne Brown Engineering to Analytics results. Acceptance criteria are based on USNRC acceptance criteria described in USNRC Procedure 84750 dated March 15, 1994.
- (c) The original and repeat analysis data sheets for Sr-89 and Sr-90 have been reconstructed from information in the laboratory notebook and the counter printouts. This sample was originally analyzed in January 1999 (login L4004) and produced unacceptable radiostrontium results. The analysis was repeated in April 1999 using a smaller aliquot of 500 ml because 1000 ml was no longer available. The repeat analysis produced good results:

Result	Analytics value	ratio
Sr-89	74 +- 8 69 +- 3	1.07
Sr-90	37 +- 1 41 +- 2	0.90

A problem such as sample identity is suspected for the first analysis.

ANALYTICS CROSS CHECK COMPARISON PROGRAM 1999

Sample ID	Media	Nuclide	Teledyne Brown Engineering Result (a)		Analytics Result(b)		Ratio (c)
E1823-396	Water	Sr-89	60 ±	5	69 ±	3	0.87
TI #09576		Sr-90	35 ±	2	46 ±	2	0.76
06/24/99							
E1824-396	Water	Gr-A	160 ±	10	98 ±	5	1.63 (d)
TI #09577		Gr-B	300 ±	10	290 ±	15	1.03
06/24/99							
E1825-396	Water	I-131	77 ±	13	68 ±	3	1.13
TI #09578		Ce-141	139 ±	14	134 ±	7	1.04
06/24/99		Cr-51	162 ±	42	172 ±	9	0.94
		Cs-134	86 ±	9	92 ±	5	0.93
		Cs-137	167 ±	17	151 ±	8	1.11
		Mn-54	77 ±	8	68 ±	3	1.13
		Fe-59	40 ±	9	38 ±	2	1.05
		Zn-65	113 ±	12	98 ±	5	1.15
		Co-60	179 ±	18	171 ±	9	1.05
E1826-396	Filter	Ce-141	169 ±	17	162 ±	8	1.04
TI #09579		Cr-51	241 ±	24	208 ±	10	1.16
06/24/99		Cs-134	105 ±	10	111 ±	6	0.95
		Cs-137	211 ±	21	182 ±	9	1.16
		Mn-54	96 ±	10	82 ±	4	1.17
		Fe-59	55 ±	8	46 ±	2	1.20
		Zn-65	144 ±	14	118 ±	6	1.22
		Co-60	214 ±	21	206 ±	10	1.04
E1827-396	Soil	Ce-141	0.274 ±	0.027	0.269 ±	0.013	1.02
TI #09580		Cr-51	0.374 ±	0.103	0.345 ±	0.017	1.08
06/24/99		Cs-134	0.200 ±	0.020	0.184 ±	0.009	1.09
		Cs-137	0.450 ±	0.045	0.429 ±	0.021	1.05
		Mn-54	0.153 ±	0.015	0.136 ±	0.007	1.13
		Fe-59	0.118 ±	0.022	0.077 ±	0.004	1.53 (e)
		Zn-65	0.206 ±	0.021	0.196 ±	0.010	1.05
		Co-60	0.351 ±	0.035	0.343 ±	0.017	1.02

Footnotes:

(a) Teledyne Results - counting error is two standard deviations. Units are pCi/liter for water and milk. For gamma results, if two standard deviations are less than 10%, then a 10% error is reported. Units are total pCi for air particulate filters. Units are pCi/gram for Soil, which has been added to the program for 1999.

(b) Analytics Result - Average ± 3 sigma

- (c) Ratio of Teledyne Brown Engineering to Analytics results. Acceptance criteria are based on USNRC acceptance criteria described in USNRC Procedure 84750 dated March 15, 1994.
- (d) A high Gross Alpha result was obtained because the calculation was mistakenly performed using Th-230 counting efficiency. If our normal Am-241 calibration were used, we would have reported 110 ± 10 pCi/L, which is an acceptable value.
- (e) Random or coincidental summing caused the problem. Two other energy lines can sum a peak on the same energy band causing more counts to be thrown in. The key line was changed and the resulting value was 0.079, which is in agreement with Analytics.

**ERA STATISTICAL SUMMARY
PROFICIENCY TESTING (PT) PROGRAM - 1999**

TI #s	DATE	NUCLIDE	ERA Known Value (pCi/l)(a)	TBE Result (b) (pCi/l)	Expected Dev. Known (c) (pCi/l)	Control Limits (d) (pCi/l)	Warning Limits (e) (pCi/l)	Performance Evaluation (f)
11811-11813	8/23/99	U(NAT)	12.4	13.0	3.00	7.20-17.6	8.94-15.9	A
11811-11813	8/20/99	Ra-226	7.21	7.37	1.08	5.34-9.08	5.96-8.46	A
11811-11813	8/23/99	Ra-228	4.51	7.17	1.13	2.57-6.45	3.21-5.81	NA (g)
11808-11810	8/24/99	Sr-89	26.6	25.0	5.00	17.9-35.3	20.8-32.4	A
11808-11810	8/24/99	Sr-90	40.2	39.7	5.00	31.5-48.9	34.4-46.0	A
13058-13060	9/15/99	Gr-A	48.6	30.3	12.2	27.7-69.5	34.6-62.6	CE (h)
13061-13063	9/14/99	Gr-B	20.0	22.0	5.00	11.3-28.7	14.2-25.8	A
14425-14427	9/01/99	H-3	6130	5530	613	5090-7170	5420-6840	A

