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CP-201700256
TXX-17044

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Ref Tech Spec 5.6.2

4/27/2017

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NOS. 50-445 AND 50-446
TRANSMITTAL OF YEAR 2016 RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Dear Sir or Madam:

Enclosed is the Annual Radiological Environmental Operating Report for the Comanche Peak[1] Radiological Environmental Monitoring Program. This report is submitted pursuant to Section 5.6.2 of the Comanche Peak Units 1 and 2 Technical Specifications (Appendix A to Operating License Nos. NPF-87 and NPF-89). The report covers the period from January 1, 2016 through December 31, 2016 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, please contact Steve Dixon at (254) 897-5482 or Kassie Powell at (254) 897-6987.

IE25
NRR

[11] TEX Operations Company LLC and Comanche Peak Company LLC are the current NRC licensees. On December 14, 2016, License Amendment Request 16-003 (ML16351A200) submitted an administrative change to change the licensee name "TEX Operations Company LLC" to "Vistra Operations Company LLC".

Sincerely,

Thomas P. McCool

Enclosure 1. Comanche Peak Annual Radiological Environmental Operating Report for 2016

c - K. M. Kennedy, Region IV
M. Watford, NRR
Resident Inspectors, Comanche Peak

Enclosure 1

Comanche Peak Annual Radiological Environmental Operating Report For 2016

LUMINANT

COMANCHE PEAK NUCLEAR POWER PLANT

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

JANUARY 1, 2016 through DECEMBER 31, 2016

LUMINANT REVIEW and APPROVAL

CREATED BY: Todd Emery — 3-20-17
Todd Emery — Date
Radiation Protection Technician

REVIEWED BY: Ellee McGurk — 3/20/17
Ellee McGurk — Date
Radiation Protection Supervisor

REVIEWED BY: Kassie Powell — 3-20-17
Kassie Powell — Date
Health Physics Supervisor

APPROVED BY: John Gumnick — 3-20-17
John Gumnick — Date
Radiation Protection Manager

Documented on RPI-710-2

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Introduction

Results of the Radiological Environmental Monitoring Program for the Comanche Peak Nuclear Power Plant (CPNPP) for the year 2016 are contained within this report. This report covers the period from January 1, 2016 through December 31, 2016 and summarizes the results of measurements and analysis of data obtained from environmental samples collected during this same timeframe.

A. Site and Station Description

CPNPP consists of two pressurized water reactor units, each designed to operate at a power level of about 1250 megawatts (electrical). The Station is located on Squaw Creek reservoir in Somervell and Hood counties, 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 Overviews of the CPNPP Radiological Environmental 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). To assure that these criteria are met, each license authorizing reactor operation includes technical specifications 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 that 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 "An Acceptable Radiological Environmental Monitoring Program" on radiological environmental monitoring issued by the Radiological Assessment Branch, Revision 1 (November 1979), the CPNPP Technical Specification "Technical Specifications for Comanche Peak Nuclear Power Plant Units 1 and 2" and the "CPSES Offsite Dose Calculation Manual" (ODCM).

The Radiological Environmental Monitoring Program includes the following:

- The measurement of ambient gamma radiation by Thermal Luminescent dosimetry;
- The determination of airborne gross beta, gamma emitters, and Iodine-131;
- The determination of tritium and gamma emitters in Discharge Pathway surface water;
- The determination of gross beta, tritium, Iodine-131, and gamma emitters in potential drinking water sources;
- The determination of tritium and gamma emitters in ground water and fish;
- The determination of gamma emitters in sediment;
- The determination of gamma emitters in food products and;
- The determination of gamma emitters and Iodine-131 in broadleaf vegetation.

The regulations governing the quantities of radioactivity in reactor effluents allow nuclear power plants to contribute, at most, only a small percentage increase 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 CPNPP, the radiological surveys of the plant environs were divided into pre-operational and operational phases.

The pre-operational phase of the program provided a general characterization of the radiation levels and concentrations prevalent in these areas 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 pre-operational phase, assists in the evaluation of the radiological impact of plant operation.

Pre-operational measurements were conducted at CPNPP from 1981 to 1989. These pre-operational measurements were performed to:

- Evaluate procedures, equipment, and techniques;
- Identify potentially important pathways to be monitored after plant operation;
- Measure background levels and the variations along potentially important pathways;
- Provide baseline data for statistical comparisons with future operational analytical results.

The operational Radiological Environmental Monitoring Program is conducted to:

- 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;
- Verify the effectiveness of in-plant measures used for controlling the release of radioactive materials;
- Identify changes in the areas at and beyond the site boundary that may impact the principal pathways of exposure.

This report documents the twenty-sixth 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. Note: Comanche Peak Steam Electric Station (CPSES) is equivalent to Comanche Peak Nuclear Power Plant (CPNPP).

Program Descriptions and Results

A. Sample Locations

Within a radius of twenty miles of the CPNPP site there are seventy-two (72) sample locations included in the monitoring program. The number of sample points and the specific locations for the sample points were determined by considering 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, and 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 areas surrounding the plant. If changes are identified that impact the principle pathways of exposure, appropriate changes to the radiological environmental monitoring program are implemented. A copy of the report "Comanche Peak Nuclear Power Plant Land Use Census" is provided in Appendix A to this report.

Table 1 – Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program contains a brief outline of the current program. This table specifies the sample media type, the number of locations for each media type, the sector and distance identifier for each sample location, the sample frequency, the type of analysis required and the frequency each analysis is required to be performed (Analytical Frequency).

Table 2 – Key to Environmental Sampling Locations provides a reference that links the sampling point designations used in procedures and forms to the appropriate physical sample location (sector and distance) and to the correct sample type. This cross-reference enhances the ability to review data and tie the data to the correct sample points and to ensure all samples are collected and analyzed as specified.

Currently there are no milk sample locations within ten miles of the CPNPP site and there are no milk sample locations within twenty miles that will participate in the environmental program. CPNPP already samples extra broadleaf locations as required due to no milk locations within the ten-mile radius therefore, no changes to the program are necessary. Milk sampling will be resumed if any future annual land use census determines a dairy has been established within the specified area.

Table 1 – Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program

Media	Number of Locations	Identification by Sector and Distance (miles)	Sampling Frequency (a)	Analysis	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-1.0; W-2.0; W-5.5; WNW-1.0; WNW-5.0; WNW-6.7; NW-1.0; NW-5.7; NW-9.9; NNW-1.35; NNW-4.6	Q, A	Thermo Luminescent (TLD)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 Isotopic Filter Gamma Isotopic Charcoal	W QC W
Discharge Pathway Surface Water	4	N-19.3; ESE-1.4; N-1.5; NE-7.4	M(b)	Gamma Isotopic Tritium	M QC
Surface Water & Drinking sources	2	NNW-0.1; N-9.9	M(c)	Gross Beta Gamma Isotopic Iodine-131 Tritium	M M M QC
Ground Water	5	SSE-4.6; W-1.2; WSW-0.1; N-9.8; N-1.45	Q	Gamma Isotopic Tritium	Q Q
Sediment	4	N-9.9; NNE-1.0; NE-7.4; SE-5.3	SA	Gamma Isotopic	SA
Fish	2	NNE-8.0; ENE-2.0	SA	Gamma Isotopic	SA
Food Products	1	ENE-9.0, E-4.2	MH	Gamma Isotopic Iodine-131	MH MH
Broadleaf Vegetation	3	N-1.45; SW-1.0; SW-13.5	M	Gamma Isotopic	M

(a) Frequency codes are: W–Weekly; M-Monthly; Q-Quarterly; QC-Quarterly Composite; MH-Monthly at Harvest; SA-Semiannual; A-Annual

(b) Surface water samples from Squaw Creek are monthly composites of weekly grab samples. Surface water samples from Lake Granbury are monthly grab samples.

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

Table 2
Key to Environmental Sampling Locations

SAMPLING POINT	LOCATION (SECTOR-MILE)	SAMPLE TYPE*	SAMPLING POINT	LOCATION (SECTOR-MILE)	SAMPLE TYPE*
A1	N-1.45	A	R29	SW-12.3	R
A2	N-9.4	A	R30	WSW-1.0	R
A3	E-3.5	A	R31	WSW-5.35	R
A4	SSE-4.5	A	R32	WSW-7.0	R
A5	S/SSW-1.2	A	R33	W-1.0	R
A6	SW-12.3	A	R34	W-2.0	R
A7	SW/WSW-0.95	A	R35	W-5.5	R
A8	NW-1.0	A	R36	WNW-1.0	R
R1	N-1.45	R	R37	WNW-5.0	R
R2	N-4.4	R	R38	WNW-6.7	R
R3	N-6.5	R	R39	NW-1.0	R
R4	N-9.4	R	R40	NW-5.7	R
R5	NNE-1.1	R	R41	NW-9.9	R
R6	NNE-5.65	R	R42	NNW-1.35	R
R7	NE-1.7	R	R43	NNW-4.6	R
R8	NE-4.8	R	SW1	N-1.5	SW
R9	ENE-2.5	R	SW2	N-9.9	SW/DW
R10	ENE-5.0	R	SW3	N-19.9	SW
R11	E-0.5	R	SW4	NE-7.4	SW
R12	E-1.9	R	SW5	ESE-1.4	SW
R13	E-3.5	R	SW6	NNW-0.1	SW/DW
R14	E-4.2	R	GW1	W-1.2	GW/DW
R15	ESE-1.4	R	GW2	WSW-0.1	GW/DW
R16	ESE-4.7	R	GW3	SSE-4.6	GW/DW
R17	SE-1.3	R	GW4	N-9.8	GW/DW
R18	SE-3.85	R	GW5	N-1.45	GW/DW
R19	SE-4.6	R	SS1	NNE-1.0	SS
R20	SSE-1.3	R	SS2	N-9.9	SS
R21	SSE-4.4	R	SS3	NE-7.4	SS
R22	SSE-4.5	R	SS4	SE-5.3	SS
R23	S-1.5	R	F1	ENE-2.0	F
R24	S-4.2	R	F2	NNE-8.0	F
R25	SSW-1.1	R	FP1	ENE-9.0	FP
R26	SSW-4.4	R	FP2	E-4.2	FP
R27	SW-0.9	R	BL1	N-1.45	BL
R28	SW-4.8	R	BL2	SW-1.0	BL
			BL3	SW-13.5	BL

Sample Type*

A – AIR SAMPLE
F – FISH
SS – SHORELINE SEDIMENT
SW – SURFACE WATER
DW – DRINKING WATER
GW – GROUND WATER
R – DIRECT RADIATION
FP – FOOD PRODUCT
BL – BROADLEAF VEGETATION

B. Direct Radiation

Beginning in year 2001 and ending in 2008, National Voluntary Laboratory Accreditation Program (NVLAP) certified Thermo Luminescent Dosimeters (TLDs) were utilized and processed on-site by CPNPP. The year 2001 was the first year that CPNPP used the Panasonic TLD System to supply all the required direct radiation (ambient) environmental monitoring.

From years 2009-2012 CPNPP contracted the services of Landauer Inc. to provide and process Optically Stimulated Luminescent dosimeters (OSLs) to determine the direct (ambient) radiation levels at the designated monitoring locations. Landauer Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

Then, in 2013 CPNPP contracted the services of Mirion Technologies to provide and process Thermo Luminescent Dosimeters (TLDs). The TLDs are used to determine the direct (ambient) radiation levels in designated monitoring locations. Mirion Technologies is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

Still currently, Thermo Luminescent Dosimeters (TLDs) are used to determine the direct (ambient) radiation levels at designated monitoring locations.

Monitoring locations were chosen according to the criteria given in the USNRC Branch Technical Position on Radiation Monitoring (Revision 1, November 1979). The area around the station was divided into 16 radial sectors of 22-1/2 degrees each, corresponding to the cardinal points of the compass. TLDs were placed in each of these sectors. The TLDs were placed in two rings around the station. An inner ring was located as close as possible to 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 direct radiation measurements, two sets of the TLDs were used at each of the 43 monitoring locations. One set of TLDs was exchanged on a quarterly basis and a second set of TLDs was exchanged on a yearly basis. Additional sets of in-transit TLDs were used as control TLDs for the quarterly and annual TLDs.

D. C. Oakley's report "National Radiation Exposure in the United States", published in 1972, calculated a background radiation dose rate equivalent of 0.22 mr/day for the area surrounding Fort Worth, Texas. This calculated value varies widely with changes in location but represents an appropriate reference value to compare with actual measured TLD doses.

Using data from the pre-operational program for the two years prior to the startup of Unit 1, the quarterly TLDs averaged a calculated dose rate of 0.14 mR/day while the yearly TLDs averaged a calculated dose rate of 0.16 mR/day. The range of measured values from this same two-year period varied from a minimum of 0.11 mR/day to a maximum of 0.22 mR/day.

Table 3 – Environmental Direct Radiation Results contains the measured dose (mR) for each quarterly TLD from each of the 43 monitoring locations. The corresponding quarterly calculated dose rate (mR/day) values are listed as well. The statistical average doses (mR) and dose rate (mR/day) values for each set of quarterly TLDs is also displayed. Additionally, the table includes the total dose (mR) of all four quarters for each specific location. The table also includes the measured dose (mR) for each annual TLD from each of the 43 monitoring locations. The corresponding annual calculated dose rate (mR/day) values are listed as well. The statistical annual average dose (mR) for the entire set of annual TLDs is reported along with the average dose rate (mR/day) for the entire set of annual TLDs.

The measured dose rates of all the quarterly TLDs ranged from a minimum of **0.074 mR/day** to a maximum of **0.183 mR/day** with an average dose rate of **0.140 mR/day**. This resulted in an average quarterly dose of **12 mR** and a total annual dose of **53 mR** for all of the forty three monitoring stations.

The measured dose rates of all the annual TLDs ranged from a minimum of **0.076 mR/day** to a maximum of **0.164 mR/day** with an average dose rate of **0.123 mR/day**. This resulted in an average quarterly dose of **12 mR** and a total annual dose of **45 mR** for all of the forty three monitoring stations.

Comparing the pre-operational data and operational data collected through the year 2016 did not produce any anomalies. The direct radiation dose data was consistent with previous years of data during the pre-operational program. Table 14 – TLD Trend Quarterly Average contains the average quarterly OSL/TLD data for the five most current years from each of the 43 monitoring locations. The implementation of the Mirion TLDs and the background subtract method used to report the data from the TLDs accounts for the lower values and accounts for consistent response from each location's total quarterly TLDs to the Annual TLDs.
See CR-2013-004934 for additional clarification on the transient subtraction method.

The 2012 CPNPP Annual Direct Radiation results were reported using personnel OSLs packaged by Landauer as environmental OSL field badges. The difference between the two is the chips under copper filters. The environmental OSLs use the average of two chips and the personnel OSLs use one chip to calculate the direct radiation results. This evaluation is documented in CR-2012-003122.

In 2013, CPNPP performed a Transient TLD Study which improved the reporting accuracy Direct Radiation Results. In summary, this study incorporated calculating the daily average in mR/Day of the transient TLDs stored in the lead storage container during the monitoring period. Details of this study can be found in CR-2013-004934.

No abnormal quarterly results were obtained by either CPNPP or by the State of Texas, Bureau of Radiation Control.

During the year 2016, there were two exceptions to the TLD Program.

[1]**CR-2016-002998** - During the performance of the quarterly environmental TLD run, it was discovered that the cubitainer end cap was missing along with the 1st Quarter and Annual TLD packs from sector NE-1.7, Badge Location R7.

[2]**CR-2016-006385** - The Annual and Quarterly environmental TLDs at a located on Squaw Creek lake, R-7, were discovered missing during the 2nd quarter environmental TLD change out. Water marks on the pole used to secure the TLDs indicate that the water level combined with the height of waves would have led to storage container damage and subsequent loss of the TLDs.

***TR-2017-002291** - Vendor was contacted for the CRs mentioned above to determine how data could be reported/monitored. Historical data (2015) will be used as reference for the 2016 environmental report.

Table 3 – Environmental Direct Radiation Results
(Units of mR dose and mR/day dose rate)

Location		1ST QTR Total	Average mR/Day	2ND QTR Total	Average mR/Day	3RD QTR Total	Average mR/Day	4TH QTR Total	Average mR/Day	AVG QTR TLD Total	Annual TLD Total	Annual Average TLD mR/day
N-1.45	R1	13	0.139	13	0.140	13	0.139	12	0.137	13	51	0.120
N-4.4	R2	15	0.161	13	0.140	15	0.161	13	0.148	14	56	0.142
N-6.5	R3	12	0.128	12	0.129	12	0.128	12	0.137	12	48	0.129
N-9.4	R4	13	0.139	13	0.140	13	0.139	11	0.126	12	50	0.131
NNE-1.1	R5	9	0.095	9	0.098	9	0.095	8	0.093	9	35	0.085
NNE-5.65	R6	13	0.139	13	0.140	13	0.139	12	0.137	13	51	0.131
NE-1.7	R7	*1	*1	*2	*2	8	0.085	8	0.093	8	16	0.076
NE-4.8	R8	15	0.161	14	0.151	13	0.139	12	0.137	13	54	0.137
ENE-2.5	R9	13	0.139	13	0.140	15	0.161	13	0.148	14	54	0.129
ENE-5.0	R10	12	0.128	16	0.173	17	0.183	15	0.170	15	60	0.164
E-0.5	R11	12	0.128	12	0.129	13	0.139	11	0.126	12	48	0.126
E-1.9	R12	14	0.150	11	0.118	11	0.117	10	0.115	12	46	0.112
E-3.5	R13	13	0.139	12	0.129	12	0.128	12	0.137	12	49	0.118
E-4.2	R14	14	0.150	14	0.151	14	0.150	12	0.137	13	54	0.137
ESE-1.4	R15	12	0.128	13	0.140	12	0.128	11	0.126	12	48	0.126
ESE-4.7	R16	12	0.128	14	0.151	14	0.150	12	0.137	13	52	0.140
SE-1.3	R17	11	0.117	14	0.151	14	0.150	12	0.137	12	51	0.131
SE-3.85	R18	12	0.128	12	0.129	12	0.128	10	0.115	11	46	0.120
SE-4.6	R19	14	0.150	12	0.129	13	0.139	12	0.137	13	51	0.123
SSE-1.3	R20	13	0.139	13	0.140	14	0.150	11	0.126	12	51	0.123
SSE-4.4	R21	14	0.150	13	0.140	13	0.139	11	0.126	13	51	0.131
SSE-4.5	R22	12	0.128	13	0.140	12	0.128	12	0.137	12	49	0.129
S-1.5	R23	13	0.139	12	0.129	11	0.117	11	0.126	12	47	0.118
S-4.2	R24	12	0.128	14	0.151	14	0.150	12	0.137	13	52	0.137
SSW-1.1	R25	12	0.128	12	0.129	13	0.139	12	0.137	12	49	0.126
SSW-4.8	R26	13	0.139	13	0.140	14	0.150	11	0.126	12	51	0.123
SW-0.9	R27	12	0.128	12	0.129	13	0.139	11	0.126	12	48	0.123
SW-4.8	R28	11	0.117	16	0.173	12	0.128	11	0.126	13	50	0.115
SW-12.3 (C)	R29	13	0.139	13	0.140	13	0.139	11	0.126	12	50	0.123
WSW-1.0	R30	13	0.139	13	0.140	14	0.150	11	0.126	12	51	0.131
WSW-5.35	R31	12	0.128	13	0.140	12	0.128	11	0.126	12	48	0.120
WSW-7.0 (C)	R32	14	0.150	14	0.151	15	0.161	13	0.148	14	56	0.131
W-1.0	R33	12	0.128	12	0.129	11	0.117	10	0.115	11	45	0.109
W-2.0	R34	12	0.128	11	0.118	12	0.128	10	0.115	11	45	0.104
W-5.5	R35	11	0.117	11	0.118	11	0.117	9	0.104	10	42	0.109
WNW-1.0	R36	12	0.128	12	0.129	13	0.139	12	0.137	12	49	0.126
WNW-5.0	R37	12	0.128	12	0.129	13	0.139	11	0.126	12	48	0.126
WNW-6.7	R38	12	0.128	12	0.129	13	0.139	12	0.137	12	49	0.120
NW-1.0	R39	12	0.128	12	0.129	13	0.139	10	0.115	12	47	0.118
NW-5.7	R40	12	0.128	13	0.140	15	0.161	12	0.137	13	52	0.131
NW-9.9	R41	11	0.117	11	0.118	12	0.128	10	0.115	11	44	0.112
NNW-1.35	R42	8	0.084	8	0.085	7	0.074	7	0.082	8	30	0.082
NNW-4.6	R43	13	0.139	14	0.151	14	0.150	13	0.148	13	54	0.142
AVERAGES		**14**	**0.132**	**13**	**0.138**	**13**	**0.136**	**13**	**0.128**	**12**	**45**	**0.123**

Table 14 – TLD Trend Quarterly Average (Five most current years)

Location	2012	2013	2014	2015	2016	% Diff 2015 to 2016	2012-2016 mR Avg	% Diff 2015 to Average
R1	26	11	11	12	13	8%	14.60	-12%
R2	26	13	13	14	14	0%	16.00	-13%
R3	25	11	12	13	12	-8%	14.60	-20%
R4	26	12	12	13	12	-8%	15.00	-22%
R5	20	8	8	9	9	0%	10.80	-18%
R6	27	12	12	14	13	-7%	15.60	-18%
R7	21	7	8	9	8	-12%	10.60	-28%
R8	25	13	13	15	13	-14%	15.80	-19%
R9	27	13	13	15	14	-7%	16.40	-16%
R10	30	14	15	16	15	-6%	18.00	-18%
R11	25	12	13	13	12	-8%	15.00	-22%
R12	23	9	10	11	12	9%	13.00	-8%
R13	25	12	11	12	12	0%	14.40	-18%
R14	27	13	13	14	13	-7%	16.00	-21%
R15	24	11	12	13	12	-8%	14.40	-18%
R16	26	12	12	14	13	-7%	15.40	-17%
R17	26	12	12	13	12	-8%	15.00	-22%
R18	22	11	11	12	11	-9%	13.40	-20%
R19	24	11	11	12	13	8%	14.20	-9%
R20	24	12	11	12	12	0%	14.20	-17%
R21	24	11	12	13	13	0%	14.60	-12%
R22	27	11	12	13	12	-8%	15.00	-22%
R23	21	11	10	12	12	0%	13.20	-10%
R24	24	11	13	14	13	-7%	15.00	-14%
R25	25	12	12	13	12	-8%	14.80	-21%
R26	26	12	12	13	12	-8%	15.00	-22%
R27	25	11	12	12	12	0%	14.40	-18%
R28	24	11	11	11	13	17%	14.00	-7%
R29	25	11	11	13	12	-8%	14.40	-18%
R30	26	12	12	13	12	-8%	15.00	-22%
R31	25	10	12	12	12	0%	14.20	-17%
R32	26	13	13	14	14	0%	16.00	-13%
R33	23	10	10	11	11	0%	13.00	-17%
R34	22	9	10	11	11	0%	12.60	-14%
R35	23	10	11	11	10	-10%	13.00	-26%
R36	26	13	12	13	12	-8%	15.20	-24%
R37	25	12	12	13	12	-8%	14.80	-21%
R38	25	11	11	13	12	-8%	14.40	-18%
R39	23	11	11	12	12	0%	13.80	-14%
R40	24	11	12	13	13	0%	14.60	-12%
R41	23	11	11	12	11	-9%	13.60	-21%
R42	20	7	8	8	8	0%	10.20	-24%
R43	26	13	13	14	13	-7%	15.80	-19%

Legend:	< 50%
	> 25%

C. Airborne Program

Air particulate and air iodine samples were collected each week from the eight monitoring locations described in Table 1 – Comanche Peak Nuclear Power Plant Environmental Radiological Monitoring Program (as seen in section II.A). 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 an impregnated charcoal cartridge which was connected in series behind the air particulate filter. Shipped to an independent laboratory, air particulate filters were analyzed weekly for gross beta activity and were composited quarterly for gamma spectrometry analysis. Charcoal cartridges were analyzed weekly for Iodine-131.

