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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
TRANSMITTAL OF THE ANNUAL RADIOLOGICAL
ENVIRONMENTAL OPERATING REPORT FOR 2000

Gentlemen:

Enclosed is one (1) copy of the Annual Radiological Environmental Operating Report for the CPSES Radiological Environmental Monitoring Program. This report is submitted pursuant to Section 5.6.2 of the CPSES Unit 1 and 2 Technical Specifications (Appendix A to Operating License Nos. NPF-87 and NPF-89). The report covers the period from January 1, 2000 through December 31, 2000 and summarizes the results of measurements and analysis of data obtained from samples collected during this interval.

If there are any questions regarding this report, contact Connie Wilkerson at (254) 897-0144 or Scott Bradley at (254) 897-5495.

C001

This communication contains no new licensing basis commitments regarding CPSES Units 1 and 2.

Sincerely,

C. L. Terry

By: Roger D. Walker
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CLW/clw
Enclosure

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TXU ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

2000 Annual Report

JANUARY 1 to DECEMBER 31, 2000

TXU ELECTRIC REVIEW/APPROVAL

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INTRODUCTION

I. INTRODUCTION

Results of the Radiological Environmental Monitoring Program for the Comanche Peak Steam Electric Station for 2000 is contained within this report. This report covers the period from January 1, 2000 through December 31, 2000 and summarizes the results of measurements and analyses of data obtained from samples collected during this interval.

A. Site and Station Description

Comanche Peak Steam Electric Station (CPSES) consists of two PWR units, each designed to operate at a power level of about 1150 megawatts (electrical). The station is located on Squaw Creek Reservoir in Somervell County about forty miles southwest of Fort Worth, Texas. Unit 1 received a low power operating license February 8, 1990 and achieved initial criticality on April 3, 1990. A full power license for Unit 1 was issued on April 17, 1990, and commercial operation was declared on August 13, 1990. Unit 2 achieved initial criticality on March 24, 1993 and synchronized to the electrical grid on April 9, 1993.

B. Objectives and Overview of the CPSES Monitoring Program

The United States Nuclear Regulatory Commission (USNRC) regulations require that nuclear power plants be designed, constructed, and operated to keep levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable (ALARA) (10 CFR 50.34a). To assure that these criteria are met, each license authorizing reactor operation includes technical specifications (10 CFR 50.36a) governing the release of radioactive effluents.

In-plant monitoring is used to assure that these predetermined release limits are not exceeded. However, as a precaution against unexpected and undefined processes which might allow undue accumulation of radioactivity in any sector of the environment, a program for monitoring the plant environs is also included.

Sampling locations were selected on the basis of local ecology, meteorology, physical characteristics of the region, and demographic and land use features of the site vicinity. The radiological environmental monitoring program was designed on the basis of the USNRC Branch Technical Position on radiological environmental monitoring issued by the Radiological Assessment Branch, Revision 1 (November 1979)[1], the CPSES Technical

Specifications[4] and the CPSES Offsite Dose Calculation Manual (ODCM)[5].

In 2000, the Radiological Environmental Monitoring Program included the measurement of ambient gamma radiation by thermoluminescent dosimetry; the determination of gamma emitters in sediment and fish; the determination of airborne gross beta, gamma emitters, and iodine-131; the measurement of tritium and gamma emitters in surface water; the measurement of tritium and gamma emitters in groundwater; the measurement of gross beta, tritium, iodine-131 and gamma emitters in drinking water; the determination of gamma emitters and iodine-131 in milk; and the measurement of gamma emitters in food products and gamma emitters and iodine-131 in broadleaf vegetation. Samples were collected by CPSES personnel. Sample analyses were performed by Teledyne Brown Engineering.

The regulations governing the quantities of radioactivity in reactor effluents allow nuclear power plants to contribute, at most, only a few percent increases above normal background radioactivity. Background levels at any one location are not constant but vary with time as they are influenced by external events such as cosmic ray bombardment, weapons test fallout, and seasonal variations. These levels also can vary spatially within relatively short distances reflecting variations in geological composition. To differentiate between background radiation levels and increases resulting from operation of CPSES, the radiological surveys of the plant environs are divided into preoperational and operational phases.

The preoperational phase of the program permits a general characterization of the radiation levels and concentrations prevailing prior to plant operation along with an indication of the degree of natural variation to be expected. The operational phase of the program obtains data which, when considered along with the data obtained in the preoperational phase, assist in the evaluation of the radiological impact of plant operation.

Preoperational measurements were conducted at CPSES from 1981 to 1989. These preoperational measurements were performed to:

1. Evaluate procedures, equipment and techniques.

2. Identify potentially important pathways to be monitored after the plant is in operation.

3. Measure background levels and their variations along potentially important pathways in the area surrounding the plant.

4. Provide baseline data for statistical comparison with future operational analytical results.

The operational Radiological Environmental Monitoring Program is conducted to:

1. Verify that measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways.

2. Verify the effectiveness of in-plant measures used for controlling the release of radioactive materials.

3. Identify changes in the use of areas at and beyond the site boundary that may impact the principal pathways of exposure.

This report documents the eleventh year of operational measurements and is submitted in accordance with the requirements of the CPSES Offsite Dose Calculation Manual, Part I, Administrative Control 6.9.1.3.

PROGRAM DESCRIPTIONS

II. PROGRAM DESCRIPTIONS

A. Sample Locations

Seventy-three locations within a radius of 20 miles from the CPSES site were included in the monitoring program for 2000. The number and location of monitoring points were determined by considering the locations where the highest off-site environmental concentrations have been predicted from plant effluent source terms, site hydrology, and site meteorological conditions. Other factors considered were applicable regulations, population distribution, ease of access to sampling stations, availability of samples at desired locations, security and future program integrity. Additionally an annual land use census is conducted to identify changes in the use of areas surrounding the plant. If changes are identified that impact the principal pathways of exposure, appropriate changes to the radiological environmental monitoring program are implemented. The results of the 2000 Land Use Census are provided in Appendix E.

The Radiological Environmental Monitoring Program for Comanche Peak is summarized in Table 1.

B. Sampling Methods and Procedures

To derive meaningful and useful data from the Radiological Environmental Monitoring Program, sampling methods and procedures are required which will provide samples representative of potential pathways of the area. The methods and procedures used for each pathway monitored are described below.

1. Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct (ambient) radiation levels at monitoring points. Sampling locations were chosen according to the criteria given in the USNRC Branch Technical Position on Radiological Monitoring (Revision 1, November 1979)[1]. The area around the station was divided into 16 radial sectors of 22-1/2 degrees each. TLDs were placed in all sectors. Thermoluminescent dosimeters were located in two rings around the station. An inner ring was located at the site boundary and an outer ring was located at a distance of 4 to 6 miles from the station.

Eleven additional TLDs were located at points of special interest, including two control locations. For routine TLD measurements, two dosimeters of $CaSO_4$:Dy in teflon cards were deployed at each selected location. One set of dosimeters was exchanged on a quarterly basis and the second set was exchanged on an annual basis. Additional sets of dosimeters were shipped with each exchange cycle to serve as in-transit controls.

For the fourth quarter of 2000, Panasonic TLD's of $CaSO_4$ were substituted for the routine $CaSO_4$ dosimeters used in years past. This fourth quarter of 2000 and all future TLD's will be of the Panasonic $CaSO_4$ variety and processed on site by the CPSES NVLAP Certified dosimetry section.

Individual dosimeters were calibrated by exposure to an accurately known radiation field from a calibrated Cs-137 source.

2. Air Particulates and Air Iodine

Air particulate and air iodine samples were collected from the eight locations described in Table 1. Each air particulate sample was collected by drawing air through a 47 millimeter diameter glass-fiber filter. Air iodine was collected by drawing air through a TEDA impregnated charcoal cartridge which was connected in series behind the filter. The filters and charcoal cartridges were collected weekly by CPSES staff. In the laboratory, air particulate filters were analyzed for gross beta activity and were composited quarterly for gamma spectrometry analysis. Charcoal cartridges were analyzed for iodine-131.

3. Milk

Milk samples were collected by CPSES staff monthly for January, February, November and December. March through October samples were collected every two weeks. Upon arrival at the laboratory, the milk samples were promptly analyzed for gamma emitters and for I-131 by utilizing radiochemistry techniques.

4. Water

The CPSES staff collected water at 11 locations. Surface water

was collected at four locations (N-19.3, ESE-1.4, N-1.5 and NE-7.4). Location N-1.5 provides samples representative of Squaw Creek Reservoir surface water at a location beyond significant influence of the plant discharge. Location ESE-1.4 provides samples representative of discharges from Squaw Creek Reservoir downstream to Squaw Creek and to Lake Granbury via the return line. (Note: There have been no discharges of water from Squaw Creek Reservoir to Lake Granbury via the return line since the start up of Unit 1.) Location NE-7.4 provides samples of Lake Granbury surface water down stream of the discharge from the return line from Squaw Creek Reservoir. A control sample is obtained from the Brazos River, upstream of Lake Granbury at location N-19.3. Surface water samples from Squaw Creek Reservoir locations were collected weekly and composited for monthly gamma isotopic analysis. Samples from Lake Granbury locations were collected monthly and analyzed by gamma spectroscopy. All surface water samples were also composited quarterly by location for tritium analysis.

Surface-drinking water was collected at two locations (N-9.9 and NNW-0.1). Samples of Squaw Creek Reservoir water were collected at location NNW-0.1. Samples from this location were analyzed pursuant to the drinking water requirements even though Squaw Creek Reservoir is not used as a potable water supply. Location N-9.9 was used to sample surface water from Lake Granbury near the intake of the City of Granbury potable water plant. Surface-drinking water samples were collected weekly and composited for iodine-131 analysis, gamma isotopic and gross beta analyses monthly. Tritium analyses were performed quarterly.

There are five groundwater locations (SSE-4.6, W-1.2, WSW-0.1, N-1.45 which are indicators and the control station, N-9.8). Groundwater supplies in the site area are not affected by plant effluents and are sampled only to provide confirmation that groundwater is not affected by plant discharges. Groundwater samples were collected quarterly. Gamma isotopic and tritium analyses were performed by location.

5. Fish

Fish samples were collected at two locations for the 2000 program. An area 2.0 miles east-northeast of the site in Squaw Creek Reservoir was chosen as the indicator location, and a location at Lake Granbury (NNE-8) was chosen as a control

location. Fish sampling was conducted in April and October for Station ENE-2.0 and NNE-8 .

Fish were collected by CPSES staff. Available edible species were gutted at the time of collection. Samples were then frozen and shipped to the laboratory for analysis. Fish were filleted in the laboratory and the edible portion analyzed by gamma spectrometry.

6. Shoreline Sediment

Shoreline sediment samples were collected in January and July from locations N-1.0 and SE-5.3. Samples were also collected from Lake Granbury at the control location N-9.9, and location NE-7.4, which is downstream of the discharge of the return line from Squaw Creek Reservoir. CPSES staff collected the sediment samples and shipped them to the laboratory for analysis by gamma spectrometry.

7. Food Products

For the year 2000, food product samples of pecans were collected by the CPSES staff at ENE-9.0 and shipped to the laboratory where they were analyzed for gamma emitters. This is the only available location to obtain food products grown for public consumption within the local area.

8. Broadleaf Vegetation

Broadleaf vegetation was collected from the control location (SW-13.5) and two indicator stations (N-1.45 and SW-1.0) near the site boundary. Broadleaf samples consisted mainly of native grasses. Gamma isotopic and iodine-131 analyses were performed for all broadleaf vegetation samples.

C. Interlaboratory Comparison Program

The CPSES Radiological Environmental Monitoring Program requires that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices be performed to demonstrate that the results of the environmental analyses are valid. To fulfill this requirement, Teledyne Brown Engineering, participated in the environmental

sample cross-check program conducted by the U.S. Environmental Protection Agency (EPA).

Beginning with 1996 the USEPA discontinued providing milk and air particulate filter samples and discontinued the program in 1998. Since the EPA is no longer involved in the program, there are no "approved" laboratories for Intercomparison Studies. For replacements, Teledyne Brown Engineering purchased comparable spiked samples from Analytics and Environmental Resource Associates (ERA). The results are presented in Appendix A.

D. Exceptions to the Sample Program

In accordance with section 6.9.1.3 of the ODCM(5), any deviations from the sampling schedule of Table 3.12.1 of the ODCM shall be reported in the annual environmental monitoring report. Appendix C contains a listing of all deviations and exceptions to the sample program.

SUMMARY AND DISCUSSION OF 2000 ANALYTICAL RESULTS

III. SUMMARY AND DISCUSSION OF 2000 ANALYTICAL RESULTS

Data from the radiological analyses of environmental media collected during the report period are tabulated and discussed below. The procedures and specifications followed in the laboratories for these analyses are as required in the Teledyne Brown Engineering, Quality Assurance Manual IWL-0032-395 and are detailed in Teledyne Brown Engineering Procedures Manual. A synopsis of analytical procedures is contained in Appendix B of this report.

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods as discussed in NCRP Report No. 50[2]. The use of "<" in the data tables symbolizes that the result is less than the lower limit of detection (LLD) as defined in Appendix B. The Teledyne Brown Engineering analytical methods met the LLD requirements addressed in the CPSES Offsite Dose Calculation Manual, except as noted in Appendix C.

Tables 2 through 19 give the radioanalytical results for individual samples. The reported averages are based only on concentrations above the limit of detection.

A. Direct Radiation

Environmental radiation dose rates determined by thermoluminescent dosimeters (TLDs) are given in Table 2. Thermoluminescent dosimetry badges with four readout areas each were deployed at each location on quarterly and annual cycles. The mean values of four readings (corrected individually for response to a known dose and for in-transit exposure) are reported.

