



**TEXAS**  
Health and Human  
Services

Texas Department of State  
Health Services

# **Radiation Inspection Branch Environmental Monitoring Summary for 2020**

**NOTE: Items within these environmental summaries have been removed due to confidential homeland security information under The Texas Public Information Act and House Bill 9, Gov. § code 418.**

# Table of Contents

<b>Introduction</b>	<b>2</b>
<b>Fixed Nuclear Facilities</b>	<b>3</b>
Comanche Peak Nuclear Power Plant	4-11
South Texas Project Nuclear Power Plant	12-17
<b>Research Reactors</b>	<b>18</b>
Texas A & M University Nuclear Science Center	19-20
University of Texas Engineering Teaching Laboratory	21-22
<b>Other Facilities</b>	<b>23</b>
Gammatron, Inc.	24-25
GeoCo, Inc.	26-27
Isotech Laboratories, Inc.	28-29
Nuclear Sources and Services, Inc.	30-31
Pantex	32-37
Radiation Technology, Inc.	38-39
Thermo Fisher	40-41
Trace Life Sciences+	42-43
<b>Appendices</b>	<b>44</b>
Department of State Health Services Laboratory Results for MAPEP Series 26	45-48
Department of State Health Services Laboratory Results for MAPEP Series 27	49-52
Department of State Health Services Laboratory Detection Limits	53-54

# Introduction

The document consists of the data collected for each monitoring point at each facility. The data is presented in the same manner as in the past. Limits of detection were not included with the data in an effort to reduce the space required for data entry. A listing of expected limits of detection for various media, geometries, and radionuclides is found in the appendices. Maps of the facilities are included, but some details have been omitted. Specific information about individual facilities can be found in the license files. Redacted copies of this and previous annual reports can be found at: <https://www.dshs.state.tx.us/radiation/ram/environmental-monitoring.aspx>

All analyses of environmental media, i.e., soil, air, water, vegetation, and sewage are performed by the Texas Department of State Health Services (DSHS), Laboratory Services Section. The Laboratory Services Section operates a highly capable radiochemistry program. Currently, the Environmental Sciences Branch participates in a program sponsored by the United States Department of Energy (USDOE), referred to as Department of Energy Laboratory Accreditation Program. It was developed by the USDOE in order to provide quality assurance and control for USDOE contractors. The most recent results of the Laboratory Services Section's performance in these "cross checks" can be found in the appendices to this document.

Landauer, Inc. performs Optically Stimulated Luminescence (OSL) readings for the facilities that have neutron sources. Approximately 200 OSLs are exchanged and read each calendar quarter. Background is subtracted from all station readings except for Comanche Peak Nuclear Power Plant, South Texas Project, and Pantex. Background is not subtracted from these three locations because the readings identify ambient doses.

Analysis of sample data from the monitored facilities indicated no release of radioactive material to the environment that exceeded the regulatory or license limits of the DSHS or any other agency such as the United States Nuclear Regulatory Commission or the USDOE. Some of the OSL readings at a few of the monitored facilities exceeded to 100mrem for the year. All licensed facilities are required by rule to document that exposures from conducting operations do not cause doses in excess of the regulatory limits to employees or individual members of the general public. The documentation is maintained for inspection by the Radiation Branch. Licensees are allowed to use mitigating factors, such as occupancy times and distance to the nearest occupied areas, in demonstrating compliance with those limits. Taking into account occupancy factors, all facilities monitored during the 2020 calendar year were found to be in compliance with radiation does limits.

Any questions should be directed to Robert E. Free at 737-218-7082 or [Robert.free@dshs.texas.gov](mailto:Robert.free@dshs.texas.gov)

---

Robert E. Free

# Fixed Nuclear Facilities

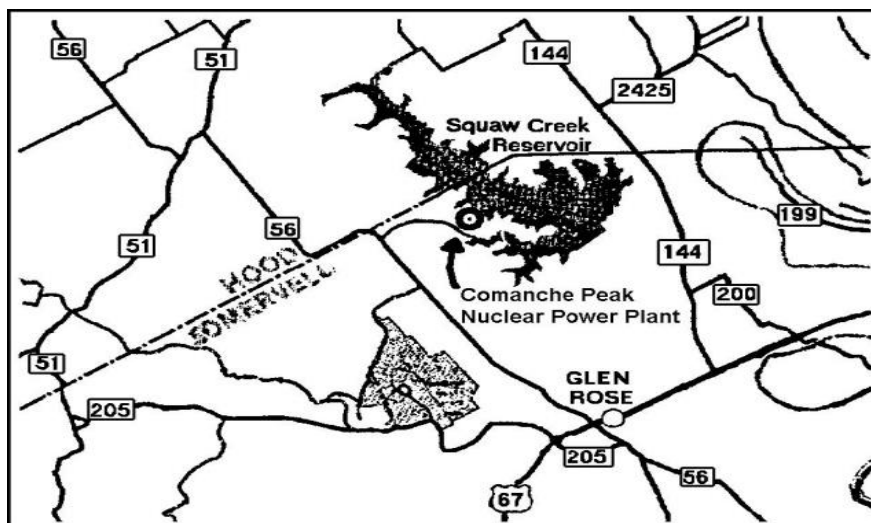
## Comanche Peak Nuclear Power Plant Radiation Branch Site No. 031

Comanche Peak Nuclear Power Plant (CPNPP) is a two-unit nuclear-fueled power plant owned and operated by Luminant Power. The plant is located in Somervell County four and one-half miles northwest of Glen Rose and approximately 80 miles southwest of downtown Dallas.

CPNPP, Luminant Power's sole nuclear power plant, with an operating capacity of 2,500 megawatts [two Westinghouse 1,250 megawatt (electric) pressurized water reactor units], began operation in 1990, although fuel had been received on-site in 1982-1983. The plant has approximately 1,300 employees. The Radiation Branch Surveillance Program consists of OSL monitoring and sampling air, fish, food products, sediment, vegetation, and water.

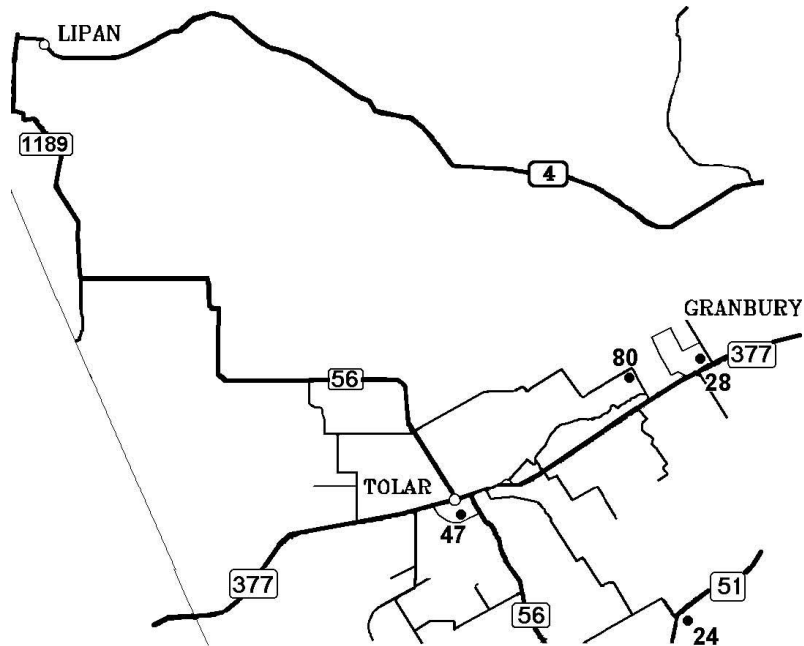
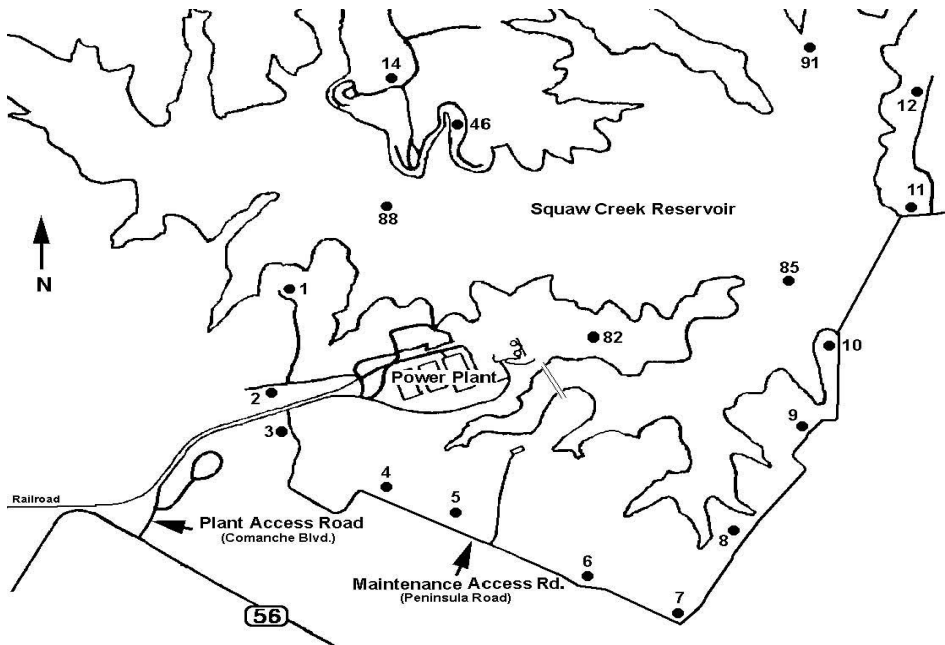