A total of 416 air particulate filters were collected and analyzed for gross beta activity. The reported gross beta activity ranged from a minimum value of **1.17E-02 pCi/m^3** to a maximum value of **1.09E-01 pCi/m^3**. Table 4 – Environmental Airborne Particulate Gross Beta Results contains the reported values of all samples. There were no anomalies noted in the data reported for 2016 when compared to pre-operational and previous operational data. Graph 1 – Environmental Air Sample Gross Beta Results – Maximum and Minimum trends the weekly high and low gross beta values to show the seasonal variation of the results as well as providing indication of consistency between the individual monitoring locations.

A total of 416 charcoal cartridges were analyzed for airborne Iodine-131. Table 5 – Environmental Air Sample Iodine-131 Results contains the reported values of each Iodine-131 analysis, all of which are less than the required lower limit of detection (LLD).

All air particulate filters were collected and composited quarterly and then analyzed by gamma spectrometry. The gamma isotopic data is presented in Table 6 – Environmental Air Particulate Composite Gamma Isotopic Results. Typical of pre-operational and previous operational data results, the only radioactive nuclide identified in all the samples was cosmogenic Beryllium-7, a naturally occurring isotope.

A review of all the State of Texas air sample data indicated no anomalies.

During the year 2016, there were three exceptions to the Airborne Program.

[1]**CR-2016-004087** - GFI power supply to Environmental air sample station failed resulting in 14 hours of operation during the week for control location A-6/ State -57. Sample start and end dates were 4/26/16 to 5/3/16.

[2]**TR-2017-002422** - During the weekly environmental run of 11-15-16, while collection air samples at location A-6 (chalk mountain), upon arrival the air sampler had power but no suction through the air sample head. The unit was removed from service. This resulted in measurements being less than measured LLD.

TR-2016-005541 - Scheduled Power loss to Environmental Air Sample Station A-1, Squaw Creek during the weeks of 5/17/16 to 5/24/16 (approximately 26 hours) and 5/24/16 to5/31/16 (approximately 5 hours). Power outage was schedule for power supply upgrade and water supply upgrades to Squaw Creek. This did not affect weekly sample results.

Table 4 -- Environmental Airborne Particulate Gross Beta Results
(Units of pCi/m3)

	A-8	A-7	A-5	A-6	A-4	A-3	A-1	A-2
	Location							
	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
Date				Control				Control
01-05-16	3.87E-02	4.21E-02	4.69E-02	5.53E-02	4.45E-02	5.07E-02	5.38E-02	4.29E-02
01-12-16	3.36E-02	3.62E-02	3.80E-02	5.13E-02	3.75E-02	4.95E-02	4.98E-02	3.35E-02
01-19-16	4.50E-02	4.79E-02	4.51E-02	6.42E-02	5.75E-02	6.79E-02	6.65E-02	4.37E-02
01-26-16	3.34E-02	4.65E-02	3.75E-02	5.16E-02	4.04E-02	3.90E-02	5.27E-02	3.09E-02
02-02-16	3.43E-02	3.97E-02	4.15E-02	5.37E-02	4.49E-02	5.24E-02	5.19E-02	3.52E-02
02-09-16	2.48E-02	3.17E-02	3.29E-02	3.90E-02	3.28E-02	4.22E-02	4.14E-02	3.02E-02
02-16-16	4.40E-02	3.96E-02	3.85E-02	5.03E-02	4.25E-02	5.94E-02	4.93E-02	3.53E-02
02-23-16	2.02E-02	2.56E-02	2.60E-02	3.36E-02	2.10E-02	2.65E-02	3.26E-02	2.01E-02
03-01-16	2.84E-02	2.70E-02	2.12E-02	3.65E-02	2.24E-02	3.11E-02	3.27E-02	2.33E-02
03-08-16	2.76E-02	3.40E-02	3.09E-02	2.45E-02	2.79E-02	3.30E-02	4.09E-02	3.65E-02
03-15-16	2.35E-02	2.58E-02	2.51E-02	2.48E-02	2.73E-02	3.10E-02	3.13E-02	3.56E-02
03-22-16	2.23E-02	2.55E-02	1.92E-02	2.60E-02	2.25E-02	2.79E-02	2.91E-02	3.30E-02
03-29-16	2.75E-02	2.44E-02	2.57E-02	2.45E-02	2.50E-02	2.78E-02	3.06E-02	3.96E-02
04-05-16	2.18E-02	2.44E-02	2.34E-02	1.84E-02	1.99E-02	2.49E-02	2.53E-02	2.99E-02
04-12-16	2.59E-02	3.30E-02	2.58E-02	2.23E-02	2.41E-02	2.41E-02	3.02E-02	3.03E-02
04-19-16	2.07E-02	1.82E-02	1.83E-02	1.92E-02	1.69E-02	1.86E-02	2.76E-02	2.01E-02
04-26-16	2.61E-02	3.01E-02	2.82E-02	2.53E-02	2.46E-02	2.68E-02	2.96E-02	2.81E-02
05-03-16	1.79E-02	1.88E-02	2.01E-02	7.16E-03 [1]	1.43E-02	2.75E-02	2.81E-02	2.34E-02
05-10-16	3.32E-02	4.29E-02	3.16E-02	3.81E-02	3.11E-02	3.91E-02	3.72E-02	3.37E-02
05-17-16	2.53E-02	3.20E-02	1.94E-02	2.48E-02	2.43E-02	2.65E-02	3.20E-02	2.89E-02
05-24-16	1.87E-02	2.33E-02	1.48E-02	1.67E-02	1.41E-02	1.76E-02	2.56E-02	1.73E-02
05-31-16	2.08E-02	2.03E-02	1.29E-02	2.21E-02	2.08E-02	2.16E-02	2.97E-02	2.77E-02
06-07-16	1.53E-02	1.89E-02	1.81E-02	1.63E-02	1.63E-02	1.65E-02	2.38E-02	2.21E-02
06-14-16	2.77E-02	3.52E-02	2.98E-02	2.65E-02	2.31E-02	3.31E-02	3.98E-02	3.37E-02
06-21-16	3.26E-02	3.27E-02	4.26E-02	2.54E-02	3.08E-02	3.43E-02	3.28E-02	4.21E-02
06-28-16	2.49E-02	2.67E-02	3.00E-02	2.32E-02	2.72E-02	2.91E-02	2.80E-02	2.90E-02
07-05-16	2.31E-02	2.56E-02	2.71E-02	2.64E-02	2.72E-02	2.80E-02	3.13E-02	3.51E-02
07-12-16	2.85E-02	2.81E-02	3.08E-02	2.98E-02	2.00E-02	2.52E-02	3.33E-02	3.20E-02
07-19-16	3.02E-02	2.84E-02	3.63E-02	2.38E-02	2.62E-02	2.98E-02	2.90E-02	3.21E-02
07-26-16	1.97E-02	2.00E-02	2.38E-02	2.15E-02	2.29E-02	2.34E-02	2.35E-02	2.19E-02
08-02-16	2.19E-02	2.79E-02	3.33E-02	1.94E-02	2.01E-02	2.64E-02	2.71E-02	2.78E-02
08-09-16	2.22E-02	2.22E-02	3.13E-02	2.49E-02	2.40E-02	2.37E-02	2.83E-02	2.48E-02
08-16-16	2.23E-02	2.95E-02	3.09E-02	2.45E-02	2.27E-02	1.81E-02	2.69E-02	2.80E-02
08-23-16	1.17E-02	1.70E-02	1.60E-02	1.58E-02	1.71E-02	1.51E-02	1.93E-02	1.76E-02
08-30-16	2.45E-02	4.06E-02	2.35E-02	1.75E-02	2.52E-02	2.02E-02	2.18E-02	2.31E-02
09-06-16	3.37E-02	4.83E-02	3.14E-02	3.68E-02	4.78E-02	3.59E-02	4.10E-02	4.05E-02
09-13-16	2.92E-02	4.46E-02	3.10E-02	2.14E-02	2.64E-02	2.89E-02	2.82E-02	3.13E-02
09-20-16	1.43E-02	3.15E-02	2.39E-02	1.71E-02	2.04E-02	1.79E-02	2.41E-02	2.04E-02
09-27-16	2.81E-02	4.91E-02	3.02E-02	2.19E-02	2.85E-02	3.12E-02	2.98E-02	3.09E-02
10-04-16	3.07E-02	6.32E-02	4.20E-02	3.26E-02	3.96E-02	4.41E-02	3.47E-02	3.82E-02
10-11-16	2.68E-02	5.21E-02	3.14E-02	2.42E-02	3.20E-02	2.74E-02	3.16E-02	3.62E-02
10-18-16	2.49E-02	4.79E-02	2.84E-02	2.32E-02	2.54E-02	3.76E-02	3.60E-02	3.09E-02
10-25-16	2.81E-02	4.93E-02	3.09E-02	1.82E-02	2.79E-02	3.35E-02	3.03E-02	3.28E-02
11-01-16	3.78E-02	6.82E-02	4.51E-02	2.87E-02	4.10E-02	4.58E-02	4.50E-02	4.90E-02
11-08-16	3.68E-02	5.32E-02	3.69E-02	7.10E-02	4.01E-02	3.69E-02	3.92E-02	5.09E-02
11-15-16	5.94E-02	1.03E-01	7.02E-02	6.63E-03 [2]	6.99E-02	6.61E-02	6.70E-02	7.49E-02
11-22-16	4.77E-02	8.48E-02	5.46E-02	5.50E-02	4.45E-02	4.78E-02	4.43E-02	4.93E-02
11-29-16	5.85E-02	1.00E-01	6.37E-02	8.36E-02	5.73E-02	6.25E-02	5.90E-02	6.67E-02
12-06-16	3.18E-02	4.10E-02	2.70E-02	4.03E-02	2.70E-02	2.62E-02	2.84E-02	3.54E-02
12-13-16	4.69E-02	8.09E-02	5.36E-02	7.45E-02	4.45E-02	5.06E-02	4.94E-02	5.47E-02
12-20-16	7.70E-02	1.25E-01	8.45E-02	1.09E-01	7.28E-02	7.49E-02	9.33E-02	8.35E-02
12-27-16	4.15E-02	6.19E-02	4.15E-02	5.14E-02	3.85E-02	4.42E-02	4.35E-02	4.15E-02

Required LLD **1.00E-02**

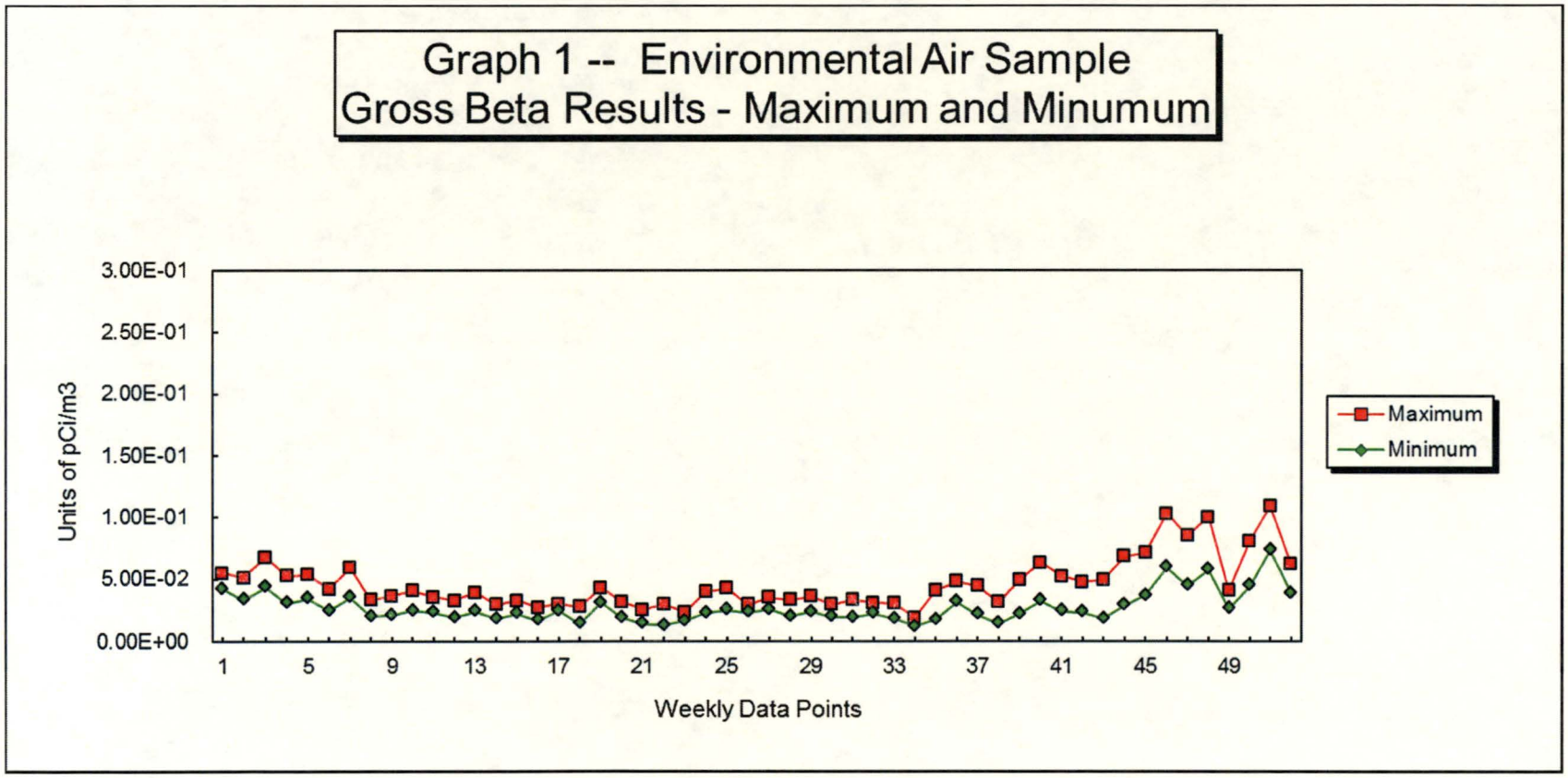

Graph 1 -- Environmental Air Sample
Gross Beta Results - Maximum and Minumum
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
Units of pCi/m3
1
5
9
13
17
21
25
29
33
37
41
45
49
Weekly Data Points
Maximum
Minimum

Table 5 -- Environmental Air Sample Iodine-131 Results

(Units of pCi/m3)

All data in following table is <MDC

	A-8	A-7	A-5	A-6	A-4	A-3	A-1	A-2
	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
Date				Control				Control
01-05-16	3.38E-02	2.33E-02	2.63E-02	2.08E-02	3.81E-02	2.05E-02	1.12E-02	2.02E-02
01-12-16	2.98E-02	2.49E-02	3.39E-02	3.74E-02	3.00E-02	3.30E-02	3.44E-02	2.65E-02
01-19-16	3.32E-02	1.62E-02	1.93E-02	2.68E-02	3.29E-02	3.17E-02	1.88E-02	2.36E-02
01-26-16	3.48E-02	3.15E-02	4.78E-02	3.05E-02	2.59E-02	2.63E-02	4.07E-02	3.70E-02
02-02-16	1.14E-02	1.62E-02	1.53E-02	3.48E-02	3.24E-02	2.67E-02	2.52E-02	3.35E-02
02-09-16	3.25E-02	3.28E-02	2.50E-02	3.94E-02	3.24E-02	4.34E-02	2.19E-02	3.35E-02
02-16-16	2.65E-02	2.87E-02	2.51E-02	3.25E-02	2.27E-02	2.64E-02	2.53E-02	1.76E-02
02-23-16	3.14E-02	3.83E-02	2.72E-02	3.27E-02	1.57E-02	2.77E-02	2.56E-02	3.29E-02
03-01-16	2.81E-02	2.99E-02	3.65E-02	2.38E-02	2.78E-02	1.93E-02	3.12E-02	1.97E-02
03-08-16	2.33E-02	3.04E-02	3.68E-02	2.58E-02	2.51E-02	2.44E-02	3.77E-02	2.06E-02
03-15-16	3.33E-02	4.04E-02	3.65E-02	2.69E-02	2.88E-02	4.69E-02	2.80E-02	3.19E-02
03-22-16	3.39E-02	3.07E-02	4.01E-02	4.77E-02	3.48E-02	4.27E-02	3.53E-02	3.96E-02
03-29-16	2.91E-02	3.27E-02	3.28E-02	2.84E-02	2.84E-02	2.99E-02	2.83E-02	2.35E-02
04-05-16	2.64E-02	2.86E-02	4.35E-02	3.13E-02	3.12E-02	2.60E-02	3.93E-02	3.14E-02
04-12-16	2.94E-02	3.12E-02	3.54E-02	2.33E-02	2.71E-02	3.60E-02	4.65E-02	3.61E-02
04-19-16	3.37E-02	4.10E-02	3.26E-02	2.61E-02	5.32E-02	2.57E-02	4.45E-02	4.06E-02
04-26-16	2.80E-02	2.24E-02	3.85E-02	2.91E-02	2.50E-02	2.80E-02	4.84E-02	2.47E-02
05-03-16	3.05E-02	3.13E-02	2.14E-02	3.56E-02	2.57E-02	3.29E-02	1.93E-02	4.45E-02
05-10-16	3.67E-02	2.05E-02	3.57E-02	2.96E-02	3.34E-02	1.84E-02	1.82E-02	2.61E-02
05-17-16	3.00E-02	1.88E-02	3.81E-02	2.59E-02	3.93E-02	2.22E-02	2.85E-02	2.21E-02
05-24-16	3.74E-02	4.12E-02	3.32E-02	2.20E-02	4.20E-02	3.95E-02	5.76E-02	4.92E-02
05-31-16	2.99E-02	2.50E-02	3.73E-02	2.63E-02	3.24E-02	3.54E-02	3.02E-02	2.56E-02
06-07-16	2.30E-02	1.92E-02	4.13E-02	2.95E-02	3.05E-02	4.29E-02	3.05E-02	3.25E-02
06-14-16	2.40E-02	2.29E-02	1.53E-02	2.57E-02	2.43E-02	3.10E-02	2.31E-02	2.34E-02
06-21-16	2.06E-02	5.24E-02	2.58E-02	3.49E-02	3.22E-02	3.22E-02	2.56E-02	4.72E-02
06-28-16	2.35E-02	2.85E-02	2.41E-02	2.33E-02	4.23E-02	3.23E-02	2.99E-02	2.51E-02
07-05-16	5.05E-02	5.58E-02	3.36E-02	3.66E-02	3.55E-02	1.89E-02	5.22E-02	4.58E-02
07-12-16	2.39E-02	2.37E-02	3.28E-02	2.99E-02	3.06E-02	2.97E-02	3.04E-02	1.98E-02
07-19-16	2.36E-02	3.60E-02	2.47E-02	2.63E-02	3.47E-02	4.36E-02	2.78E-02	3.55E-02
07-26-16	3.78E-02	4.82E-02	3.32E-02	1.53E-02	3.59E-02	4.91E-02	3.53E-02	2.12E-02
08-02-16	6.68E-02	3.14E-02	3.16E-02	4.59E-02	4.66E-02	5.77E-02	4.36E-02	2.72E-02
08-09-16	2.20E-02	3.31E-02	2.85E-02	4.89E-02	4.04E-02	5.89E-02	5.33E-02	2.05E-02
08-16-16	2.75E-02	2.96E-02	6.17E-02	3.55E-02	4.68E-02	2.39E-02	3.20E-02	4.01E-02
08-23-16	2.44E-02	2.83E-02	3.49E-02	3.72E-02	2.70E-02	2.29E-02	2.52E-02	2.76E-02
08-30-16	2.22E-02	1.75E-02	2.57E-02	2.23E-02	1.73E-02	3.99E-02	2.01E-02	3.00E-02
09-06-16	2.33E-02	2.78E-02	3.64E-02	1.79E-02	1.38E-02	2.00E-02	2.16E-02	1.42E-02
09-13-16	1.17E-02	2.35E-02	2.47E-02	2.43E-02	1.18E-02	2.54E-02	4.19E-02	1.73E-02
09-20-16	2.89E-02	1.84E-02	1.36E-02	1.71E-02	2.73E-02	2.01E-02	2.03E-02	1.57E-02
09-27-16	1.44E-02	3.06E-02	3.04E-02	2.89E-02	2.51E-02	1.96E-02	2.27E-02	4.74E-02
10-04-16	2.55E-02	2.84E-02	4.19E-02	3.81E-02	4.92E-02	3.19E-02	4.08E-02	3.68E-02
10-11-16	1.81E-02	3.03E-02	2.29E-02	5.05E-02	2.94E-02	3.19E-02	2.47E-02	1.43E-02
10-18-16	2.08E-02	3.27E-02	1.83E-02	2.17E-02	3.91E-02	3.08E-02	2.12E-02	1.71E-02
10-25-16	1.73E-02	4.32E-02	2.36E-02	2.99E-02	1.38E-02	2.28E-02	4.26E-02	1.95E-02
11-01-16	3.53E-02	1.62E-02	1.86E-02	2.87E-02	3.76E-02	1.86E-02	3.33E-02	4.97E-02
11-08-16	1.89E-02	2.03E-02	2.28E-02	2.36E-02	1.64E-02	2.74E-02	1.99E-02	4.53E-02
11-15-16	2.04E-02	2.73E-02	2.31E-02	2.20E-02	2.77E-02	2.23E-02	4.21E-02	3.44E-02
11-22-16	2.08E-02	2.86E-02	3.17E-02	1.68E-02	2.64E-02	3.29E-02	2.75E-02	2.24E-02
11-29-16	2.69E-02	2.59E-02	1.29E-02	2.36E-02	4.04E-02	2.03E-02	3.53E-02	1.72E-02
12-06-16	2.35E-02	3.48E-02	1.39E-02	2.83E-02	2.31E-02	2.44E-02	1.90E-02	4.48E-02
12-13-16	3.03E-02	1.59E-02	2.42E-02	2.45E-02	3.91E-02	3.26E-02	1.46E-02	4.91E-02
12-20-16	3.75E-02	3.13E-02	4.50E-02	4.96E-02	4.35E-02	2.89E-02	1.53E-02	4.12E-02
12-27-16	2.80E-02	2.34E-02	1.46E-02	1.71E-02	2.03E-02	3.24E-02	2.35E-02	2.15E-02