Footnotes:

- (a) The ERA Known Value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.
- (b) Average $\pm$ 1 sigma.
- (c) Established per the guidelines contained in the EPA's National Standards for Water Proficiency Testing Criteria Document, December 1998, as applicable.
- (d) Established per the guidelines contained in the EPA's National Standards for Water Proficiency Testing Criteria Document, December 1998, as applicable.
- (e) Established per the guidelines contained in the EPA's National Standards for Water Proficiency Testing Criteria Document, December 1998, as applicable.
- (f) A= Acceptable. Reported Result falls within the Warning Limits.
NA = Not Acceptable. Reported Result falls outside of the Control Limits.
CE = Check for Error. Reported Result falls within the Control Limits and outside of the Warning Limits.
- (g) A calculation error was made by not correcting for Ra-226 content. If this correction is made, an average result of 5.7 pCi/l is obtained which is in the acceptance region.
- (h) The low value is attributed to greater self-absorption characteristics of the sample matrix compared to those of the calibration matrix. This source of bias is often observed in gross alpha measurements, nevertheless, the average result is within the control region (but outside the warning region).

APPENDIX C
SYNOPSIS OF ANALYTICAL PROCEDURES

ANALYTICAL PROCEDURES SYNOPSIS

Appendix C is a synopsis of the analytical procedures performed during 1999 on samples collected for the Nebraska Public Power Nuclear Plant's Radiological Environmental Monitoring Program. All analyses have been mutually agreed upon by Nebraska Public Power and Teledyne Brown Engineering and include those recommended by the USNRC Branch Technical Position, Rev. 1, November 1979.

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GROSS BETA ANALYSIS OF SAMPLES

Air Particulates

After a delay of five or more days, allowing for the radon-222 and radon-220 (thoron) daughter products to decay, the filters are counted in a gas-flow proportional counter. An unused air particulate filter, supplied by the customer, is counted as the blank.

Calculations of the results, the two sigma error and the lower limit of detection (LLD):

$$\text{RESULT (pCi/m}^3\text{)} = ((S/T) - (B/t))/(2.22 \text{ V E})$$

$$\text{TWO SIGMA ERROR (pCi/m}^3\text{)} = 2((S/T^2) + (B/t^2))^{1/2}/(2.22 \text{ V E})$$

$$\text{LLD (pCi/m}^3\text{)} = 4.66 (B^{1/2})/(2.22 \text{ V E t})$$

where:

- S = Gross counts of sample including blank
- B = Counts of blank
- E = Counting efficiency
- T = Number of minutes sample was counted
- t = Number of minutes blank was counted
- V = Sample aliquot size (cubic meters)

DETERMINATION OF GROSS BETA ACTIVITY IN WATER SAMPLES

Introduction

The procedures described in this section are used to measure the overall radioactivity of water samples without identifying the radioactive species present. No chemical separation techniques are involved.

One liter of the sample is evaporated on a hot plate. A smaller volume may be used if the sample has a significant salt content as measured by a conductivity meter. If requested by the customer, the sample is filtered through No. 54 filter paper before evaporation, removing particles greater than 30 microns in size.

After evaporating to a small volume in a beaker, the sample is rinsed into a 2-inch diameter stainless steel planchette which is stamped with a concentric ring pattern to distribute residue evenly. Final evaporation to dryness takes place under heat lamps.

Residue mass is determined by weighing the planchette before and after mounting the sample. The planchette is counted for beta activity on an automatic proportional counter. Results are calculated using empirical self-absorption curves which allow for the change in effective counting efficiency caused by the residue mass.

Detection Capability

Detection capability depends upon the sample volume actually represented on the planchette, the background and the efficiency of the counting instrument, and upon self-absorption of beta particles by the mounted sample. Because the radioactive species are not identified, no decay corrections are made and the reported activity refers to the counting time.

The minimum detectable level (MDL) for water samples is nominally 1.6 picoCuries per liter for gross beta at the 4.66 sigma level (1.0 pCi/l at the 2.83 sigma level), assuming that 1 liter of sample is used and that $\frac{1}{2}$ gram of sample residue is mounted on the planchette. These figures are based upon a counting time of 50 minutes and upon representative values of counting efficiency and background of 0.2 and 1.2 cpm, respectively.

The MDL becomes significantly lower as the mount weight decreases because of reduced self-absorption. At a zero mount weight, the 4.66 sigma MDL for gross beta is 0.9 picoCuries per liter. These values reflect a beta counting efficiency of 0.38.

ANALYSIS OF SAMPLES FOR TRITIUM

(Liquid Scintillation)

Water

Ten milliliters of water are mixed with 10 ml of a liquid scintillation "cocktail" and then the mixture is counted in an automatic liquid scintillator.