A statistical summary of the 2000 data is included in Table 20. For the quarterly analyses the average dose rate of the control locations was 0.18 mR/day with a range of 0.16-0.19 mR/day. The average of the indicator locations for the quarterly samples was 0.17 mR/day with a range of 0.12 to 0.26 mR/day. For the annual samples, the average dose rate for the control samples was 0.14 mR/day. The indicator locations had an average of 0.13 mR/day with a range of 0.09-0.17 mR/day.

Oakley[3] calculates an ionizing background radiation dose equivalent of 82.2 mR/year for Fort Worth including a terrestrial component of 45.6 mR/year and an ionizing cosmic ray component of 36.6 mR/year (excludes neutron component). Since Oakley's values represent averages covering wide geographical areas, the measured ambient

radiation average of 58.4 mR/year for the immediate locale of CPSES is consistent with Oakley's observations. Significant variations occur between geographical areas as a result of geological composition and altitude differences. Temporal variations result from changes in cosmic ray intensity, local human activities, and factors such as ground cover and soil moisture.

Anomalies in the 2000 measured doses relative to preoperational data were not noted. For 1989, the averages for the indicator locations were 0.16 mR/day (range of 0.11 to 0.22) and 0.13 mR/day (range of 0.11 to 0.17), for the quarterly and annual samples respectively. The 1988 averages for the quarterly and annual indicator locations were 0.16 mR/day (range of 0.10 to 0.20) and 0.15 mR/day (range of 0.12 to 0.18) respectively.

B. Air Particulates and Air Iodine

A total of 416 charcoal cartridges were analyzed for airborne iodine-131 by gamma spectrometry. No iodine-131 was detected at any of the sampling stations. Results of these measurements are presented in Table 3.

A total of 416 air particulate filters were collected and analyzed for gross beta activity. For 2000 the average gross beta activity for the control location was 0.026 pCi/m^3 with a range from 0.008 to 0.049 pCi/m^3. For the seven indicator locations the yearly average was 0.024 pCi/m^3 with a range from 0.009 to 0.071 pCi/m^3. The gross beta analysis data are presented in Table 4. Anomalies in gross beta measurements relative to preoperational data were not noted.

Air filters were composited quarterly and then analyzed by gamma spectrometry. The gamma spectrometry data is presented in Table 5. Cosmogenic beryllium-7 was detected in all 32 samples. The average beryllium-7 activity for the control location was 0.083 pCi/m^3 with a range of 0.076 to 0.096 pCi/m^3. For the indicator locations, the average beryllium-7 activity was 0.080 pCi/m^3 with a range of 0.006 to 0.119 pCi/m^3. Potassium-40, a naturally occurring nuclide, was measured in thirteen samples. The average potassium-40 for the control location was 0.010 pCi/m^3. The average potassium-40 activity for the indicator locations was 0.010 pCi/m^3 with a range of 0.006 to 0.020 pCi/m^3.

Two composite samples for the 4th quarter resulted in positive values for Cs-137. One sample, the control location was reported as 0.0008 pCi/m3 while the indicator location was reported as 0.0009 pCi/m3.

C. Milk

A total of 21 milk samples were collected in 2000. Twenty samples were analyzed for iodine-131 by radiochemistry and for other gamma emitting isotopes by gamma spectrometry. Results of these measurements are presented in Table 6 and 7 and exceptions to the program are discussed in Appendix C.

No iodine-131 was found in any of the milk samples. The lower limits of detection can be found in Table 6 and exceptions to the program are discussed in Appendix C.

Results of the gamma spectrometry measurements are presented in Table 7. Naturally occurring potassium-40 was detected in all of the milk samples. The average activity for the control location was 1334 pCi/l with a range of 1100 to 1610 pCi/l. Cesium-134, Cs-137 and La-140/Ba-140 were not detected in any of the samples. The lower limits of detection can be found in Table 7 and exceptions to the program are discussed in Appendix C.

D. Water

Groundwater samples were collected from five locations during 2000. The samples were analyzed for gamma emitters and tritium on a quarterly basis, pursuant to the ODCM requirements for groundwater. Twenty samples were analyzed for gamma emitters by gamma spectrometry. Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb/Zr-95, Cs-134, Cs-137 and Ba/La-140 were not detected in any of the samples. Potassium-40 was reported in two samples, one at SSE-4.6 and one at WSW-0.1, both of which are suspect due to the vendor not achieving the required LLD's. Quarterly samples for each sampling location were analyzed for tritium; no tritium was detected. Results of these analyses are contained in Table 8 and 9 respectively. Exceptions to the program are discussed in Appendix C.

Surface-drinking water was collected from two stations. All samples were analyzed for gamma emitters; results were below the lower limit of detection. Twenty-four samples were analyzed for gross beta activity. The indicator station had an average activity of 22.5 pCi/l with a range of 12 to 29 pCi/l. The control station had an average activity of 16.4 pCi/l with a range of 7 to 43 pCi/l. Eight quarterly composites were analyzed for tritium. The indicator station had an average activity of 11000 pCi/l. The control station showed no tritium activity above the lower limit of detection. Iodine-131 analyses by radiochemistry were performed on 22 samples of surface-drinking water; there was no measurable activity. Results of these analyses

are contained in Tables 10 through 13. Exceptions to the program are discussed in Appendix C.

Surface water was sampled from four locations during 2000. Samples were analyzed for gamma isotopic on a monthly basis (composite (2) and monthly (2)) and tritium composites on a quarterly basis. Forty-eight samples were analyzed by gamma spectrometry. Results of these analyses were below the lower limit of detection. Sixteen composited surface water samples were analyzed for tritium. The indicator stations had an average activity of 11000 pCi/l. The results of these analyses can be found in Table 14 and 15 respectively. The 3rd quarter and 4th quarter results were lower than predicted and the values reported by the laboratory are not consistent with the expected values and are not consistent with the results reported by the State of Texas. CPSES is using the results reported by the State of Texas as the correct value for lake tritium levels. The tritium detected in Squaw Creek Reservoir samples of surface water and surface-drinking water is attributed to liquid effluent discharges from CPSES. The level of tritium in the Squaw Creek Reservoir is well within the expected value predicted in the CPSES Final Safety Analysis Report. Exceptions to the program are discussed in Appendix C.

E. Fish

The results of gamma isotopic analyses of fish samples collected during 2000 are presented in Table 16. A total of four samples were analyzed, two from the indicator location (ENE-2) and two from the control location (NNE-8). Sampling efforts concentrated on the larger edible species of commercial and/or recreational importance. Exceptions to the program are discussed in Appendix C.

Cesium-137 was not detected in any of the samples. Preoperational levels of Cesium-137 have ranged from 3 to 39 pCi/kg wet on thirteen different occasions. Naturally occurring potassium-40 was detected in all samples. The average potassium-40 concentration for the two indicator samples is 2965 pCi/kg wet with a range of 2850 to 3080 pCi/kg wet. The average concentration for the control location is 2670 pCi/kg wet with a range of 2280 to 3060 pCi/kg wet. No other gamma emitters were detected in any samples.

F. Shoreline Sediments

The processes by which radionuclides and stable elements are concentrated in bottom sediments are complex, involving physiochemical interaction in the environment between the various organic and inorganic materials from the watershed. These interactions can proceed by a myriad of steps in which the elements are absorbed in or

displaced from the surfaces of colloidal particles enriched with chelating organic materials. Biological action of bacteria and other benthic organisms also contribute to the concentration of certain elements and in the acceleration of the sedimentation process.

Results of the gamma isotopic analyses of the sediments sampled from the CPSES environment are given in Table 17. For 2000 four locations, one control and three indicators, were sampled. Naturally occurring gamma emitters found in detectable concentrations were Be-7, K-40, Pb-212, Bi-214, Pb-214, Ra-226 and Th-228. Cesium-137 was measured in two samples, one from indicator station SE-5.3 at 115 pCi/kg dry and one from control station N-9.9 at 81.9 pCi/kg dry. Preoperational levels of Cesium-137 have ranged from 9.2 to 150 pCi/kg on four different occasions.

G. Food Products

Results of gamma isotopic analyses of food samples are contained in Table 18. Pecans were analyzed from ENE-9.0 as the only available commercial food product. Potassium-40, a naturally occurring isotope, was found with an activity of 2530 pCi/kg wet. Naturally occurring beryllium-7 was not detected. Iodine-131, Cs-134 and Cs-137 were not detected. Garden sites used in past years have all been unavailable for the last two years due to extremes in weather. For 2000, only location FP-1 (pecans) remained as a required sample location.

H. Broadleaf Vegetation

Results of gamma isotopic analyses of broadleaf vegetation samples are contained in Table 19. A total of 36 samples were analyzed from three locations. Potassium-40, a naturally occurring isotope, was found in 35 samples. The average potassium-40 activity for the control location was 5064 pCi/kg wet with a range of 1770 to 8100 pCi/kg wet. For the indicator locations the average potassium-40 activity was 4119 pCi/kg wet with a range of 1590 to 10400 pCi/kg wet. Naturally occurring beryllium-7 was detected in twenty-two indicator samples with an average activity of 2928 pCi/kg wet; the range was 393 to 5800 pCi/kg wet. Nine of the twelve samples from control station SW-13.5 were found to have beryllium-7 with an average activity of 2102 pCi/kg wet and a range of 534 to 5700 pCi/kg wet. The laboratory failed to analyze for I-131 (low level) for samples collected on 12-26-00 and failed to achieve the required LLD's for Cs-134 and Cs-137 for samples collected 09-26-00. Two positive values were reported for Cs-137, 20.5pCi/kg and 16.0 pCi/kg, both within the normal range for pre-operational and operational historical values.

CONCLUSIONS

IV. Conclusions

It is concluded, from the results obtained from radiological environmental samples during the year 2000 and by comparison of these levels to preoperational measurements and operational controls, that the operation of CPSES during the year 2000 resulted in no changes in measurable levels of radiation or radioactive materials in the environment, except for the tritium detected in Squaw Creek Reservoir.

The atmospheric environment was sampled for airborne particulate matter, radioiodine and direct radiation. The terrestrial environment was sampled using milk, groundwater, surface drinking water, food products, and broadleaf vegetation samples. The aquatic environment was sampled using surface water, fish, and shoreline sediment samples. The analyses of these samples provided results which were either below the measurement detection limits, or were indicative of natural terrrestrial and cosmic ray radiation levels, except for the tritium in the surface water of Squaw Creek Reservoir which was below the reporting levels for radioactivity concentrations in environmental samples.

REFERENCES

V. REFERENCES

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2. National Council on Radiation Protection and Measurements, "Environmental Radiation Measurements", NCRP Report No. 50, Washington, D.C., December 27, 1976

3. Oakley, D.C., "Natural Radiation Exposure in the United States", ORP/SID 72-1 Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C., June 1972

4. Comanche Peak Steam Electric Station Units 1 and 2 Technical Specifications

5. Offsite Dose Calculation Manual For TXU Electric Comanche Peak Steam Electric Station Units 1 and 2.

DATA TABLES

TABLE 1
(Page 1 of 2)
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM -- 2000

Media	Number of Locations	Identification by Sector and Distance (Miles)	Sampling Frequency (a)	Analyses	Analytical Frequency (a)
Gamma Exposure	43	N-1.45; N-4.4; N-6.5; N-9.4; NNE-1.1; NNE-5.65; NE-1.7; NE-4.8; ENE-2.5; ENE-5.0; E-0.5; E-1.9; E-3.5; E-4.2; ESE-1.4; ESE-4.7; SE-1.3; SE-3.85; SE-4.6; SSE-1.3; SSE-4.4; SSE-4.5; S-1.5; S-4.2; SSW-1.1; SSW-4.4; SW-0.9; SW-4.8; SW-12.3; WSW-1.0; WSW-5.35; WSW-7.0; W-1; W-2; W-5.5; WNW-1; WNW-5.0; WNW-6.7; NW-1; NW-5.7; NW-9.9; NNW-1.35; NNW-4.6	Q,A	Thermoluminescent Dosimetry	Q,A
Air Particulate Air Iodine	8	N-9.4 E-3.5; SSE-4.5 SW-12.3; NW-1.0; N-1.45; SW/WSW-0.95 S/SSW-1.2	W	Gross Beta Gamma Spectrometry Filter Gamma Spectrometry Charcoal Cartridge	W QC W
Surface Water	4	N-19.3; ESE-1.4; N-1.5 NE-7.4	M (b)	Gamma Spectrometry Tritium	M QC
Groundwater	5	SSE-4.6 W-1.2; WSW-0.1 N-9.8; N-1.45	Q	Gamma Spectrometry Tritium	Q Q
Water-Surface Drinking	2	NNW-0.1; N-9.9	M (c)	Gross Beta Gamma Spectrometry Iodine-131 Tritium	M M M QC

TABLE 1
(Page 2 of 2)
T X U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM -- 2000

Media	Number of Locations	Identification by Sector and Distance (Miles)	Sampling Frequency (a)	Analyses	Analytical Frequency (a)
Sediment	4	N-9.9; NNE-1; NE-7.4 SE-5.3	SA	Gamma Spectrometry	SA
Fish	2	NNE-8; ENE-2	SA	Gamma Spectrometry	SA
Milk	1	SW-14.5	SM, (d)	Iodine-131	SM, (d)
				Gamma Spectrometry	SM (d)
Food Products	1	ENE-9.0	MH	Gamma Spectrometry Iodine-131	MH MH
Broadleaf Vegetation	3	N-1.45; SW-1.0; SW-13.5	M	Gamma Spectrometry	M
				Iodine-131	M

(a) Frequency Codes Are:

W = Weekly
M = Monthly
Q = Quarterly
QC = Quarterly Composite
SM = Semimonthly (i.e., once per 2-week period)
MH = Monthly during availability for harvest
SA = Semiannual
A = Annual

(b) Surface water samples from Squaw Creek Reservoir are monthly composites of weekly grab samples. Samples from Lake Granbury are monthly composites of weekly grab samples when Lake Granbury is receiving letdown from Squaw Creek Reservoir; otherwise they are monthly grab samples.