Table 6 -- Environmental Air Particulate Composite Gamma Isotopic Results

		A-8	A-7	A-5	A-6	A-4	A-3	A-1	A-2	
	Location	NW-1.0	SW/WSW-0.95	SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4	
	Nuclides				Control				Control	
	Ba-140	<2.08E-01	<4.96E-01	<3.22E-01	<2.30E-01	<2.89E-01	<3.06E-01	<2.51E-01	<2.25E-01	
	Be-7	1.52E-01	1.88E-01	1.22E-01	1.79E-01	1.25E-01	1.37E-01	1.79E-01	1.37E-01	
	Co-57	<5.42E-04	<7.21E-04	<5.83E-04	<4.73E-04	<4.94E-04	<5.69E-04	<3.98E-04	<4.76E-04	
	Co-58	<1.44E-03	<2.92E-03	<2.23E-03	<1.09E-03	<1.56E-03	<2.32E-03	<1.25E-03	<1.39E-03	
Composite Dates	Co-60	<7.24E-04	<1.20E-04	<8.84E-04	<1.27E-03	<7.80E-04	<1.44E-03	<9.34E-04	<8.72E-04	
1ST QTR	Cs-134	<8.29E-04	<1.81E-03	<1.07E-03	<7.54E-04	<1.01E-03	<8.45E-04	<5.93E-03	<7.44E-04	Required LLD 5.0E-2
12/29/15 – 3/29/16	Cs-137	<8.12E-04	<1.29E-03	<1.03E-03	<6.84E-04	<4.84E-04	<8.36E-04	<6.59E-04	<6.23E-04	Required LLD 6.0E-2
	Fe-59	<5.09E-03	<9.90E-03	<5.33E-03	<7.20E-03	<5.25E-03	<5.69E-03	<5.00E-03	<5.97E-03	
	K-40	<1.55E-02	<0.00E+00	<1.53E-02	<9.77E-03	<1.46E-02	<9.65E-03	<9.47E-03	<9.42E-03	
	La-140	<9.53E-02	<1.96E-01	<8.20E-02	<1.42E-01	<1.07E-01	<1.69E-01	<1.10E-01	<6.06E-02	
	Mn-54	<9.31E-04	<1.46E-03	<1.28E-03	<1.16E-03	<7.60E-04	<8.53E-04	<9.52E-04	<8.44E-04	
	Nb-95	<2.07E-03	<3.47E-03	<2.13E-03	<2.40E-03	<1.96E-03	<2.09E-03	<1.79E-03	<1.60E-03	
	Zn-65	<1.99E-03	<3.35E-03	<2.53E-03	<2.71E-03	<2.22E-03	<2.00E-03	<2.40E-03	<2.39E-03	
	Zr-95	<3.45E-03	<5.39E-03	<3.76E-03	<3.86E-03	<2.55E-03	<3.73E-03	<3.48E-03	<2.70E-03	
	Ba-140	<3.50E-01	<3.52E-01	<3.34E-01	<3.22E-01	<3.89E-01	<4.00E-01	<3.62E-01	<3.39E-01	
	Be-7	1.39E-01	1.51E-01	1.27E-01	1.57E-01	1.23E-01	1.27E-01	1.84E-01	1.43E-01	
	Co-57	<4.58E-04	<5.87E-04	<5.33E-04	<5.13E-04	<4.93E-04	<4.84E-04	<3.94E-04	<5.32E-04	
	Co-58	<1.43E-03	<1.41E-03	<1.55E-03	<2.14E-03	<2.03E-03	<1.96E-03	<1.62E-03	<1.74E-03	
Composite Dates	Co-60	<7.02E-04	<4.34E-04	<1.26E-03	<1.39E-03	<9.97E-04	<1.23E-03	<0.00E+00	<5.41E-04	
2ND QTR	Cs-134	<1.18E-03	<8.26E-04	<7.10E-04	<1.31E-03	<1.33E-03	<9.20E-04	<8.52E-04	<6.19E-04	Required LLD 5.0E-2
3/29/16 – 6/28/16	Cs-137	<7.68E-04	<6.46E-04	<7.16E-04	<6.60E-04	<8.25E-04	<6.34E-04	<7.59E-04	<7.24E-04	Required LLD 6.0E-2
	Fe-59	<5.43E-03	<6.34E-03	<5.15E-03	<6.02E-03	<7.10E-03	<5.74E-03	<4.15E-03	<5.33E-03	
	K-40	<1.64E-02	<5.75E-03	<4.51E-03	<1.84E-02	<4.51E-03	<9.37E-03	<1.59E-02	<6.64E-03	
	La-140	<1.35E-01	<1.53E-01	<1.11E-01	<1.90E-01	<1.92E-01	<2.32E-01	<1.32E-01	<1.31E-01	
	Mn-54	<8.90E-04	<9.95E-04	<7.20E-04	<1.20E-03	<6.51E-04	<7.41E-04	<8.59E-04	<9.01E-04	
	Nb-95	<1.67E-03	<1.84E-03	<2.73E-03	<1.96E-03	<2.26E-03	<2.16E-03	<1.85E-03	<1.73E-03	
	Zn-65	<1.86E-03	<2.14E-03	<1.30E-03	<2.25E-03	<1.68E-03	<2.22E-03	<2.33E-03	<2.11E-03	
	Zr-95	<2.79E-03	<3.61E-03	<4.03E-03	<3.36E-03	<3.61E-03	<3.00E-03	<3.39E-03	<2.82E-03	

Table 6 – Environmental Air Particulate Composite Gamma Isotopic Results (continued)
(Units of pCi/m3)

		A-8	A-7	A-5	A-6	A-4	A-3	A-1	A-2	
	Location	NW-1.0	SW/WSW-0.95	SSW-1.2	SW-12.3	SSE-4.5	E-3.5	N-1.45	N-9.4	
	Nuclides				Control				Control	
	Ba-140	<3.78E-01	<2.88E-01	<2.29E-01	<2.88E-01	<3.25E-01	<1.98E-01	<3.95E-01	<3.61E-01	
	Be-7	1.34E-01	1.79E-01	1.54E-01	9.87E-02	1.39E-01	1.52E-01	1.60E-01	1.61E-01	
	Co-57	<5.27E-04	<4.55E-04	<5.26E-04	<4.54E-04	<4.09E-04	<4.27E-04	<5.38E-04	<5.88E-04	
	Co-58	<1.77E-03	<1.60E-03	<1.64E-03	<1.23E-03	<1.32E-03	<1.62E-03	<1.31E-03	<1.30E-03	
Composite Dates	Co-60	<1.05E-03	<6.11E-04	<1.09E-03	<6.75E-04	<8.00E-04	<5.67E-04	<1.17E-03	<1.11E-03	
3RD QTR	Cs-134	<9.55E-04	<8.96E-04	<7.37E-04	<7.63E-04	<7.21E-04	<4.85E-04	<1.11E-03	<9.80E-04	Required LLD 5.0E-2
6/28/16 – 9/27/16	Cs-137	<9.62E-04	<5.87E-04	<4.49E-04	<6.23E-04	<6.24E-04	<6.15E-04	<8.56E-04	<1.11E-03	Required LLD 6.0E-2
	Fe-59	<6.19E-03	<3.06E-03	<6.04E-03	<4.89E-03	<5.45E-03	<5.11E-03	<6.67E-03	<4.71E-03	
	K-40	<1.70E-02	<1.38E-02	<7.45E-03	<8.16E-03	<5.64E-03	<1.80E-02	<7.38E-03	<1.65E-02	
	La-140	<1.02E-01	<1.32E-01	<9.90E-02	<1.30E-01	<1.30E-01	<1.36E-01	<1.54E-01	<1.37E-01	
	Mn-54	<1.10E-03	<7.21E-04	<8.08E-04	<8.55E-04	<8.71E-04	<7.12E-04	<1.04E-03	<1.11E-03	
	Nb-95	<1.44E-03	<2.15E-03	<1.34E-03	<1.46E-03	<1.68E-03	<1.84E-03	<2.70E-03	<1.97E-03	
	Zn-65	<2.14E-03	<2.46E-03	<2.17E-03	<2.56E-03	<1.90E-03	<1.38E-03	<2.15E-03	<1.73E-03	
	Zr-95	<3.07E-03	<2.59E-03	<1.79E-03	<3.02E-03	<2.53E-03	<2.62E-03	<4.25E-03	<3.39E-03	
	Ba-140	<8.08E-02	<6.15E-02	<8.64E-02	<7.59E-02	<4.26E-02	<4.71E-02	<5.37E-02	<5.38E-02	
	Be-7	1.48E-01	2.51E-01	1.38E-01	1.84E-01	1.21E-01	1.44E-01	1.47E-01	1.49E-01	
	Co-57	<4.32E-04	<4.47E-04	<4.36E-04	<3.55E-04	<2.63E-04	<2.66E-04	<2.90E-04	<2.64E-04	
	Co-58	<1.44E-03	<1.11E-03	<0.00E+00	<9.97E-04	<7.00E-04	<8.32E-04	<8.57E-04	<7.12E-04	
Composite Dates	Co-60	<3.44E-04	<1.16E-03	<0.00E+00	<5.81E-04	<6.35E-04	<6.12E-04	<5.42E-04	<6.25E-04	
4TH QTR	Cs-134	<9.23E-04	<5.84E-04	<1.03E-03	<7.75E-04	<5.13E-04	<5.08E-04	<2.98E-04	<5.31E-04	Required LLD 5.0E-2
9/27/16- 12/27/16	Cs-137	<7.15E-04	<5.70E-04	<5.98E-04	<6.51E-04	<3.66E-04	<3.78E-04	<3.63E-04	<4.68E-04	Required LLD 6.0E-2
	Fe-59	<2.64E-03	<2.54E-03	<4.04E-03	<3.40E-03	<2.31E-03	<2.00E-03	<2.54E-03	<2.85E-03	
	K-40	<5.06E-03	2.04E-02	<2.68E-02	9.47E-03	<4.99E-03	1.37E-02	1.18E-02	<5.63E-03	
	La-140	<9.08E-03	<3.08E-02	<5.40E-02	<2.59E-02	<2.16E-02	<2.34E-02	<2.04E-02	<2.29E-02	
	Mn-54	<8.46E-04	<7.62E-04	<9.28E-04	<7.21E-04	<4.97E-04	<4.02E-04	<4.09E-04	<4.36E-04	
	Nb-95	<1.43E-03	<1.02E-03	<1.44E-03	<1.12E-03	<8.27E-04	<7.31E-04	<9.07E-04	<1.01E-03	
	Zn-65	<1.50E-03	<1.16E-03	<1.81E-03	<1.26E-03	<1.27E-03	<1.17E-03	<9.20E-04	<1.07E-03	
	Zr-95	<2.01E-03	<2.20E-03	<2.61E-03	<1.78E-03	<1.26E-03	<1.77E-03	<1.52E-03	<1.25E-03	

D. Discharge Pathway Surface Water Program

Discharge Pathway Surface water monitoring stations are found at four locations as detailed in Table 1 – Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program (as seen in section II.A). 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 an installed return line. [*NOTE: The installed return line to Lake Granbury has never been used to send water back to Lake Granbury.*] Location NE-7.4 provides samples of Lake Granbury surface water downstream 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. Discharge Pathway 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 spectrometry. All Discharge Pathway Surface Water samples were also composited quarterly by location for tritium analysis.

All Discharge Pathways Surface Water samples were collected as required. Table 7 -- Environmental Discharge Pathway Surface Water Tritium and Gamma Isotopic Results contains the reported values. Forty-eight samples were analyzed by gamma spectrometry. All results for the required radionuclides were reported as less than the required LLDs. Sixteen quarterly composited samples were analyzed for tritium. The results of the reported tritium values for Squaw Creek reservoir were in line with expected concentrations. The tritium values ranged from a high of **1.66E+04** pCi/l to a low of **<5.24E+02** pCi/l. The results from Lake Granbury were all less than the required LLDs as expected. The tritium concentration reported in Squaw Creek is well below the action level of **3.0E+4** pCi/l and is following the expected concentration variations based on fuel cycles, power histories and reservoir makeup due to rain and pump transfers from Lake Granbury. Graph 2 – Environmental Surface Water Tritium Results indicates the current results and the short-term trend of the tritium concentration in Squaw Creek reservoir, Squaw Creek spillway, Lake Granbury, and Brazos River (control location). Graph 3 – Squaw Creek Maximum Tritium Values trends the reservoir tritium concentration since it was first detected in 1990 after Unit 1 startup and is located on page 29. Squaw Creek reservoir tritium is a direct product from the operation of CPNPP.

There should not be any significant changes in the tritium concentrations in the near future and no action levels are anticipated. A review of pre-operational and operational data indicated the 2016 results were both expected and consistent with previous data and that no anomalies had occurred.

During the year 2016, there were two exceptions to the Discharge Pathway Surface Water Program.

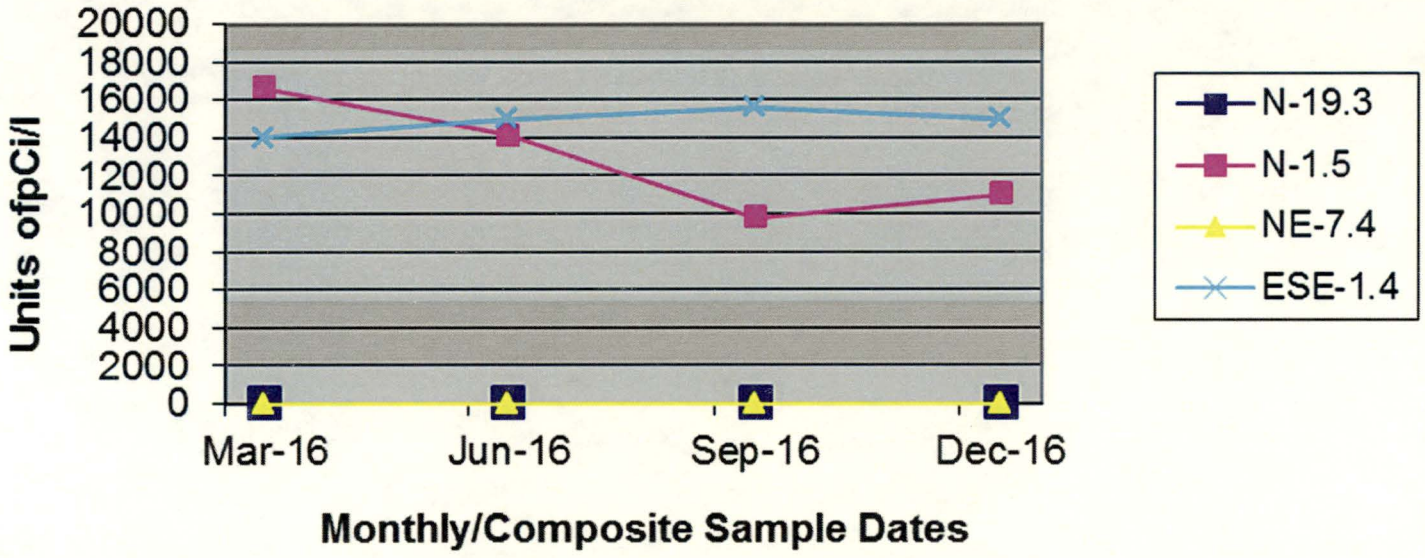
CR-2016-005555 - Discharge Pathway Surface Water Environmental sample for location SW-5, downstream discharge from Squaw Creek had reported Tritium analysis results from Gel laboratories of 21.13 pCi/ml with an MDA of 1.365 / Lc of 1.365 / Uncert of 2.303 (pCi/ml). This activity is below the level in ODCM Table 3.12-2 Reporting levels for Radioactivity Concentrations in Environment Samples.

CR-2016-005689 - Gel Laboratory reported that the water sample for SW-1 in a one gallon cube had broken and emptied into the shipping container. Sufficient water sample was retained with the shipping container for analysis. This sample was sent to GEL on 6/1/16.