Shaded area indicates location of Somervell County

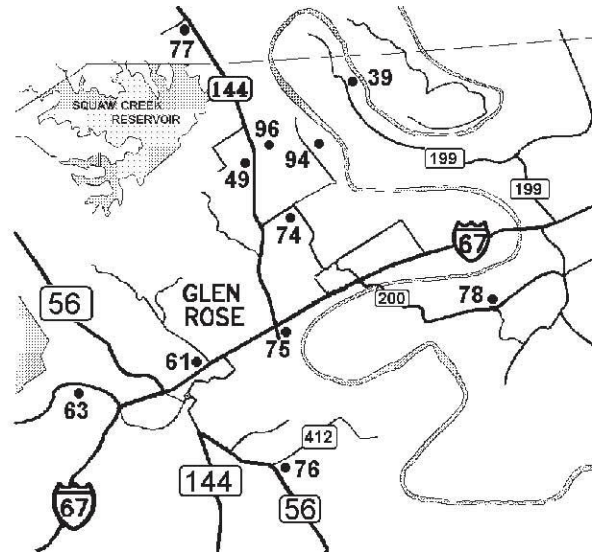
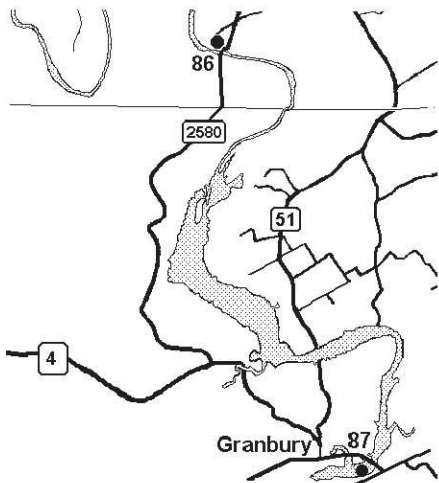
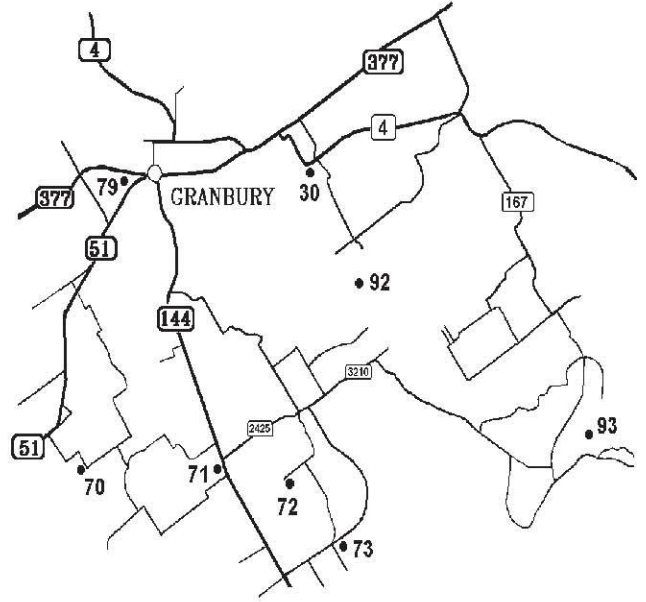
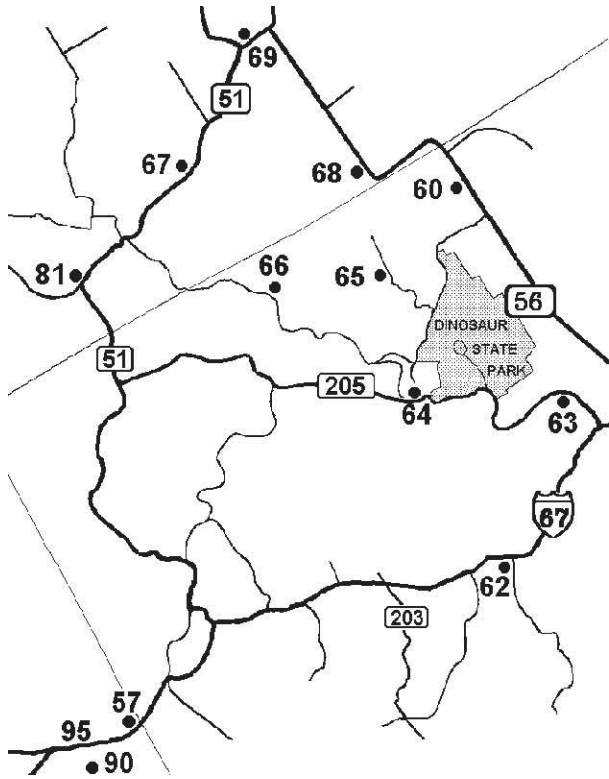


# Monitoring Station Locations

Note: Sample type not indicated on maps.



# Comanche Peak Nuclear Power Plant Monitoring Station Locations



## Comanche Peak Nuclear Power Plant Environmental Sample Results

### Optically Stimulated Luminescent Dosimeter (OSL) Monitoring Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	31	29	23	26	109	
2	33	30	23	27	113	
3	29	28	21	24	102	
4	33	30	23	28	114	
5	31	30	23	27	111	
6	31	29	22	27	109	
7	29	28	22	26	105	
8	30	28	22	26	106	
9	35	31	23	27	116	
10	31	29	24	27	111	
11	29	26	22	27	104	
12	33	30	23	29	115	
14	31	28	24	28	111	
24	32	28	23	27	110	
28	34	30	26	28	118	
30	32	30	24	27	113	
39	31	30	24	27	112	
46	32	32	23	28	115	
47	30	28	23	27	108	
49	0	31	24	27	82	QTR 1 OSL Missing
60	31	29	22	26	108	
61	30	28	21	24	103	
62	31	30	22	27	110	
63	34	32	25	29	120	
64	32	29	23	27	111	
65	28	27	21	25	101	
66	31	28	22	26	107	
67	29	29	21	25	104	
68	29	28	21	26	104	
69	30	28	22	26	106	
70	32	32	23	26	113	
71	32	32	22	27	113	
72	33	32	23	28	116	
73	31	31	22	26	110	
74	31	30	23	27	111	
75	30	28	22	27	107	
76	31	29	23	26	109	
77	30	29	22	26	107	
78	33	30	24	26	113	
79	32	28	23	27	110	
80	32	30	23	29	114	
81	33	29	25	31	118	
82	31	28	23	27	109	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.