Calculation of the results, the two sigma error and the lower limit detection (LLD) in pCi/l:

$$\text{RESULT} = (N-B)/(2.22 \text{ V E})$$

$$\text{TWO SIGMA ERROR} = 2((N + B)/\bullet t)^{1/2}/(2.22 \text{ V E})$$

$$\text{LLD} = 4.66 (B/\bullet t)^{1/2}/(2.22 \text{ V E})$$

where:

N = the gross cpm of the sample

B = the background of the detector in cpm

2.22 = conversion factor changing dpm to pCi

V = volume of the sample in ml

E = efficiency of the detector

•t = counting time for the sample

ANALYSIS OF SAMPLES FOR STRONTIUM-89 AND -90

Water

Stable strontium carrier is added to 1 liter of sample and the volume is reduced by evaporation. Strontium is precipitated as $\text{Sr}(\text{NO}_3)_2$ using nitric acid. A barium scavenge and an iron (ferric hydroxide) scavenge are performed followed by addition of stable yttrium carrier and a minimum of 5 day period for yttrium ingrowth. Yttrium is then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchette and is counted in a low level beta counter to infer Sr-90 activity. Strontium-89 activity is determined by precipitating SrCO_3 from the sample after yttrium separation. This precipitate is mounted on a nylon planchette and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting.

Milk

Stable strontium carrier is added to 1 liter of sample and the sample is first evaporated, then ashed in a muffle furnace. The ash is dissolved and strontium is precipitated as phosphate, then is dissolved and precipitated as SrNO_3 using fuming (90%) nitric acid. A barium chromate scavenge and an iron (ferric hydroxide) scavenge are then performed. Stable yttrium carrier is added and the sample is allowed to stand for a minimum of 5 days for yttrium ingrowth. Yttrium is then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchette and is counted in a low level beta counter to infer Sr-90 activity. Strontium-89 is determined by precipitating SrCO_3 from the sample after yttrium separation. This precipitate is mounted on a nylon planchette and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting.

Soil and Sediment

The sample is first dried under heat lamps and an aliquot is taken. Stable strontium carrier is added and the sample is leached in hydrochloric acid. The mixture is filtered and strontium is precipitated from the liquid portion as phosphate. Strontium is precipitated as $\text{Sr}(\text{NO}_3)_2$ using fuming (90%) nitric acid. A barium chromate scavenge and an iron (ferric hydroxide) scavenge are then performed. Stable yttrium carrier is added and the sample is allowed to stand for a minimum of 5 days for yttrium ingrowth. Yttrium is then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchette and is counted in a low level beta counter to infer Sr-90 activity. Strontium-89 activity is determined by precipitating SrCO_3 from the sample after yttrium separation. This precipitate is mounted on a nylon planchette and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting.

Organic Solids

A wet portion of the sample is dried and then ashed in a muffle furnace. Stable strontium carrier is added and the ash is leached in hydrochloric acid. The sample is filtered and strontium is precipitated from the liquid portion as phosphate. Strontium is precipitated as $\text{Sr}(\text{NO}_3)_2$ using fuming (90%) nitric acid. An iron (ferric hydroxide) scavenge is performed, followed by addition of stable yttrium carrier and a minimum of 5 days period for yttrium ingrowth. Yttrium is then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchette and is counted in a low level beta counter to infer strontium-90 activity. Strontium-89 activity is determined by precipitating SrCO_3 from the sample after yttrium separation. This precipitate is mounted on a nylon planchette and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting.

Air Particulates

Stable strontium carrier is added to the sample and it is leached in nitric acid to bring deposits into solution. The mixture is then filtered and the filtrate is reduced in volume by evaporation. Strontium is precipitated as $\text{Sr}(\text{NO}_3)_2$ using fuming (90%) nitric acid. A barium scavenge is used to remove some interfering species. An iron (ferric hydroxide) scavenge is performed, followed by addition of stable yttrium carrier and a 7 to 10 day period for yttrium ingrowth. Yttrium is then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchette and is counted in a low level beta counter to infer strontium-90 activity. Strontium-89 activity is determined by precipitating SrCO_3 from the sample after yttrium separation. This precipitate is mounted on a nylon planchette and is covered with 80 mg/cm^2 aluminum absorber for low level beta counting.

Calculations of the results, two sigma errors and lower limits of detection (LLD) are expressed in activity of pCi/volume or pCi/mass:

$$\begin{aligned}\text{RESULT Sr-89} &= (\text{N}/\text{Dt} - \text{B}_\text{C} - \text{B}_\text{A}) / (2.22 \text{ V } \text{Y}_\text{S} \text{ DF}_{\text{Sr-89}} \text{ E}_{\text{Sr-89}}) \\ \text{TWO SIGMA ERROR Sr-89} &= 2((\text{N}/\text{Dt} + \text{B}_\text{C} + \text{B}_\text{A}) / \text{t})^{1/2} / (2.22 \text{ V } \text{Y}_\text{S} \text{ DF}_{\text{Sr-89}} \text{ E}_{\text{Sr-89}}) \\ \text{LLD Sr-89} &= 4.66((\text{B}_\text{C} + \text{B}_\text{A}) / \text{t})^{1/2} / (2.22 \text{ V } \text{Y}_\text{S} \text{ DF}_{\text{Sr-89}} \text{ E}_{\text{Sr-89}}) \\ \text{RESULT Sr-90} &= (\text{N} / \text{t} - \text{B}) / (2.22 \text{ V } \text{Y}_1 \text{ Y}_2 \text{ DF IF E}) \\ \text{TWO SIGMA ERROR Sr-90} &= 2((\text{N} / \text{t} + \text{B}) / \text{t})^{1/2} / (2.22 \text{ V } \text{Y}_1 \text{ Y}_2 \text{ DF E IF}) \\ \text{LLD Sr-90} &= 4.66(\text{B} / \text{t})^{1/2} / (2.22 \text{ V } \text{Y}_1 \text{ Y}_2 \text{ IF DF E})\end{aligned}$$