Table 7 -- Environmental Discharge Pathway Surface Water Tritium and Gamma Isotopic Results
(Units of pCi/l)

	SW-5	H-3	Nuclides													
Date	Location		Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	ESE-1.4		<1.54E+01	<1.85E+01	<1.89E+00	<1.89E+00	<1.89E+00	<1.75E+00	<4.30E+00	<8.26E+00	<1.96E+01	<5.25E+00	<1.73E+00	<1.79E+00	<3.69E+00	<3.61E+00
02-23-16	ESE-1.4		<1.59E+01	<1.71E+01	<2.02E+00	<1.91E+00	<1.86E+00	<1.77E+00	<4.29E+00	<8.53E+00	2.93E+01	<5.33E+00	<1.72E+00	<1.91E+00	<3.56E+00	<3.49E+00
03-29-16	ESE-1.4	1.37E+04	<1.50E+01	<1.58E+01	<1.66E+00	<1.65E+00	<1.58E+00	<1.55E+00	<3.61E+00	<8.43E+00	3.71E+01	<5.41E+00	<1.47E+00	<1.71E+00	<2.77E+00	<2.95E+00
04-26-16	ESE-1.4		<1.96E+01	<1.99E+01	<2.00E+00	<1.90E+00	<1.99E+00	<1.92E+00	<4.92E+00	<1.13E+01	<1.77E+01	<6.24E+00	<1.81E+00	<2.47E+00	<3.82E+00	<3.92E+00
05-31-16	ESE-1.4		<1.84E+01	<1.57E+01	<1.71E+00	<1.42E+00	<1.53E+00	<1.50E+00	<3.69E+00	<1.04E+01	2.77E+01	<6.18E+00	<1.39E+00	<1.92E+00	<3.14E+00	<3.15E+00
06-28-16	ESE-1.4	1.36E+04	<1.67E+01	<1.42E+01	<1.60E+00	<1.44E+00	<1.62E+00	<1.50E+00	<3.59E+00	<9.32E+00	<1.39E+01	<5.27E+00	<1.44E+00	<1.76E+00	<3.01E+00	<3.07E+00
07-26-16	ESE-1.4		<1.93E+01	<2.26E+01	<2.22E+00	<2.45E+00	<2.34E+00	<2.32E+00	<5.13E+00	<1.07E+01	<2.22E+01	<7.11E+00	<2.15E+00	<2.35E+00	<5.00E+00	<4.12E+00
08-30-16	ESE-1.4		<1.31E+01	<1.32E+01	<1.33E+00	<1.24E+00	<1.26E+00	<1.15E+00	<3.16E+00	<8.36E+00	<1.15E+01	<4.65E+00	<1.26E+00	<1.35E+00	<2.55E+00	<2.58E+00
09-27-16	ESE-1.4	1.11E+04	<1.69E+01	<1.75E+01	<1.78E+00	<1.87E+00	<1.99E+00	<1.82E+00	<4.45E+00	<8.71E+00	<2.00E+01	<5.67E+00	<1.72E+00	<2.36E+00	<4.21E+00	<4.03E+00
10-25-16	ESE-1.4		<1.16E+01	<1.32E+01	<1.41E+00	<1.31E+00	<1.45E+00	<1.39E+00	<3.49E+00	<6.22E+00	<1.25E+01	<3.88E+00	<1.27E+00	<1.63E+00	<2.37E+00	<2.58E+00
11-29-16	ESE-1.4		<1.60E+01	<1.71E+01	<2.02E+00	<1.66E+00	<1.73E+00	<1.69E+00	<3.50E+00	<7.79E+00	<1.80E+01	<4.57E+00	<1.90E+00	<2.16E+00	<3.58E+00	<3.27E+00
12-27-16	ESE-1.4	1.10E+04	<1.22E+01	<1.16E+01	<1.35E+00	<1.33E+00	<1.23E+00	<1.22E+00	<2.97E+00	<7.21E+00	<2.00E+01	<4.03E+00	<1.09E+00	<1.55E+00	<2.35E+00	<2.20E+00
	SW-1		Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	N-1.5		<1.54E+01	<1.66E+01	<1.77E+00	<1.95E+00	<1.90E+00	<1.83E+00	<4.57E+00	<8.45E+00	<1.79E+01	<4.73E+00	<1.53E+00	<2.03E+00	<3.36E+00	<3.31E+00
02-23-16	N-1.5		<1.42E+01	<1.44E+01	<1.54E+00	<1.62E+00	<1.57E+00	<1.46E+00	<3.54E+00	<7.01E+00	<1.41E+01	<4.60E+00	<1.31E+00	<1.67E+00	<2.85E+00	<2.68E+00
03-29-16	N-1.5	1.66+04	<1.49E+01	<1.48E+01	<1.55E+00	<1.37E+00	<1.54E+00	<1.81E+00	<3.50E+00	<8.29E+00	<2.05E+01	<4.57E+00	<1.36E+00	<1.73E+00	<2.98E+00	<3.04E+00
04-26-16	N-1.5		<1.75E+01	<1.66E+01	<1.77E+00	<1.83E+00	<1.69E+00	<1.61E+00	<4.31E+00	<1.02E+01	2.88E+01	<6.45E+00	<1.51E+00	<1.82E+00	<3.56E+00	<3.37E+00
05-31-16	N-1.5		<2.02E+01	<1.84E+01	<2.02E+00	<1.98E+00	<1.90E+00	<1.70E+00	<4.81E+00	<1.19E+01	<1.67E+01	<6.81E+00	<1.67E+00	<2.23E+00	<3.70E+00	<3.78E+00
06-28-16	N-1.5	1.41E+04	<1.61E+01	<1.56E+01	<1.56E+00	<1.37E+00	<1.60E+00	<1.49E+00	<3.35E+00	<9.09E+00	<1.20E+01	<5.06E+00	<1.36E+00	<1.65E+00	<2.92E+00	<2.87E+00
07-26-16	N-1.5		<1.64E+01	<1.79E+01	<2.13E+00	<1.94E+00	<1.88E+00	<1.90E+00	<4.32E+00	<8.87E+00	<1.95E+01	<6.59E+00	<1.78E+00	<2.04E+00	<4.05E+00	<3.60E+00
08-30-16	N-1.5		<1.54E+01	<1.35E+01	<1.73E+00	<1.36E+00	<1.58E+00	<1.36E+00	<3.39E+00	<8.88E+00	<1.48E+01	<4.94E+00	<1.36E+00	<1.71E+00	<3.15E+00	<3.01E+00
09-27-16	N-1.5	9.78E+03	<1.37E+01	<1.44E+01	<1.62E+00	<1.53E+00	<1.59E+00	<1.36E+00	<3.68E+00	<6.95E+00	<2.15E+01	<4.72E+00	<1.40E+00	<1.66E+00	<2.66E+00	<2.84E+00
10-25-16	N-1.5		<1.29E+01	<1.43E+01	<1.70E+00	<1.76E+00	<1.95E+00	<1.63E+00	<3.88E+00	<7.37E+00	<1.41E+01	<4.44E+00	<1.59E+00	<1.87E+00	<2.94E+00	<3.25E+00
11-29-16	N-1.5		<1.47E+01	<2.00E+01	<1.96E+00	<2.07E+00	<2.02E+00	<1.94E+00	<4.14E+00	<7.88E+00	<2.00E+01	<4.97E+00	<1.73E+00	<2.10E+00	<4.01E+00	<3.73E+00
12-27-16	N-1.5	1.10E+04	<1.42E+01	<1.31E+01	<1.35E+00	<1.25E+00	<1.37E+00	<1.27E+00	<3.17E+00	<7.35E+00	<1.34E+01	<4.63E+00	<1.25E+00	<1.50E+00	<2.46E+00	<2.47E+00
	SW-4		Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	NE-7.4		<6.77E+00	<1.19E+01	<1.25E+00	<1.35E+00	<1.44E+00	<1.37E+00	<2.46E+00	<2.45E+00	<1.96E+01	<2.08E+00	<1.30E+00	<1.40E+00	<2.68E+00	<2.17E+00
02-23-16	NE-7.4		<7.13E+00	<1.23E+01	<1.30E+00	<1.60E+00	<1.45E+00	<1.40E+00	<2.83E+00	<2.99E+00	<2.11E+01	<2.51E+00	<1.26E+00	<1.48E+00	<2.80E+00	<2.31E+00
03-29-16	NE-7.4	<1.33E+03	<7.27E+00	<1.25E+01	<1.43E+00	<1.54E+00	<1.62E+00	<1.53E+00	<2.92E+00	<2.43E+00	<1.31E+01	<2.29E+00	<1.40E+00	<1.51E+00	<3.05E+00	<2.50E+00
04-26-16	NE-7.4		<8.78E+00	<1.54E+01	<1.55E+00	<1.84E+00	<1.78E+00	<1.83E+00	<3.35E+00	<3.28E+00	<1.66E+01	<2.90E+00	<1.72E+00	<1.75E+00	<3.16E+00	<3.25E+00
05-31-16	NE-7.4		<1.17E+01	<1.73E+01	<2.42E+00	<2.27E+00	<2.52E+00	<2.49E+00	<4.90E+00	<3.76E+00	<3.27E+01	<3.39E+00	<2.45E+00	<2.51E+00	<4.62E+00	<3.92E+00
06-28-16	NE-7.4	<5.30E+02	<9.35E+00	<1.48E+01	<2.07E+00	<2.02E+00	<2.20E+00	<2.04E+00	<4.16E+00	<3.44E+00	2.74E+01	<3.38E+00	<2.00E+00	<2.13E+00	<3.99E+00	<3.68E+00
07-26-16	NE-7.4		<7.22E+00	<1.42E+01	<1.62E+00	<1.65E+00	<1.73E+00	<1.81E+00	<3.62E+00	<2.87E+00	<1.81E+01	<2.62E+00	<1.57E+00	<1.71E+00	<3.80E+00	<2.79E+00
08-30-16	NE-7.4		<6.44E+00	<1.05E+01	<1.20E+00	<1.25E+00	<1.32E+00	<1.32E+00	<2.36E+00	<2.28E+00	<9.47E+00	<1.92E+00	<1.14E+00	<1.14E+00	<2.55E+00	<2.45E+00
09-27-16	NE-7.4	<6.49E+02	<1.47E+01	<2.60E+01	<2.76E+00	<2.97E+00	<3.18E+00	<3.15E+00	<5.90E+00	<4.88E+00	<2.92E+01	<4.97E+00	<2.67E+00	<2.96E+00	<5.15E+00	<4.88E+00
10-25-16	NE-7.4		<6.65E+00	<1.20E+01	<1.39E+00	<1.35E+00	<1.57E+00	<1.45E+00	<3.17E+00	<2.32E+00	<1.36E+01	<2.40E+00	<1.39E+00	<1.27E+00	<2.70E+00	<2.70E+00
11-29-16	NE-7.4		<5.92E+00	<1.19E+01	<1.32E+00	<1.72E+00	<1.73E+00	<1.49E+00	<3.48E+00	<1.99E+00	<1.87E+01	<2.34E+00	<1.52E+00	<1.61E+00	<3.17E+00	<2.55E+00
12-27-16	NE-7.4	<5.55E+02	<6.92E+00	<1.08E+01	<1.23E+00	<1.21E+00	<1.45E+00	<1.28E+00	<2.28E+00	<2.57E+00	<1.82E+01	<2.16E+00	<1.15E+00	<1.32E+00	<2.37E+00	<2.07E+00
	SW-3		Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	N-19.3		<7.42E+00	<1.40E+01	<1.42E+00	<1.67E+00	<1.66E+00	<1.56E+00	<3.24E+00	<2.72E+00	<1.54E+01	<2.67E+00	<1.51E+00	<1.58E+00	<2.86E+00	<2.64E+00
02-23-16	N-19.3		<8.30E+00	<1.38E+01	<1.58E+00	<1.63E+00	<1.67E+00	<1.55E+00	<3.28E+00	<3.13E+00	<2.08E+01	<2.96E+00	<1.51E+00	<1.61E+00	<2.91E+00	<2.89E+00
03-29-16	N-19.3	<1.36E+03	<6.61E+00	<1.26E+01	<1.39E+00	<1.48E+00	<1.47E+00	<1.40E+00	<2.76E+00	<2.42E+00	<2.05E+01	<2.06E+00	<1.43E+00	<1.44E+00	<2.97E+00	<2.30E+00
04-26-16	N-19.3		<7.89E+00	<1.44E+01	<1.63E+00	<1.64E+00	<1.77E+00	<1.68E+00	<3.01E+00	<2.99E+00	<1.43E+01	<2.49E+00	<1.67E+00	<1.47E+00	<2.96E+00	<2.81E+00
05-31-16	N-19.3		<1.05E+01	<1.93E+01	<2.02E+00	<2.46E+00	<2.37E+00	<2.23E+00	<4.59E+00	<3.91E+00	<3.27E+01	<3.35E+00	<2.11E+00	<2.14E+00	<4.62E+00	<3.90E+00
06-28-16	N-19.3	<5.24E+02	<7.92E+00	<1.39E+01	<1.56E+00	<1.42E+00	<1.71E+00	<1.60E+00	<3.01E+00	<2.97E+00	<1.49E+01	<2.54E+00	<1.34E+00	<1.58E+00	<2.84E+00	<2.64E+00
07-26-16	N-19.3		<6.96E+00	<1.26E+01	<1.32E+00	<1.30E+00	<1.58E+00	<1.48E+00	<2.72E+00	<2.75E+00	<1.23E+01	<2.10E+00	<1.35E+00	<1.44E+00	<2.52E+00	<2.48E+00
08-30-16	N-19.3		<7.87E+00	<1.32E+01	<1.54E+00	<1.75E+00	<1.78E+00	<1.57E+00	<3.31E+00	<2.65E+00	<2.24E+01	<2.60E+00	<1.49E+00	<1.80E+00	<3.38E+00	<2.67E+00
09-27-16	N-19.3	<6.45E+02	<6.08E+00	<1.06E+01	<1.24E+00	<1.15E+00	<1.40E+00	<1.29E+00	<2.48E+00	<2.07E+00	<1.11E+01	<1.66E+00	<1.29E+00	<1.17E+00	<2.10E+00	<2.23E+00
10-25-16	N-19.3		<5.00E+00	<9.33E+00	<1.14E+00	<1.17E+00	<1.29E+00	<1.22E+00	<2.14E+00	<2.00E+00	<1.13E+01	<1.93E+00	<1.22E+00	<1.25E+00	<2.23E+00	<1.93E+00
11-29-16	N-19.3		<5.43E+00	<1.25E+01	<1.27E+00	<1.36E+00	<1.70E+00	<1.44E+00	<2.54E+00	<1.79E+00	<1.22E+01	<1.85E+00	<1.38E+00	<1.32E+00	<2.59E+00	<2.20E+00
12-27-16	N-19.3	<5.56E+02	<6.22E+00	<1.04E+01	<1.19E+00	<1.21E+00	<1.27E+00	<1.24E+00	<2.41E+00	<2.43E+00	<1.12E+01	<1.86E+00	<1.09E+00	<1.37E+00	<2.45E+00	<2.14E+00
Required LLD's		2.00E+03	1.50e+01		1.50e+01	1.50e+01	1.50e+01	1.80e+01	3.00e+01			1.50e+01	1.50e+01	1.50e+01	3.00e+01	1.50e+01
Reportable Level		3.00e+04	2.00e+02		1.00e+03	3.00e+02	3.00e+01	5.00e+01	4.00e+02			2.00e+02	1.00e+03	4.00e+02	3.00e+02	4.00e+02

Graph 2 -- Environmental Surface Water Tritium Results



E. Squaw Creek and Lake Granbury Surface Water Program

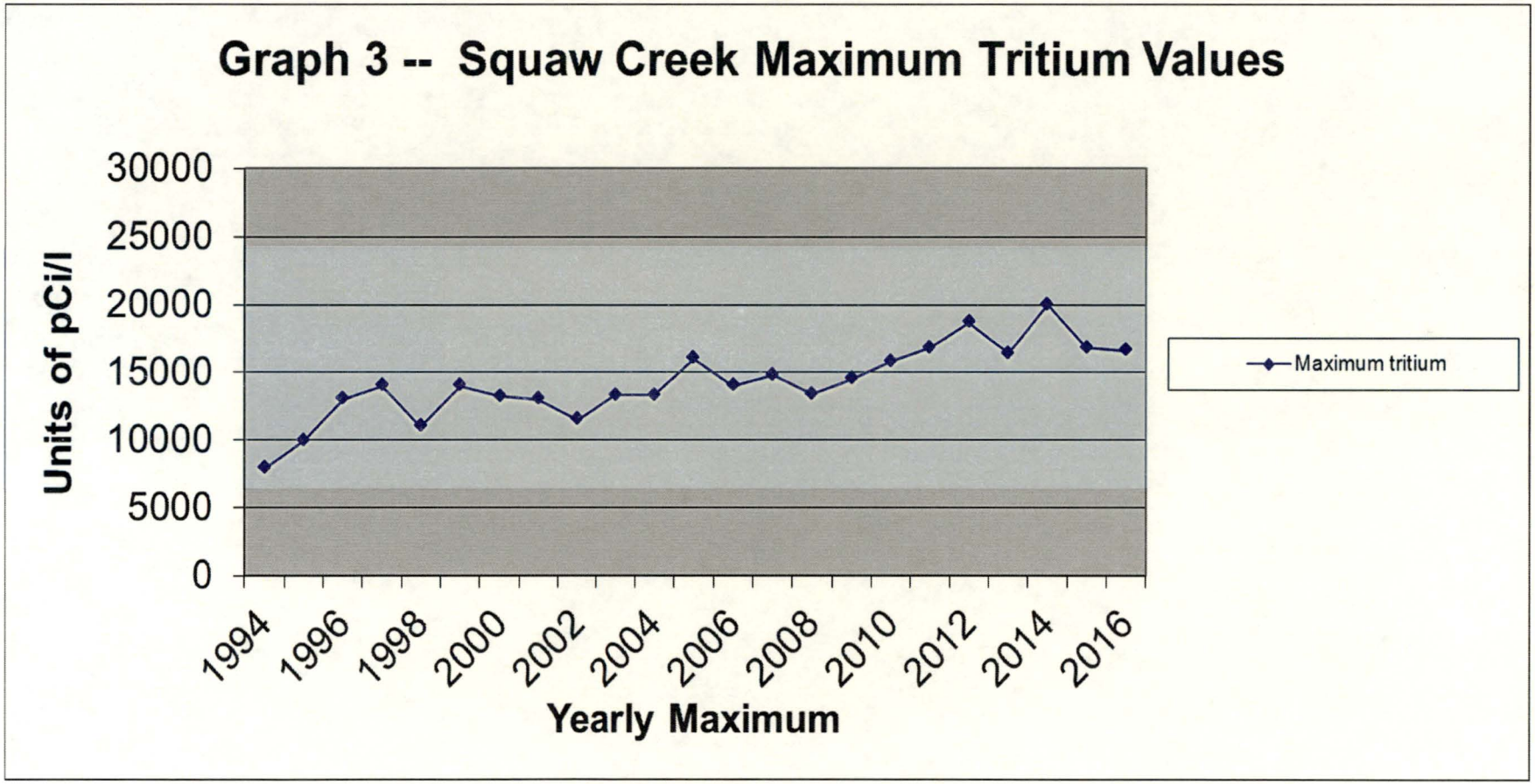
Surface water was collected at two monitoring locations. Table 1 - Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program (as seen in section II.A) details the location and types of analysis required. Samples of water from Squaw Creek reservoir were collected at the monitoring location NNW-0.1. There is not a surface water drinking source within a mile of CPNPP; monitoring location N-9.9 was used as a surface drinking water location based on the proximity of the City of Granbury intake to the Granbury potable water system. These sources were analyzed to drinking water standards to be conservative, although they were not drinking water sources. All surface water samples were collected weekly and then composited for Iodine-131 analysis, gamma isotopic analysis, and gross beta analysis on a monthly basis. Tritium analysis was performed on a quarterly basis.

All samples were analyzed for gamma emitting radionuclides. The results are reported in Table 8 – Environmental Squaw Creek and Lake Granbury Surface Water Tritium, Gross Beta and Gamma Isotopic Results. There were no gamma emitting radionuclides identified in any of the twenty-four composite samples. Tritium reported in Squaw Creek reservoir ranged from **1.04E+04 pCi/l to 1.61E+04 pCi/l** and **averaged 1.31E+04 pCi/l** as indicated in Graph 3 – Squaw Creek Maximum Tritium Values **.** Tritium reported from all Lake Granbury water samples indicated less than the required LLD as expected. Graph 4 – Environmental Squaw Creek and Lake Granbury Surface Water Tritium Results trends the results reported for the year 2016. Gross Beta results at the indicator location NNW-0.1 ranged from **<1.71+01 pCi/l** to **2.31E+01 pCi/l** with an average of **1.61+01 pCi/l**. Gross Beta results at the control location N-9.9 ranged from **4.79E+00 pCi/l** to **1.03E+01 pCi/l** with an average of **6.37E+00 pCi/l.** Graph 5 – Environmental Squaw Creek and Lake Granbury Surface Water Gross Beta Results trends the gross beta results for the two monitor locations and indicates no influence from Comanche Peak in the levels detected in the two different bodies of water. Past gross beta results for Lake Granbury have been as high as **1.38E+01 pCi/l**, which is still notably under the reportable levels for gross beta**.** The gross beta results received are within values previously reported and there is no reportable level for gross beta so no action is required at this time.

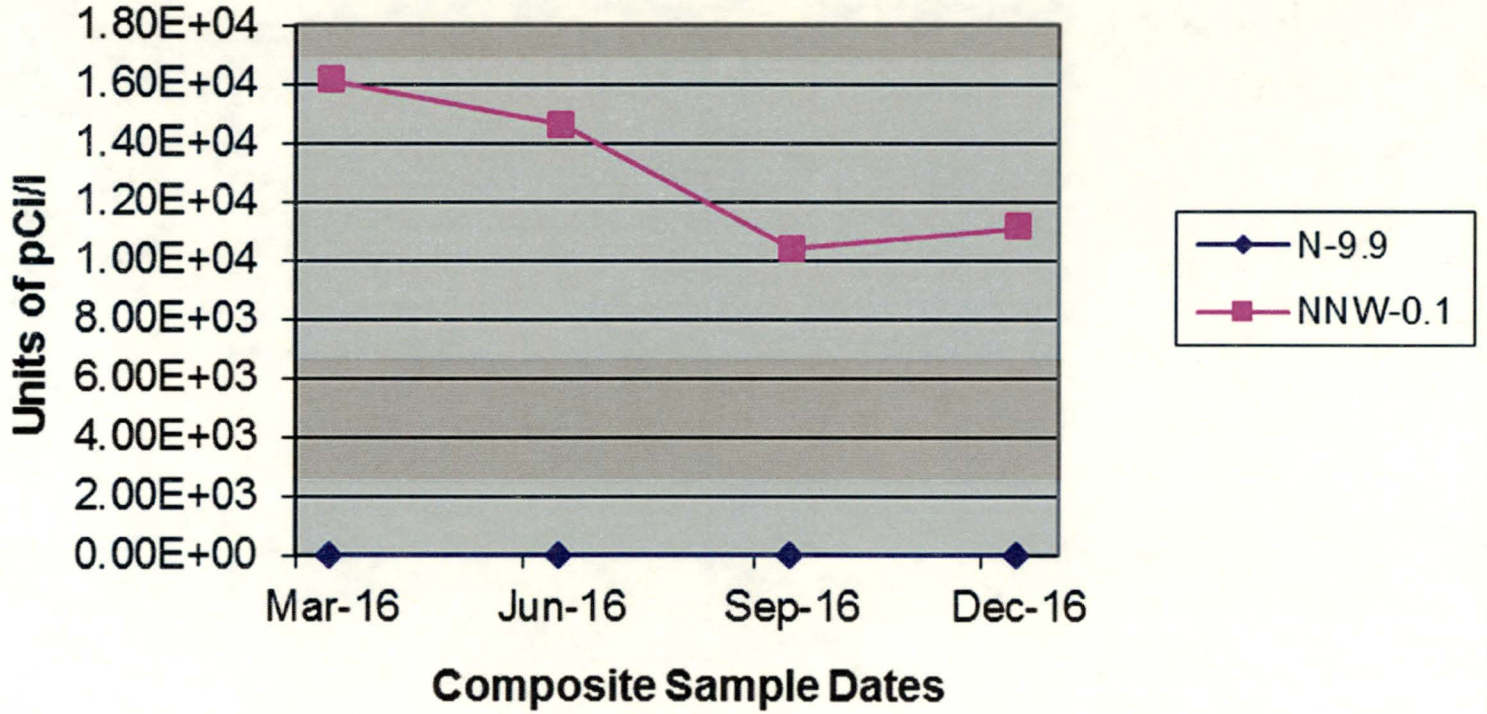
During the year 2016, there were no exceptions to the Surface Water Program.