## Comanche Peak Nuclear Power Plant Environmental Sample Results

Date	Lab	Station	Beta	Units
<b>Air Particulate Samples</b>				
1/7/2020	AE92992	001	3.60e-14	µCi/mL
1/7/2020	AE92994	057	2.91e-14	µCi/mL
1/14/2020	AE93562	001	2.77e-14	µCi/mL
1/14/2020	AE93564	057	2.21e-14	µCi/mL
1/21/2020	AE94517	001	2.66e-14	µCi/mL
1/21/2020	AE94519	057	1.95e-14	µCi/mL
1/28/2020	AE95823	001	1.97e-14	µCi/mL
1/28/2020	AE95825	057	1.94e-14	µCi/mL
2/4/2020	AE96939	001	2.02e-14	µCi/mL
2/4/2020	AE96941	057	2.22e-14	µCi/mL
2/11/2020	AE97974	001	1.81e-14	µCi/mL
2/11/2020	AE97976	057	1.96e-14	µCi/mL
2/18/2020	AE98869	001	1.96e-14	µCi/mL
2/18/2020	AE98871	057	2.10e-14	µCi/mL
2/25/2020	AE99870	001	2.07e-14	µCi/mL
2/25/2020	AE99872	057	1.98e-14	µCi/mL
3/3/2020	AF00994	001	1.81e-14	µCi/mL
3/3/2020	AF00996	057	2.04e-14	µCi/mL
3/10/2020	AF02106	001	1.87e-14	µCi/mL
3/10/2020	AF02108	057	2.01e-14	µCi/mL
3/17/2020	AF03416	001	1.52e-14	µCi/mL
3/17/2020	AF03418	057	1.45e-14	µCi/mL
3/24/2020	AF04190	001	1.25e-14	µCi/mL
3/24/2020	AF04192	057	1.34e-14	µCi/mL
3/31/2020	AF05147	001	1.76e-14	µCi/mL
3/31/2020	AF05149	057	1.82e-14	µCi/mL
4/7/2020	AF05976	001	1.56e-14	µCi/mL
4/7/2020	AF05978	057	1.65e-14	µCi/mL
4/14/2020	AF06752	001	2.08e-14	µCi/mL
4/14/2020	AF06754	057	2.18e-14	µCi/mL
4/21/2020	AF07554	057	2.06e-14	µCi/mL
4/21/2020	AF07556	057	2.27e-14	µCi/mL
4/28/2020	AF08582	001	2.03e-14	µCi/mL
4/28/2020	AF08584	057	2.45e-14	µCi/mL
5/5/2020	AF09436	001	1.89e-14	µCi/mL
5/5/2020	AF09438	057	2.00e-14	µCi/mL
5/12/2020	AF11069	001	1.69e-14	µCi/mL
5/12/2020	AF11071	057	1.90e-14	µCi/mL
5/19/2020	AF11774	001	1.72e-14	µCi/mL
5/19/2020	AF11776	057	1.83e-14	µCi/mL
5/26/2020	AF12755	001	1.79e-14	µCi/mL
5/26/2020	AF12757	057	1.84e-14	µCi/mL
6/2/2020	AF13739	057	2.09e-14	µCi/mL
6/2/2020	AF13741	001	1.99e-14	µCi/mL
6/9/2020	AF14697	057	3.04e-14	µCi/mL
6/9/2020	AF14699	001	2.80e-14	µCi/mL
6/16/2020	AF15684	001	3.15e-14	µCi/mL
6/16/2020	AF15686	057	2.39e-14	µCi/mL
6/23/2020	AF16411	001	2.57e-14	µCi/mL
6/23/2020	AF16413	057	2.10e-14	µCi/mL
6/30/2020	AF17694	001	2.60e-14	µCi/mL
6/30/2020	AF17696	057	2.20e-14	µCi/mL

Date	Lab	Station	Beta	Units
<b>Air Particulate Samples</b>				
7/7/2020	AF18461	057	2.83e-14	µCi/mL
7/7/2020	AF18463	001	2.60e-14	µCi/mL
7/14/2020	AF19251	001	2.00e-14	µCi/mL
7/14/2020	AF19253	057	2.32e-14	µCi/mL
7/21/2020	AF20140	001	2.34e-14	µCi/mL
7/21/2020	AF20142	057	2.76e-14	µCi/mL
7/28/2020	AF20992	057	1.090e-14	µCi/mL
8/4/2020	AF21704	001	2.26e-14	µCi/mL
8/4/2020	AF21706	057	2.52e-14	µCi/mL
8/11/2020	AF22992	001	2.69e-14	µCi/mL
8/11/2020	AF22994	057	2.82e-14	µCi/mL
8/18/2020	AF24379	001	2.33e-14	µCi/mL
8/18/2020	AF24381	057	2.45e-14	µCi/mL
8/25/2020	AF25486	001	3.34e-14	µCi/mL
8/25/2020	AF25488	057	3.49e-14	µCi/mL
8/28/2020	AF20990	001	1.100e-14	µCi/mL
9/1/2020	AF26561	001	1.60e-14	µCi/mL
9/1/2020	AF26563	057	1.93e-14	µCi/mL
9/8/2020	AF26910	001	1.70e-14	µCi/mL
9/8/2020	AF26912	057	1.86e-14	µCi/mL
9/15/2020	AF27639	001	1.99e-14	µCi/mL
9/15/2020	AF27641	057	2.40e-14	µCi/mL
9/22/2020	AF28008	001	4.24e-14	µCi/mL
9/22/2020	AF28010	057	4.63e-14	µCi/mL
9/29/2020	AF29110	001	1.76e-14	µCi/mL
9/29/2020	AF29112	057	1.92e-14	µCi/mL
10/6/2020	AF29731	057	3.24e-14	µCi/mL
10/6/2020	AF29733	001	2.76e-14	µCi/mL
10/13/2020	AF30701	001	3.40e-14	µCi/mL
10/13/2020	AF30703	057	3.77e-14	µCi/mL
10/20/2020	AF31372	001	3.02e-14	µCi/mL
10/20/2020	AF31374	057	3.54e-14	µCi/mL
10/27/2020	AF32258	001	1.99e-14	µCi/mL
10/27/2020	AF32260	057	2.18e-14	µCi/mL
11/3/2020	AF32924	001	2.44e-14	µCi/mL
11/3/2020	AF32926	057	2.62e-14	µCi/mL
11/10/2020	AF33850	001	2.25e-14	µCi/mL
11/10/2020	AF33852	057	2.53e-14	µCi/mL
11/17/2020	AF34760	057	2.62e-14	µCi/mL
11/17/2020	AF34762	001	2.28e-14	µCi/mL
11/24/2020	AF35737	001	2.68e-14	µCi/mL
11/24/2020	AF35739	057	2.22e-14	µCi/mL
12/1/2020	AF36078	001	4.06e-14	µCi/mL
12/1/2020	AF36080	057	3.19e-14	µCi/mL
12/8/2020	AF36937	001	4.04e-14	µCi/mL
12/8/2020	AF36939	057	3.20e-14	µCi/mL
12/15/2020	AF37756	001	1.82e-14	µCi/mL
12/15/2020	AF37758	057	3.12e-14	µCi/mL
12/22/2020	AF38192	001	5.29e-14	µCi/mL
12/22/2020	AF38194	057	3.92e-14	µCi/mL
12/29/2020	AF38238	001	3.25e-14	µCi/mL
12/29/2020	AF38240	057	2.99e-14	µCi/mL