(c) Drinking water samples are a monthly composite of weekly grab samples.

(d) Milk sample collection and analysis frequency is semimonthly when animals are on pasture. Otherwise samples are collected and analyzed monthly.

FIGURE 1

KEY OF ENVIRONMENTAL SAMPLING LOCATIONS

SAMPLING POINT	LOCATION (SECTOR-MILE)	SAMPLE TYPE*	SAMPLING POINT	LOCATION (SECTOR-MILE)	SAMPLE TYPE*
A1	N-1.45	A	R28	SW-4.8	R
A2	N-9.4	A	R29	SW-12.3	R
A3	E-3.5	A	R30	WSW-1.0	R
A4	SSE-4.5	A	R31	WSW-5.35	R
A5	S/SSW-1.2	A	R32	WSW-7.0	R
A6	SW-12.3	A	R33	W-1.0	R
A7	SW/WSW-0.95	A	R34	W-2.0	R
A8	NW-1.0	A	R35	W-5.5	R
			R36	WNW-1.0	R
			R37	WNW-5.0	R
			R38	WNW-6.7	R
			R39	NW-1.0	R
			R40	NW-5.7	R
R1	N-1.45	R	R41	NW-9.9	R
R2	N-4.4	R	R42	NNW-1.35	R
R3	N-6.5	R	R43	NNW-4.6	R
R4	N-9.4	R	SW1	N-1.5	SW
R5	NNE-1.1	R	SW2	N-9.9	SW/DW
R6	NNE-5.65	R	SW3	N-19.9	SW
R7	NE-1.7	R	SW4	NE-7.4	SW
R8	NE-4.8	R	SW5	ESE-1.4	SW
R9	ENE-2.5	R	SW6	NNW-0.1	SW/DW
R10	ENE-5.0	R	GW1	W-1.2	GW/DW
R11	E-0.5	R	GW2	WSW-0.1	GW/DW
R12	E-1.9	R	GW3	SSE-4.6	GW/DW
R13	E-3.5	R	GW4	N-9.8	GW/DW
R14	E-4.2	R	GW5	N-1.45	GW/DW
R15	ESE-1.4	R	SS1	NNE-1.0	SS
R16	ESE-4.7	R	SS2	N-9.9	SS
R17	SE-1.3	R	SS3	NE-7.4	SS
R18	SE-3.85	R	SS4	SE-5.3	SS
R19	SE-4.6	R	M4	SW-14.5	M
R20	SSE-1.3	R	F1	ENE-2.0	F
R21	SSE-4.4	R	F2	NNE-8.0	F
R22	SSE-4.5	R	FP1	ENE-9.0	FP
R23	S-1.5	R	BL1	N-1.45	BL
R24	S-4.2	R	BL2	SW-1.0	BL
R25	SSW-1.1	R	BL3	SW-13.5	BL
R26	SSW-4.4	R			
R27	SW-0.9	R			

TYPE*
- A - AIR SAMPLE
- R - DIRECT RADIATION
- SW - SURFACE WATER
- DW - DRINKING WATER
- GW - GROUNDWATER
- SS - SHORELINE SEDIMENT
- M - MILK
- F - FISH
- FP - FOOD PRODUCT
- BL - BROADLEAF VEGETATION

TABLE 2
TEXAS UTILITY ELECTRIC COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
Direct Radiation - Thermoluminescent Dosimetry
Results in mR/day ± 2 s. d.

Station	FIRST QUARTER 01/05/00 - 04/05/00	SECOND QUARTER 04/05/00 – 07/05/00	THIRD QUARTER 07/05/00 - 10/03/00	FOURTH QUARTER 10/03/00 - 01/03/01	AVERAGE ± 2 S.D.	ANNUAL 01/05/00-01/03/01
N-1.45	0.15 ±0.013	0.17 ±0.004	0.18 ±0.013	0.18 ±0.028	0.17 ±0.015	0.13 ±0.010
N-4.4	0.17 ±0.012	0.19 ±0.008	0.19 ±0.008	0.22 ±0.020	0.19 ±0.012	0.15 ±0.011
N-6.5	0.18 ±0.017	0.19 ±0.013	0.17 ±0.013	0.18 ±0.027	0.18 ±0.018	0.14 ±0.018
N-9.4	0.17 ±0.010	0.18 ±0.013	0.17 ±0.020	0.17 ±0.026	0.17 ±0.017	0.14 ±0.011
NNE-1.1	0.13 ±0.014	0.14 ±0.018	0.13 ±0.009	0.13 ±0.018	0.13 ±0.015	0.09 ±0.007
NNE-5.65	0.18 ±0.009	0.18 ±0.010	0.18 ±0.017	0.19 ±0.027	0.18 ±0.016	0.14 ±0.009
NE-1.7	0.16 ±0.002	0.15 ±0.027	0.15 ±0.010	0.16 ±0.027	0.16 ±0.017	0.12 ±0.008
NE-4.8	0.17 ±0.007	0.18 ±0.003	0.18 ±0.007	0.17 ±0.024	0.18 ±0.010	0.13 ±0.011
ENE-2.5	0.20 ±0.019	0.21 ±0.020	**Stolen**	**Stolen**	0.21 ±0.020	**Stolen**
ENE-5	0.21 ±0.019	0.21 ±0.011	0.22 ±0.014	0.22 ±0.037	0.22 ±0.020	0.17 ±0.021
E-0.5	0.17 ±0.013	0.18 ±0.023	0.18 ±0.016	0.20 ±0.020	0.18 ±0.018	0.14 ±0.021
E-1.9	0.16 ±0.004	0.16 ±0.013	0.16 ±0.008	0.15 ±0.017	0.16 ±0.011	0.11 ±0.009
E-3.5	0.21 ±0.014	0.21 ±0.012	0.21 ±0.013	0.24 ±0.021	0.22 ±0.015	0.18 ±0.004
E-4.2	0.19 ±0.008	0.19 ±0.008	0.19 ±0.014	0.21 ±0.010	0.20 ±0.010	0.16 ±0.022
ESE-1.4	0.17 ±0.006	0.18 ±0.012	0.17 ±0.012	0.18 ±0.023	0.18 ±0.013	0.14 ±0.004
ESE-4.7	0.16 ±0.010	0.19 ±0.007	0.19 ±0.007	0.19 ±0.002	0.18 ±0.007	0.16 ±0.012
SE-1.3	0.19 ±0.013	0.19 ±0.009	0.20 ±0.019	0.27 ±0.121	0.21 ±0.041	0.16 ±0.028
SE-3.85	0.17 ±0.016	0.17 ±0.008	0.17 ±0.003	0.18 ±0.010	0.17 ±0.009	0.13 ±0.010
SE-4.6	0.17 ±0.021	0.18 ±0.019	0.18 ±0.006	0.18 ±0.029	0.18 ±0.019	0.14 ±0.020
SSE-1.3	0.17 ±0.010	0.18 ±0.010	0.17 ±0.013	0.11 ±0.012	0.16 ±0.011	0.13 ±0.003
SSE-4.4	0.17 ±0.010	0.19 ±0.003	0.18 ±0.007	0.19 ±0.008	0.18 ±0.007	0.14 ±0.013
SSE-45	0.17 ±0.009	0.18 ±0.004	0.17 ±0.012	0.20 ±0.036	0.18 ±0.015	0.14 ±0.009
S-1.5	0.17 ±0.004	0.17 ±0.007	0.16 ±0.010	0.23 ±0.060	0.18 ±0.020	0.12 ±0.007
S-4.2	0.17 ±0.009	0.17 ±0.006	0.17 ±0.005	0.24 ±0.056	0.19 ±0.019	0.13 ±0.004
SSW-1.1	0.16 ±0.014	0.17 ±0.018	0.16 ±0.010	0.22 ±0.008	0.18 ±0.013	0.14 ±0.011
SSW-4.4	0.16 ±0.044	0.18 ±0.018	0.17 ±0.013	0.23 ±0.023	0.19 ±0.025	0.13 ±0.018
SW-0.9	0.17 ±0.013	0.17 ±0.018	0.16 ±0.008	0.17 ±0.026	0.17 ±0.016	0.13 ±0.009
SW-4.8	0.17 ±0.009	0.17 ±0.010	0.15 ±0.023	0.17 ±0.020	0.17 ±0.016	0.13 ±0.024
SW-12.3	0.18 ±0.006	0.18 ±0.017	0.18 ±0.006	0.17 ±0.060	0.18 ±0.022	0.14 ±0.018
WSW-1	0.17 ±0.019	0.17 ±0.018	0.17 ±0.012	0.19 ±0.004	0.18 ±0.013	0.14 ±0.010
WSW-5.35	0.17 ±0.019	0.17 ±0.005	0.16 ±0.006	0.18 ±0.011	0.17 ±0.010	0.13 ±0.004
WSW-7	0.18 ±0.031	0.18 ±0.008	0.17 ±0.007	0.19 ±0.011	0.18 ±0.014	0.14 ±0.011
W-1	0.16 ±0.010	0.16 ±0.006	0.15 ±0.006	0.20 ±0.006	0.17 ±0.007	0.12 ±0.008
W-2	0.15 ±0.009	0.16 ±0.004	0.14 ±0.007	0.15 ±0.020	0.15 ±0.010	0.12 ±0.011
W-5.5	0.20 ±0.018	0.17 ±0.001	0.16 ±0.006	0.19 ±0.024	0.18 ±0.012	0.13 ±0.008
WNW-1	0.19 ±0.009	0.19 ±0.013	0.18 ±0.009	0.19 ±0.009	0.19 ±0.010	0.15 ±0.006
WNW-5	0.18 ±0.018	0.18 ±0.013	0.18 ±0.010	0.23 ±0.017	0.19 ±0.015	0.13 ±0.009
WNW-6.7	0.17 ±0.008	0.18 ±0.002	0.17 ±0.007	0.18 ±0.029	0.18 ±0.012	0.13 ±0.009
NW-1	0.17 ±0.014	0.17 ±0.008	0.17 ±0.006	0.17 ±0.018	0.17 ±0.012	0.13 ±0.008
NW-5.7	0.17 ±0.024	0.18 ±0.003	0.15 ±0.026	0.18 ±0.026	0.17 ±0.020	0.13 ±0.003
NW-9.9	0.16 ±0.007	0.17 ±0.006	0.15 ±0.029	0.16 ±0.030	0.16 ±0.018	0.12 ±0.007
NNW-1.35	0.14 ±0.008	0.14 ±0.017	0.13 ±0.005	0.13 ±0.008	0.14 ±0.010	0.10 ±0.004
NNW-4.6	0.18 ±0.006	0.20 ±0.006	0.19 ±0.008	0.19 ±0.037	0.19 ±0.014	0.15 ±0.009

TLD's at location R-9 (ENE-2.5) were stolen for 3rd, 4th Quarter and Annual time frame.

TABLE 3
(Page 1 of 2)
TEXAS UTILITIES ELECTRIC COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF I-131 IN FILTERED AIR
Results in Units of pCi/m3 ± 2 s.d.

STATION COLLECTION DATE	NW-1.0	SW/WSW-0.95	S/SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4
JANUARY								
12/28/99-01/04/00	<0.02	<0.02	<0.02	<0.02	<0.009	<0.009	<0.009	<0.009
01/04/00-01/11/00	<0.02	<0.02	<0.02	<0.02	<0.01	<0.009	<0.009	<0.009
01/11/00-01/18/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
01/18/00-01/25/00	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
01/25/00-02/01/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FEBRUARY								
02/01/00-02/08/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
02/08/00-02/15/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
02/15/00-02/22/00	<0.009	<0.009	<0.009	<0.009	<0.02	<0.02	<0.02	<0.02
02/22/00-02/29/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
MARCH								
02/29/00-03/07/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
03/07/00-03/14/00	<0.01	<0.01	<0.01	<0.01	<0.009	<0.009	<0.009	<0.009
03/14/00-03/21/00	<0.009	<0.009	<0.009	<0.009	<0.02	<0.02	<0.02	<0.02
03/21/00-03/28/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.03	<0.01
APRIL								
03/28/00-04/04/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
04/04/00-04/11/00	<0.01	<0.01	<0.01	<0.01	<0.009	<0.009	<0.009	<0.009
04/11/00-04/18/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
04/18/00-04/25/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MAY								
04/25/00-05/02/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
05/02/00-05/09/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
05/09/00-05/16/00	<0.01	<0.01	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
05/16/00-05/23/00	<0.008	<0.008	<0.008	<0.008	<0.01	<0.01	<0.01	<0.01
05/23/00-05/30/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
JUNE								
05/30/00-06/06/00	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
06/06/00-06/13/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02
06/13/00-06/20/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01
06/20/00-06/27/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 3
(Page 2 of 2)
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF I-131 IN FILTERED AIR
Results in Units of pCi/m3 ± 2 s.d.