WHERE:	N	=	total counts from sample (counts)
	$\bullet t$	=	counting time for sample (min)
	B_C	=	background rate of counter (cpm) using absorber configuration
	2.22	=	dpm/pCi
	V	=	volume or weight of sample analyzed
	B_A	=	background addition from Sr-90 and ingrowth of Y-90
	B_A	=	$0.016 (K) + (K) E_{Y/abs} (IG_{Y-90})$
	Y_S	=	chemical yield of strontium
	DF_{SR-89}	=	decay factor from the mid collection date to the counting date for SR-89
	E_{SR-89}	=	efficiency of the counter for SR-89 with the 80 mg/cm.sq. aluminum absorber
	K	=	$(N \bullet t - B_C) Y_{-90} / (E_{Y-90} IF_{Y-90} DF_{Y-90} Y_1)$
	DF_{Y-90}	=	the decay factor for Y-90 from the "milk" time to the mid count time
	E_{Y-90}	=	efficiency of the counter for Y-90
	IF_{Y-90}	=	ingrowth factor for Y-90 from scavenge time to milking time
	IG_{Y-90}	=	the ingrowth factor for Y-90 into the strontium mount from the "milk" time to the mid count time
	0.016	=	the efficiency of measuring SR-90 through a No. 6 absorber
	$E_{Y/abs}$	=	the efficiency of counting Y-90 through a No. 6 absorber
	B	=	background rate of counter (cpm)
	Y_1	=	chemical yield of yttrium
	Y_2	=	chemical yield of strontium
	DF	=	decay factor of yttrium from the radiochemical milking time to the mid count time
	E	=	efficiency of the counter for Y-90
	IF	=	ingrowth factor for Y-90 from scavenge time to the radio-chemical milking time

ANALYSIS OF SAMPLES FOR IODINE-131

Milk or Water

Two liters of sample are first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin is used to remove iodine from the sample. The iodine is then stripped from the resin with sodium hypochlorite solution, is reduced with hydroxylamine hydrochloride and is extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution and is precipitated as palladium iodide. The sodium bisulfite solution and is precipitated as palladium iodide. The precipitate is weighed for chemical yield and is mounted on a nylon planchette for low level beta counting. The chemical yield is corrected by measuring the stable iodide content of the milk or the water with a specific ion electrode.

Calculations of results, two sigma error and the lower limit of detection (LLD) in pCi/l:

$$\begin{aligned}\text{RESULT} &= (N/\bullet t - B)/(2.22 E V Y DF) \\ \text{TWO SIGMA ERROR} &= 2((N/\bullet t + B)/\bullet t)^{1/2}/(2.22 E V Y DF) \\ \text{LLD} &= 4.66(B/\bullet t)^{1/2}/(2.22 E V Y DF)\end{aligned}$$

where:	N	=	total counts from sample (counts)
	•t	=	counting time for sample (min)
	B	=	background rate of counter (cpm)
	2.22	=	dpm/pCi
	V	=	volume or weight of sample analyzed
	Y	=	chemical yield of the mount or sample counted
	DF	=	decay factor from the collection to the counting date
	E	=	efficiency of the counter for I-131, corrected for self absorption effects by the formula
	E	=	$E_s(\exp-0.0061M)/(\exp-0.0061M_s)$
	E _s	=	efficiency of the counter determined from an I-131 standard mount
	M _s	=	mass of PdI ₂ on the standard mount, mg
	M	=	mass of PDI ₂ on the sample mount, mg

GAMMA SPECTROMETRY OF SAMPLES

Milk and Water

A 1.0 liter Marinelli beaker is filled with a representative aliquot of the sample. The sample is then counted for approximately 1000 minutes with a shielded Ge(Li) detector coupled to a mini-computer-based data acquisition system which performs pulse height analysis.

Dried Solids Other Than Soils and Sediments

A large quantity of the sample is dried at a low temperature, less than 100°C. As much as possible (up to the total sample) is loaded into a tared 1-liter Marinelli and weighed. The sample is then counted for approximately 1000 minutes with a shielded Ge(Li) detector coupled to a mini-computer-based data acquisition system which performs pulse height analysis.

Fish

As much as possible (up to the total sample) of the edible portion of the sample is loaded into a tared Marinelli and weighed. The sample is then counted for approximately 1000 minutes with a shielded Ge(Li) detector coupled to a mini-computer-based data acquisition system which performs pulse height analysis.

Soils and Sediments

Soils and sediments are dried at a low temperature, less than 100°C. The soil or sediment is loaded fully into a tared, standard 300 cc container and weighed. The sample is then counted for approximately six hours with a shielded Ge(Li) detector coupled to a mini-computer-based data acquisition system which performs pulse height and analysis.

Charcoal Cartridges (Air Iodine)

Charcoal cartridges are counted up to five at a time, with one positioned on the face of a Ge(Li) detector and up to four on the side of the Ge(Li) detector. Each Ge(Li) detector is calibrated for both positions. The detection limit for I-131 of each charcoal cartridge can be determined (assuming no positive I-131) uniquely from the volume of air which passed through it. In the event I-131 is observed in the initial counting of a set, each charcoal cartridge is then counted separately, positioned on the face of the detector.

Air Particulate

The thirteen airborne particulate filters for a quarterly composite for each field station are aligned one in front of another and then counted for at least six hours with a shielded Ge(Li)

detector coupled to a mini-computer-based data acquisition system which performs pulse height analysis.