Table 8 -- Environmental Squaw Creek and Lake Granbury Surface Water Tritium, Gross Beta and Gamma Isotopic Results
(Units of pCi/l)

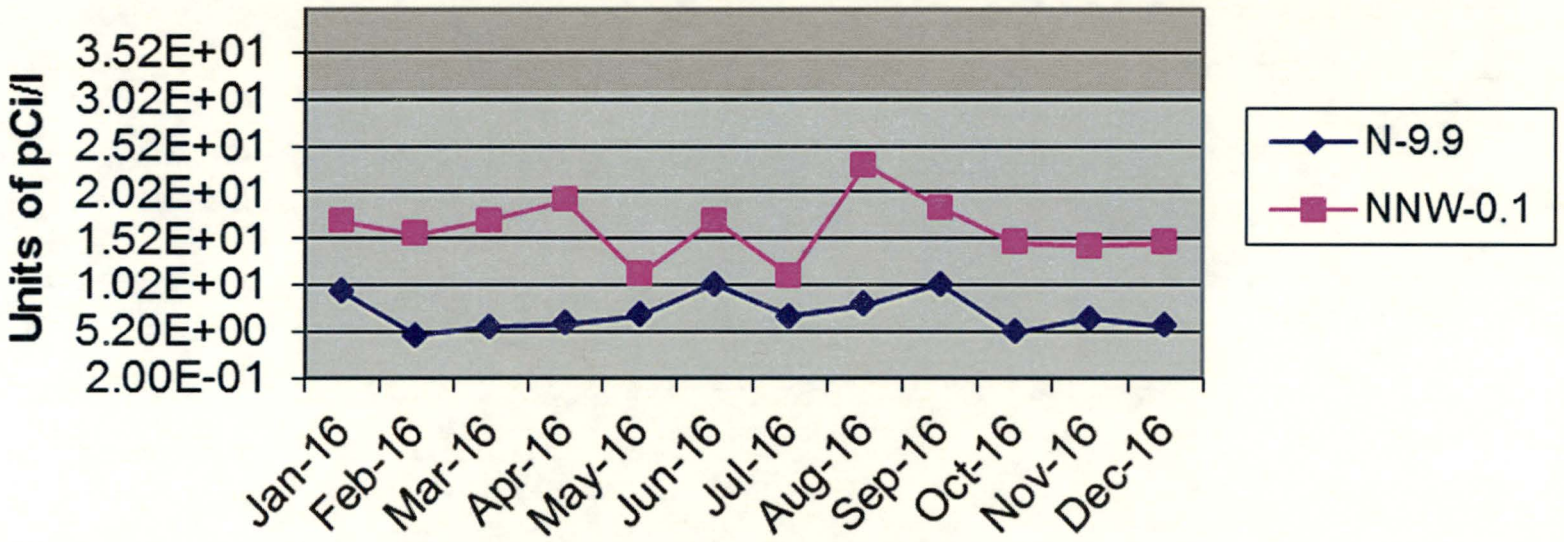
	SW-6		Gross	Nuclides											
Date	Location	H-3	Beta	I-131	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	NNW-0.1		1.70E+01	<8.22E-01	<1.76E+01	<1.86E+00	<2.35E+00	<1.97E+00	<1.70E+00	<4.35E+00	<5.82E+00	<1.67E+00	<2.08E+00	<3.60E+00	<3.41E+00
02-23-16	NNW-0.1		1.57E+01	<6.53E-01	<1.43E+01	<1.69E+00	<1.51E+00	<1.50E+00	<1.52E+00	<3.54E+00	<4.88E+00	<1.45E+00	<1.60E+00	<2.82E+00	<2.74E+00
03-29-16	NNW-0.1	1.61E+04	<1.71E+01	<8.82E-01	<1.49E+01	<1.91E+00	<1.87E+00	<1.82E+00	<1.83E+00	<4.01E+00	<5.51E+00	<1.74E+00	<2.00E+00	<3.59E+00	<3.35E+00
04-26-16	NNW-0.1		1.93E+01	<9.00E-01	<1.85E+01	<1.88E+00	<2.17E+00	<2.00E+00	<1.82E+00	<4.63E+00	<6.12E+00	<1.73E+00	<2.23E+00	<4.07E+00	<3.85E+00
05-31-16	NNW-0.1		1.13E+01	<8.75E-01	<2.04E+01	<2.02E+00	<2.13E+00	<1.93E+00	<1.76E+00	<4.87E+00	<8.50E+00	<1.90E+00	<2.34E+00	<3.93E+00	<3.91E+00
06-28-16	NNW-0.1	1.46E+04	1.71E+01	<4.58E-01	<1.65E+01	<1.59E+00	<1.62E+00	<1.57E+00	<1.46E+00	<3.73E+00	<5.82E+00	<1.38E+00	<1.81E+00	<3.30E+00	<2.87E+00
07-26-16	NNW-0.1		1.12E+01	<9.03E-01	<1.35E+01	<1.64E+00	<1.51E+00	<1.55E+00	<1.49E+00	<3.41E+00	<4.00E+00	<1.42E+00	<1.68E+00	<3.15E+00	<2.95E+00
08-30-16	NNW-0.1		2.31E+01	<7.96E-01	<1.60E+01	<1.61E+00	<1.44E+00	<1.43E+00	<1.42E+00	<3.22E+00	<5.60E+00	<1.32E+00	<1.74E+00	<2.82E+00	<2.75E+00
09-27-16	NNW-0.1	1.04E+04	1.85E+01	<9.15E-01	<1.67E+01	<1.85E+00	<1.68E+00	<1.73E+00	<1.61E+00	<3.72E+00	<4.98E+00	<1.62E+00	<2.11E+00	<3.26E+00	<3.32E+00
10-25-16	NNW-0.1		1.47E+01	<9.05E-01	<1.17E+01	<1.22E+00	<1.42E+00	<1.34E+00	<1.27E+00	<2.68E+00	<2.94E+00	<1.29E+00	<1.52E+00	<2.37E+00	<2.57E+00
11-29-16	NNW-0.1		1.44E+01	<8.69E-01	<1.20E+01	<1.62E+00	<1.48E+00	<1.72E+00	<1.46E+00	<3.18E+00	<4.51E+00	<1.45E+00	<1.72E+00	<2.90E+00	<2.90E+00
12-27-16	NNW-0.1	1.11E+04	1.48E+01	<8.78E-01	<1.53E+01	<1.34E+00	<1.33E+00	<1.43E+00	<1.31E+00	<3.07E+00	<4.50E+00	<1.35E+00	<1.62E+00	<2.58E+00	<2.48E+00
	SW-2														
01-26-16	N-9.9		9.48E+00	<7.29E-01	<2.05E+01	<2.47E+00	<2.53E+00	<2.54E+00	<2.25E+00	<6.25E+00	<6.68E+00	<2.30E+00	<2.66E+00	<4.50E+00	<4.63E+00
02-23-16	N-9.9		4.79E+00	<7.16E-01	<1.38E+01	<1.57E+00	<1.52E+00	<1.45E+00	<1.53E+00	<3.44E+00	<4.37E+00	<1.37E+00	<1.48E+00	<3.12E+00	<2.81E+00
03-29-16	N-9.9	<1.34E+03	5.72E+00	<9.33E-01	<1.50E+01	<1.64E+00	<1.31E+00	<1.48E+00	<1.37E+00	<3.97E+00	<5.15E+00	<1.44E+00	<1.71E+00	<2.80E+00	<2.95E+00
04-26-16	N-9.9		6.09E+00	<8.86E-01	<1.52E+01	<1.49E+00	<1.53E+00	<1.53E+00	<1.38E+00	<3.53E+00	<4.81E+00	<1.38E+00	<1.69E+00	<3.17E+00	<2.78E+00
05-31-16	N-9.9		6.96E+00	<9.15E-01	<2.32E+01	<2.07E+00	<1.80E+00	<2.03E+00	<2.02E+00	<4.78E+00	<6.98E+00	<1.68E+00	<2.29E+00	<3.83E+00	<3.75E+00
06-28-16	N-9.9	<5.12E+02	1.03E+01	<4.32E-01	<1.86E+01	<2.08E+00	<1.96E+00	<2.00E+00	<1.89E+00	<4.58E+00	<6.22E+00	<1.62E+00	<2.00E+00	<3.72E+00	<3.44E+00
07-26-16	N-9.9		6.79E+00	<8.66E-01	<1.45E+01	<1.59E+00	<1.73E+00	<1.62E+00	<1.45E+00	<3.48E+00	<4.67E+00	<1.43E+00	<1.93E+00	<3.15E+00	<3.06E+00
08-30-16	N-9.9		8.07E+00	<8.86E-01	<1.32E+01	<1.31E+00	<1.28E+00	<1.26E+00	<1.20E+00	<2.81E+00	<4.48E+00	<1.13E+00	<1.25E+00	<2.54E+00	<2.20E+00
09-27-16	N-9.9	<6.38E+02	1.03E+01	<9.28E-01	<1.53E+01	<1.54E+00	<1.44E+00	<1.75E+00	<1.48E+00	<3.74E+00	<4.95E+00	<1.36E+00	<1.81E+00	<3.14E+00	<2.75E+00
10-25-16	N-9.9		5.10E+00	<9.04E-01	<1.08E+01	<1.27E+00	<1.21E+00	<1.24E+00	<1.25E+00	<2.77E+00	<3.34E+00	<1.17E+00	<1.58E+00	<2.67E+00	<2.33E+00
11-29-16	N-9.9		6.63E+00	<8.47E-01	<1.22E+01	<1.43E+00	<1.47E+00	<1.51E+00	<1.49E+00	<3.08E+00	<3.27E+00	<1.31E+00	<1.53E+00	<2.42E+00	<2.66E+00
12-27-16	N-9.9	<5.44E+02	5.82E+00	<8.64E-01	<1.38E+01	<1.29E+00	<1.07E+00	<1.40E+00	<1.32E+00	<2.66E+00	<3.77E+00	<1.28E+00	<1.59E+00	<2.39E+00	<2.50E+00
Required LLD's		2.00E+03	4.00E+00	1.00E+00	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.80E+01	3.00E+01	1.50E+01	1.50E+01	1.50E+01	3.00E+01	1.50E+01
Reportable Level		2.00E+04	None	2.00E+00	2.00E+02	1.00E+03	3.00E+02	3.00E+01	5.00E+01	4.00E+02	2.00E+02	1.00E+03	4.00E+02	3.00E+02	4.00E+02


Graph 3 -- Squaw Creek Maximum Tritium Values
Units of pCi/l
30000
25000
20000
15000
10000
5000
0
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Yearly Maximum
Maximum tritium

Graph 4 -- Environmental Squaw Creek and Lake Granbury Surface Water Tritium Results



Graph 5 -- Environmental Squaw Creek and Lake Granbury Surface Water Gross Beta Results



F. Ground Water Program

Table 1 – Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program (as seen in section II.A) specifies the five groundwater monitoring locations. 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 and analyzed for gamma isotopes and tritium at each location.

A total of twenty groundwater samples were collected from the five different monitoring locations. There were no radionuclides identified in any of the samples. All required LLDs were met for each required gamma emitting radionuclide. Tritium analysis was performed on twenty samples, all indicated less than the required LLD. Results for all the groundwater analyses are reported in Table 9 - Environmental Groundwater Tritium and Gamma Isotopic Results. These results confirm that plant discharges are having no effect on groundwater in the area surrounding Comanche Peak.

Seventeen sample locations of groundwater were taken quarterly in accordance with STA-654, "Groundwater Protection Program".

During the year 2016, there were no exceptions to the Ground Water Program.

Table 9 -- Environmental Groundwater Tritium and Gamma Isotopic Results

GW-1 W-1.2

Collect Date	Parameter	Result	Minimal Detectable Concentration (MDC)	LLD	Units	Qualifier	Reportable Levels
3/29/2016 7:49	Tritium	-1.65E+02	4.91E+02	2.00E+03	pCi/L	U	2.00E+04
3/29/2016 7:49	Manganese-54	-1.42E+00	2.18E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 7:49	Iron-59	-1.74E+00	4.31E+00	3.00E+01	pCi/L	U	4.00E+02
3/29/2016 7:49	Cobalt-58	7.77E-01	2.30E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 7:49	Cobalt-60	6.74E-01	2.39E+00	1.50E+01	pCi/L	U	3.00E+02
3/29/2016 7:49	Zinc-65	-3.99E-01	4.94E+00	3.00E+01	pCi/L	U	3.00E+02
3/29/2016 7:49	Zirconium-95	-6.00E-01	4.02E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 7:49	Iodine-131	2.32E+00	2.87E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 7:49	Cesium-134	-1.41E-03	2.34E+00	1.50E+01	pCi/L	U	2.00E+01
3/29/2016 7:49	Cesium-137	2.79E-01	2.44E+00	1.80E+01	pCi/L	U	3.00E+01
3/29/2016 7:49	Barium-140	2.69E+00	9.41E+00	1.50E+01	pCi/L	U	5.00E+01
3/29/2016 7:49	Lanthanum-140	1.67E-01	3.35E+00	1.50E+01	pCi/L	U	2.00E+02
6/28/2016 7:46	Tritium	2.78E+00	6.00E+02	2.00E+03	pCi/L	U	2.00E+04
6/28/2016 7:46	Manganese-54	6.42E-01	2.24E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 7:46	Iron-59	2.33E+00	3.43E+00	3.00E+01	pCi/L	U	4.00E+02
6/28/2016 7:46	Cobalt-58	-3.91E-01	2.27E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 7:46	Cobalt-60	2.86E-01	2.32E+00	1.50E+01	pCi/L	U	3.00E+02
6/28/2016 7:46	Zinc-65	-3.05E-01	4.80E+00	3.00E+01	pCi/L	U	3.00E+02
6/28/2016 7:46	Zirconium-95	-8.27E-01	3.93E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 7:46	Iodine-131	-1.10E+00	4.19E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 7:46	Cesium-134	1.53E+00	2.39E+00	1.50E+01	pCi/L	U	2.00E+01
6/28/2016 7:46	Cesium-137	1.38E+00	2.24E+00	1.80E+01	pCi/L	U	3.00E+01
6/28/2016 7:46	Barium-140	1.14E+00	1.21E+01	1.50E+01	pCi/L	U	5.00E+01
6/28/2016 7:46	Lanthanum-140	-8.65E-01	3.96E+00	1.50E+01	pCi/L	U	2.00E+02
9/27/2016 7:39	Tritium	2.32E+02	5.83E+02	2.00E+03	pCi/L	U	2.00E+04
9/27/2016 7:39	Manganese-54	6.39E-01	1.24E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 7:39	Iron-59	1.73E-01	2.44E+00	3.00E+01	pCi/L	U	4.00E+02
9/27/2016 7:39	Cobalt-58	-1.18E+00	1.10E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 7:39	Cobalt-60	2.31E-01	1.24E+00	1.50E+01	pCi/L	U	3.00E+02
9/27/2016 7:39	Zinc-65	-5.24E-01	2.67E+00	3.00E+01	pCi/L	U	3.00E+02
9/27/2016 7:39	Zirconium-95	3.06E-01	2.19E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 7:39	Iodine-131	6.56E-01	2.11E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 7:39	Cesium-134	-7.13E-01	1.20E+00	1.50E+01	pCi/L	U	2.00E+01
9/27/2016 7:39	Cesium-137	1.88E-01	1.27E+00	1.80E+01	pCi/L	U	3.00E+01
9/27/2016 7:39	Barium-140	2.43E+00	5.82E+00	1.50E+01	pCi/L	U	5.00E+01
9/27/2016 7:39	Lanthanum-140	1.25E-01	2.00E+00	1.50E+01	pCi/L	U	2.00E+02
12/27/2016 7:43	Tritium	1.58E+02	4.77E+02	2.00E+03	pCi/L	U	2.00E+04
12/27/2016 7:43	Manganese-54	-7.06E-01	1.08E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 7:43	Iron-59	-3.77E-01	2.28E+00	3.00E+01	pCi/L	U	4.00E+02
12/27/2016 7:43	Cobalt-58	-1.39E-01	1.19E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 7:43	Cobalt-60	2.01E-01	1.20E+00	1.50E+01	pCi/L	U	3.00E+02
12/27/2016 7:43	Zinc-65	5.17E-01	2.11E+00	3.00E+01	pCi/L	U	3.00E+02
12/27/2016 7:43	Zirconium-95	-2.05E-01	2.16E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 7:43	Iodine-131	-1.04E+00	2.28E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 7:43	Cesium-134	2.30E-01	1.27E+00	1.50E+01	pCi/L	U	2.00E+01
12/27/2016 7:43	Cesium-137	7.26E-01	1.23E+00	1.80E+01	pCi/L	U	3.00E+01
12/27/2016 7:43	Barium-140	3.13E+00	6.56E+00	1.50E+01	pCi/L	U	5.00E+01
12/27/2016 7:43	Lanthanum-140	-2.78E-01	2.01E+00	1.50E+01	pCi/L	U	2.00E+02

Qualifiers: U – Target isotope was analyzed for but not detected above the MDC and LLD

UI – Uncertain identification for gamma spectroscopy

Table 9 -- Environmental Groundwater Tritium and Gamma Isotopic Results Cont.

GW-2 WSW-0.1

Collect Date	Parameter	Result	Minimal Detectable Concentration (MDC)	LLD	Units	Qualifier	Reportable Levels
3/29/2016 8:29	Tritium	4.63E+01	5.20E+02	2.00E+03	pCi/L	U	2.00E+04
3/29/2016 8:29	Manganese-54	-3.33E-01	1.83E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 8:29	Iron-59	2.31E+00	4.13E+00	3.00E+01	pCi/L	U	4.00E+02
3/29/2016 8:29	Cobalt-58	6.07E-01	1.97E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 8:29	Cobalt-60	-5.24E-01	1.99E+00	1.50E+01	pCi/L	U	3.00E+02
3/29/2016 8:29	Zinc-65	1.20E+00	4.37E+00	3.00E+01	pCi/L	U	3.00E+02
3/29/2016 8:29	Zirconium-95	-8.45E-01	2.91E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 8:29	Iodine-131	-2.86E-01	2.42E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 8:29	Cesium-134	-1.46E-01	2.14E+00	1.50E+01	pCi/L	U	2.00E+01
3/29/2016 8:29	Cesium-137	-1.14E+00	1.83E+00	1.80E+01	pCi/L	U	3.00E+01
3/29/2016 8:29	Barium-140	1.75E+00	8.19E+00	1.50E+01	pCi/L	U	5.00E+01
3/29/2016 8:29	Lanthanum-140	-9.53E-01	2.52E+00	1.50E+01	pCi/L	U	2.00E+02
6/28/2016 8:17	Tritium	5.13E+01	6.00E+02	2.00E+03	pCi/L	U	2.00E+04
6/28/2016 8:17	Manganese-54	1.82E-01	1.65E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 8:17	Iron-59	-1.38E+00	3.13E+00	3.00E+01	pCi/L	U	4.00E+02
6/28/2016 8:17	Cobalt-58	-1.14E-01	1.70E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 8:17	Cobalt-60	-5.08E-01	1.58E+00	1.50E+01	pCi/L	U	3.00E+02
6/28/2016 8:17	Zinc-65	-1.67E-01	3.46E+00	3.00E+01	pCi/L	U	3.00E+02
6/28/2016 8:17	Zirconium-95	-1.46E+00	3.06E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 8:17	Iodine-131	7.28E-01	3.48E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 8:17	Cesium-134	-8.24E-01	1.84E+00	1.50E+01	pCi/L	U	2.00E+01
6/28/2016 8:17	Cesium-137	1.30E-01	1.77E+00	1.80E+01	pCi/L	U	3.00E+01
6/28/2016 8:17	Barium-140	7.79E+00	9.37E+00	1.50E+01	pCi/L	U	5.00E+01
6/28/2016 8:17	Lanthanum-140	-8.36E-01	2.86E+00	1.50E+01	pCi/L	U	2.00E+02
9/27/2016 8:04	Tritium	4.87E+02	5.93E+02	2.00E+03	pCi/L	U	2.00E+04
9/27/2016 8:04	Manganese-54	-4.56E-01	1.02E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 8:04	Iron-59	-8.81E-01	2.33E+00	3.00E+01	pCi/L	U	4.00E+02
9/27/2016 8:04	Cobalt-58	-9.71E-02	1.16E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 8:04	Cobalt-60	5.80E-01	1.38E+00	1.50E+01	pCi/L	U	3.00E+02
9/27/2016 8:04	Zinc-65	-8.91E-01	2.29E+00	3.00E+01	pCi/L	U	3.00E+02
9/27/2016 8:04	Zirconium-95	-6.79E-01	2.02E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 8:04	Iodine-131	-3.51E-02	2.11E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 8:04	Cesium-134	1.07E-01	1.35E+00	1.50E+01	pCi/L	U	2.00E+01
9/27/2016 8:04	Cesium-137	-4.28E-02	1.28E+00	1.80E+01	pCi/L	U	3.00E+01
9/27/2016 8:04	Barium-140	1.01E+00	6.05E+00	1.50E+01	pCi/L	U	5.00E+01
9/27/2016 8:04	Lanthanum-140	-4.22E-01	1.91E+00	1.50E+01	pCi/L	U	2.00E+02
12/27/2016 8:00	Tritium	1.17E+02	4.86E+02	2.00E+03	pCi/L	U	2.00E+04
12/27/2016 8:00	Manganese-54	9.35E-02	1.34E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 8:00	Iron-59	-5.73E-01	2.96E+00	3.00E+01	pCi/L	U	4.00E+02
12/27/2016 8:00	Cobalt-58	2.06E-01	1.31E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 8:00	Cobalt-60	1.80E+00	1.60E+00	1.50E+01	pCi/L	UI	3.00E+02
12/27/2016 8:00	Zinc-65	-1.65E-01	3.03E+00	3.00E+01	pCi/L	U	3.00E+02
12/27/2016 8:00	Zirconium-95	-6.61E-01	2.46E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 8:00	Iodine-131	-5.71E-01	2.76E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 8:00	Cesium-134	4.98E-01	1.52E+00	1.50E+01	pCi/L	U	2.00E+01
12/27/2016 8:00	Cesium-137	9.89E-01	1.61E+00	1.80E+01	pCi/L	U	3.00E+01
12/27/2016 8:00	Barium-140	-1.00E+00	7.91E+00	1.50E+01	pCi/L	U	5.00E+01
12/27/2016 8:00	Lanthanum-140	6.07E-01	2.78E+00	1.50E+01	pCi/L	U	2.00E+02

Qualifiers: U – Target isotope was analyzed for but not detected above the MDC and LLD

UI – Uncertain identification for gamma spectroscopy

Table 9 -- Environmental Groundwater Tritium and Gamma Isotopic Results Cont.