STATION COLLECTION DATE	NW-1.0	SW/WSW-0.95	S/SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4
JULY								
06/27/00-07/04/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
07/04/00-07/11/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
07/11/00-07/18/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
07/18/00-07/25/00	<0.009	<0.01	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
07/25/00-08/01/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AUGUST								
08/01/00-08/08/00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
08/08/00-08/15/00	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
08/15/00-08/22/00	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004
08/22/00-08/29/00	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
SEPTEMBER								
08/29/00-09/05/00	<0.01	<0.01	<0.01	<0.008	<0.01	<0.01	<0.01	<0.01
09/05/00-09/12/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09/12/00-09/19/00	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
09/19/00-09/26/00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09/26/00-10/03/00	<0.023	<0.023	<0.023	<0.0229	<0.0127	<0.0109	<0.012	<0.0117
OCTOBER								
10/03/00-10/10/00	<0.00657	<0.0656	<0.00656	<0.00653	<0.00469	<0.00638	<0.00641	<0.00333
10/10/00-10/17/00	<0.00885	<0.00884	<0.00884	<0.00887	<0.00464	<0.005	<0.00564	<0.00522
10/17/00-10/24/00	<0.0106	<0.0152	<0.00908	<0.0152	<0.0143	<0.0143	<0.0143	<0.0143
10/24/00-10/31/00	<0.0124	<0.0124	<0.0123	<0.0123	<0.0088	<0.0103	<0.0103	<0.0101
NOVEMBER								
10/31/00-11/07/00	<0.00855	<0.00854	<0.00859	<0.00855	<0.00537	<0.0078	<0.00779	<0.00788
11/07/00-11/14/00	<0.0104	<0.0104	<0.00573	<0.00893	<0.00892	<0.00891	<0.00887	<0.00462
11/14/00-11/21/00	<0.0114	<0.0114	<0.00813	<0.0119	<0.0119	<0.0119	<0.0119	<0.00752
11/21/00-11/28/00	<0.00862	<0.00862	<0.00862	<0.00851	<0.00534	<0.00869	<0.00868	<0.00862
DECEMBER								
11/28/00-12/05/00	<0.0111	<0.011	<0.011	<0.0111	<0.00997	<0.00997	<0.00995	<0.00993
12/05/00-12/12/00	<0.0108	<0.0108	<0.0108	<0.0108	<0.00749	<0.0123	<0.00123	<0.0122
12/12/00-12/19/00	<0.0123	<0.0123	<0.0123	<0.00664	<0.00924	<0.00924	<0.00922	<0.00917
12/19/00-12/26/00	<0.0122	<0.0122	<0.0122	<0.00879	<0.01	<0.01	<0.01	<0.0074

TABLE 4
(Page 1 of 2)
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GROSS BETA EMITTERS IN AIR PARTICULATES
Results in Units of 10-3 pCi/m3 ± 2 s.d.

STATION COLLECTION DATE	NW-1.0	SW/WSW-0.95	S/SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4
JANUARY								
12/28/99-01/04/00	28 ± 4	38 ± 4	31 ± 4	25 ± 4	32 ± 4	30 ± 4	31 ± 4	50 ± 4
01/04/00-01/11/00	31 ± 4	31 ± 4	25 ± 4	27 ± 4	27 ± 4	26 ± 4	23 ± 3	36 ± 4
01/11/00-01/18/00	18 ± 3	20 ± 3	19 ± 3	18 ± 3	21 ± 3	16 ± 3	20 ± 3	26 ± 4
01/18/00-01/25/00	41 ± 4	45 ± 4	36 ± 4	36 ± 4	40 ± 4	37 ± 4	37 ± 4	54 ± 5
01/25/00-02/01/00	24 ± 4	25 ± 4	25 ± 4	23 ± 3	24 ± 4	27 ± 4	23 ± 3	33 ± 4
FEBRUARY								
02/01/00-02/08/00	34 ± 4	36 ± 4	34 ± 4	29 ± 4	37 ± 4	33 ± 4	32 ± 4	50 ± 4
02/08/00-02/15/00	45 ± 4	45 ± 4	51 ± 4	47 ± 4	48 ± 4	48 ± 4	48 ± 4	71 ± 5
02/15/00-02/22/00	28 ± 4	30 ± 4	30 ± 4	32 ± 4	36 ± 4	31 ± 4	28 ± 4	43 ± 4
02/22/00-02/29/00	16 ± 3	17 ± 3	15 ± 3	19 ± 3	23 ± 3	20 ± 3	16 ± 3	23 ± 3
MARCH								
02/29/00-03/07/00	18 ± 3	16 ± 3	17 ± 3	19 ± 3	18 ± 3	17 ± 3	18 ± 3	22 ± 3
03/07/00-03/14/00	21 ± 3	17 ± 3	18 ± 3	20 ± 3	20 ± 3	21 ± 3	18 ± 3	27 ± 4
03/14/00-03/21/00	13 ± 3	17 ± 3	14 ± 3	15 ± 3	14 ± 3	18 ± 3	14 ± 3	21 ± 3
03/21/00-03/28/00	14 ± 3	17 ± 3	19 ± 3	18 ± 3	15 ± 3	16 ± 3	52 ± 9	25 ± 4
APRIL								
03/28/00-04/04/00	17 ± 4	25 ± 4	22 ± 4	16 ± 4	15 ± 4	16 ± 4	24 ± 4	23 ± 4
04/04/00-04/11/00	21 ± 3	22 ± 3	14 ± 3	16 ± 3	18 ± 3	16 ± 3	21 ± 3	15 ± 3
04/11/00-04/18/00	15 ± 3	19 ± 3	19 ± 3	17 ± 3	18 ± 3	17 ± 3	19 ± 3	24 ± 4
04/18/00-04/25/00	15 ± 3	20 ± 4	20 ± 4	18 ± 3	18 ± 3	17 ± 3	22 ± 4	29 ± 4
04/25/00-05/02/00	20 ± 3	29 ± 4	27 ± 4	23 ± 4	21 ± 4	22 ± 4	28 ± 4	31 ± 4
MAY								
05/02/00-05/09/00	16 ± 3	19 ± 3	19 ± 3	17 ± 3	15 ± 3	18 ± 3	20 ± 3	23 ± 4
05/09/00-05/16/00	18 ± 3	21 ± 3	22 ± 4	19 ± 3	16 ± 3	20 ± 3	20 ± 3	28 ± 4
05/16/00-05/23/00	16 ± 3	18 ± 3	17 ± 3	15 ± 3	13 ± 3	16 ± 3	18 ± 3	21 ± 4
05/23/00-05/30/00	16 ± 3	17 ± 3	19 ± 3	19 ± 3	13 ± 3	19 ± 3	18 ± 3	26 ± 4
JUNE								
05/30/00-06/0600	12 ± 3	15 ± 3	16 ± 3	15 ± 3	14 ± 3	12 ± 3	15 ± 3	17 ± 3
06/06/00-06/13/00	17 ± 3	17 ± 3	15 ± 3	15 ± 3	13 ± 3	13 ± 3	17 ± 3	21 ± 3
06/13/00-06/20/00	10 ± 3	15 ± 3	13 ± 3	8 ± 3	12 ± 3	12 ± 3	18 ± 5	14 ± 3
06/20/00-06/27/00	18 ± 3	17 ± 3	26 ± 4	20 ± 3	17 ± 3	21 ± 3	20 ± 3	24 ± 4

TABLE 4
(Page 2 of 2)
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GROSS BETA EMITTERS IN AIR PARTICULATES
Results in Units of 10-3 pCi/m3 ± 2 s.d.

STATION COLLECTION DATE	NW-1.0	SW/WSW-0.95	S/SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4
JULY								
06/27/00-07/04/00	17 ± 3	15 ± 3	21 ± 3	17 ± 3	16 ± 3	16 ± 3	19 ± 3	24 ± 4
07/04/00-07/11/00	19 ± 3	20 ± 3	24 ± 4	19 ± 3	20 ± 3	26 ± 4	22 ± 3	22 ± 3
07/11/00-07/18/00	23 ± 3	17 ± 3	26 ± 4	26 ± 4	23 ± 3	25 ± 4	22 ± 3	27 ± 4
07/18/00-07/25/00	21 ± 3	21 ± 4	24 ± 3	22 ± 3	20 ± 3	19 ± 3	24 ± 3	23 ± 3
07/25/00-08/01/00	23 ± 4	23 ± 4	27 ± 4	27 ± 4	21 ± 4	17 ± 3	22 ± 4	26 ± 4
AUGUST								
08/01/00-08/08/00	18 ± 3	19 ± 3	28 ± 3	22 ± 3	21 ± 3	15 ± 3	24 ± 3	21 ± 3
08/08/00-08/15/00	18 ± 3	13 ± 3	24 ± 4	18 ± 3	18 ± 3	19 ± 3	18 ± 3	19 ± 3
08/15/00-08/22/00	22 ± 4	20 ± 4	33 ± 4	24 ± 4	26 ± 4	25 ± 4	23 ± 4	26 ± 4
08/22/00-08/29/00	20 ± 3	13 ± 3	24 ± 4	21 ± 3	16 ± 3	21 ± 3	15 ± 3	21 ± 3
SEPTEMBER								
08/29/00-09/05/00	33 ± 5	26 ± 5	48 ± 6	32 ± 4	25 ± 4	29 ± 4	25 ± 4	29 ± 4
09/05/00-09/12/00	17 ± 3	21 ± 3	27 ± 4	21 ± 3	17 ± 3	19 ± 3	16 ± 3	19 ± 3
09/12/00-09/19/00	17 ± 3	23 ± 4	26 ± 4	20 ± 3	19 ± 3	19 ± 3	18 ± 3	23 ± 4
09/19/00-09/26/00	13 ± 3	15 ± 3	18 ± 3	11 ± 3	16 ± 3	13 ± 3	15 ± 3	17 ± 3
OCTOBER								
09/26/00-10/03/00	18 ± 4	29 ± 4	32 ± 4	33 ± 4	21 ± 4	19 ± 4	24 ± 4	17 ± 4
10/03/00-10/10/00	13 ± 3	17 ± 3	18 ± 3	16 ± 3	9 ± 2	11 ± 2	16 ± 3	10 ± 2
10/10/00-10/17/00	13 ± 4	24 ± 4	27 ± 4	22 ± 4	18 ± 4	17 ± 4	16 ± 4	24 ± 4
10/17/00-10/24/00	30 ± 4	38 ± 4	41 ± 4	41 ± 4	24 ± 4	33 ± 4	27 ± 4	37 ± 4
10/24/00-10/31/00	14 ± 3	19 ± 3	23 ± 4	20 ± 4	14 ± 3	18 ± 3	16 ± 3	22 ± 4
NOVEMBER								
10/31/00-11/07/00	15 ± 3	19 ± 3	11 ± 3	11 ± 3	21 ± 3	20 ± 3	14 ± 3	16 ± 3
11/07/00-11/14/00	21 ± 4	26 ± 4	37 ± 4	28 ± 4	20 ± 4	22 ± 4	27 ± 4	32 ± 4
11/14/00-11/21/00	35 ± 4	60 ± 5	61 ± 5	49 ± 5	30 ± 4	38 ± 4	41 ± 4	54 ± 5
11/21/00-11/28/00	31 ± 4	44 ± 4	49 ± 5	37 ± 4	25 ± 4	33 ± 4	37 ± 4	43 ± 4
DECEMBER								
11/28/00-12/05/00	22 ± 4	35 ± 4	39 ± 4	24 ± 4	18 ± 3	26 ± 4	27 ± 4	27 ± 4
12/05/00-12/12/00	38 ± 4	55 ± 5	63 ± 5	48 ± 4	31 ± 4	38 ± 4	39 ± 4	49 ± 4
12/12/00-12/19/00	24 ± 4	33 ± 4	38 ± 4	32 ± 4	23 ± 4	25 ± 4	27 ± 4	36 ± 4
12/19/00-12/26/00	15 ± 3	24 ± 4	27 ± 4	22 ± 4	15 ± 3	19 ± 4	19 ± 4	23 ± 4

TABLE 5
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN AIR PARTICULATE FILTERS
Results in Units of E-03 pCi/m3 ± s.d.