## Comanche Peak Nuclear Power Plant Environmental Sample Results

Date	Lab	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Pb-	Tl-208	Zn-65	Zr-95	Units
<b>Fish Product Samples</b>																		
5/5/2020	AF09440	092	<5.0e-8	<1.3e-8	<1.3e-8	<1.4e-8	<1.5e-8	<2.5e-8	<1.8e-8	2.70e-6	<1.5e-8	<1.3e-8	<1.3e-8			<2.8e-8	<2.2e-8	µCi/g
5/5/2020	AF09441	092	<3.4e-8	<9.0e-9	<1.1e-8	<9.6e-9	<1.1e-8	<2.2e-8	<1.1e-8	2.69e-6	<1.2e-8	<1.0e-8	<9.9e-9	2.8e-8		<2.5e-8	<1.6e-8	µCi/g
5/5/2020	AF09443	091	<5.2e-8	<1.4e-8	<1.5e-8	<1.5e-8	<1.6e-8	<2.6e-8	<1.8e-8	3.31e-6	<1.4e-8	<1.5e-8	<1.4e-8			<3.0e-8	<2.4e-8	µCi/g
5/6/2020	AF09442	091	<4.8e-8	<1.2e-8	<1.4e-8	<1.3e-8	<1.4e-8	<2.6e-8	<1.6e-8	2.42e-6	<1.5e-8	<1.3e-8	<1.3e-8	3.3e-8	1.7e-8	<2.9e-8	<2.2e-8	µCi/g
11/10/2020	AF33854	091	<2.5e-8	<5.6e-9	<6.8e-9	<5.6e-9	<5.5e-9	<1.3e-8	<8.3e-9	3.16e-6	<9.0e-9	<5.7e-9	<6.1e-9			<1.4e-8	<9.8e-9	µCi/g
11/10/2020	AF33855	091	<4.5e-8	<1.2e-8	<1.2e-8	<1.2e-8	<1.3e-8	<2.5e-8	<1.5e-8	2.79e-6	<1.3e-8	<1.2e-8	<1.2e-8			<2.8e-8	<2.1e-8	µCi/g

Date	Lab	Station	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	Units
<b>Food Product Samples</b>																
6/9/2020	AF14701	094	<3.2e-8	<7.6e-9	<9.0e-9	<7.5e-9	<8.3e-9	<1.8e-8	<9.4e-9	3.27e-6	<9.0e-9	<7.8e-9	<8.2e-9	<2.0e-8	<1.4e-8	µCi/g
12/8/2020	AF36941	095	<3.1e-8	<8.1e-9	<9.0e-9	<8.6e-9	<8.9e-9	<1.9e-8	<9.5e-9	3.02e-6	<8.6e-9	<8.3e-9	<8.3e-9	<2.1e-8	<1.5e-8	µCi/g

Date	Lab	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Pb-	Tl-208	Zn-65	Zr-95	Units
<b>Sediment Samples</b>																		
1/14/2020	AE93566	088	<2.5e-7	<4.8e-8	<4.6e-8	<5.5e-8	<4.9e-8	<9.9e-8	<9.0e-8	1.83e-6	<8.5e-8	<4.2e-8	<6.3e-8	4.00e-7	8.0e-8	<1.5e-7	<8.1e-8	µCi/g

Date	Lab	Station	Ba-140	Be-7	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Pb-	Tl-208	Zn-65	Zr-95	Units
<b>Vegetation for Milk Samples</b>																			
1/28/2020	AE95827	014	<5.7e-8	1.97e-6	<1.2e-8	<1.4e-8	<1.3e-8	<1.3e-8	<2.7e-8	<2.1e-8	2.60e-6	<1.9e-8	<1.3e-8	<1.3e-8			<2.7e-8	<2.1e-8	µCi/g
2/25/2020	AE99874	014	<5.6e-8	3.48e-6	<1.1e-8	<1.3e-8	<1.1e-8	<1.2e-8	<2.7e-8	<2.1e-8	6.44e-6	<1.4e-8	<1.2e-8	<1.3e-8			<3.0e-8	<2.1e-8	µCi/g
3/31/2020	AF05153	014	<4.9e-8	1.60e-5	<1.2e-8	<1.5e-8	<1.4e-8	<1.4e-8	<2.8e-8	<2.0e-8	4.24e-6	<1.7e-8	<1.4e-8	<1.3e-8			<3.1e-8	<2.2e-8	µCi/g
3/31/2020	AF05154	090	<7.7e-8	1.235e-6	<1.9e-8	<2.1e-8	<2.1e-8	<2.1e-8	<4.0e-8	<2.9e-8	2.23e-6	<2.5e-8	<2.0e-8	<2.0e-8			<4.7e-8	<3.4e-8	µCi/g
4/28/2020	AF08586	014	<4.9e-8	1.31e-6	<1.3e-8	<1.4e-8	<1.2e-8	<1.3e-8	<2.8e-8	<1.5e-8	7.27e-6	<1.4e-8	<1.3e-8	<1.3e-8			<3.2e-8	<2.1e-8	µCi/g
5/26/2020	AF12759	014	<7.3e-8	3.91e-6	<2.0e-8	<2.2e-8	<2.0e-8	<2.1e-8	<3.9e-8	<2.4e-8	3.28e-6	<2.5e-8	<2.0e-8	<2.0e-8			<4.6e-8	<3.4e-8	µCi/g
6/30/2020	AF17698	014	<6.7e-8	1.80e-6	<1.9e-8	<1.8e-8	<1.8e-8	<1.9e-8	<3.2e-8	<2.4e-8	7.0e-7	<2.0e-8	<1.7e-8	<1.8e-8			<3.8e-8	<2.9e-8	µCi/g
6/30/2020	AF17699	090	<1.2e-7	5.02e-6	<2.1e-8	<2.4e-8	<2.2e-8	<2.2e-8	<4.9e-8	<4.2e-8	4.39e-6	<3.9e-8	<2.2e-8	<2.5e-8			<5.1e-8	<3.8e-8	µCi/g
7/28/2020	AF20996	014	<6.8e-8	3.89e-6	<1.5e-8	<1.6e-8	<1.5e-8	<1.5e-8	<3.1e-8	<2.7e-8	2.60e-6	<2.5e-8	<1.4e-8	<1.6e-8			<3.3e-8	<2.6e-8	µCi/g
8/25/2020	AF25492	014	<1.1e-7	3.01e-6	<2.1e-8	<2.3e-8	<2.2e-8	<2.3e-8	<4.7e-8	<3.7e-8	5.63e-6	<2.9e-8	<2.2e-8	<2.4e-8			<5.1e-8	<3.7e-8	µCi/g
9/29/2020	AF29116	014	<8.5e-8	1.96e-6	<2.1e-8	<2.3e-8	<2.2e-8	<2.2e-8	<4.3e-8	<2.5e-8	3.30e-6	<2.7e-8	<2.0e-8	<2.1e-8			<4.9e-8	<3.4e-8	µCi/g
9/29/2020	AF29117	090	<1.5e-7	5.65e-6	<3.8e-8	<4.0e-8	<3.9e-8	<4.1e-8	<7.1e-8	<5.2e-8	3.65e-6	<4.8e-8	<3.8e-8	<3.9e-8			<8.2e-8	<6.3e-8	µCi/g
11/24/2020	AF35743	014	<6.4e-8	8.4e-7	<1.5e-8	<1.5e-8	<1.4e-8	<1.4e-8	<3.1e-8	<2.3e-8	3.56e-6	<1.9e-8	<1.4e-8	<1.4e-8			<3.2e-8	<2.3e-8	µCi/g
12/29/2020	AF38244	014	<1.3e-7	4.15e-6	<2.5e-8	<2.8e-8	<2.7e-8	<2.7e-8	<5.3e-8	<4.6e-8	2.67e-6	<4.2e-8	<2.5e-8	<2.6e-8	1.07e-7	4.4e-8	<5.6e-8	<4.2e-8	µCi/g
12/29/2020	AF38245	090	<1.4e-7	4.99e-6	<2.7e-8	<2.9e-8	<2.8e-8	<2.7e-8	<5.7e-8	<4.9e-8	1.98e-6	<4.6e-8	<2.6e-8	<2.8e-8			<6.4e-8	<4.7e-8	µCi/g