A mini-computer software program defines peaks by certain changes in the slope of the spectrum. The program also compares the energy of each peak with a library of peaks for isotope identification and then performs the radioactivity calculation using the appropriate fractional gamma ray abundance, half life, detector efficiency, and net counts in the peak region. The calculation of results, two sigma error and the lower limit of detection (LLD) in pCi/volume of pCi/mass:

$$\text{RESULT} = (S-B)/(2.22 \ t \ E \ V \ F \ DF)$$

$$\text{TWO SIGMA ERROR} = 2(S+B)^{1/2}/(2.22 \ t \ E \ V \ F \ DF)$$

$$\text{LLD} = 4.66(B)^{1/2}/(2.22 \ t \ E \ V \ F \ DF)$$

where: S = Area, in counts, of sample peak and background
(region of spectrum of interest)

B = Background area, in counts, under sample peak,
determined by a linear interpolation of the representative backgrounds on
either side of the peak

t = length of time in minutes the sample was counted

2.22 = dpm/pCi

E = detector efficiency for energy of interest
and geometry of sample

V = sample aliquot size (liters, cubic meters, kilograms,
or grams)

F = fractional gamma abundance (specific for each
emitted gamma)

DF = decay factor from the mid-collection date to the
counting date

Addendum to Gamma Spec Procedure

Relationship of mother-daughter decay chains

Ba-140 (half-life = ~12.8d) decays to La-140 (half-life ~ 40 hrs) and the daughter radionuclide, La-140 approaches ~ 90% of the Ba-140 activity within ~ 6 days. The La-140 photon energy at 1596 KeV is used to quantify the Ba-140 activity due to its high photon emission probability yield (96%) producing a higher count rate when present and therefore, a smaller associated counting error.

Zr-95 (half-life = ~65d) decays to Nb-95 (half-life = ~35d). The photon energy of Nb-95 (~765 KeV) is used to quantify Zr-95 because of the high photon emission probability yield (~100%) yielding a higher count rate and an associated lower counting error. The daughter radionuclide, Nb-95 approaches the Zr-95 activity after a time period of ~65 days, an estimated time interval occurring between sample exposure, collection and shipping, and analysis.

ENVIRONMENTAL DOSIMETRY

Teledyne Brown Engineering uses a $\text{CaSO}_4\text{:Dy}$ thermoluminescent dosimeter (TLD) which the company manufactures. This material has a high light output, negligible thermally induced signal loss (fading), and negligible self dosing. The energy response curve (as well as all other features) satisfies NRC Reg. Guide 4.13. Transit doses are accounted for by use of separate TLDs.

Following the field exposure period the TLDs are placed in a Teledyne Brown Engineering Model 8300. One fourth of the rectangular TLD is heated at a time and the measured light emission (luminescence) is recorded. The TLD is then annealed and exposed to a known Cs-137 dose; each area is then read again. This provides a calibration of each area of each TLD after every field use. The transit controls are read in the same manner.

Calculations of results and the two sigma error in net milliRoentgen (mR):

$$\begin{aligned}\text{RESULT} &= D = (D_1 + D_2 + D_3 + D_4)/4 \\ \text{TWO SIGMA ERROR} &= 2((D_1 - D)^2 + (D_2 - D)^2 + (D_3 - D)^2 + (D_4 - D)^2/3)^{1/2}\end{aligned}$$

WHERE:

D_1	=	the net mR of area 1 of the TLD, and similarly for D_2 , D_3 , and D_4
D_1	=	$I_1 K/R_1 - A$
I_1	=	the instrument reading of the field dose in area 1
K	=	the known exposure by the Cs-137 source
R_1	=	the instrument reading due to the Cs-137 dose on area 1
A	=	average dose in mR, calculated in similar manner as above, of the transit control TLDs
D	=	the average net mR of all 4 areas of the TLD.

LLD Formulas

The LLD formulas in section C are consistent with the LLD discussion in the ODAM. The term s_b in the ODAM equals $\sqrt{B/t}$ by Poisson statistics, where B = blank counts and t = blank counting interval. The decay factor term $e^{-\lambda \Delta t}$ in the ODAM is the same as the DF terms in section C, but does not appear in certain analyses such as gross beta because decay does not apply. In the tritium analysis, decay is not considered because of the relatively long half-life.

Efficiencies and volumes are consistent between the two documents. Chemical yields appear in section C where applicable, but do not apply to other analyses such as tritium and gross beta.

APPENDIX D
DETECTION LIMITS AND REPORTING LEVELS

NEBRASKA PUBLIC POWER - COOPER NUCLEAR STATION
DETECTION LIMITS AND REPORTING LEVELS

Isotope	ODAM LLD	Rept. Level
<u>Water - pCi/liter</u>		
Gross Beta	4	N/A
H-3	2000	30,000
Mn-54	15	1000
Fe-59	30	400
Co-58	15	1000
Co-60	15	300
Zn-65	30	300
Zr-95	30	400
Nb-95	15	400
I-131	1	2
Cs-134	15	30
Cs-137	18	50
Ba-140	60	200
La-140	15	200
<u>Air Filter - pCi/m3</u>		
Gross Beta	0.01	N/A
I-131	0.07	0.9
Cs-134	0.05	10
Cs-137	0.06	20
<u>Fish - pCi/Kg-wet</u>		
Mn-54	130	30,000
Fe-59	260	10,000
Co-58	130	30,000
Co-60	130	10,000
Zn-65	260	20,000
Cs-134	130	1,000
Cs-137	150	2,000
<u>Milk - pCi/liter</u>		
I-131	1	3
Cs-134	15	60
Cs-137	18	70
Ba-140	60	300
La-140	15	300