LOCATION	COMPOSITE PERIOD	Be-7	K-40	Ru-103	Cs-134	Cs-137
FIRST QUARTER						
NW-10	12/28/99-03/28/00	83± 9	< 9	<0.8	<0.4	<0.4
SW-WSW-0.95	12/28/99-03/28/00	78±8	< 8	<0.9	<0.4	<0.4
S/SSW-1.2	12/28/99-03/28/00	78± 8	< 10	<0.8	<0.5	<0.7
SW-12.3	12/28/99-03/28/00	80± 8	< 9	<0.9	<0.5	<0.4
SSE-4.5	12/28/99-03/28/00	77± 10	< 20	<1.0	<0.7	<0.6
E-3.5	12/28/99-03/28/00	80± 9	12± 4	<0.9	<0.4	<0.5
N-1.45	12/28/99-03/28/00	76± 9	9± 4	<1.0	<0.4	<0.4
N-9.4	12/28/99-03/28/00	109± 11	< 9	<0.9	<0.4	<0.6
SECOND QUARTER ***						
NW-1.0	03/28/00-06/27/00	67± 10	<9	<2.0	<0.4	<0.4
SW/WSW-0.95	03/28/00-06/27/00	91± 10	7± 3	<1.0	<0.4	<0.3
S/SSW-1.2	03/28/00-06/27/00	90± 1	<20	<2.0	<0.6	<0.5
SW-12.3	03/28/00-06/27/00	78± 9	10± 4	<1.0	<0.5	<0.5
SSE-4.5	03/28/00-06/27/00	67± 9	6± 3	<1.0	<0.4	<0.4
E-3.5	03/28/00-06/27/00	63± 11	20± 5	<2.0	<0.7	<0.6
N-1.45	03/28/00-06/27/00	81± 13	<20	<2.0	<0.6	<0.7
N-9.4	03/28/00-06/27/00	104± 12	<10	<1.0	<0.5	<0.5
THIRD QUARTER ***						
NW-1.0	06/27/00-09/26/00	69± 13	7± 3	<13	<0.7	<0.6
SW/WSW-0.95	06/27/00-09/26/00	82± 122	11± 4	<16	<0.8	<0.7
S/SSW-1.2	06/27/00-09/26/00	115± 29	7± 4	<12	<0.7	<0.6
SW-12.3	06/27/00-09/26/00	96± 12	10± 3	<11	<0.6	1 ± .2***
SSE-4.5	06/27/00-09/26/00	79± 12	7± 4	<6	<0.3	<0.3
E-3.5	06/27/00-09/26/00	87± 13	6± 4	<6	<0.3	<0.3
N-1.45	06/27/00-09/26/00	79± 13	13± 6	<7	<0.4	<0.3
N-9.4	06/27/00-09/26/00	97± 13	8± 4	<6	<0.4	<0.4
FOURTH QUARTER ***						
NW-1.0	09/26/00-12/26/00	0.6 ± .06	6 ± 6	<.004	<.5	<.5
SW/WSW-0.95	09/26/00-12/26/00	77± 7	<9	<2	<.6	<.4
S/SSW-1.2	09/26/00-12/26/00	8 ± 9	<13	<3	<.8	.9 ± .2***
SW-12.3	09/26/00-12/26/00	55 ± 6	<9	<2	<.6	<.5
SSE-4.5	09/26/00-12/26/00	98 ± 8	<8	<2	<.5	<.4
E-3.5	09/26/00-12/26/00	76 ± 7	<9	<2	<.6	.8 ± .2***
N-1.45	09/26/00-12/26/00	119± 10	<12	<4	<.8	<.7
N-9.4	09/26/00-12/26/00	58± 7	<9	<3	<.6	<.5

***** Contract lab failed to meet the required LLD for I-131 for this sample period. Positive Cs-137 values are suspect due to low levels and LLD's reported.**

TABLE 6
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF I-131 IN MILK
Results in pCi/l ± 2 s.d.

MONTH	COLLECTION DATE	SW-14.5
January	01/25/00	< 0.2
February	02/29/00	< 0.2
March	03/14/00	< 0.2
	03/28/00	< 0.2
April	04/11/00	< 0.2
	04/25/00	< 0.2
May	05/09/00	< 0.2
	05/23/00	< 0.2
June	06/06/00	< 0.2
	06/20/00	< 0.2
July	07/04/00	< 0.4
	07/18/00	< 0.1
August	08/01/00	< 0.2
	08/15/00	< 0.2
	08/29/00	< 0.3
September	09/12/00	< 0.3
	09/26/00	< 0.3
October	10/10/00	< 0.3
	10/24/00	< 0.4
November	11/07/00	< 0.4
December	12/26/00	***

***** Contract lab failed to analyze for I-131.**

TABLE 7
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN MILK
Results in Units of pCi/liter ± 2 s.d.

LOCATION	COLLECTION DATE	K-40	Cs-134	Cs-137	La-140/Ba-140
STATION **SW-14.5**					
JANUARY	01/25/00	1190±120	< 3	< 4	< 5
FEBRUARY	02/29/00	1470±150	< 5	< 5	< 7
MARCH	03/14/00	1260±130	< 4	< 4	< 4
	03/28/00	1380±140	< 4	< 4	< 6
APRIL	04/11/00	1230±120	< 4	< 4	< 5
	04/25/00	1340±130	< 3	< 4	< 4
MAY	05/09/00	1400±140	< 5	< 5	< 6
	05/23/00	1460±150	< 3	< 3	< 4
JUNE	06/06/00	1250±130	< 3	< 3	< 5
	06/20/00	1340±130	< 4	< 4	< 5
JULY	07/04/00	1100±110	< 3	< 3	< 4
	07/18/00	1390±140	< 3	< 3	< 4
AUGUST	08/01/00	1390±140	< 4	< 3	< 3
	08/15/00	1390±140	< 3	< 3	< 4
	08/29/00	1360± 140	< 3	< 3	<20 ***
SEPTEMBER	09/12/00	1610±160	< 3	< 4	< 7
	09/26/00	1360± 74	< 6	< 6	< 44000***
OCTOBER	10/10/00	1310± 68	< 6	< 5	< 21000***
	10/24/00	1260± 150	< 6	< 6	< 40***
NOVEMBER	11/07/00	1310±160	< 5	< 5	< 20***
DECEMBER	12/26/00	1220± 101	< 8	< 8	< 1520***

***** Contract lab failed to meet required LLD's for Ba-140.**

TABLE 8
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN GROUNDWATER
Results in Units of pCi/l ± 2 s.d.

COLLECTION DATE	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb/Zr-95	Cs-134	Cs-137	Ba/La-140
STATION W-1.2										
03/28/00	< 50	< 3	< 3	< 7	< 4	< 7	< 4	< 4	< 4	< 5
06/27/00	< 90	< 4	< 4	< 10	< 4	< 7	< 4	< 4	< 4	< 8
09/26/00 ***	< 79	< 6	< 13	< 58	< 4	< 12	< 27	< 4	< 4	< 20300
12/26/00 ***	< 77	< 4	< 8	< 22	< 4	< 10	< 13	< 4	< 4	< 700
STATION SSE-4.6										
03/28/00	< 70	< 3	< 3	< 6	< 3	< 6	< 3	< 3	< 3	< 5
06/27/00	< 90	< 4	< 4	< 10	< 4	< 8	< 4	< 4	< 4	< 8
09/26/00 ***	91	< 5	< 13	< 60	< 4	< 11	< 27	< 4	< 4	< 20600
12/26/00 ***	< 59	< 3	< 5	< 15	< 3	< 6	< 9	< 3	< 3	< 468
STATION N-1.45										
03/28/00	< 50	< 3	< 3	< 7	< 4	< 7	< 3	< 3	< 4	< 5
06/27/00	< 40	< 2	< 3	< 7	< 3	< 5	< 3	< 3	< 3	< 7
09/26/00 ***	< 159	< 8	< 20	< 88	< 6	< 18	< 39	< 6	< 6	< 29700
12/26/00 ***	< 63	< 1	< 0.1	< .05	< 2	< 2	< .17	< 2	< 3	< .0001
STATION WSW-0.1										
03/28/00	< 50	< 3	< 2	< 5	< 3	< 6	< 3	< 3	< 3	< 5
06/27/00	< 50	< 3	< 4	< 10	< 4	< 7	< 4	< 4	< 3	< 10
09/26/00 ***	< 64	< 5	< 13	< 51	< 6	< 10	< 24	< 4	< 4	< 18000
12/26/00 ***	666	< 4	< 7	< 21	< 3	< 9	< 13	< 3	< 4	< 702
STATION N-9.8										
03/28/00	< 60	< 3	< 3	< 7	< 3	< 6	< 3	< 4	< 4	< 5
06/27/00	< 50	< 3	< 3	< 9	< 3	< 6	< 4	< 3	< 3	< 9
09/26/00 ***	< 75	< 5	< 14	< 58	< 4	< 12	< 27	< 4	< 4	< 20800
12/26/00 ***	< 53	< 3	< 5	< 13	< 5	< 6	< 8	< 2	< 4	< 427

***** Contract lab failed to meet the required LLD's for Fe-59, Co-58, Zr-95, Ba-140 and I-131 for this time period. Positive K-40 values are suspect.**

TABLE 9
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF TRITIUM IN GROUNDWATER
Results in pCi/l ± 2 s.d.

QUARTER	COLLECTION DATE	LOCATION	TRITIUM ACTIVITY
1	03/28/00	W-1.2	< 700
	03/28/00	SSE-4.6	< 700
	03/28/00	N-1.45	< 700
	03/28/00	WSW-0.1	< 700
	03/28/00	N-9.8	< 700
2	06/27/00	W-1.2	< 1000
	06/27/00	SSE-4.6	< 1000
	06/27/00	N-1.45	< 1000
	06/27/00	WSW-0.1	< 1000
	06/27/00	N-9.8	< 1000
3	09/26/00	W-1.2	< 100
	09/26/00	SSE-4.6	< 100
	09/26/00	N-1.45	< 100
	09/26/00	WSW-0.1	< 100
	09/26/00	N-9.8	< 100
4	12/26/00	W-1.2	< 200
	12/26/00	SSE-4.6	< 200
	12/26/00	N-1.45	< 200
	12/26/00	WSW-0.1	< 200
	12/26/00	N-9.8	< 200

TABLE 10
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS of GROSS BETA IN WATER-SURFACE/DRINKING
Results in pCi/l ± 2 s.d.

MONTH	COLLECTION DATE	NNW-0.1	N-9.9
JANUARY	01/04/00-01/25/00	27 ±4	15 ±3.0
FEBRUARY	02/01/00-02/29/00	29 ±5	43 ±4.0
MARCH	03/07/00-03/28/00	25 ±4	15 ±.3.0
APRIL	04/04/00-04/25/00	18± 4	26± 5
MAY	05/02/00-05/30/00	12± 4	22± 4
JUNE	06/06/00-06/27/00	27± 4	9± 2
JULY	07/04/00-07/25/00	24± 5	11± 2
AUGUST	08/01/00-08/29/00	28± 7	13± 3
SEPTEMBER	09/05/00-09/26/00	24± 5	14± 4
OCTOBER	10/03/00-10/31/00	13± 5	9± 1
NOVEMBER	11/07/00-11/28/00	16± 1	7± 1
DECEMBER	12/05/00-12/26/00	27± 7	14± 3

TABLE 11
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN WATER SURFACE/DRINKING
Results in Units of pCi/l ± 2 s.d.

COLLECTION DATE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb/Zr-95	Cs-134	Cs-137	Ba/La-140
STATION **NNW-0.1**									
01/04/00-01/25/00	< 3	< 3	< 7	< 3	< 7	< 3	< 3	< 4	< 5
02/01/00-02/29/00	< 3	< 3	< 6	< 3	< 6	< 3	< 3	< 3	< 4
03/07/00-03/28/00	< 4	< 4	< 10	< 4	< 9	< 5	< 5	< 5	< 6
04/04/00-04/25/00	< 3	< 3	< 9	< 4	< 7	< 4	< 3	< 4	< 6
05/02/00-05/30/00	< 3	< 3	< 9	< 3	< 6	< 3	< 3	< 3	< 10
06/06/00-06/27/00	< 3	< 3	< 7	< 3	< 5	< 3	< 3	< 3	< 6
07/04/00-07/25/00 ***	< 8	< 9	< 21	< 12	< 18	< 17	< 8	< 10	< 112
08/01/00-08/29/00 ***	< 3	< 4	< 7	< 3	< 7	< 7	< 3	< 3	< 19
09/05/00-09/26/00 ***	< 7	< 22	< 97	< 5	< 16	< 41	< 6	< 5	< 71000
10/03/00-10/31/00	< 4	< 5	< 7	< 3	< 8	< 7	< 3	< 4	< 7
11/07/00-11/28/00	< 1	< 1	< 3	< 1	< 3	< 3	< 2	< 1	< 6
12/05/00-12/26/00 ***	< 3	< 6	< 17	< 3	< 8	< 11	< 3	< 4	< 576
STATION **N-9.9**									
01/04/00-01/25/00	< 3	< 3	< 7	< 3	< 8	< 3	< 3	< 4	< 5
02/01/00-02/29/00	< 3	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 4
03/07/00-03/28/00	< 3	< 3	< 6	< 3	< 6	< 3	< 3	< 3	< 4
04/04/00-04/25/00	< 2	< 3	< 7	< 3	< 5	< 3	< 3	< 3	< 4
05/02/00-05/30/00	< 2	< 2	< 7	< 2	< 5	< 3	< 3	< 3	< 9
06/06/00-06/27/00	< 3	< 4	< 9	< 4	< 7	< 4	< 4	< 3	< 7
07/04/00-07/25/00 ***	< 3	< 4	< 8	< 3	< 6	< 7	< 3	< 3	< 50
08/01/00-08/29/00 ***	< 5	< 5	< 12	< 8	< 11	< 10	< 5	< 6	< 32
09/05/00-09/26/00 ***	< 5	< 17	< 76	< 4	< 13	< 31	< 5	< 4	< 57500
10/03/00-10/31/00	< 4	< 4	< 7	< 3	< 4	< 7	< 3	< 4	< 7
11/07/00-11/28/00	< 2	< 2	< 4	< 1	< 4	< 3	< 2	< 1	< 3
12/05/00-12/26/00 ***	< 4	< 7	< 21	< 4	< 10	< 13	< 4	< 4	< 668

***** Contract lab failed to meet the required LLD's for the samples for this time period.**

TABLE 12
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF I-131 IN WATER-SURFACE/DRINKING
Results in pCi/l ± 2 s.d.

MONTH	COLLECTION DATE	NNW-0.1	N-9.9
January	01/04/00-01/25/00	< 0.6	< 0.6
February	02/01/00-02/29/00	< 0.8	< 0.8
March	03/07/00-03/28/00	< 0.5	< 0.6
April	04/04/00-04/25/00	< 0.6	< 0.5
May	05/02/00-05/30/00	< 0.8	< 0.8
June	06/06/00-06/27/00	< 0.8	< 0.9
July	07/04/00-07/25/00	< 0.2	< 0.2
August	08/01/00-08/29/00	< 0.2	< 0.2
September	09/05/00-09/26/00	< 0.6	< 0.7
October	10/03/00-10/31/00	< 0.6	< 0.6
November	11/07/00-11/28/00	< 1.0	< 1.0
December	12/05/00-12/26/00	***	***

***** Contract lab failed to analyze for I-131 for this time period.**

TABLE 13
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF TRITIUM IN WATER-SURFACE/DRINKING
Results in pCi/l ± 2 s.d.