## Comanche Peak Nuclear Power Plant Environmental Sample Results

Date	Lab	Station	Ba-140	Co-58	Co-60	Cs-134	Cs-137	Fe-59	I-131	K-40	La-140	Mn-54	Nb-95	Pb-212	Tl-208	Zn-65	Zr-95	Gross	Units
<b>Water-Surface Samples</b>																			
1/28/2020	AE95828	086	<5.9e-9	<1.5e-9	<1.6e-9	<1.6e-9	<1.7e-9	<3.2e-9	<1.9e-9		<2.3e-9	<1.6e-9	<1.6e-9			<3.5e-9	<2.6e-9	6.3e-9	μCi/mL
1/28/2020	AE95829	085	<7.0e-9	<1.7e-9	<1.8e-9	<1.9e-9	<2.1e-9	<3.0e-9	<2.6e-9		<2.3e-9	<1.9e-9	<1.8e-9			<3.5e-9	<3.1e-9	1.16e-8	μCi/mL
2/25/2020	AE99875	085	<7.7e-9	<1.9e-9	<2.1e-9	<2.0e-9	<2.2e-9	<3.6e-9	<2.8e-9		<2.3e-9	<2.0e-9	<2.1e-9			<4.0e-9	<3.5e-9	1.46e-8	μCi/mL
2/25/2020	AE99876	086	<8.1e-9	<2.1e-9	<2.1e-9	<2.2e-9	<2.3e-9	<4.1e-9	<2.8e-9		<2.7e-9	<2.0e-9	<2.1e-9			<4.3e-9	<3.4e-9	5.1e-9	μCi/mL
3/31/2020	AF05151	085	<7.1e-9	<1.8e-9	<1.8e-9	<1.9e-9	<2.1e-9	<3.2e-9	<2.6e-9		<2.3e-9	<1.9e-9	<1.9e-9			<3.8e-9	<3.2e-9	1.02e-8	μCi/mL
3/31/2020	AF05152	086	<8.4e-9	<2.1e-9	<2.0e-9	<2.2e-9	<2.3e-9	<4.0e-9	<2.8e-9		<2.7e-9	<2.1e-9	<2.3e-9			<4.1e-9	<3.8e-9	8.7e-9	μCi/mL
4/28/2020	AF08587	086	<6.0e-9	<1.7e-9	<1.8e-9	<1.7e-9	<1.7e-9	<3.2e-9	<1.9e-9		<2.3e-9	<1.6e-9	<1.7e-9			<3.3e-9	<2.7e-9	7.8e-9	μCi/mL
4/28/2020	AF08588	085	<8.6e-9	<1.9e-9	<2.2e-9	<2.2e-9	<2.3e-9	<4.2e-9	<2.7e-9		<2.7e-9	<2.1e-9	<2.2e-9			<4.2e-9	<3.7e-9	1.50e-8	μCi/mL
5/26/2020	AF12760	085	<6.8e-9	<1.7e-9	<1.9e-9	<2.0e-9	<2.1e-9	<3.4e-9	<2.6e-9		<2.2e-9	<1.8e-9	<1.8e-9			<3.7e-9	<3.2e-9	1.30e-8	μCi/mL
5/26/2020	AF12761	086	<5.9e-9	<1.5e-9	<1.7e-9	<1.6e-9	<1.8e-9	<3.3e-9	<1.9e-9		<2.4e-9	<1.7e-9	<1.6e-9			<3.4e-9	<2.7e-9	6.7e-9	μCi/mL
6/30/2020	AF17700	085	<6.1e-9	<1.6e-9	<1.8e-9	<1.6e-9	<1.8e-9	<3.1e-9	<1.9e-9		<2.3e-9	<1.6e-9	<1.6e-9			<3.3e-9	<2.9e-9	1.39e-8	μCi/mL
6/30/2020	AF17701	086	<7.9e-9	<2.0e-9	<2.0e-9	<2.2e-9	<2.3e-9	<4.0e-9	<2.7e-9		<2.8e-9	<2.0e-9	<2.1e-9			<4.5e-9	<3.6e-9	6.4e-9	μCi/mL
7/7/2020	AF18465	088	<3.1e-7	<6.9e-8	<7.5e-8	<6.8e-8	<1.1e-7	<1.3e-7	<8.4e-8	8.1e-6	<9.2e-8	<7.0e-8	<8.9e-8	5.1e-7	2.21e-7	<1.8e-7	<1.4e-7		μCi/mL
7/28/2020	AF20994	086	<5.8e-9	<1.5e-9	<1.7e-9	<1.6e-9	<1.7e-9	<3.3e-9	<1.9e-9		<2.3e-9	<1.6e-9	<1.6e-9			<3.3e-9	<2.7e-9	5.7e-9	μCi/mL
7/28/2020	AF20995	085	<8.4e-9	<2.2e-9	<2.2e-9	<2.2e-9	<2.3e-9	<3.8e-9	<2.7e-9		<2.7e-9	<2.0e-9	<2.1e-9			<4.3e-9	<3.6e-9	1.42e-8	μCi/mL
8/25/2020	AF25490	086	<6.2e-9	<1.6e-9	<1.8e-9	<1.6e-9	<1.7e-9	<3.2e-9	<2.1e-9		<2.4e-9	<1.6e-9	<1.6e-9			<3.4e-9	<2.6e-9	8.0e-9	μCi/mL
8/25/2020	AF25491	085	<8.8e-9	<2.1e-9	<2.2e-9	<2.2e-9	<2.3e-9	<4.3e-9	<2.9e-9		<2.8e-9	<2.0e-9	<2.2e-9			<4.3e-9	<3.7e-9	1.28e-8	μCi/mL
9/29/2020	AF29114	085	<8.1e-9	<2.1e-9	<2.1e-9	<2.2e-9	<2.4e-9	<4.2e-9	<2.8e-9		<2.6e-9	<2.1e-9	<2.1e-9			<4.2e-9	<3.6e-9	1.57e-8	μCi/mL
9/29/2020	AF29115	086	<6.5e-9	<1.6e-9	<1.7e-9	<1.7e-9	<1.6e-9	<3.2e-9	<2.0e-9		<2.4e-9	<1.6e-9	<1.6e-9			<3.2e-9	<2.7e-9	8.4e-9	μCi/mL
10/27/2020	AF32262	085	<8.1e-9	<2.0e-9	<2.0e-9	<2.0e-9	<2.3e-9	<4.0e-9	<2.8e-9		<2.7e-9	<2.0e-9	<2.2e-9			<4.7e-9	<3.5e-9	1.62e-8	μCi/mL
10/27/2020	AF32263	086	<6.3e-9	<1.6e-9	<1.8e-9	<1.6e-9	<1.8e-9	<3.1e-9	<1.9e-9		<2.3e-9	<1.6e-9	<1.6e-9			<3.6e-9	<2.6e-9	8.3e-9	μCi/mL
11/24/2020	AF35741	085	<7.9e-9	<1.6e-9	<1.7e-9	<1.6e-9	<1.7e-9	<3.4e-9	<2.8e-9		<2.7e-9	<1.6e-9	<1.8e-9			<3.3e-9	<2.8e-9	1.61e-8	μCi/mL
11/24/2020	AF35742	086	<9.0e-9	<1.9e-9	<1.7e-9	<2.1e-9	<2.1e-9	<3.8e-9	<3.6e-9	1.13e-7	<2.7e-9	<1.8e-9	<2.1e-9			<4.0e-9	<3.4e-9	1.04e-8	μCi/mL
12/29/2020	AF38242	085	<6.4e-9	<1.7e-9	<1.8e-9	<1.7e-9	<1.7e-9	<3.1e-9	<2.0e-9		<2.3e-9	<1.8e-9	<1.7e-9			<3.5e-9	<2.7e-9	1.78e-8	μCi/mL
12/29/2020	AF38243	086	<7.8e-9	<1.9e-9	<2.2e-9	<2.0e-9	<2.2e-9	<4.1e-9	<2.4e-9		<2.8e-9	<2.0e-9	<2.1e-9			<4.4e-9	<3.4e-9	7.4e-9	μCi/mL