NEBRASKA PUBLIC POWER - COOPER NUCLEAR STATION

DETECTION LIMITS AND REPORTING LEVELS

Isotope	ODAM LLD	Rept. Level
<u>Vegetation - pCi/Kg-wet</u>		
I-131	60	100
Cs-134	60	1,000
Cs-137	80	2,000
<u>Sediment - pCi/Kg-dry</u>		
Cs-134	150	N/A
Cs-137	180	N/A

APPENDIX E
REMP SAMPLING AND ANALYTICAL EXCEPTIONS

EXCEPTIONS

Appendix E contains the exceptions to the 1999 REMP Program. Where possible, causes of the deviations have been corrected to prevent recurrence. Several samples were unavailable due to seasonal unavailability. All deviations from the sampling schedule have been documented on the data tables. Data Tables are in Section VII.

Exceptions for Scheduled REMP Sampling and Analysis During 1999, NPPD Cooper Nuclear Station

Station(s)	Pathway	Sample	Collection Period	Exception/Reason	Actions Taken and Replacement Samples, Where Applicable
5	Airborne	Air particulate & Charcoal filter	03/02/99-05/03/99	Sample not available; pump out of service	Equipment repaired and returned to normal service; no further action necessary
8	Airborne	Air particulate & Charcoal filter	04/21/99-05/03/99	Possible meter failure; air volume not known	Equipment repaired and returned to normal service; no further action necessary
6	Airborne	Air particulate & Charcoal filter	04/27/99-05/03/99	Filter lost due to holder malfunction	Equipment repaired and returned to normal service; no further action necessary
4	Airborne	Air particulate & Charcoal filter	06/22/99-06/29/99	Sample not available due to Missouri River flood	Regular sampling resumed following flood; no further action necessary
3	Airborne	Air particulate & Charcoal filter	06/22/99-07/06/99	Sample not available due to Missouri River flood	Regular sampling resumed following flood; no further action necessary
9	Airborne	Air particulate & Charcoal filter	09/07/99-09/14/99	Results invalid due to low sample volume	Equipment repaired and returned to normal service; no further action necessary
8, 10	Airborne	Air particulate & Charcoal filter	11/16/99-11/23/99	Station not accessible due to poor road conditions	Regular sampling resumed when conditions allowed; no further action necessary
59	Ambient Gamma	TLD	01/26/99-04/27/99	Post destroyed	Equipment repaired and returned to normal service; no further action necessary
81, 88, 89	Ambient Gamma	TLD	04/27/99-07/07/99	Sample missing	TLD's for next sampling period were placed at sites; no further action taken
3	Ambient Gamma	TLD	04/27/99-07/07/99	Sample not available due to Missouri River flood	Regular sampling resumed following flood; no further action necessary
28	Aquatic	Fish	06/23/99	Bottom feeder not available	Attributable to natural seasonal variations; no further action necessary
28, 35, 96, 101	Ingestion	Broadleaf vegetation	05/25/99	Insufficient vegetation; partial or no sample at some sites	Attributable to natural seasonal variations; no further action necessary
28, 35	Ingestion	Broadleaf vegetation	06/15/99	Insufficient vegetation available; partial sample	Attributable to natural seasonal variations; no further action necessary
100	Ingestion	Milk - other producer	07/06/99	Sample not available from producer	Other milk sample collected at Station 99; no further action taken
35, 96, 101	Ingestion	Broadleaf vegetation	08/18/99	Insufficient vegetation; partial sample	Attributable to natural seasonal variations; Station 28 used for backup
35, 96, 101	Ingestion	Broadleaf vegetation	09/15/99	Insufficient vegetation; partial or no sample at some sites	Attributable to natural seasonal variations; no further action necessary
35, 96, 101	Ingestion	Broadleaf vegetation	10/12/99	Sample not available due to early frost	Attributable to natural seasonal variations; no further action necessary

APPENDIX F
SUMMARY OF DOSES TO A MEMBER OF THE PUBLIC OFF-SITE

TABLE 3. Summary of Doses to Maximum Individual at the Site Boundary, Resulting from Exposure to Radioactivity Discharged in Liquid Effluents, January-December 1999, Cooper Nuclear Station

Period and Pathway	Dose to Individual, mrem							
	Skin	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
1st Quarter	7.00 E-06	1.56 E-02	1.12 E-03	3.54 E-03	5.96 E-06	3.64 E-04	1.24 E-04	1.96 E-03
2nd Quarter	1.42 E-05	1.13 E-02	2.00 E-03	3.01 E-03	1.21 E-05	6.31 E-04	2.04 E-04	3.96 E-03
3rd Quarter	6.98 E-06	2.28 E-02	2.92 E-03	4.39 E-03	5.94 E-06	9.75 E-04	3.27 E-04	3.47 E-03
4th Quarter	5.06 E-06	1.48 E-02	2.10 E-03	3.97 E-03	4.31 E-06	7.02 E-04	2.35 E-04	1.66 E-03
Totals for 1999	3.32 E-05	6.45 E-02	8.14 E-03	1.49 E-02	2.83 E-05	2.67 E-03	8.90 E-04	1.11 E-02