QUARTER	COLLECTION PERIOD	NW-0.1	N-9.9
1	01/04/00-03/28/00	11000 ± 1000	< 200
2	04/04/00-06/27/00	11000± 1000	< 200
3	07/04/00-09/26/00 ***	5300± 200	< 200
4	10/03/00-12/26/00 ***	5400± 200	< 100

State of Texas Results

3	07/04/00-09/26/00	11300± 700	< 1000
4	10/03/00-12/26/00	13200± 800	<1000

***** Tritium values reported by the Contract lab are less than expected and therefore suspect. Samples supplied to the State of Texas were reported as indicated above and closely reflect expected values.**

TABLE 14
(Page 1 OF 2)
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN SURFACE WATER
Results in Units of pCi/l ± 2 s.d.

COLLECTION DATE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb/Zr-95	Cs-134	Cs-137	Ba/La-140
STATION ESE-1.4									
01/04/00-01/25/00	< 3	< 4	< 8	< 4	< 7	< 4	< 4	< 4	< 6
02/01/00-02/29/00	< 3	< 3	< 6	< 3	< 6	< 3	< 3	< 3	< 4
03/07/00-03/28/00	< 3	< 3	< 7	< 4	< 6	< 3	< 3	< 3	< 5
05/02/00-05/30/00	< 3	< 3	< 9	< 3	< 6	< 3	< 3	< 3	< 10
06/06/00-06/27/00	< 3	< 3	< 10	< 4	< 6	< 3	< 3	< 4	< 8
07/04/00-07/25/00	< 3	< 3	< 8	< 3	< 6	< 4	< 4	< 3	< 5
08/01/00-08/29/00	< 2	< 3	< 6	< 3	< 5	< 3	< 3	< 3	< 4
09/05/00-09/26/00 ***	< 7	< 20	< 93	< 5	< 16	< 40	< 6	< 5	< 73300
10/03/00-10/31/00 ***	< 2	< 2	< 5	< 2	< 2	< 5	< 3	< 2	< 30
11/07/00-11/28/00 ***	< 4	< 3	< 8	< 1	< 4	< 3	< 3	< 3	< 40
12/05/00-12/26/00 ***	< 3	< 5	< 15	< 3	< 6	< 10	< 3	< 3	< 535
STATION N-1.5									
01/04/00-01/25/00	< 4	< 4	< 9	< 4	< 10	< 4	< 4	< 5	< 5
02/01/00-02/29/00	< 2	< 2	< 5	< 2	< 5	< 2	< 2	< 3	< 4
03/07/00-03/28/00	< 3	< 2	< 6	< 3	< 6	< 3	< 3	< 3	< 4
04/04/00-04/25/00	< 3	< 3	< 8	< 3	< 7	< 3	< 3	< 3	< 6
05/02/00-05/30/00	< 3	< 3	< 9	< 3	< 6	< 3	< 3	< 3	< 10
06/06/00-06/27/00	< 3	< 3	< 9	< 3	< 7	< 4	< 3	< 3	< 6
07/04/00-07/25/00	< 2	< 3	< 7	< 2	< 5	< 3	< 3	< 3	< 5
08/01/00-08/29/00	< 3	< 3	< 7	< 3	< 5	< 3	< 3	< 3	< 4
09/05/00-09/26/00 ***	< 6	< 20	< 93	< 5	< 16	< 42	< 6	< 5	< 73000
10/03/00-10/31/00 ***	< 3	< 2	< 6	< 2	< 5	< 6	< 2	< 2	< 20
11/07/00-11/28/00 ***	< 3	< 4	< 8	< 3	< 5	< 5	< 5	< 5	< 40
12/05/00-12/26/00 ***	< 3	< 5	< 16	< 3	< 7	< 10	< 3	< 5	< 505

***** Contract lab failed to meet the required LLD's for the samples for this time period.**

.TABLE 14
(Page 2 OF 2)
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN SURFACE WATER
Results in Units of pCi/l ± 2 s.d.

COLLECTION DATE	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb/Zr-95	Cs-134	Cs-137	Ba/La-140
STATION NE-7.4									
01/25/00	< 3	< 3	< 6	< 4	< 7	< 3	< 3	< 3	< 5
02/29/00	< 2	< 2	< 5	< 2	< 5	< 3	< 2	< 3	< 3
03/28/00	< 3	< 3	< 6	< 3	< 6	< 3	< 3	< 4	< 5
04/25/00	< 4	< 5	< 10	< 4	< 10	< 5	< 5	< 5	< 7
05/30/00	< 3	< 3	< 10	< 3	< 7	< 4	< 3	< 3	< 10
06/27/00	< 3	< 3	< 7	< 3	< 6	< 3	< 3	< 3	< 7
07/25/00	< 4	< 5	< 10	< 4	< 8	< 9	< 4	< 4	< 59
08/29/00	< 4	< 4	< 10	< 4	< 8	< 4	< 4	< 4	< 5
09/26/00 ***	< 9	< 28	< 135	< 6	< 22	< 54	< 8	< 6	< 102000
10/31/00 ***	< 1	< 2	< 3	< 1	< 3	< 3	< 2	< 2	< 20
11/28/00 ***	< 3	< 3	< 5	< 1	< 5	< 4	< 3	< 3	< 20
12/26/00 ***	< 2	< 4	< 12	< 2	< 5	< 7	< 2	< 2	< 400
STATION N-19.3									
01/25/00	< 3	< 3	< 6	< 3	< 7	< 3	< 3	< 3	< 4
02/29/00	< 3	< 3	< 5	< 3	< 6	< 3	< 3	< 3	< 4
03/28/00	< 3	< 3	< 7	< 3	< 6	< 3	< 3	< 4	< 5
04/25/00	< 3	< 3	< 7	< 3	< 6	< 3	< 3	< 3	< 5
05/30/00	< 3	< 3	< 10	< 3	< 7	< 4	< 3	< 3	< 10
06/27/00	< 3	< 4	< 10	< 4	< 7	< 3	< 4	< 4	< 7
07/25/00	< 3	< 3	< 9	< 3	< 6	< 4	< 3	< 4	< 7
08/29/00	< 3	< 3	< 8	< 3	< 6	< 3	< 3	< 3	< 4
09/26/00 ***	< 6	< 19	< 88	< 5	< 16	< 38	< 6	< 5	< 69400
10/31/00 ***	< 3	< 2	< 10	< 2	< 4	< 7	< 4	< 3	< 40
11/28/00 ***	< 2	< 2	< 3	< 2	< 4	< 4	< 2	< 2	< 40
12/26/00 ***	< 3	< 5	< 16	< 3	< 7	< 10	< 2	< 3	< 549

***** Contract lab failed to meet the required LLD's for the samples for this time period.**

TABLE 15
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF TRITIUM IN SURFACE WATER
Results in pCi/l ± 2 s.d.

QUARTER	COLLECTION PERIOD	ESE-1.4	N-1.5	NE-7.4	N-19.3
1	01/04/00-03/28/00	11000 ±1000	11000 ±1000	< 200	< 200
2	04/04/00-06/27/00	11000 ±1000	11000 ±1000	< 200	< 200
3	07/04/00-09/26/00 ***	5200± 200	5300± 200	< 100	< 100
4	10/03/00-12/26/00 ***	5300± 200	5500± 200	< 100	< 100
State of Texas					
3	07/04/00-09/26/00	11300± 700			< 1000
4	10/03/00-12/26/00	13200± 800			< 1000

***** Tritium values reported by the Contract lab are less than expected and therfore suspect.**
Samples supplied to the State of Texas were reported as indicated above and closely reflect expected values.

TABLE 16
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN FISH
Results in pCi/Kg (wet) ± 2 s.d.

COLLECTION DATE	STATION	DESCRIPTION	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
04/18/00	ENE-2.0	Bass	3080 ± 310	< 10	< 10	< 50	< 10	< 30	< 10	< 10
04/18/00	ENE-2.0	Catfish	2850 ± 280	< 10	< 20	< 50	< 10	< 30	< 10	< 20
04/20/00	NNE-8.0	Bass	3060 ± 310	< 10	< 10	< 40	< 10	< 30	< 10	< 10
04/20/00	NNE-8.0	Catfish	2280± 230	< 20	< 20	< 60	< 20	< 40	< 20	< 20
10/16/00	ENE-2.0	Catfish	***							
10/20/00	ENE-2.0	Bass	***							
10/21/00	NNE-8.0	Catfish	***							
10/22/00	NNE-8.0	Bass	***							

*** **Contract lab lost the fish samples for this time period.**

TABLE 17
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN SEDIMENT
Results in pCi/kg (dry) ± 2 s.d.

COLLECTION DATE	SAMPLE POINT	Be-7	K-40	Cs-134	Cs-137	Pb-212	Bi-214	Pb-214	Ra-226	Th-228
STATION NNE-1.0										
01/11/00	SS-1	< 200	1740±250	< 20	< 20	185± 24	328± 41	346± 42	<500	-----
07/11/00	SS-1	< 200	6370± 640	< 20	< 20	250± 30	260± 36	300± 39	1180± 380	247± 25
STATION NE-7.4										
01/11/00	SS-3	< 200	2780± 290	<20	<30	282± 28	251± 32	237± 41	<400	----
07/11/00	SS-3	< 300	822 ± 212	< 20	< 20	87± 31	94± 37	87± 43	< 400	86± 31
STATION N-9.9										
01/11/00	SS-2	< 200	6700± 670	< 20	< 20	319±32	369± 38	383± 38	489± 244	----
07/11/00	SS-2	< 400	5520± 550	< 30	115± 26	550± 60	640± 70	----	1100± 480	543± 54
STATION SE-5.3										
01/11/00	SS-4	1410± 550	6300± 880	< 60	82± 40	879± 115	708± 122	603± 137	< 1000	----
07/11/00	SS-4	< 200	1780± 250	< 20	< 20	150± 30	210± 36	200± 41	< 400	148± 28

— Results not reported by the Contract lab for this nuclide.

TABLE 18
T U ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN FOOD PRODUCTS
Results in Units of pCi/kg (wet) ± 2 s.d.

STATION	DESCRIPTION	COLLECTION DATE	Be-7	K-40	I-131	Cs-134	Cs-137
ENE-9.0	PECANS	11/14/00 ***	<300	2530± 1390	<13200	<12	< 12

***** Contract lab failed to meet the required LLD's for this sample for this time period.**

TABLE 19
TEXAS UTILITIES ELECTRIC
COMANCHE PEAK STEAM ELECTRIC STATION
CONCENTRATIONS OF GAMMA EMITTERS* IN BROADLEAF VEGETATION
Results in Units of pCi/kg (wet) ± 2 s.d.

STATION	DESCRIPTION	COLLECTION DATE	Be-7	K-40	I-131	Cs-134	Cs-137	Th-228
N-1.45 (BL-1)	Vegetation	01/25/00	4550 ± 460	1700 ± 300	< 20	< 30	< 40	< 60
	Vegetation	02/29/00	4240 ± 420	3020 ± 370	< 10	< 40	< 40	< 60
	Vegetation	03/28/00	1060 ± 120	2060 ± 210	< 10	< 20	< 20	< 20
	Vegetation	04/25/00	841 ± 104	4640 ± 460	< 7	< 10	< 10	< 20
	Vegetation	05/30/00	3230 ± 320	3900 ± 390	< 20	< 10	21 ± 10	< 20
	Vegetation	06/27/00	1080 ± 110	5090 ± 510	< 8	< 10	< 10	< 20
	Vegetation	07/25/00	799 ± 161	5360 ± 540	< 10	< 20	< 20	< 30
	Vegetation	08/29/00	1380 ± 220	5200 ± 520	< 30	< 30	< 30	< 50
	Vegetation	09/26/00 ***	< 4030	3050 ± 752	< 10	< 97	< 79	< 125
	Vegetation	10/31/00 ***	2710 ± 250	3540 ± 320	< 60	< 10	< 10	< 1000
	Vegetation	11/28/00 ***	5800 ± 200	3600 ± 200	< 50	< 10	16 ± 10	< 1000
	Vegetation	12/26/00 ***	857 ± 119	2420 ± 181	<10800	< 19	< 17	29 ± 10
SW 13.5 (BL-3)	Vegetation	01/25/00	3100 ± 340	1770 ± 350	< 40	< 40	< 40	< 60
	Vegetation	02/29/00	796 ± 122	7040 ± 700	< 10	< 20	< 20	< 30
	Vegetation	03/28/00	752 ± 135	6790 ± 680	< 10	< 20	< 20	< 30
	Vegetation	04/25/00	732 ± 93	4470 ± 450	< 20	< 10	< 10	< 20
	Vegetation	05/30/00	1440 ± 140	4340 ± 430	< 20	< 20	< 20	< 20
	Vegetation	06/27/00	534 ± 103	4220 ± 420	< 20	< 20	< 20	< 20
	Vegetation	07/25/00	< 200	6670 ± 670	< 10	< 20	< 20	< 30
	Vegetation	08/29/00	< 400	8120 ± 810	< 30	< 40	< 40	< 80
	Vegetation	09/26/00 ***	< 2510	6370 ± 570	< 7	< 64	< 52	< 80
	Vegetation	10/31/00 ***	2480 ± 310	2430 ± 420	< 50	< 20	< 10	< 1000
	Vegetation	11/28/00 ***	5700 ± 300	3500 ± 300	< 60	< 9	< 10	< 90
	Vegetation	12/26/00 ***	3380 ± 308	< 385	< 19500	< 33	< 28	< 51
SW-1.0 (BL-2)	Vegetation	01/25/00	586 ± 90	10400 ± 1000	< 20	< 10	< 10	< 20
	Vegetation	02/29/00	3260 ± 330	6520 ± 650	< 10	< 20	< 20	< 40
	Vegetation	03/28/00	3370 ±340	4820 ± 480	< 10	< 20	< 20	< 30
	Vegetation	04/25/00	3390 ± 340	3190 ± 320	< 10	< 20	< 20	< 30
	Vegetation	05/30/00	1440 ± 210	2730 ± 270	< 10	< 20	< 20	< 30
	Vegetation	06/27/00	2670 ± 270	4510 ± 450	< 8	< 10	< 10	< 20
	Vegetation	07/25/00	1030 ± 230	4200 ± 420	< 10	< 30	< 30	< 40
	Vegetation	08/29/00	393 ± 143	1590 ± 180	< 40	< 20	< 20	< 30
	Vegetation	09/26/00 ***	< 4220	6480 ± 1120	< 8	< 92	< 97	< 148
	Vegetation	10/31/00 ***	2730 ± 330	3950 ± 480	< 50	< 20	< 20	< 2000
	Vegetation	11/28/00 ***	3900 ± 200	4500 ± 300	< 50	< 20	< 10	< 1000
	Vegetation	12/26/00 ***	1010 ± 155	2380 ± 218	< 12800	< 24	< 20	< 40

***** Contract lab failed to meet the required LLD's for this time period.**

APPENDIX A
CROSS CHECK PROGRAM

INTERLABORATORY COMPARISION 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 ERA Interlaboratory Comparison table for 2000 has been included with this report.