GW-3 SSE-4.6

Collect Date	Parameter	Result	Minimal Detectable Concentration (MDC)	LLD	Units	Qualifier	Reportable Levels
3/29/2016 10:40	Tritium	-5.53E+01	4.95E+02	2.00E+03	pCi/L	U	2.00E+04
3/29/2016 10:40	Manganese-54	4.77E-01	1.70E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 10:40	Iron-59	-8.59E-01	3.46E+00	3.00E+01	pCi/L	U	4.00E+02
3/29/2016 10:40	Cobalt-58	-4.03E-01	1.62E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 10:40	Cobalt-60	-5.87E-01	1.76E+00	1.50E+01	pCi/L	U	3.00E+02
3/29/2016 10:40	Zinc-65	-5.06E-01	3.46E+00	3.00E+01	pCi/L	U	3.00E+02
3/29/2016 10:40	Zirconium-95	4.55E-01	2.95E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 10:40	Iodine-131	-1.14E-01	2.34E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 10:40	Cesium-134	1.90E-02	1.83E+00	1.50E+01	pCi/L	U	2.00E+01
3/29/2016 10:40	Cesium-137	1.33E-01	1.93E+00	1.80E+01	pCi/L	U	3.00E+01
3/29/2016 10:40	Barium-140	7.73E-01	7.54E+00	1.50E+01	pCi/L	U	5.00E+01
3/29/2016 10:40	Lanthanum-140	-6.45E-02	2.72E+00	1.50E+01	pCi/L	U	2.00E+02
6/28/2016 9:32	Tritium	1.76E+02	5.86E+02	2.00E+03	pCi/L	U	2.00E+04
6/28/2016 9:32	Manganese-54	-6.97E-01	2.06E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 9:32	Iron-59	5.62E-01	4.54E+00	3.00E+01	pCi/L	U	4.00E+02
6/28/2016 9:32	Cobalt-58	-2.74E-01	2.09E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 9:32	Cobalt-60	-1.12E+00	2.13E+00	1.50E+01	pCi/L	U	3.00E+02
6/28/2016 9:32	Zinc-65	1.45E+00	4.55E+00	3.00E+01	pCi/L	U	3.00E+02
6/28/2016 9:32	Zirconium-95	1.96E+00	4.16E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 9:32	Iodine-131	1.66E+00	3.90E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 9:32	Cesium-134	9.84E-01	2.63E+00	1.50E+01	pCi/L	U	2.00E+01
6/28/2016 9:32	Cesium-137	-1.39E-01	2.31E+00	1.80E+01	pCi/L	U	3.00E+01
6/28/2016 9:32	Barium-140	2.31E+00	1.15E+01	1.50E+01	pCi/L	U	5.00E+01
6/28/2016 9:32	Lanthanum-140	-1.16E+00	4.03E+00	1.50E+01	pCi/L	U	2.00E+02
9/27/2016 9:17	Tritium	2.95E+02	5.88E+02	2.00E+03	pCi/L	U	2.00E+04
9/27/2016 9:17	Manganese-54	3.19E-01	1.45E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 9:17	Iron-59	-8.58E-01	2.91E+00	3.00E+01	pCi/L	U	4.00E+02
9/27/2016 9:17	Cobalt-58	-5.27E-01	1.30E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 9:17	Cobalt-60	1.12E+00	1.65E+00	1.50E+01	pCi/L	U	3.00E+02
9/27/2016 9:17	Zinc-65	7.06E-01	2.98E+00	3.00E+01	pCi/L	U	3.00E+02
9/27/2016 9:17	Zirconium-95	-2.48E+00	2.60E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 9:17	Iodine-131	4.22E-01	2.42E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 9:17	Cesium-134	-4.08E-01	1.54E+00	1.50E+01	pCi/L	U	2.00E+01
9/27/2016 9:17	Cesium-137	2.76E-01	1.53E+00	1.80E+01	pCi/L	U	3.00E+01
9/27/2016 9:17	Barium-140	-2.31E+00	6.96E+00	1.50E+01	pCi/L	U	5.00E+01
9/27/2016 9:17	Lanthanum-140	3.72E-01	2.50E+00	1.50E+01	pCi/L	U	2.00E+02
12/27/2016 9:00	Tritium	7.28E+01	4.70E+02	2.00E+03	pCi/L	U	2.00E+04
12/27/2016 9:00	Manganese-54	6.77E-01	1.55E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 9:00	Iron-59	-4.14E-01	3.25E+00	3.00E+01	pCi/L	U	4.00E+02
12/27/2016 9:00	Cobalt-58	-2.69E-02	1.45E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 9:00	Cobalt-60	-3.15E-01	1.49E+00	1.50E+01	pCi/L	U	3.00E+02
12/27/2016 9:00	Zinc-65	-1.30E+00	2.88E+00	3.00E+01	pCi/L	U	3.00E+02
12/27/2016 9:00	Zirconium-95	1.81E-01	2.76E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 9:00	Iodine-131	2.73E-01	3.04E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 9:00	Cesium-134	8.19E-01	1.68E+00	1.50E+01	pCi/L	U	2.00E+01
12/27/2016 9:00	Cesium-137	1.42E-01	1.48E+00	1.80E+01	pCi/L	U	3.00E+01
12/27/2016 9:00	Barium-140	3.95E+00	8.21E+00	1.50E+01	pCi/L	U	5.00E+01
12/27/2016 9:00	Lanthanum-140	-7.41E-01	2.63E+00	1.50E+01	pCi/L	U	2.00E+02

Qualifiers: U – Target isotope was analyzed for but not detected above the MDC and LLD

UI – Uncertain identification for gamma spectroscopy

Table 9 -- Environmental Groundwater Tritium and Gamma Isotopic Results Cont.

GW-4 N-9.8

Collect Date	Parameter	Result	Minimal Detectable Concentration (MDC)	LLD	Units	Qualifier	Reportable Levels
3/29/2016 12:02	Tritium	1.03E+00	4.94E+02	2.00E+03	pCi/L	U	2.00E+04
3/29/2016 12:02	Manganese-54	-1.30E-01	1.56E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 12:02	Iron-59	-2.24E+00	3.05E+00	3.00E+01	pCi/L	U	4.00E+02
3/29/2016 12:02	Cobalt-58	-1.04E-01	1.53E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 12:02	Cobalt-60	8.87E-01	1.89E+00	1.50E+01	pCi/L	U	3.00E+02
3/29/2016 12:02	Zinc-65	-2.53E+00	3.28E+00	3.00E+01	pCi/L	U	3.00E+02
3/29/2016 12:02	Zirconium-95	-4.91E-03	2.75E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 12:02	Iodine-131	1.49E-02	2.23E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 12:02	Cesium-134	1.74E+00	1.86E+00	1.50E+01	pCi/L	U	2.00E+01
3/29/2016 12:02	Cesium-137	-1.77E-01	1.67E+00	1.80E+01	pCi/L	U	3.00E+01
3/29/2016 12:02	Barium-140	-3.58E+00	6.22E+00	1.50E+01	pCi/L	U	5.00E+01
3/29/2016 12:02	Lanthanum-140	-3.64E-02	2.11E+00	1.50E+01	pCi/L	U	2.00E+02
6/28/2016 11:51	Tritium	1.20E+02	5.98E+02	2.00E+03	pCi/L	U	2.00E+04
6/28/2016 11:51	Manganese-54	2.81E-01	1.72E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 11:51	Iron-59	4.86E-01	3.68E+00	3.00E+01	pCi/L	U	4.00E+02
6/28/2016 11:51	Cobalt-58	7.80E-03	1.67E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 11:51	Cobalt-60	-1.03E+00	1.61E+00	1.50E+01	pCi/L	U	3.00E+02
6/28/2016 11:51	Zinc-65	1.67E+00	3.69E+00	3.00E+01	pCi/L	U	3.00E+02
6/28/2016 11:51	Zirconium-95	-4.41E+00	3.01E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 11:51	Iodine-131	-1.87E-01	3.22E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 11:51	Cesium-134	1.11E+00	1.86E+00	1.50E+01	pCi/L	U	2.00E+01
6/28/2016 11:51	Cesium-137	-1.45E-01	1.72E+00	1.80E+01	pCi/L	U	3.00E+01
6/28/2016 11:51	Barium-140	3.68E+00	8.48E+00	1.50E+01	pCi/L	U	5.00E+01
6/28/2016 11:51	Lanthanum-140	-7.30E-01	2.92E+00	1.50E+01	pCi/L	U	2.00E+02
9/27/2016 12:16	Tritium	1.27E+02	5.92E+02	2.00E+03	pCi/L	U	2.00E+04
9/27/2016 12:16	Manganese-54	4.04E-01	1.16E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 12:16	Iron-59	-4.11E-01	2.32E+00	3.00E+01	pCi/L	U	4.00E+02
9/27/2016 12:16	Cobalt-58	-2.92E-01	1.14E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 12:16	Cobalt-60	8.60E-02	1.11E+00	1.50E+01	pCi/L	U	3.00E+02
9/27/2016 12:16	Zinc-65	-5.02E-01	2.25E+00	3.00E+01	pCi/L	U	3.00E+02
9/27/2016 12:16	Zirconium-95	6.91E-01	2.12E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 12:16	Iodine-131	1.12E+00	1.91E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 12:16	Cesium-134	1.93E-01	1.29E+00	1.50E+01	pCi/L	U	2.00E+01
9/27/2016 12:16	Cesium-137	-3.35E-01	1.16E+00	1.80E+01	pCi/L	U	3.00E+01
9/27/2016 12:16	Barium-140	2.55E+00	6.04E+00	1.50E+01	pCi/L	U	5.00E+01
9/27/2016 12:16	Lanthanum-140	9.70E-01	2.00E+00	1.50E+01	pCi/L	U	2.00E+02
12/27/2016 11:47	Tritium	4.36E+01	4.78E+02	2.00E+03	pCi/L	U	2.00E+04
12/27/2016 11:47	Manganese-54	-1.97E-01	1.46E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 11:47	Iron-59	-4.99E-01	2.87E+00	3.00E+01	pCi/L	U	4.00E+02
12/27/2016 11:47	Cobalt-58	-1.47E-01	1.39E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 11:47	Cobalt-60	9.53E-02	1.51E+00	1.50E+01	pCi/L	U	3.00E+02
12/27/2016 11:47	Zinc-65	-7.73E-01	2.98E+00	3.00E+01	pCi/L	U	3.00E+02
12/27/2016 11:47	Zirconium-95	-3.51E-01	2.48E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 11:47	Iodine-131	4.04E-01	3.00E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 11:47	Cesium-134	1.89E-01	1.61E+00	1.50E+01	pCi/L	U	2.00E+01
12/27/2016 11:47	Cesium-137	-1.69E-01	1.44E+00	1.80E+01	pCi/L	U	3.00E+01
12/27/2016 11:47	Barium-140	-5.18E-01	7.79E+00	1.50E+01	pCi/L	U	5.00E+01
12/27/2016 11:47	Lanthanum-140	2.65E+00	2.39E+00	1.50E+01	pCi/L	UI	2.00E+02

Qualifiers: U – Target isotope was analyzed for but not detected above the MDC and LLD

UI – Uncertain identification for gamma spectroscopy

Table 9 -- Environmental Groundwater Tritium and Gamma Isotopic Results Cont.

GW-5 N-1.45

Collect Date	Parameter	Result	Minimal Detectable Concentration (MDC)	LLD	Units	Qualifier	Reportable Levels
3/29/2016 11:26	Tritium	6.18E+01	5.06E+02	2.00E+03	pCi/L	U	2.00E+04
3/29/2016 11:26	Manganese-54	5.50E-01	1.59E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 11:26	Iron-59	-4.43E-01	3.08E+00	3.00E+01	pCi/L	U	4.00E+02
3/29/2016 11:26	Cobalt-58	2.48E-01	1.58E+00	1.50E+01	pCi/L	U	1.00E+03
3/29/2016 11:26	Cobalt-60	6.63E-02	1.57E+00	1.50E+01	pCi/L	U	3.00E+02
3/29/2016 11:26	Zinc-65	9.46E-01	3.46E+00	3.00E+01	pCi/L	U	3.00E+02
3/29/2016 11:26	Zirconium-95	-1.16E+00	2.89E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 11:26	Iodine-131	-1.20E-01	2.24E+00	1.50E+01	pCi/L	U	4.00E+02
3/29/2016 11:26	Cesium-134	2.14E-01	1.74E+00	1.50E+01	pCi/L	U	2.00E+01
3/29/2016 11:26	Cesium-137	4.87E-01	1.74E+00	1.80E+01	pCi/L	U	3.00E+01
3/29/2016 11:26	Barium-140	2.17E+00	7.05E+00	1.50E+01	pCi/L	U	5.00E+01
3/29/2016 11:26	Lanthanum-140	5.01E-01	2.45E+00	1.50E+01	pCi/L	U	2.00E+02
6/28/2016 10:23	Tritium	-2.47E+02	5.90E+02	2.00E+03	pCi/L	U	2.00E+04
6/28/2016 10:23	Manganese-54	-5.01E-03	1.63E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 10:23	Iron-59	-1.31E+00	3.28E+00	3.00E+01	pCi/L	U	4.00E+02
6/28/2016 10:23	Cobalt-58	-2.99E-01	1.53E+00	1.50E+01	pCi/L	U	1.00E+03
6/28/2016 10:23	Cobalt-60	1.90E-01	1.98E+00	1.50E+01	pCi/L	U	3.00E+02
6/28/2016 10:23	Zinc-65	-4.23E-01	3.38E+00	3.00E+01	pCi/L	U	3.00E+02
6/28/2016 10:23	Zirconium-95	-4.54E+00	2.96E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 10:23	Iodine-131	-2.16E+00	2.84E+00	1.50E+01	pCi/L	U	4.00E+02
6/28/2016 10:23	Cesium-134	1.82E+00	1.65E+00	1.50E+01	pCi/L	UI	2.00E+01
6/28/2016 10:23	Cesium-137	2.25E-01	1.75E+00	1.80E+01	pCi/L	U	3.00E+01
6/28/2016 10:23	Barium-140	-2.65E+00	8.10E+00	1.50E+01	pCi/L	U	5.00E+01
6/28/2016 10:23	Lanthanum-140	-7.28E-01	2.72E+00	1.50E+01	pCi/L	U	2.00E+02
9/27/2016 10:06	Tritium	2.97E+02	6.00E+02	2.00E+03	pCi/L	U	2.00E+04
9/27/2016 10:06	Manganese-54	1.34E-01	1.58E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 10:06	Iron-59	-4.79E-01	3.00E+00	3.00E+01	pCi/L	U	4.00E+02
9/27/2016 10:06	Cobalt-58	-1.98E-01	1.45E+00	1.50E+01	pCi/L	U	1.00E+03
9/27/2016 10:06	Cobalt-60	7.71E-02	1.54E+00	1.50E+01	pCi/L	U	3.00E+02
9/27/2016 10:06	Zinc-65	-2.54E-01	3.34E+00	3.00E+01	pCi/L	U	3.00E+02
9/27/2016 10:06	Zirconium-95	-8.38E-01	2.83E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 10:06	Iodine-131	-8.15E-01	2.73E+00	1.50E+01	pCi/L	U	4.00E+02
9/27/2016 10:06	Cesium-134	-4.70E-01	1.66E+00	1.50E+01	pCi/L	U	2.00E+01
9/27/2016 10:06	Cesium-137	-1.54E+00	1.82E+00	1.80E+01	pCi/L	U	3.00E+01
9/27/2016 10:06	Barium-140	5.03E-01	7.86E+00	1.50E+01	pCi/L	U	5.00E+01
9/27/2016 10:06	Lanthanum-140	4.11E-01	2.61E+00	1.50E+01	pCi/L	U	2.00E+02
12/27/2016 9:46	Tritium	2.14E+02	4.81E+02	2.00E+03	pCi/L	U	2.00E+04
12/27/2016 9:46	Manganese-54	5.93E-01	1.52E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 9:46	Iron-59	-1.01E+00	3.14E+00	3.00E+01	pCi/L	U	4.00E+02
12/27/2016 9:46	Cobalt-58	1.26E-02	1.46E+00	1.50E+01	pCi/L	U	1.00E+03
12/27/2016 9:46	Cobalt-60	-1.24E-01	1.57E+00	1.50E+01	pCi/L	U	3.00E+02
12/27/2016 9:46	Zinc-65	-1.91E+00	2.83E+00	3.00E+01	pCi/L	U	3.00E+02
12/27/2016 9:46	Zirconium-95	-1.13E+00	2.64E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 9:46	Iodine-131	4.88E-01	3.13E+00	1.50E+01	pCi/L	U	4.00E+02
12/27/2016 9:46	Cesium-134	-2.06E-02	1.69E+00	1.50E+01	pCi/L	U	2.00E+01
12/27/2016 9:46	Cesium-137	-1.33E+00	1.71E+00	1.80E+01	pCi/L	U	3.00E+01
12/27/2016 9:46	Barium-140	-5.61E+00	8.19E+00	1.50E+01	pCi/L	U	5.00E+01
12/27/2016 9:46	Lanthanum-140	-6.55E-01	2.45E+00	1.50E+01	pCi/L	U	2.00E+02

Qualifiers: U – Target isotope was analyzed for but not detected above the MDC and LLD

UI – Uncertain identification for gamma spectroscopy

G. Sediment Program

Table 1 – Comanche Peak Nuclear Power Plant Radiological Environmental Monitoring Program (as seen in section II.A) specifies shoreline sediments were collected at four different monitoring locations. One sample location is along the shore of Squaw Creek Reservoir, one sample location is on Squaw Creek downstream of the dam discharge and two locations are along Lake Granbury's shores. Each sample is collected on a six-month frequency and sent to the contract laboratory for analysis by gamma spectrometry.

The process of shoreline sedimentation is a complex evolution whereby potential radionuclides and stable elements may concentrate in the bottom sediment of particular bodies of water. The concentrations are affected by such things as colloidal particles combining with chelating agents and biological action of bacteria and other benthic organisms. Monitoring of the area shorelines provides one of the first and best indicators of radionuclide deposition.

Results from the gamma isotopic analysis of shoreline sediments is reported in Table 10 – Environmental Sediment Gamma Isotopic Results. As expected and in agreement with previous results from both the pre-operational and operational programs, naturally occurring Potassium-40 was detected in all eight samples and Beryllium-7 was detected in two samples. All required radionuclide results were reported as less than the required LLDs. As expected, there were no results in any sediment sample that indicated any direct influence from CPNPP discharges to the local environment.

During the year 2016, there were no exceptions to the Sediment Program.