Date	Lab	Station	H-3	Units
<b>Water Composite</b>				
2/4/2020	AE93561	086	<1.0e-6	μCi/mL
7/14/2020	AF19015	085	1.330e-5	μCi/mL
7/14/2020	AF19016	086	<1.0e-6	μCi/mL
	AF10130	085	1.170e-5	μCi/mL
	AF10131	086	<1.0e-6	μCi/mL
10/6/2020	AF29379	085	1.330e-5	μCi/mL
10/6/2020	AF29380	086	<1.0e-6	μCi/mL

NOTE: \* Indicates the analysis was by alpha spectrometry, or Ra-226, analysis by radon emanation.

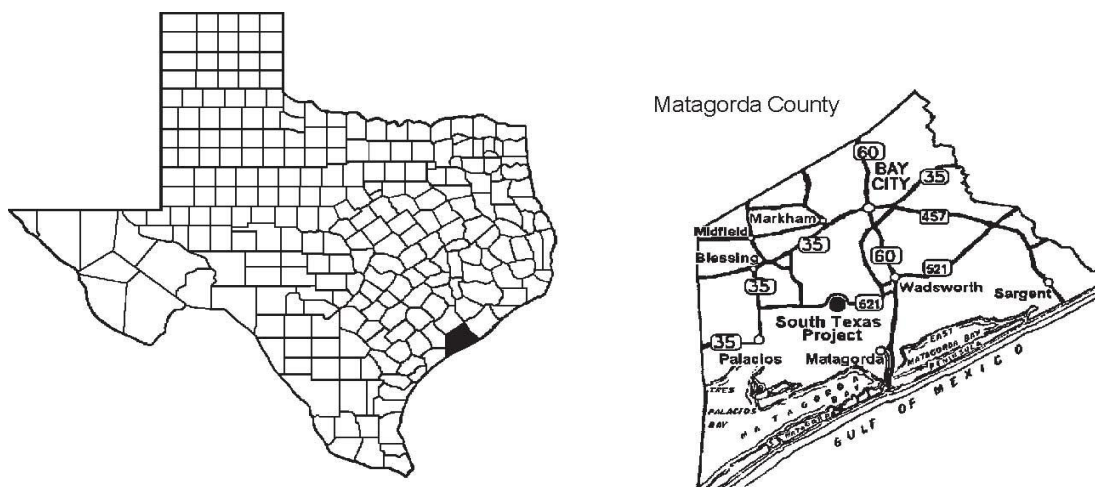
\*\*Indicates the tritium (H-3) analysis for food product, sediment, and vegetation is reported in μCi/mL

## South Texas Project

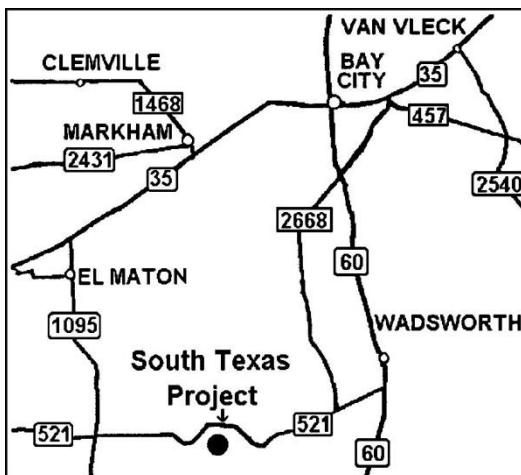
Radiation Branch Site No. 012

The South Texas Project (STP) is a commercial nuclear power plant operated by STP Nuclear Operating Company and is located 89 miles southwest of Houston and 14 miles south-southwest of Bay City. Two 1250 megawatt (electric) Westinghouse pressurized water nuclear reactors are in operation at the site. Unit 1 became operational in August of 1988 and Unit 2 in June of 1989.

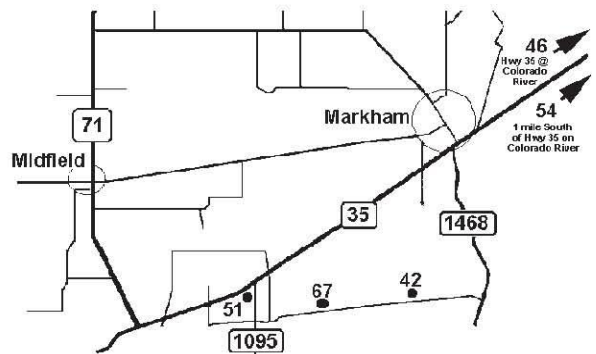
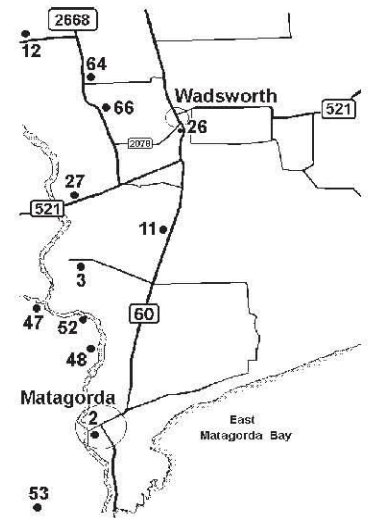
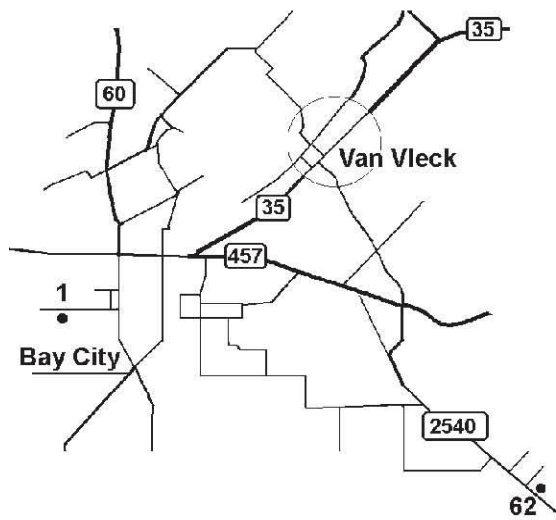
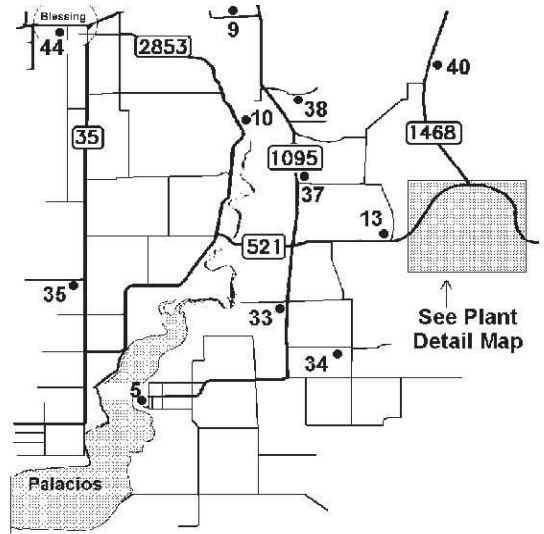
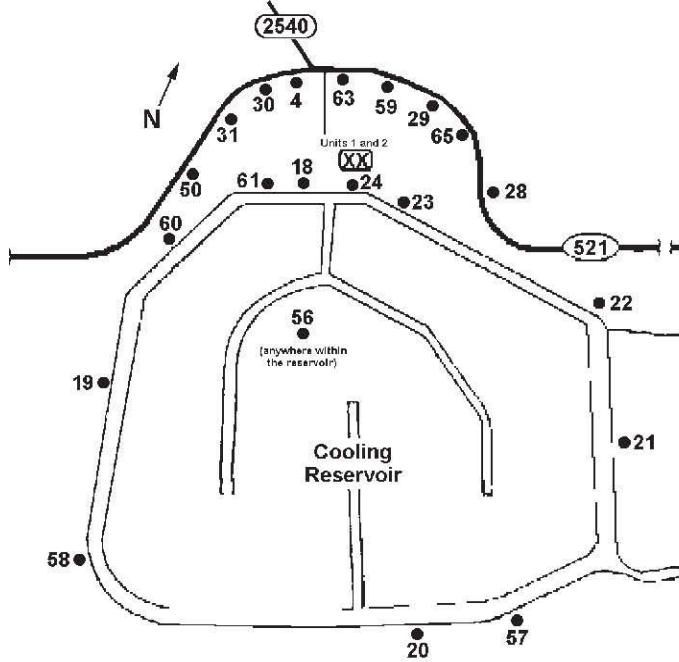
STP Nuclear Operating Company is owned by NRG Energy, Austin Energy, and City Public Service of San Antonio. STP Nuclear Operating Company manages and operates the plant for its owners, who share its energy in proportion to their ownership interest. The Radiation Branch Surveillance Program consists of OSL monitoring and sampling air, fish, food products, sediment, vegetation, and water.