ERA STATISTICAL SUMMARY
PROFICIENCY TESTING (PT) PROGRAM - 2000

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)
28459-28461	2/24/00	U(NAT)	6.07	5.77	3.00	.870 - 11.3	2.61 – 9.53	A
28459-28461	2/24/00	Ra-226	8.26	7.20	1.24	6.11 – 10.4	6.83 - 9.69	A
28459-28461	2/24/00	Ra-228	2.25	2.37	0.56	1.28 - 3.22	1.60 - 2.90	A
27742-27744	2/10/00	Gr-A	58.4	83.6	14.6	33.3 - 83.5	41.5 - 75.3	NA
27742-27744	2/10/00	Gr-B	16.8	15.4	5.00	38.1 - 25.5	311 - 22.6	A
29348-29350	3/01/00	H-3	23800	22300	12380	21100-26500	21000-26500	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 ± 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.

ANALYTICS CROSS CHECK COMPARISON PROGRAM 2000

Sample Date	Media	Nuclide	Teledyne Brown Engineering Result (a)		Analytics Result		Ratio (b)
03/20/00	Milk	I-131	18 ±	1	20 ±	1	0.90
		Cr-51	381 ±	38	387 ±	19	0.98
		Cs-134	132 ±	13	143 ±	7	0.92
		Cs-137	128 ±	13	114 ±6	1.12	
		Co-58	89 ±	9	79 ±4	1.13	
		Mn-54	195 ±	20	176 ±9	1.11	
		Fe-59	161 ±	16	144 ±7	1.12	
		Zn-65	171 ±	17	165 ±8	1.04	
		CO-60	179 ±	18	176 ±9	1.02	
03/20/00	Milk	Sr-89	13 ±	3	25 ±1	0.52	(c)
		Sr-90	16 ±	1	19 ±1	0.84	
06/19/00	Air Filter	Ce-141	143 ±	8	132 ±7	1.08	
		Cr-51	229 ±	17	198 ±10	1.16	
		Cs-134	74 ±	4	81 ±4	0.91	
		Cs-137	143 ±	8	115 ±6	1.24	
		Co-58	89 ±	5	77 ±4	1.16	
		Mn-54	102 ±	6	84 ±4	1.21	
		Fe-59	98 ±	6	75 ±4	1.31	
		Zn-65	188 ±	11	139 ±7	1.35	
		Co-60	113 ±	7	104 ±5	1.09	
06/19/00	Cartridge	I-131	106 ±	6	88 ±	4	1.20
06/19/00	Air Filter	Sr-90	88 ±	5	96 ±5	0.92	
06/19/00	Air Filter	Gross Alpha	103 ±	6	93 ± 5	1.11	
		Gross Beta	210 ±	6	193 ±10	1.09	
09/18/00	Milk	I-131	97 ±	10	87 ±	4	1.11
		Ce-141	83 ±	8	77 ±	4	1.08
		Cr-51	323 ±	40	304 ±	15	1.06
		Cs-134	98 ±	10	102 ±	5	0.96
		Cs-137	117 ±	12	107 ±	5	1.09
		Co-58	64 ±	6	60 ±	3	1.07
		Mn-54	99 ±	10	88 ±	4	1.13
		Fe-59	132 ±	13	119 ±	6	1.11
		Zn-65	218 ±	22	196 ±	10	1.11
		Co-60	209 ±	21	197 ±	10	1.06

ANALYTICS CROSS CHECK COMPARISON PROGRAM 2000 (cont.)

Sample Date	*Media*	*Nuclide*	*Teledyne Brown Engineering Result (a)*	*Analytics Result*	*Ratio (b)*
09/18/00	*Milk*	*Sr-89*	*14 ± 1*	*15 ± 1*	*0.93*
		Sr-90	*18 ± 1*	*14 ± 1*	*1.29*

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.*

(c) *Caused by incorrect rinsing of the strontium extraction column. Additional training was conducted and was documented in the analyst's training file. Subsequent tests on two milk samples spiked with Sr-89 produced correct results.*

APPENDIX B
SYNOPSIS OF ANALYTIC PROCEDURES

ANALYTICAL PROCEDURES SYNOPSIS

Appendix D is a synopsis of the analytical procedures performed on samples collected for the Comanche Peak Steam Electric Station's Radiological Environmental Monitoring Program. All analyses procedures have been mutually agreed upon by Texas Utilities and Teledyne Brown Engineering and include those recommended by the USNRC Branch Technical Position, Rev. 1, November 1979.

ANALYSIS TITLES

Gross Beta Analysis of Samples

Determination of Gross Beta Activity in Water Samples

Analysis of Samples for Tritium (liquid scintillation)

Analysis of Samples for Iodine-131

Gamma Spectrometry of Samples

Environmental Dosimetry

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):

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

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

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

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:

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

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

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

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 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:

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

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
	Ms	=	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:

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

ENVIRONMENTAL DOSIMETRY

Teledyne Brown Engineering uses a $CaS0_4$: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):

RESULT = $D = (D_1+D_2+D_3+D_4)/4$

TWO SIGMA ERROR = $2((D_1-D)^2+(D_2-D)^2+(D_3-D)^2+(D_4-D)^2)/3)^{1/2}$

WHERE:

	D_1	=	the net mR of area 1 of the TLD, and similarly for D_2, D_3, and D_4
	D1	=	$I_1\ K/R_1 - A$
	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.

Appendix C Exceptions to the 2000 REMP

Appendix C Exceptions to the 2000 REMP

1. **Direct Radiation Exceptions:** The direct radiation TLD's for the R-9 (ENE-2.5) location were stolen for the following periods: 3rd Quarter 2000, 4th Quarter 2000 and the 2000 Annual time periods. These exceptions were beyond the control of CPSES.

2. **Air Particulates and Air Radioiodine Exceptions:** The contract vendor failed to meet the required LLD for I-131 for the quarterly composites for the time periods of 2nd Quarter 2000, 3rd Quarter 2000 and 4th Quarter 2000. 4th Quarter 2000 had two positive values reported for Cs-137, slightly above the LLD. One of these samples was from the control location 12.5 miles away in a less prevalent wind direction. Suspect bad data reported by laboratory. These exceptions were beyond the control of CPSES.

3. **Milk Exceptions:** The contract vendor failed to meet the required LLD for Ba-140 in the following samples: 08-29-00, 09-26-00, 10-10-00, 10-24-00, 11-07-00 and 12-26-00. The contract vendor failed to analyze for I-131 in the following sample: 12-26-00. These exceptions were beyond the control of CPSES.

4a. **Water Exceptions: Ground Water:** The contract vendor failed to meet the required LLD for I-131 for the following samples: 06-27-00 and 12-26-00. The contract vendor failed to meet the required LLD's for Co-58, Fe-59, Zr-95, I-131 and Ba-140 for the samples: 09-26-00. The contract vendor reported questionable results of a positive K-40 indication in the following samples: 09-26-00 and 12-26-00. These exceptions were beyond the control of CPSES.

4b. **Water Exceptions: Surface Water:** The contract vendor reported the tritium value at a value much less than expected for the samples: 3rd Quarter 2000. The contract vendor failed to meet the required LLD for I-131 for the samples: 05-30-00, 07-25-00, 09-26-00, 10-31-00, 11-28-00 and 12-26-00. The contract vendor failed to meet the required LLD for Ba-140 for the samples: 07-25-00, 09-26-00 and 12-26-00. The contract vendor failed to meet the required LLD for Fe-59, Co-58 and Zr-95 for the sample: 09-26-00. These exceptions were beyond the control of CPSES.

4c. **Water Exceptions: Surface Drinking Water:** The contract vendor reported the tritium value at a value much less than expected for the samples: 3rd Quarter 2000. The contract vendor failed to analyze for I-131 (low level) for the sample: 12-26-00. The contract vendor failed to meet the required LLD for Fe-59 for the sample: 09-26-00. The contract vendor failed to meet the required LLD for Co-58 for the sample: 09-26-00. The contract vendor failed to meet the required LLD for Zr-95 for the samples: 07-25-00 and 09-26-00. The contract vendor failed to meet the required LLD for Ba-140 for the samples: 07-25-00, 08-29-00, 09-26-00 and 12-26-00. These exceptions were beyond the control of CPSES.

5. **Fish Exceptions:** The contract vendor misplaced all the fish collected before the required analysis could take place for the samples : 10-16-00 and 10-22-00. These exceptions were beyond the control of CPSES.

6. **Shoreline Sediment Exceptions:** There were no exceptions involving shoreline sediments.

7. **Food Product Exceptions:** The contract vendor failed to meet the required LLD for I-131 on the food product (pecans) supplied at the time of harvest for the sample: 11-14-00. These exceptions were beyond the control of CPSES.

8. **Broadleaf Vegetation Exceptions:** The contract vendor failed to meet the required LLD's for Cs-134 and Cs-137 for the samples: 09-26-00. The contract vendor failed to analyze for low level I-131 for the samples: 10-31-00, 11-28-00, and 12-26-00. These exceptions were beyond the control of CPSES.

9. **Summary of Exceptions:** CPSES personnel collected all required samples as specified in the ODCM Radiological Environmental Monitoring Program. CPSES shipped all required samples on time and the contract vendor received all samples. The contract vendor first reported temporary problems with equipment, which had to be replaced, and the replacement took longer than expected. Then the vendor informed CPSES that they would be moving the entire laboratory operation, which included replacement of personnel and moving of all samples to the new laboratory. In the interim, the vendor subcontracted samples that were time critical but still failed to achieve the required LLD's on many samples. The contract vendor proved to be unable to provide much of the required sample analysis. Letters of explanation and non-conformance reports have been supplied to CPSES for the missed information. Most of the analysis that were time critical were missed by the vendor and not performed in accordance with the ODCM. There were no nuclides reported in any analysis that were not expected. There were no instances of any nuclides detected that had not been detected during pre-operational periods. Even though the required LLD's for all nuclides were not met, there were only two instances where positive values were reported while on the same report some LLD's were not meet. The two instances were that Cs-137 was reported positive for two 4th quarter air particulate composites (one of which was the control location).

As of January 1, 2001, CPSES changed vendors. The new contract vendor is now totally responsible for all radiological environmental monitoring program sample analysis.

Appendix D Exceeded Reporting Levels

Appendix D Exceeded Reporting Levels

During this reporting year of 2000, none of the analytical measurements exceeded any notification levels.

Appendix E Land Use Census

Aug 12, 2000

COMANCHE PEAK STEAM ELECTRIC STATION LAND USE CENSUS 2000

The Land Use Census identified receptors within a five (5) mile radius of the plant in each of the sixteen (16) meteorological sectors. The Land Use Census was conducted July 19 and 20, 2000 and includes the following items:

1. Evaluation of the 2000 Land Use Census
2. Nearest Resident by Sector, Distance, X/Q and D/Q
3. Nearest Garden by Sector, Distance and D/Q
4. Nearest Milk Animal by Sector, Distance and D/Q
5. Population by Sector and Distance
6. Environmental Sample Locations Table
7. Environmental Monitoring Locations Map- 2 Mile Radius
8. Environmental Monitoring Locations Map- 20 Mile Radius*
9. 5 Mile Sector and Road Map with Field Data*

*These maps are vaulted along with this census, copies of this census will not contain a copy of these maps unless specifically requested..

Evaluation of the 2000 Land Use Census

The results of the 2000 Land Use Census were reviewed for impact on the Radiological Environmental Monitoring Program (REMP). The specific areas reviewed, that could be affected by changes found in the land use census, were the sampling requirements for milk, broadleaf vegetation and food products.

Reviewing the milk sampling requirements from the ODCM Table 3.12-1 requires that samples are to be obtained from milking animals in three locations within a 5 km distance having the highest potential dose. If none are available, samples are acceptable from milking animals in locations 5 to 8 km distance where doses are calculated to be greater than 1 mrem per year. A sample is also required at a control location. There are currently no identified milking animals (cow or goat) within the specified distances. Currently the only location where milk samples are collected is at a control location (SW - 14.5).