Table 10 -- Environmental Sediment Gamma Isotopic Results
(Units of pCi/kg)

		Nuclides													
		Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
Date	Location														
01-19-16	SE-5.3	<2.62E+02	7.57E+02	<4.48E+01	<5.95E+01	<6.60E+01	<5.83E+01	<1.18E+02	<9.05E+01	7.09E+03	<9.80E+01	0.00E+00	<4.67E+01	<9.77E+01	<9.82E+01
01-19-16	NNE-1.0	<1.81E+02	<2.65E+02	<3.11E+01	<3.67E+01	<3.98E+01	<3.43E+01	<7.43E+01	<7.32E+01	8.25E+03	<5.60E+01	<3.31E+01	<3.63E+01	<8.85E+01	<5.91E+01
01-19-16	NE-7.4	<1.83E+02	3.33E+02	<3.35E+01	<3.98E+01	<4.44E+01	<3.59E+01	<8.03E+01	<7.55E+01	6.78E+03	<5.88E+01	<4.09E+01	<4.73E+01	<6.99E+01	<7.01E+01
01-19-16	N-9.9	<1.59E+02	4.14E+02	<2.79E+01	<3.21E+01	<3.61E+01	<3.39E+01	<6.11E+01	<6.21E+01	2.14E+03	<5.55E+01	<3.00E+01	<3.49E+01	<6.51E+01	<5.06E+01
07-05-16	SE-5.3	<8.06E+02	<4.84E+02	<6.01E+01	<5.57E+01	<6.58E+01	<5.68E+01	<1.47E+02	<4.69E+02	4.76E+03	<2.34E+02	<6.12E+01	<8.49E+01	<1.57E+02	<1.17E+02
07-05-16	NNE-1.0	<8.44E+02	<7.35E+02	<6.77E+01	<6.57E+01	<8.07E+01	<6.05E+01	<1.29E+02	<5.77E+02	7.19E+03	<3.43E+02	<5.37E+01	<7.08E+01	<1.45E+02	<1.32E+02
07-05-16	NE-7.4	<1.02E+03	<8.50E+02	<7.39E+01	<5.78E+01	<7.82E+01	<7.52E+01	<1.72E+02	<6.07E+02	6.66E+03	<2.44E+02	<5.76E+01	<9.12E+01	0.00E+00	<1.26E+02
07-05-16	N-9.9	<6.07E+02	<4.77E+02	<4.24E+01	<3.42E+01	<3.96E+01	<4.35E+01	<9.90E+01	<4.12E+02	2.45E+03	<2.31E+02	<3.64E+01	<4.77E+01	<7.99E+01	<8.88E+01
Required LLD's						1.50E+02	1.80E+02								
Reportable Levels						None	None								

H. Fish Program

Fish samples were collected at two locations. One monitoring location is an area approximately two miles east-northeast of the site on Squaw Creek Reservoir. The second location is on Lake Granbury approximately eight miles north-northeast of the site. Fish sampling is scheduled for the months of April and October. The collected fish are frozen and shipped to the independent laboratory where the edible portions are analyzed for gamma emitting radio-nuclides. Annually, tritium analysis is performed on Squaw Creek fish (CR-2014-013335).

The results of the analysis performed on the collected fish samples are reported in Table 11 -- Environmental Fish Gamma Isotopic Results. Catfish and Bass samples were analyzed as indicated in the table. There were no positive results reported except for the expected Potassium-40, which is naturally occurring in all living organisms. All required radionuclide results were reported as less than the required LLDs. As a result of the fish-sampling program, there were no anomalies noted and no indication of any influence on the surrounding environment from Comanche Peak plant discharges.

No abnormal results were reported by CPNPP or by the State of Texas. As expected, Potassium-40 was the only positive isotope found.

During the year 2016 there were two exceptions to the Fish Program.

CR-2016-003264 - RPI-713 6.3.5.2 states a fish sample from Lake Granbury will be obtained and sent to GEL Labs and the State of Texas for analysis. The collection took place 4-12-16 however, the bass sample from Lake Granbury will have to be obtained at a later date due to the muddy lake water from the recent rain fall. Samples were obtain on 8-2-16.

TR-2016-004809 - The analysis of the (cooked) fish sample collected on 4/12/16 from squaw Creek indicated a positive Tritium analysis results. This is not an ODCM required sample/analysis and there is NO reporting level. Below and attached are the results from Gel laboratories. As part of the immediate actions the Environmental department had an additional fish sample collected from Squaw Creek for Radiation Protection to send to Gel Laboratories for tritium analysis. These results do not exceed any dose limitation standards for public consumption.

Table 11 -- Environmental Fish Gamma Isotopic Results
(Units of pCi/kg wet)

		Nuclides													
		Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95	Fish Type
Date	Location														
04-12-16	Squaw Creek	<3.47E-02	<6.52E-03	<7.40E-03	<7.86E-03	<6.39E-03	<1.90E-02	<1.25E-02	3.67E+00	<1.12E-02	<5.63E-03	<6.30E-03	<1.73E-02	<1.19E-02	*Catfish*
04-12-16	Squaw Creek	<2.56E-02	<5.03E-03	<5.76E-03	<5.56E-03	<4.83E-03	<1.46E-02	<1.02E-02	3.07E+00	<9.43E-03	<5.10E-03	<5.62E-03	<1.30E-02	<8.81E-03	*Bass*
10-4-16	Squaw Creek	<1.83E-02	<3.37E-03	<3.58E-03	<3.61E-03	<3.41E-03	<7.69E-03	<5.63E-03	1.63E+00	<4.61E-03	<3.72E-03	<3.62E-03	<6.97E-03	<6.44E-03	*Bass*
10-4-16	Squaw Creek	<1.95E-02	<4.14E-03	<4.08E-03	<4.35E-03	<3.96E-03	<8.27E-03	<6.83E-03	2.45E+00	<4.06E-03	<4.11E-03	<3.91E-03	<9.22E-03	<7.66E-03	*Catfish*
04-12-16	Lake Granbury	<3.61E-02	<6.13E-03	<5.78E-03	<6.31E-03	<5.53E-03	<1.32E-02	<1.32E-02	1.51E+00	<1.00E-02	<6.62E-03	<5.25E-03	<1.58E-02	<9.29E-03	*Catfish*
08-2-16	Lake Granbury	<2.35E-02	<4.64E-03	<7.28E-03	<6.23E-03	<6.48E-03	<1.46E-02	<6.63E-02	3.46E+00	<5.94E-03	<5.90E-03	<5.89E-03	<1.38E-02	<1.02E-02	*Bass*
10-4-16	Lake Granbury	<1.78E-02	<4.06E-03	<4.46E-03	<3.99E-03	<4.04E-03	<1.06E-02	<6.82E-03	3.78E+00	<5.13E-03	<4.29E-03	<4.09E-03	<1.09E-02	<6.96E-03	*Bass*
10-4-16	Lake Granbury	<6.75E-02	<1.23E-02	<1.39E-02	<1.55E-02	<1.41E-02	<2.90E-02	<2.18E-02	1.44E+00	<1.82E-02	<1.48E-02	<1.41E-02	<3.14E-02	<2.09E-02	*Catfish*
Required LLD's			1.30E+02	1.30E+02	1.30E+02	1.50E+02	2.60E+02				1.30E+02		2.60E+02		
Reportable Levels			3.00E+04	1.00E+04	1.00E+03	2.00E+03	1.00E+04				3.00E+04		2.00E+04		
		H-3													
		pCi/g													
4-12-16	Squaw Creek	9.44E+00	Bass												
6-6-16	Squaw Creek	1.60E+00	Bass												
Required LLD's		6.00E+00													

I. Food Products Program

Food products (pecans) were collected at the time of harvest. The samples are obtained at monitoring location ENE-9.0 at the time of harvest and are shipped to the contract laboratory for gamma isotopic analysis. There was food products (cucumbers, tomatoes, squash) produced that required monitoring for location E-4.2 in 2016.

Results of the gamma isotopic analyses are reported in Table 12 -- Environmental Food Products Gamma Isotopic Results. Naturally occurring Potassium 40 was detected in the samples as expected and all other required radionuclide results were reported as less than the required LLDs.

During the year 2016, there were no exceptions to the Food Products Program.

Table 12 -- Environmental Food Products Gamma Isotopic Results

Location ENE-9.0

Matrix	Collect Date	Parameter	Result	MDC	LLD	Units
Pecans	12/6/2016 12:00	Beryllium-7	-6.48E+00	1.02E+02	N/A	pCi/kg
Pecans	12/6/2016 12:00	Potassium-40	3.13E+03	1.37E+02	N/A	pCi/kg
Pecans	12/6/2016 12:00	Manganese-54	3.81E+00	1.26E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Iron-59	1.11E+01	2.33E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Cobalt-58	2.12E-01	1.32E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Cobalt-60	-1.56E+00	1.29E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Zinc-65	-1.07E+01	2.60E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Zirconium-95	2.63E+01	2.72E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Niobium-95	-7.08E-01	1.17E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Iodine-131	-3.09E+00	1.42E+01	6.00E+01	pCi/kg
Pecans	12/6/2016 12:00	Cesium-134	-3.62E+00	1.40E+01	6.00E+01	pCi/kg
Pecans	12/6/2016 12:00	Cesium-137	1.58E-02	1.32E+01	8.00E+01	pCi/kg
Pecans	12/6/2016 12:00	Barium-140	9.01E-01	5.25E+01	N/A	pCi/kg
Pecans	12/6/2016 12:00	Lanthanum-140	-1.91E+00	1.83E+01	N/A	pCi/kg

Location E-4.2

Matrix	Collect Date	Parameter	Result	MDC	LLD	Units
Cucumber	7/19/2016 12:00	Beryllium-7	7.18E+00	6.55E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Potassium-40	2.37E+03	9.17E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Manganese-54	-1.37E+00	7.94E+00	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Iron-59	-5.05E-01	1.96E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Cobalt-58	1.65E+00	8.95E+00	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Cobalt-60	1.83E+00	9.46E+00	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Zinc-65	5.33E+00	2.10E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Zirconium-95	-4.66E+00	1.41E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Niobium-95	-1.86E+00	8.98E+00	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Iodine-131	-8.76E-01	1.86E+01	6.00E+01	pCi/kg
Cucumber	7/19/2016 12:00	Cesium-134	3.84E+00	1.00E+01	6.00E+01	pCi/kg
Cucumber	7/19/2016 12:00	Cesium-137	-3.84E+00	8.80E+00	8.00E+01	pCi/kg
Cucumber	7/19/2016 12:00	Barium-140	1.90E+01	4.55E+01	N/A	pCi/kg
Cucumber	7/19/2016 12:00	Lanthanum-140	-3.49E+00	1.37E+01	N/A	pCi/kg

Table 12 -- Environmental Food Products Gamma Isotopic Results Continued

Location E-4.2

Tomato	7/19/2016 12:00	Beryllium-7	-1.67E+01	8.15E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Potassium-40	1.80E+03	8.74E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Manganese-54	6.53E-01	8.56E+00	N/A	pCi/kg
Tomato	7/19/2016 12:00	Iron-59	5.75E+00	2.13E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Cobalt-58	5.14E+00	1.07E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Cobalt-60	-3.27E+00	1.03E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Zinc-65	-1.40E+01	1.94E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Zirconium-95	-6.66E+00	1.36E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Niobium-95	-8.37E-01	9.62E+00	N/A	pCi/kg
Tomato	7/19/2016 12:00	Iodine-131	2.52E-01	1.89E+01	6.00E+01	pCi/kg
Tomato	7/19/2016 12:00	Cesium-134	3.84E+00	1.07E+01	6.00E+01	pCi/kg
Tomato	7/19/2016 12:00	Cesium-137	7.08E-01	9.33E+00	8.00E+01	pCi/kg
Tomato	7/19/2016 12:00	Barium-140	3.59E+01	5.64E+01	N/A	pCi/kg
Tomato	7/19/2016 12:00	Lanthanum-140	-4.12E+00	1.13E+01	N/A	pCi/kg

Location E-4.2

Squash	10/4/2016 12:00	Beryllium-7	-1.58E+01	3.73E+01	N/A	pCi/kg
Squash	10/4/2016 12:00	Potassium-40	2.29E+03	4.92E+01	N/A	pCi/kg
Squash	10/4/2016 12:00	Manganese-54	4.41E-01	4.96E+00	N/A	pCi/kg
Squash	10/4/2016 12:00	Iron-59	-1.70E+00	1.04E+01	N/A	pCi/kg
Squash	10/4/2016 12:00	Cobalt-58	-4.19E-01	4.64E+00	N/A	pCi/kg
Squash	10/4/2016 12:00	Cobalt-60	-3.71E-01	4.89E+00	N/A	pCi/kg
Squash	10/4/2016 12:00	Zinc-65	-8.10E+00	1.11E+01	N/A	pCi/kg
Squash	10/4/2016 12:00	Zirconium-95	3.10E+00	8.94E+00	N/A	pCi/kg
Squash	10/4/2016 12:00	Niobium-95	2.67E+00	4.33E+00	N/A	pCi/kg
Squash	10/4/2016 12:00	Iodine-131	-4.59E+00	6.92E+00	6.00E+01	pCi/kg
Squash	10/4/2016 12:00	Cesium-134	-2.05E+00	4.84E+00	6.00E+01	pCi/kg
Squash	10/4/2016 12:00	Cesium-137	5.54E-01	4.93E+00	8.00E+01	pCi/kg
Squash	10/4/2016 12:00	Barium-140	2.73E+00	2.21E+01	N/A	pCi/kg
Squash	10/4/2016 12:00	Lanthanum-140	8.58E-01	7.73E+00	N/A	pCi/kg

J. Broadleaf Program

Broadleaf sample collection is conducted in accordance with the requirements of the Radiological Environmental Monitoring Program and referenced in Table 13--Environmental Broadleaf Iodine-131 and Gamma Isotopic Results. The program specifies that additional broadleaf sampling is required based on the absence of milk monitoring locations. One broadleaf control location is located at SW-13.5 in the vicinity of the previous control milk location. The two indicator locations, N-1.45 and SW-1.0, are located near the site boundaries. The broadleaf samples consist of mainly native grasses and cedar leaves and are analyzed for Iodine-131 and gamma emitting isotopes.

All radionuclide analysis met their required LLDs. The naturally occurring radionuclide of Potassium-40 was found in 36 of 36 samples taken. The radionuclide Beryllium-7 was present in 35 of 36 samples.

No abnormal results were reported by CPNPP or by the State of Texas.

During the year 2016, there was one exception to the Broadleaf Program.

CR-2016-003704 - Unexplained positive Cs-137 result 1/26/2016 for location BL3. Sample re-analyzed and reported less than minimal detectable concentration (<MDC). Report included in package. Annual report updated with re-analyzed result.

Table 13 -- Environmental Broadleaf Iodine-131 and Gamma Isotopic Results
(Units of pCi/kg wet)

		Nuclides													
	BL-1	I-131	Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
Date	Location														
01-26-16	N-1.45	<4.66E+02	<5.67E+02	2.29E+04	<4.04E+01	<2.64E+01	<3.41E+01	<3.09E+01	<7.44E+01	1.77E+03	<1.65E+02	<3.31E+01	<4.05E+01	<5.78E+01	<6.79E+01
02-23-16	N-1.45	<4.92E+01	<1.26E+02	3.56E+03	<2.58E+01	<3.22E+01	<3.31E+01	<2.74E+01	<4.91E+01	<2.38E+02	<4.95E+01	<2.59E+01	<2.06E+01	<4.00E+01	<5.92E+01
03-29-16	N-1.45	<3.88E+01	<1.27E+02	3.57E+03	<3.03E+01	<2.73E+01	<3.04E+01	<3.07E+01	<7.65E+01	1.08E+04	<3.98E+01	<2.90E+01	<2.88E+01	<7.38E+01	<5.09E+01
04-26-16	N-1.45	<3.06E+01	<9.25E+01	1.39E+03	<2.13E+01	<2.13E+01	<2.12E+01	<1.94E+01	<4.66E+01	4.17E+03	<2.79E+01	<2.08E+01	<2.05E+01	<4.23E+01	<3.62E+01
05-31-16	N-1.45	<1.33E+01	<4.21E+01	1.19E+03	<1.03E+01	<1.35E+01	<1.14E+01	<1.14E+01	<2.31E+01	6.65E+03	<1.39E+01	<1.12E+01	<1.10E+01	<2.54E+01	<2.00E+01
06-28-16	N-1.45	<9.99E+00	<3.31E+01	8.52E+02	<8.99E+00	<9.94E+00	<9.71E+00	<8.56E+00	<1.98E+01	6.82E+03	<9.55E+00	<8.65E+00	<9.00E+00	<2.27E+01	<1.47E+01
07-26-16	N-1.45	<4.98E+01	<1.53E+02	1.92E+03	<4.00E+01	<5.04E+01	<4.94E+01	<4.51E+01	<8.58E+01	9.31E+03	<6.13E+01	<4.59E+01	<4.97E+01	<9.19E+01	<8.14E+01
08-30-16	N-1.45	<1.59E+01	<5.11E+01	1.46E+03	<1.14E+01	<1.39E+01	<1.20E+01	<1.21E+01	<2.50E+01	7.25E+03	<1.64E+01	<1.21E+01	<1.15E+01	<2.83E+01	<1.85E+01
09-27-16	N-1.45	<5.17E+01	<1.17E+02	1.42E+03	<1.72E+01	<1.47E+01	<1.82E+01	<1.74E+01	<3.11E+01	4.68E+03	<2.89E+01	<1.58E+01	<1.73E+01	<3.16E+01	<3.02E+01
10-25-16	N-1.45	<2.27E+01	<6.55E+01	3.34E+03	<1.52E+01	<1.73E+01	<1.62E+01	<1.52E+01	<2.72E+01	3.46E+03	<1.21E+01	<1.43E+01	<1.31E+01	<3.32E+01	<2.50E+01
11-29-16	N-1.45	<4.64E+01	<1.28E+02	4.52E+03	<2.56E+01	<3.03E+01	<2.97E+01	<2.78E+01	<5.77E+01	5.86E+03	<4.47E+01	<2.82E+01	<2.80E+01	<5.85E+01	<4.81E+01
12-27-16	N-1.45	<4.11E+01	<1.39E+02	9.06E+03	<3.11E+01	<3.11E+01	<3.57E+01	<3.36E+01	<5.50E+01	5.02E+02	<3.65E+01	<3.39E+01	<3.30E+01	<5.49E+01	<5.80E+01
	BL-3	I-131	Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
	Control														
01-26-16	SW-13.5	<2.46E+02	<2.78E+02	1.57E+04	<2.01E+01	<1.87E+01	<1.77E+01	<2.49E+01	<4.60E+01	9.72E+02	<8.26E+01	<1.68E+01	<2.10E+01	<3.70E+01	<3.83E+01
02-23-16	SW-13.5	<5.33E+01	<1.15E+02	5.86E+03	<2.37E+01	<3.61E+01	<3.00E+01	<2.54E+01	<6.10E+01	5.56E+02	<4.12E+01	<3.10E+01	<2.87E+01	<4.80E+01	<4.04E+01
03-29-16	SW-13.5	<2.59E+01	<8.41E+01	4.03E+02	<1.89E+01	<2.38E+01	<1.75E+01	<1.76E+01	<3.70E+01	5.60E+03	<2.23E+01	<1.95E+01	<1.81E+01	<4.58E+01	<3.08E+01
04-26-16	SW-13.5	<2.79E+01	<7.64E+01	1.48E+03	<1.57E+01	<1.82E+01	<1.62E+01	<1.62E+01	<3.47E+01	4.24E+03	<2.70E+01	<1.64E+01	<1.67E+01	<3.78E+01	<2.90E+01
05-31-16	SW-13.5	<2.87E+01	<9.52E+01	9.06E+03	<2.24E+01	<2.43E+01	<2.45E+01	<2.39E+01	<4.68E+01	3.13E+03	<3.21E+01	<2.25E+01	<2.37E+01	<4.84E+01	<3.77E+01
06-28-16	SW-13.5	<2.24E+01	<7.87E+01	1.05E+03	<1.79E+01	<2.05E+01	<2.12E+01	<1.96E+01	<3.93E+01	8.76E+03	<2.39E+01	<1.75E+01	<1.97E+01	<4.25E+01	<3.11E+01
07-26-16	SW-13.5	<3.84E+01	<1.55E+02	8.92E+02	<2.53E+01	<4.11E+01	<3.74E+01	<4.10E+01	<6.94E+01	9.60E+03	<4.74E+01	<3.77E+01	<3.11E+01	<7.96E+01	<6.63E+01
08-30-16	SW-13.5	<2.93E+01	<9.48E+01	4.30E+03	<1.85E+01	<1.96E+01	<2.22E+01	<2.99E+01	<3.95E+01	2.05E+03	<2.78E+01	<1.93E+01	<2.14E+01	<4.15E+01	<3.22E+01
09-27-16	SW-13.5	<2.99E+01	<9.13E+01	4.15E+03	<1.81E+01	<2.00E+01	<2.06E+01	<2.05E+01	<3.64E+01	3.46E+03	<3.03E+01	<1.76E+01	<1.99E+01	<3.92E+01	<2.96E+01
10-25-16	SW-13.5	<1.76E+01	<5.63E+01	4.12E+03	<1.04E+01	<1.31E+01	<1.37E+01	<1.33E+01	<2.07E+01	2.20E+03	<1.72E+01	<1.20E+01	<1.26E+01	<2.52E+01	<1.93E+01
11-29-16	SW-13.5	<4.72E+01	<1.25E+02	9.96E+03	<2.62E+01	<2.82E+01	<2.77E+01	<2.60E+01	<5.33E+01	2.61E+03	<3.70E+01	<2.94E+01	<2.70E+01	<6.29E+01	<5.50E+01
12-27-16	SW-13.5	<4.47E+01	<1.35E+02	9.79E+03	<2.96E+01	<3.78E+01	<3.44E+01	<3.28E+01	<5.71E+01	1.32E+03	<4.70E+01	<3.12E+01	<3.46E+01	<7.16E+01	<5.15E+01
	BL-2	I-131	Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	K-40	La-140	Mn-54	Nb-95	Zn-65	Zr-95
01-26-16	SW-1.0	<3.79E+02	<4.53E+02	1.59E+04	<3.25E+01	<2.64E+01	<2.80E+01	<2.74E+01	<7.53E+01	8.74E+02	<1.66E+02	<2.57E+01	<3.39E+01	<5.91E+01	<5.89E+01
02-23-16	SW-1.0	<4.42E+01	<1.20E+02	4.84E+03	<2.73E+01	<1.51E+01	<3.39E+01	<2.76E+01	<4.63E+01	5.12E+02	<4.04E+01	<2.65E+01	<2.78E+01	<5.51E+01	<4.98E+01
03-29-16	SW-1.0	<4.66E+01	<1.56E+02	6.49E+03	<2.96E+01	<3.73E+01	<3.74E+01	<3.22E+01	<6.71E+01	4.81E+03	<5.49E+01	<3.41E+01	<3.30E+01	<7.81E+01	<6.47E+01
04-26-16	SW-1.0	<2.07E+01	<5.95E+01	1.76E+03	<1.28E+01	<1.34E+01	<1.40E+01	<1.33E+01	<3.01E+01	4.05E+03	<2.04E+01	<1.32E+01	<1.35E+01	<2.94E+01	<2.24E+01
05-31-16	SW-1.0	<2.14E+01	<6.34E+01	5.66E+03	<1.53E+01	<1.92E+01	<1.68E+01	<1.70E+01	<3.22E+01	3.87E+03	<2.13E+01	<1.61E+01	<1.62E+01	<3.59E+01	<2.81E+01
06-28-16	SW-1.0	<2.11E+01	<6.53E+01	1.85E+03	<1.75E+01	<2.23E+01	<1.94E+01	<1.77E+01	<3.65E+01	4.43E+03	<2.31E+01	<1.82E+01	<1.78E+01	<3.75E+01	<3.07E+01
07-26-16	SW-1.0	<5.34E+01	<1.61E+02	3.74E+03	<3.82E+01	<4.03E+01	<4.17E+01	<4.41E+01	<7.75E+01	4.58E+03	<4.77E+01	<3.82E+01	<4.42E+01	<8.54E+01	<7.14E+01
08-30-16	SW-1.0	<2.23E+01	<7.24E+01	1.91E+03	<1.46E+01	<1.57E+01	<1.64E+01	<1.35E+01	<2.81E+01	2.75E+03	<1.83E+01	<1.45E+01	<1.19E+01	<3.25E+01	<2.72E+01
09-27-16	SW-1.0	<2.88E+01	<8.13E+01	1.79E+03	<1.56E+01	<2.11E+01	<1.84E+01	<1.73E+01	<3.65E+01	4.12E+03	<2.11E+01	<1.83E+01	<1.92E+01	<3.93E+01	<3.30E+01
10-25-16	SW-1.0	<2.00E+01	<6.27E+01	2.46E+03	<1.23E+01	<1.47E+01	<1.35E+01	<1.34E+01	<2.44E+01	4.01E+03	<1.93E+01	<1.34E+01	<1.45E+01	<2.75E+01	<2.04E+01
11-29-16	SW-1.0	<5.77E+01	<1.59E+02	5.41E+03	<3.00E+01	<3.52E+01	<3.78E+01	<3.43E+01	<5.68E+01	1.92E+03	<5.12E+01	<3.23E+01	<3.56E+01	<6.67E+01	<5.84E+01
12-27-16	SW-1.0	<6.46E+01	<2.27E+02	8.46E+03	<4.92E+01	<5.22E+01	<6.26E+01	<5.91E+01	<1.03E+02	2.52E+03	<6.17E+01	<5.17E+01	<5.75E+01	<1.10E+02	<8.68E+01
Required LLD's		6.00E+01					6.00E+01	8.00E+01							
Reportable Levels		1.00E+02					1.00E+03	2.00E+03							