Shaded area indicates location of Matagorda County



# South Texas Project Monitoring Station Locations



Note: Sample type not indicated on maps.

## South Texas Project Environmental Sample Results

### Optically Stimulated Luminescent Dosimeter (OSL) Monitoring Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	33	31	24	29	117	
2	33	30	24	28	115	
3	32	28	24	26	110	
4	36	32	24	29	121	
5	33	30	22	28	113	
9	37	30	23	28	118	
10	37	31	24	28	120	
11	33	30	23	28	114	
12	37	29	25	29	120	
13	36	32	23	29	120	
18	31	30	25	26	112	
19	35	28	23	0	86	QTR 4 OSL Missing
20	33	30	25	28	116	
21	32	30	23	28	113	
22	33	30	25	29	117	
23	31	28	22	26	107	
24	34	31	22	29	116	
26	31	30	23	25	109	
27	34	31	25	29	119	
28	35	33	25	28	121	
29	38	32	24	31	125	
30	36	31	24	30	121	
31	41	32	27	30	130	
33	35	29	23	30	117	
34	35	31	23	30	119	
35	35	31	25	29	120	
37	37	32	24	29	122	
38	32	30	24	26	112	
40	34	30	23	27	114	
42	39	36	0	33	108	QTR 3 OSL Missing
44	30	30	22	25	107	
50	39	35	25	32	131	
51	36	31	24	30	121	
57	33	30	22	26	111	
58	32	30	23	28	113	
59	35	32	25	31	123	
60	34	29	24	29	116	
61	33	29	23	27	112	
62	41	33	27	31	132	
63	35	32	23	31	121	
64	33	30	25	29	117	
65	36	32	24	29	121	
66	36	32	23	29	120	
67	35	32	26	30	123	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.





## South Texas Project Environmental Sample Results

Date	Lab	Station	Gross	Units
<b>Air Particulates Samples</b>				
1/7/2020	AE92990	030	2.58e-14	µCi/mL
1/7/2020	AE92988	035	2.43e-14	µCi/mL
1/14/2020	AE94164	030	1.94e-14	µCi/mL
1/14/2020	AE94162	035	2.07e-14	µCi/mL
1/21/2020	AE94801	030	1.57e-14	µCi/mL
1/21/2020	AE94799	035	1.75e-14	µCi/mL
1/29/2020	AE96138	030	2.16e-14	µCi/mL
1/29/2020	AE96136	035	2.18e-14	µCi/mL
2/4/2020	AE96937	030	2.60e-14	µCi/mL
2/4/2020	AE96935	035	2.82e-14	µCi/mL
2/11/2020	AE97980	030	2.09e-14	µCi/mL
2/11/2020	AE97978	035	2.15e-14	µCi/mL
2/18/2020	AE99119	030	1.56e-14	µCi/mL
2/18/2020	AE99117	035	1.54e-14	µCi/mL
2/25/2020	AE99868	030	2.01e-14	µCi/mL
2/25/2020	AE99866	035	1.95e-14	µCi/mL
3/3/2020	AF00983	030	2.01e-14	µCi/mL
3/3/2020	AF00981	035	1.96e-14	µCi/mL
3/10/2020	AF02382	030	1.72e-14	µCi/mL
3/10/2020	AF02380	035	1.75e-14	µCi/mL
3/17/2020	AF03396	030	1.55e-14	µCi/mL
3/17/2020	AF03394	035	1.42e-14	µCi/mL
3/23/2020	AF04163	030	1.41e-14	µCi/mL
3/23/2020	AF04161	035	1.54e-14	µCi/mL
3/31/2020	AF05567	030	1.74e-14	µCi/mL
3/31/2020	AF05565	035	1.73e-14	µCi/mL
4/7/2020	AF06204	030	1.94e-14	µCi/mL
4/7/2020	AF06202	035	1.81e-14	µCi/mL
4/14/2020	AF06934	030	2.30e-14	µCi/mL
4/14/2020	AF06932	035	2.27e-14	µCi/mL
4/21/2020	AF07524	030	2.75e-14	µCi/mL
4/21/2020	AF07522	035	2.67e-14	µCi/mL
4/28/2020	AF08546	030	2.40e-14	µCi/mL
4/28/2020	AF08544	035	2.34e-14	µCi/mL
5/5/2020	AF10140	030	1.93e-14	µCi/mL
5/5/2020	AF10138	035	1.84e-14	µCi/mL
5/12/2020	AF10776	030	2.12e-14	µCi/mL
5/12/2020	AF10774	035	2.14e-14	µCi/mL
5/19/2020	AF11957	030	1.91e-14	µCi/mL
5/19/2020	AF11955	035	1.83e-14	µCi/mL
5/26/2020	AF12702	030	2.20e-14	µCi/mL
5/26/2020	AF12700	035	1.99e-14	µCi/mL
6/2/2020	AF13737	030	2.08e-14	µCi/mL
6/2/2020	AF13735	035	2.11e-14	µCi/mL
6/9/2020	AF14691	030	2.10e-14	µCi/mL
6/9/2020	AF14689	035	2.02e-14	µCi/mL
6/16/2020	AF16417	030	2.18e-14	µCi/mL
6/16/2020	AF16415	035	2.17e-14	µCi/mL
6/23/2020	AF16943	030	1.98e-14	µCi/mL
6/23/2020	AF16941	035	1.87e-14	µCi/mL
6/30/2020	AF17922	030	2.07e-14	µCi/mL
6/30/2020	AF17920	035	1.92e-14	µCi/mL