Since not all milk samples are available, the broadleaf vegetation sampling specified in ODCM Table 3.12-1 is being performed. Broadleaf sample requirements are such that samples of broadleaf vegetation are to be collected from each of two offsite locations of the highest predicted annual average D/Q if milk sampling is not performed at all the required locations. Currently, broadleaf vegetation samples are collected at two indicator locations (N - 1.45 and SW - 1.0) and one control location (SW - 13.5). These indicator locations are near the site boundary in sectors where broadleaf vegetation is available and D/Q is high. Therefore, no changes to the broadleaf sampling program are required.

Food product sample requirements of ODCM Table 3.12-1 requires that one sample of each principal class of food product be collected from any area that is irrigated with water in which liquid plant waste has been discharged. Of the gardens identified in the land use census, no gardens are located in any area that irrigates with water in which liquid plant wastes are discharged. Currently, food products are sampled from one indicator location (ENE - 9.0) when in season. The indicator location for ENE-9.0 for pecans at time of harvest will be continued since it is a major source of food

products sold to the public.

The 2000 Land Use Census did not identify any locations that are "available for sampling" and that would yield a calculated dose 20% greater than at the current sampling locations.

Calculated values for the associated X/Q and D/Q values for each controlling receptor location and pathway are included along with the receptor distances in the data tables of this land use census. The values used to determine potential dose due to radioactive effluent discharges are the highest calculated values based on annual average values. The annual average X/Q used for dose calculations is 3.30E-6, tritium X/Q is 4.36E-6, and the D/Q value is 3.34 E-8. All these values are conservative based on the 2000 Land Use Census data and therefore no changes are required in the dose calculation parameters as verified by the field data.

* X/Q units are Sec/cubic meter * D/Q units are inverse square meters

Nearest Resident by Sector, Distance, X/Q and D/Q

Sector	Distance (Miles)	X/Q	D/Q
N	2.2	9.28E-07	5.32E-09
NNE	2.2	5.58E-07	2.90E-09
NE	2.2	3.92E-07	1.42E-09
ENE	2.4	2.58E-07	7.08E-10
E	2.4	3.02E-07	6.62E-10
ESE	2.0	4.70E-07	1.20E-09
SE	1.9	8.30E-07	3.40E-09
SSE	1.5	1.10E-06	6.60E-09
S	1.5	8.50E-07	5.20E-09
SSW	2.2	3.24E-07	1.41E-09
SW	1.1	1.40E-06	5.50E-09
WSW	1.0	1.80E-06	6.50E-09
W	1.6	7.64E-07	2.50E-09
WNW	3.0	3.76E-07	1.07E-09
NW	2.7	6.98E-07	2.24E-09
NNW	2.8	5.28E-07	2.10E-09

Note: The Annual Average X/Q used for dose calculations is 3.30E-06 sec/cubic meter.

The Tritium value X/Q used for dose calculations is 4.36E-06 sec/cubic meter.

The Annual Average D/Q used for dose calculations is 3.34E-08 inverse square meters.

Nearest Garden by Sector, Distance and D/Q

Sector	Distance (Miles)	D/Q
N	3.4	2.90E-09
NNE	2.5	2.30E-09
NE	2.4	1.14E-09
ENE	2.4	7.08E-10
E	2.4	6.62E-10
ESE	3.3	3.96E-10
SE	3.8	6.26E-10
SSE	1.9	3.88E-09
S	2.1	2.28E-09
SSW	4.5	2.60E-10
SW	1.5	2.50E-09
WSW	1.6	1.98E-09
W	3.3	4.42E-10
WNW	3.0	1.04E-09
NW	None	None
NNW	None	None

Nearest Milk Animal by Sector, Distance and D/Q

Sector	Distance (Miles)	D/Q
N	None	None
NNE	None	None
NE	None	None
ENE	None	None
E	None	None
ESE	None	None
SE	None	None
SSE	None	None
S	None	None
SSW	None	None
SW	None	None
WSW	None	None
W	None	None
WNW	None	None
NW	None	None
NNW	None	None

Population by Sector and Distance

Sector	0-1	1-2	2-3	3-4	4-5	Total
N	-	-	5	27	109	141
NNE	-	-	11	106	21	138
NE	-	-	64	93	245	402
ENE	-	-	77	19	24	120
E	-	-	109	166	29	304
ESE	-	3	8	74	165	250
SE	-	16	88	67	67	238
SSE	-	59	61	43	2131	2294
S	-	43	27	32	181	283
SSW	-	-	5	3	56	64
SW	-	72	8	59	43	182
WSW	-	234	3	16	-	253
W	-	13	8	21	8	50
WNW	-	-	-	37	59	96
NW	-	-	3	-	-	3
NNW	-	-	3	40	24	67
TOTAL	-	440	480	803	3162	4885

Based on an average of 2.66 residents per house. This average was obtained from North Central Texas Council of Governments for Hood and Somervell Counties and is derived from an average residents per house of 2.57 and 2.74, respectively.

Environmental Sample Locations Table

Sampling Point	Location	Sample Type*
A1	N-1.45 (Squaw Creek Park)	A
A2	N-9.4 (Granbury)	A
A3	E-3.5 (Children's Home)	A
A4	SSE-4.5 (Glen Rose)	A
A5	S/SSW-1.2	A
A6	SW-12.3 (CONTROL)	A
A7	SW/WSW-0.95	A
A8	NW-1.0	A
R1	N-1.45 (Squaw Creek Park)	R
R2	N-4.4	R
R3	N-6.5	R
R4	N-9.4 (Granbury)	R
R5	NNE-1.1	R
R6	NNE-5.65	R
R7	NE-1.7	R
R8	NE-4.8	R
R9	ENE-2.5	R
R10	ENE-5.0	R
R11	E-0.5	R
R12	E-1.9	R
R13	E-3.5 (Children's Home)	R
R14	E-4.2	R
R15	ESE-1.4	R
R16	ESE-4.7	R
R17	SE-1.3	R
R18	SE-3.85	R

Environmental Sample Locations Table (cont.)

Sampling Point	Location	Sample Type*
R19	SE-4.6	R
R20	SSE-1.3	R
R21	SSE-4.4 (Glen Rose)	R
R22	SSE-4.5 (Glen Rose)	R
R23	S-1.5	R
R24	S-4.2	R
R25	SSW-1.1	R
R26	SSW-4.4 (State Park)	R
R27	SW-0.9	R
R28	SW-4.8 (Girl Scout Camp)	R
R29	SW-12.3 (CONTROL)	R
R30	WSW-1.0	R
R31	WSW-5.35	R
R32	WSW-7.0 (CONTROL)	R
R33	W-1.0	R
R34	W-2.0	R
R35	W-5.5	R
R36	WNW-1.0	R
R37	WNW-5.0	R
R38	WNW-6.7	R
R39	NW-1.0	R
R40	NW-5.7	R
R41	NW-9.9 (Tolar)	R
R42	NNW-1.35	R
R43	NNW-4.6	R

Environmental Sample Locations Table (cont.)

Sampling Point	Location	Sample Type*
SW1	N-1.5 (Squaw Creek Reservoir Marina)	SW
SW2	N-9.9 (Lake Granbury)	SW/DW[1]
SW3	N-19.3 (CONTROL-Brazos River)	SW
SW4	NE-7.4 (Lake Granbury)	SW
SW5	ESE-1.4 (Squaw Creek Reservoir)	SW[2]
SW6	NNW-0.1 (Squaw Creek Reservoir)	SW/DW[3]
GW1	W-1.2 (NOSF Potable Water)	GW
GW2	WSW-0.1 (Plant Potable Water)	GW[3,4]
GW3	SSE-4.6 (Glen Rose)	GW[4]
GW4	N-9.8 (Granbury)	GW[1,4]
GW5	N-1.45 (Squaw Creek Park)	GW[4]
SS1	NNE-1.0 (Squaw Creek Reservoir)	SS
SS2	N-9.9 (Lake Granbury)	SS
SS3	NE-7.4 (Lake Granbury)	SS
SS4	SE-5.3 (Squaw Creek)	SS
M4	SW-14.5 (CONTROL)	M
F1	ENE-2.0 (Squaw Creek Reservoir)	F
F2	NNE-8.0 (Lake Granbury)	F
FP1	ENE-9.0 (Leonard Bros. Pecan Farm)	FP

Environmental Sample Locations Table (cont.)

Sampling Point	Location	Sample Type*
BL1	N-1.45	BL
BL2	SW-1.0	BL[5]
BL3	SW-13.5 (CONTROL)	BL[5]

*Sample Type : A - Air Sample; R - Direct Radiation; SW - Surface Water;
DW - Drinking Water GW - Ground Water; SS - Shoreline Sediments;
M - Milk; F - Fish; FP - Food Products; BL - Broadleaf Vegetation

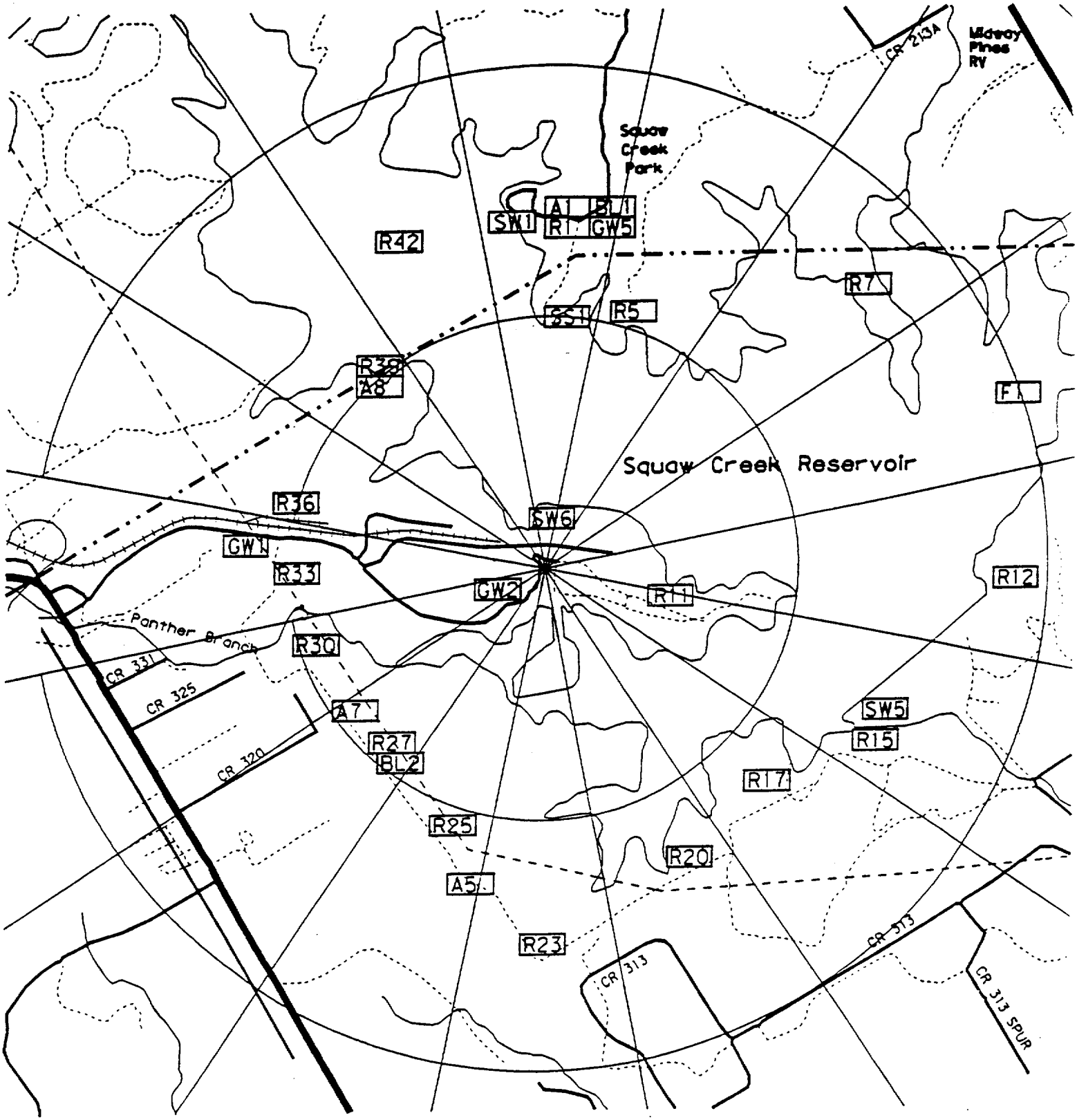
NOTES: 1) The municipal water system for the City of Granbury is supplied by surface water from Lake Granbury (location SW2) and ground water (location GW4). Each of these supplies is sampled. These samples are not required for compliance with Radiological Effluent Control 3/4.12.1, Table 3.12-1, because they are not affected by plant discharges.

2) This sample (location SW6) is representative of discharges from Squaw Creek Reservoir both down Squaw Creek and to Lake Granbury via the return line to Lake Granbury.

3) Plant potable water can be supplied by surface water from Squaw Creek Reservoir (location SW6) and ground water from onsite wells (location GW2). Each of these possible sources of water are sampled.

4) Ground water supplies in the plant site area are not affected by plant liquid effluents as discussed in CPSES FSAR Section 2.4.13 and are therefore not required to be monitored for radioactivity to meet the requirements of the Radiological Effluent Control 3/4.12.1, Table 3.12-1.

5) Broadleaf sampling will be performed at the specified locations if milk samples are unavailable from any location.



Environmental Sample Locations Map - 2 Mile Radius