Summary of Gaseous Effluent Dose Calculations
DOSES TO MAXIMUM INDIVIDUAL (MREM), JANUARY-DECEMBER 1999

COOPER NUCLEAR STATION JANUARY-DECEMBER 1999
SPECIAL LOCATION # 1 SITE BOUNDARY
AT 0.69 MILESNNW

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	1.36E-02	1.37E-02	1.64E-02	1.39E-02	1.41E-02	2.10E-01	1.32E-02	3.16E-02
TEEN	1.38E-02	1.38E-02	1.85E-02	1.45E-02	1.48E-02	2.86E-01	1.33E-02	3.16E-02
CHILD	1.43E-02	1.36E-02	2.61E-02	1.55E-02	1.58E-02	5.25E-01	1.33E-02	3.16E-02
INFANT	1.45E-02	1.32E-02	1.81E-02	1.70E-02	1.70E-02	1.09E+00	1.33E-02	3.16E-02

COOPER NUCLEAR STATION JANUARY-DECEMBER 1999
SPECIAL LOCATION # 2 NEAR RESIDENCE
AT 0.90 MILES NW

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	2.44E-02	2.46E-02	2.78E-02	2.46E-02	2.45E-02	1.31E-01	2.43E-02	5.56E-02
TEEN	2.45E-02	2.48E-02	3.02E-02	2.50E-02	2.49E-02	1.73E-01	2.44E-02	5.56E-02
CHILD	2.49E-02	2.45E-02	3.91E-02	2.58E-02	2.56E-02	3.04E-01	2.44E-02	5.56E-02
INFANT	2.47E-02	2.40E-02	2.83E-02	2.66E-02	2.62E-02	6.12E-01	2.44E-02	5.56E-02

APPENDIX G
REMP SAMPLE STATION DESCRIPTIONS

REMP SAMPLE STATION DESCRIPTIONS

The following pages contain descriptions of the CNS REMP Sample Stations that were active or used for part or all of 1999. Changes to existing sampling locations that occurred during the year include: Sample Station 42 was discontinued as a Milk – Other Producer location, Sample Station 99 was changed from the Milk – Nearest Producer to a Milk – Other Producer, Sample Station 61 was re-activated as Milk – Nearest Producer, and the Broadleaf Vegetation designation was removed for Stations 28 and 81. In accordance with CNS ODAM specifications Stations 35, 96, and 101 were selected as Broadleaf Vegetation sites for 1999. Note that Sample Station numbers missing from the following sequence are for inactive or discontinued sampling locations.

REMP SAMPLE STATION DESCRIPTIONS
SAMPLE TYPES AND SAMPLE LOCATIONS

<u>Sample Station</u> ^(a)	<u>Sample Description -- Type and Location</u>
No. 1	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: Outside the northwest edge of fence, east of the gate to the LLRW storage pad on the CNS site, NW1/4, S32, T5N, R16E, Nemaha County, Nebraska.
No. 2	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: North side of county road access to the south portion of CNS site, SW1/4, S32, T5N, R16E, Nemaha County, Nebraska.
No. 3	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry 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.
No. 4	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: Located 1/2 mile south of Phelps City, Missouri, on west side of Highway "U", NE1/4, S2, T64N, R42W, Atchison County, Missouri.
No. 5	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: Located 1/4 mile south and 1/4 mile east of Langdon, Missouri, on north side of road, west of railroad tracks, SW1/4, S18, T64N, R41W, Atchison County, Missouri.
No. 6	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: One mile west of the end of Missouri State Highway "U", SW corner of the intersection, NW1/4, S34, T64N, R42W, Atchison County, Missouri.

<u>Sample Station</u>	<u>Sample Description -- Type and Location</u>
No. 7	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: 300 yards east of Highway 67 on north side of road, SW1/4, S6, T4N, R16E, Nemaha County, Nebraska.
No. 8	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: 1/2 mile north, 3/4 mile west and 3/4 mile north of Nemaha, on west side of road adjacent to transmission line, NE1/4, S35, T5N, R15E, Nemaha County, Nebraska.
No. 9	Type: (1) Air Particulate and Charcoal Filters (2) Environmental Thermoluminescent Dosimetry Location: Four miles north of Highway 136, on Highway 67. Then 1 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 and 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) is taken from the Missouri River immediately upstream from the Plant Intake Structure (River Mile 532.5). (During periods when unsafe conditions warrant, Station 35 may be used as an alternate upstream collection site.)
No. 20	Type: (1) Environmental Thermoluminescent Dosimetry Location: On NNW boundary of NPPD property, east side of county road, SE1/4, S30, T5N, R16E, Nemaha County, Nebraska.

Sample
Station

Sample Description -- Type and Location

No. 28

Type: (1) Water – River, (2) Fish
(3) Sediment from Shoreline
(4) Food Products - Broadleaf Vegetation

Location: Samples (1), (3), and (4) are taken from the Missouri River or its shore downstream near River Mile 530. Sample (2) is taken from the Missouri River 1/2 to 3 miles downstream of the plant site.

No. 35

Type: (1) Fish
(2) Water - River (Alternate Site)
(3) Food Products – Broadleaf Vegetation

Location: Sample (1) will be taken twice a year from the Missouri River about 1 to 3 miles above the CNS intake structure. During periods when unsafe conditions warrant, Station 35 may be used as an alternate to Station 12 (upstream collection site) for sample type (2). Sample (3) is taken about 1/4 mile south of the Brownville State Recreation Area in Sector A.