K. Conclusions

Based on the results presented in this report and from comparisons with the pre-operational and operational program results from previous years, it can be concluded that the impact of Comanche Peak on the environment is minimal. The only indication directly attributable to Comanche Peak is the tritium detected in Squaw Creek reservoir.

Gross beta trend indications concerning Squaw Creek Reservoir are consistent with previous values and do not indicate any increase due to influence from Comanche Peak. Future data will be evaluated as it is received and will be addressed as necessary.

The tritium in Squaw Creek reservoir is reaching equilibrium and is expected to remain well below the reportable level.

There were no values reported during the year 2016 that exceeded any NRC reportable limit.

L. Inter Laboratory Comparison and Cross Check Program

GEL Laboratories LLC

GEL Laboratories LLC is the independent contract laboratory that processes the radiological environmental monitoring samples collected by CPNPP. The contract laboratory is required to participate in an Interlaboratory Comparison Program in accordance with the ODCM Control 3.12.3. GEL participates in multiple programs to ensure all environmental media sent to them are analyzed to the proper standards.

GEL Laboratories, LLC (GEL) is a privately owned environmental laboratory. GEL was established as an analytical testing laboratory in 1981. Now a full service lab, their analytical divisions use state of the art equipment and methods to provide a comprehensive array of organic, inorganic, and radiochemical analyses.

GEL administers the QA program in accordance with the Quality Assurance Plan, GL-QSB-001. Their Quality Systems include all quality assurance (QA) policies and quality control (QC) procedures necessary to plan, implement, and assess the work they perform. GEL's QA Program establishes a quality management system (QMS) that governs all of the activities of their organization.

GEL Laboratories NUPIC Audit

Summary

The NUPIC Audit was conducted at GEL Laboratories, 2040 Savage Road, Charleston, SC 29407 during the time period of October 17th-21st, 2016. As the Technical Specialist, I conducted tours, observations, interviews, reviewed Standard Operating Procedures, and reviewed data. Radiochemical, Radiation Environmental Monitoring Program (REMP), Radiological Effluent, and Ground Water analyses were observed in the various laboratories. Previous Technical Audit reports from GEL were reviewed prior to the audit visit. Recommended actions or deltas from previous audits were pursued during this visit to see how GEL had reconciled these previously identified issues. Additionally, known deviations (data error reports) in data reporting from working through with GEL through EnRad Laboratories were a topic of interest. GEL's Quality Assurance Plan is designed to comply with the specifications outlined in the following NUPIC recognized documents: ANSI N42.23-1996 Measurement and Associated Instrument Quality Assurance for Radiobioassay Laboratories, 10 CFR Part 21 – Reporting of Defects and Noncompliance, 10 CFR Part 50 Appendix B – Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, 10 CFR Part 61 – Licensing Requirements for Land Disposal of Radioactive Waste, NRC Reg Guide 4.8, and NRC Reg Guide 4.15. At the conclusion of the technical audit, it was found that GEL is in compliance with the quality control standards imposed by the above regulations and those of their Quality Assurance Plan and Standard Operating Procedures.

Technical Specialist Conclusion

The results of this audit were discussed during the Exit Meeting on October 21st, 2016. It was found that GEL is in compliance with the quality control standards imposed by the specifications outlined in the following NUPIC recognized documents: ANSI N42.23-1996 - Measurement and Associated Instrument Quality Assurance for Radiobioassay Laboratories, 10 CFR Part 21 – Reporting of Defects and Noncompliance, 10 CFR Part 50 Appendix B – Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, 10 CFR Part 61 – Licensing Requirements for Land Disposal of Radioactive Waste, NRC Reg Guide 4.8, and NRC Reg Guide 4.15, and the requirements of their Quality Assurance Plan and their Standard Operating Procedures.

Appendix A

Comanche Peak Nuclear Power Plant
Land Use Census
2016

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 August 1-4, 2016 and includes the following items:

1. Evaluation of the 2016 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. 5 Mile Sector and Road Map with Field Data
9. Environmental Monitoring Locations Map – all sample locations

Evaluation of the 2016 Land Use Census

The results of the 2016 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 therefore; there are no current milk samples during the year 2016. NOTE: A Control milk location was identified at 12.3 Miles SW, Deridder Dairy, but operator did not wish to participate. (CR-2011-0013802)

If no milk samples are available, the broadleaf vegetation sampling specified in ODCM Table 3.12-1 will be 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 change to the broadleaf sampling program is 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 2014 Land Use Census identified one location within 5 miles with a garden of greater than 500 ft^2 producing broadleaf vegetation as outlined in CPNPP procedures and Comanche Peak Steam Electric Station Offsite Dose Calculation Manual. This garden was in operation for the year 2016 and is located at E-4.2. Tomatoes and cucumbers were collected from this location. This garden does not meet the ODCM Table 3.12-1 requirements because the products are not irrigated by water in which liquid plant wastes have been discharged.

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 following values are based on the original pre-operational and subsequent Comanche Peak 3 and 4 new build calculations which identified predominant wind direction, structures affecting potential release patterns, and area population. 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 2015 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	2.6	6.39E-07	3.50E-09
NNE	2.5	4.20E-07	2.00E-09
NE	2.5	2.90E-07	1.00E-09
ENE	2.6	2.20E-07	5.77E-10
E	2.5	2.70E-07	5.80E-10
ESE	2.2	4.02E-07	9.00E-10
SE	2.0	7.1E-07	2.80E-09
SSE	1.5	1.10E-06	6.60E-09
S	1.5	8.50E-07	5.20E-09
SSW	1.8	5.04 E-7	2.42 E-9
SW	0.8	3.56E-06	1.85E-08
WSW	0.8	3.92E-06	1.63E-08
W	1.6	7.64E-07	2.50E-09
WNW	2.5	4.70E-07	1.40E-09
NW	4.8	2.52E-07	6.20E-10
NNW	2.2	1.12E-06	5.16E-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	None	None
NNE	None	None
NE	None	None
ENE	None	None
E	4.2	2.00E-10
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

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

*No Milk samples are currently being collected.

Population by Sector and Distance

Sector	0-1	1-2	2-3	3-4	4-5	Total
N	-	-	12	68	107	187
NNE	-	-	8	68	56	132
NE	-	-	164	169	293	626
ENE	-	-	107	27	20	154
E	-	-	171	198	34	403
ESE	-	-	79	107	147	333
SE	-	-	202	404	103	709
SSE	-	93	112	109	2562	2876
S	-	30	123	59	243	455
SSW	-	6	8	8	70	92
SW	8	104	8	85	51	256
WSW	36	157	8	6	-	207
W	-	97	10	17	12	136
WNW	-	-	7	49	127	183
NW	-	-	-	-	7	7
NNW	-	-	5	44	46	95
TOTAL	44	487	1024	1418	3878	6851

The average number of residents per house was obtained from North Central Texas Council of Governments for Hood and Somervell Counties. The number of residents per house is 2.44 and 2.80, respectively. (http://www.indexmundi.com/facts/united-states/quick-facts/texas/average-household-size#table)

Note: 2011 thru 2016 Land Use Census was performed with the use of maps and information provided by Somervell County/Hood County 9-1-1 addressing/ geographic information system. Changes were noted during the 2011 Land Use Census in sector population which attributed to use of 911 (Hood and Somervell counties) dispatchers maps. A 9-1-1 map is vaulted under RPI-714-1.

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[2, 3]
GW1	W-1.2 (Security Rifle Range)	GW[7]
GW2	WSW-0.1 (Somerville Water district)	GW[3, 4,6]
GW3	SSE-4.6 (Glen Rose – Somerville Water District)	GW[4]
GW4	N-9.8 (Granbury)	GW[1, 4,6]
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
F1	ENE-2.0 (Squaw Creek Reservoir)	F
F2	NNE-8.0 (Lake Granbury)	F
FP1	ENE-9.0 (Leonard Bros. Pecan Farm)	FP

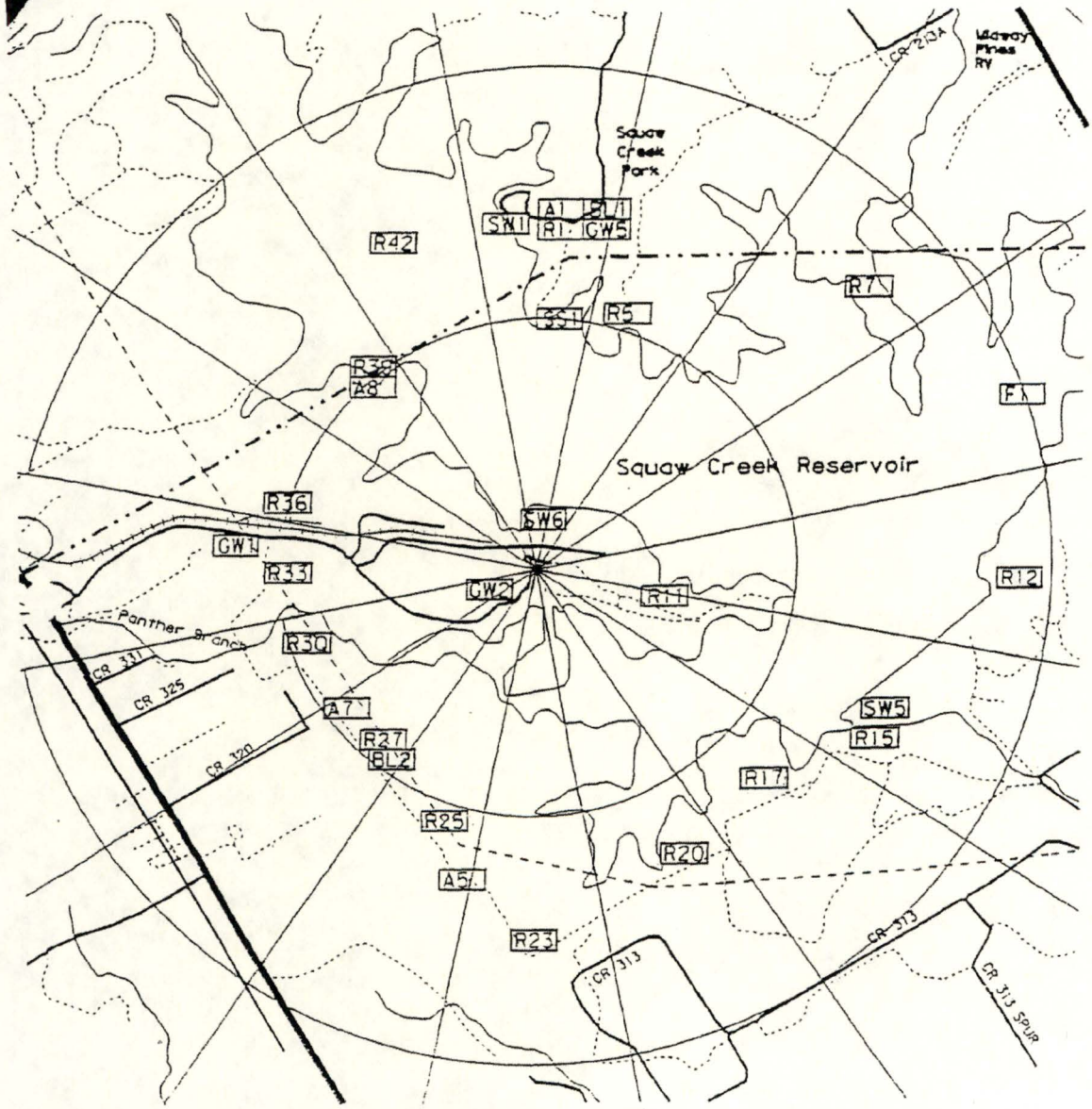
Environmental Sample Locations Table (cont.)

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:

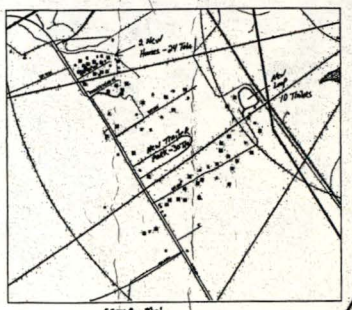
1. The municipal water system for the City of Granbury is supplied by surface water from Lake Granbury (location SW2) and ground water (location GW4). Each of these supplies is sampled. These samples are not required for compliance with Radiological Effluent Control 3/4.12.1, Table 3.12-1, because they 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 if used.
3. Plant potable water could be supplied by surface water from Squaw Creek Reservoir (location SW6) or ground water from onsite wells (location GW2) but is currently supplied by the Somerville County Water District from the Wheeler Branch Reservoir. Each of these possible sources of water were 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.
6. Plant Potable Water (GW2) and Glen Rose (GW3) are supplied from surface water by the Somerville Water District from the Wheeler Branch Reservoir.
7. CPNPP Security Rifle Range (GW1) is supplied by a local Well.

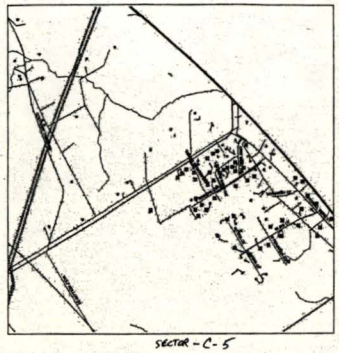


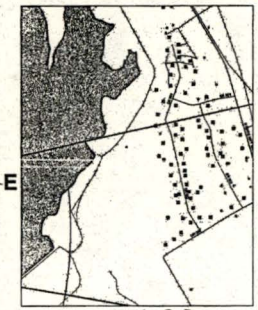
Environmental Sample Locations Map - 2 Mile Radius

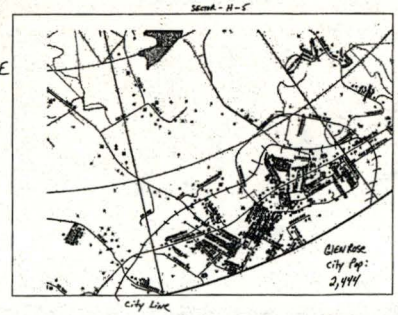
2016

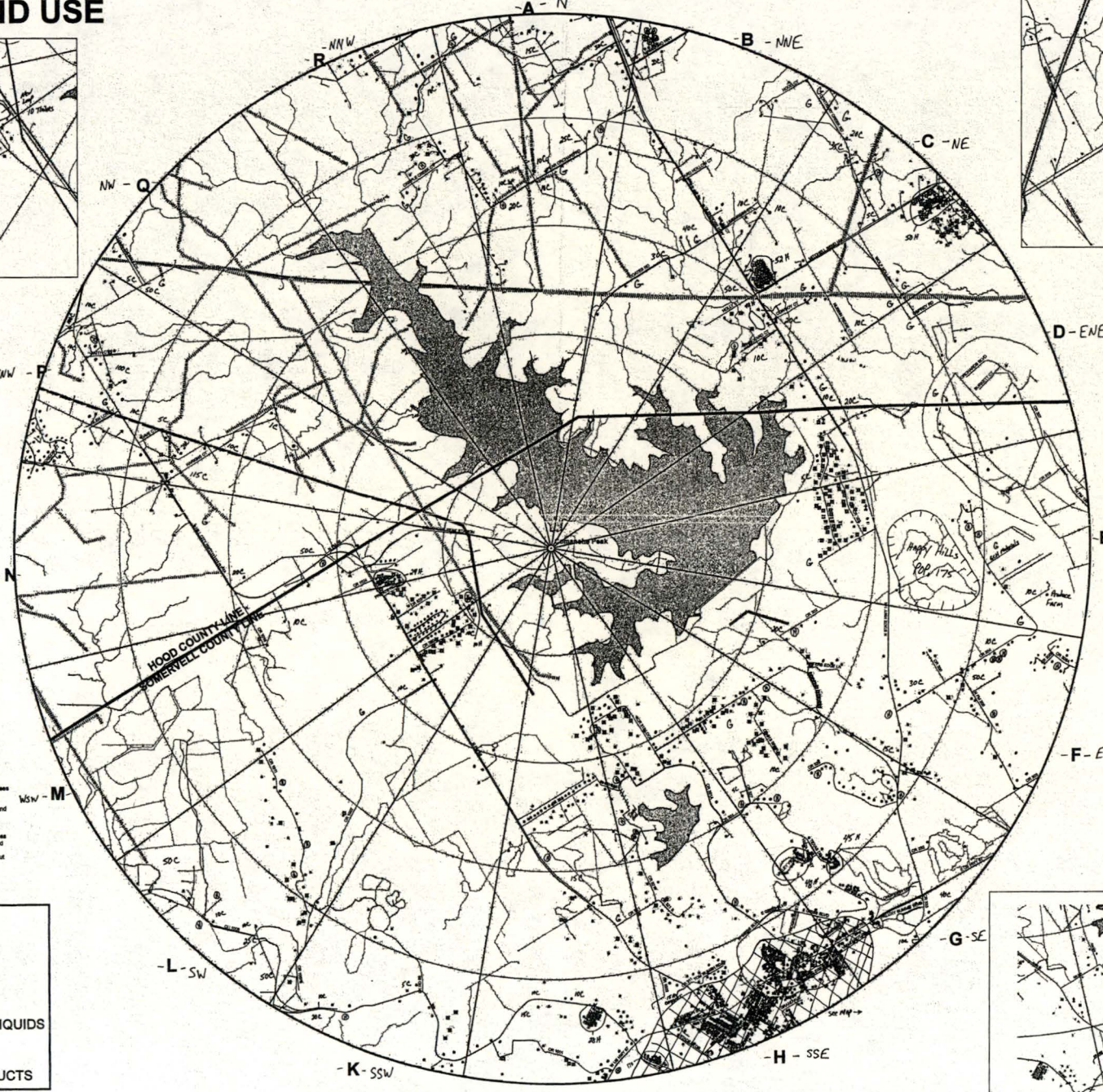
CPNPP LAND USE

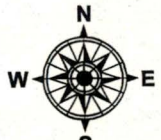












● = House
▩ = Trailer
*C = Cows
G = Gas Well

TextNote: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents on the approximate relative location of property boundaries.

Hood County does not guarantee the correctness or accuracy of any features on this product and assumes no responsibility for the content. This product may be revised at any time without notification to any user.

Pipelines_5_Mile
CMDTY_DESC
- CRUDE OIL
- NATURAL GAS
- NATURAL GAS LIQUIDS
- RAW LPG
- REFINED PRODUCTS

Date: 8/5/2014

0 0.75 1.5 3 4.5 6 Miles

Environmental Sample Locations Map - 20 Mile Radius