No. 42

Type: (1) Milk – Other Producer

Location: One mile south, 1-1/4 miles east of Barada, Nebraska, south side of county road, NW1/4, S30, T3N, R17E, Richardson County, Nebraska.

No. 44

Type: (1) Environmental Thermoluminescent Dosimetry

Location: 1/4 mile south of Auburn Country Club on Highway 75, then 1/2 mile east of Highway 75 at fence line north of county road, SE1/4, S27, T5N, R14E, Nemaha County, Nebraska.

No. 47

Type: (1) Water - Ground

Location: At Falls City municipal water supply well approximately 2 miles south of Rulo, Nebraska, east side of road, out of main header flow meter, SW1/4, S20, T1N, R18E, Richardson County, Nebraska.

No. 56

Type: (1) Environmental Thermoluminescent Dosimetry

Location: 1-1/4 miles SW of Langdon, Missouri, on Highway "U", on the right side of the highway, NW1/4, S23, T64N, R42W, Atchison County, Missouri.

No. 58

Type: (1) Environmental Thermoluminescent Dosimetry

Location: Three miles south of Brownville, Nebraska, on county road, at the SE corner of the intersection with the farm road leading to Sample Station No. 2, SE1/4, S31, T5N, R16E, Nemaha County, Nebraska.

<u>Sample Station</u>	<u>Sample Description -- Type and Location</u>
No. 59	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile SSE of the CNS Elevated Release Point, in the vicinity 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 Highway 136, then 1 mile north on the county road, turn right and proceed approximately 1/2 mile east, on south side of road, 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 road, NW1/4, S19, T4N, R16E, Nemaha County, Nebraska.
No. 67	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2 miles west of Brownville, Nebraska, on Highway 136, then north 1-1/2 miles on county road and east 1/2 mile, on north side of road, NE1/4, S11, T5N, R15E, Nemaha County, Nebraska.
No. 71	Type: (1) Environmental Thermoluminescent Dosimetry Location: Two miles east of Phelps City, Missouri, on Highway 136, then south 1-1/2 miles on county road and west 1/4 mile, SE1/4, S6, T64N, R41W, Atchison County, Missouri.
No. 79	Type: (1) Environmental Thermoluminescent Dosimetry Location: 1-7/8 miles south of Brownville, NE, on east side of paved road, NPPD property, SE1/4, S30, T5N, R16E, Nemaha County, Nebraska.
No. 80	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/8 miles south of Brownville, on the east side of 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 NE corner of the intersection of the paved county road and CNS access road, NPPD property, NE1/4, S31, T5N, R16E, Nemaha County, Nebraska.

<u>Sample Station</u>	<u>Sample Description -- Type and Location</u>
No. 82	Type: (1) Environmental Thermoluminescent Dosimetry Location: 7/8 mile south of CNS in a field, on 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 1 mile to the junction of the driveway and county road (east side of drive), NE1/4, S19, T4N, R16E, Nemaha County, Nebraska.
No. 84	Type: (1) Environmental Thermoluminescent Dosimetry Location: 2-1/2 miles west of Brownville, NE, south side of Highway 136 west of Locust Grove School, NW1/4, S22, T5N, R15E, Nemaha County, Nebraska.
No. 85	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile east of Brownville, Nebraska, on Highway 136, then north 1/4 mile on the east side of the county road, NE1/4, S33, T65N, R42W, Atchison County, Missouri.
No. 86	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on Highway 136, then north 1-1/2 miles on Highway "D" on west side, SE1/4, S22, T65N, R42W, Atchison County, Missouri.
No. 87	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on Highway 136, then south 1/2 mile on county road and 3/4 mile west on county road to the end of the road, NW1/4, S3, T64N, R42W, Atchison County, Missouri.
No. 88	Type: (1) Environmental Thermoluminescent Dosimetry Location: One mile west of Phelps City, Missouri, on Highway 136, then south 2 miles at the end of the county road, 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 SE corner of the county road intersection, NE1/4, S14, T64N, R42W, Atchison County, Missouri.

<u>Sample Station</u>	<u>Sample Description -- Type and Location</u>
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, 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 south side of the water tower, 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, NE1/4, S24, T64N, R42W, Atchison County, Missouri.
No. 96	Type: (1) Food Products – Broadleaf Vegetation Location: Approximately 1 mile south of Brownville, Nebraska, along the paved road, in the road ditch in Sector R, SW1/4, S19, T5N, R16E, Nemaha County, Nebraska.
No. 99	Type (1) Milk (Nearest and Other Producer) Location: 1-1/4 miles south of Shubert, Nebraska, on the west side of Highway 67, NE1/4, S24, T3N, R15E, Richardson County, Nebraska.
No. 100	Type: (1) Milk (Other Producer) Location: Two miles south and 1 mile west of Shubert, Nebraska, SW1/4, S23, T3N, R15E, Richardson County, Nebraska.
No. 101	Type: (1) Food Products - Broadleaf Vegetation Location: 5-1/2 miles east and 1/2 mile north of Rock Port, Missouri, near the junction of Highway 136 and Highway 59, in Sector D, encompasses portions of several sections, Atchison County, Missouri.

NOTES: (a) Sample Station numbers missing from the sequence are for inactive or discontinued sampling locations.