Date	Lab	Station	Gross	Units
<b>Air Particulates Samples</b>				
7/7/2020	AF18459	030	2.35e-14	µCi/mL
7/7/2020	AF18457	035	2.48e-14	µCi/mL
7/14/2020	AF19518	030	2.49e-14	µCi/mL
7/14/2020	AF19516	035	2.38e-14	µCi/mL
7/21/2020	AF20134	030	2.17e-14	µCi/mL
7/21/2020	AF20132	035	2.20e-14	µCi/mL
7/27/2020	AF20774	030	1.11e-14	µCi/mL
7/27/2020	AF20772	035	1.20e-14	µCi/mL
8/4/2020	AF21919	030	1.46e-14	µCi/mL
8/4/2020	AF21917	035	1.44e-14	µCi/mL
8/11/2020	AF22990	030	2.54e-14	µCi/mL
8/11/2020	AF22988	035	2.42e-14	µCi/mL
8/18/2020	AF24703	030	1.74e-14	µCi/mL
8/18/2020	AF24701	035	1.80e-14	µCi/mL
8/25/2020	AF25249	030	3.05e-14	µCi/mL
8/25/2020	AF25247	035	2.94e-14	µCi/mL
9/1/2020	AF26113	030	1.51e-14	µCi/mL
9/1/2020	AF26111	035	1.62e-14	µCi/mL
9/8/2020	AF26718	030	2.61e-14	µCi/mL
9/8/2020	AF26716	035	2.57e-14	µCi/mL
9/15/2020	AF27479	030	2.18e-14	µCi/mL
9/15/2020	AF27477	035	2.09e-14	µCi/mL
9/22/2020	AF28314	030	2.83e-14	µCi/mL
9/22/2020	AF28312	035	2.91e-14	µCi/mL
9/29/2020	AF28926	030	1.67e-14	µCi/mL
9/29/2020	AF28924	035	1.59e-14	µCi/mL
10/6/2020	AF29725	030	2.76e-14	µCi/mL
10/6/2020	AF29723	035	3.09e-14	µCi/mL
10/13/2020	AF30450	030	2.68e-14	µCi/mL
10/13/2020	AF30448	035	2.59e-14	µCi/mL
10/20/2020	AF31369	030	3.32e-14	µCi/mL
10/20/2020	AF31367	035	3.37e-14	µCi/mL
10/27/2020	AF32506	030	1.87e-14	µCi/mL
10/27/2020	AF32504	035	1.89e-14	µCi/mL
11/2/2020	AF32887	030	3.17e-14	µCi/mL
11/2/2020	AF32885	035	3.27e-14	µCi/mL
11/10/2020	AF34259	030	1.80e-14	µCi/mL
11/10/2020	AF34257	035	1.94e-14	µCi/mL
11/17/2020	AF35163	030	1.69e-14	µCi/mL
11/17/2020	AF35161	035	1.71e-14	µCi/mL
11/24/2020	AF35749	030	1.76e-14	µCi/mL
11/24/2020	AF35747	035	1.72e-14	µCi/mL
12/1/2020	AF36330	030	1.72e-14	µCi/mL
12/1/2020	AF36328	035	1.84e-14	µCi/mL
12/8/2020	AF36935	030	3.08e-14	µCi/mL
12/8/2020	AF36933	035	3.00e-14	µCi/mL
12/15/2020	AF37896	030	9.29e-13	µCi/mL
12/15/2020	AF37894	035	2.77e-14	µCi/mL
12/21/2020	AF38189	030	3.09e-14	µCi/mL
12/21/2020	AF38187	035	3.41e-14	µCi/mL
12/29/2020	AF38273	030	2.37e-14	µCi/mL
12/29/2020	AF38271	035	2.43e-14	µCi/mL

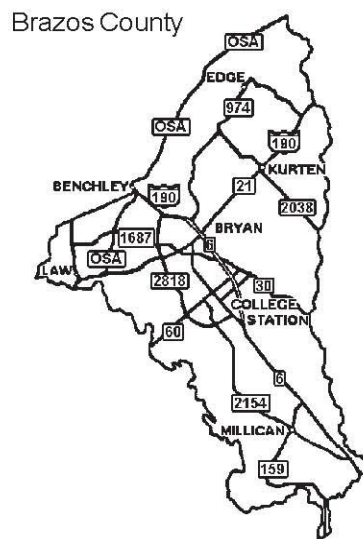
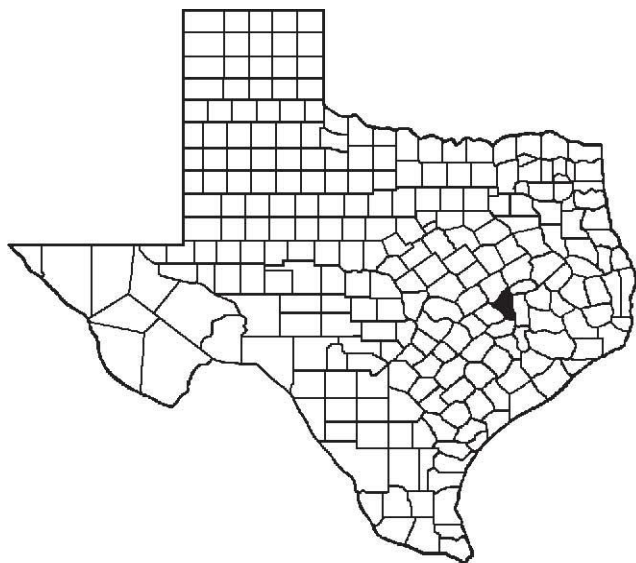


# Research Reactors

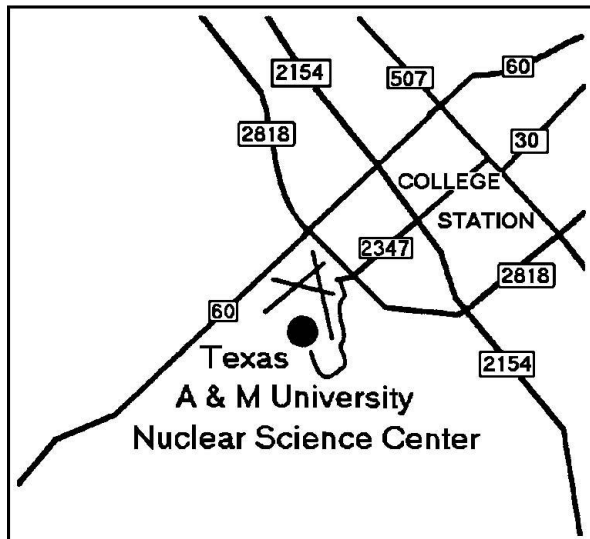
# Texas A & M University Nuclear Science Center

## Radiation Branch Site No. 001

Texas A&M Nuclear Science Center (NSC) is located seven miles south of downtown Bryan just south of Easterwood Airport. NSC houses a one-megawatt TRIGA (Testing, Research, Isotope Production, General Atomics) research reactor that came online in 1961. The Radiation Branch Surveillance Program consists of OSL monitoring.



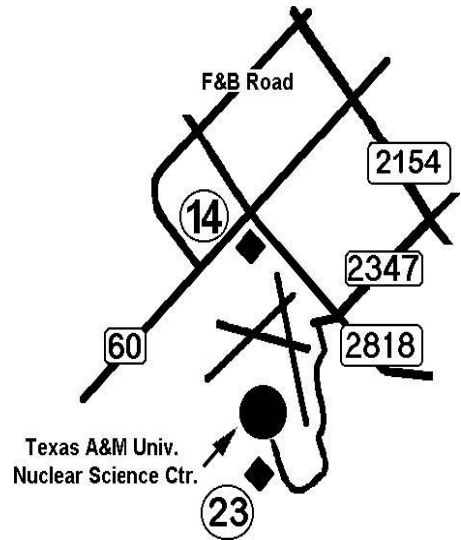
Shaded area indicates location of Brazos County



## Texas A & M University Nuclear Science Center Monitoring Station Locations



Homeland Security -Diagram Removed



### Texas A & M Nuclear Science Center Optically Stimulated Luminescent Dosimeter (OSL) Monitoring Results<sup>1</sup> (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
2	35	31	24	33	123	
3	34	33	25	30	122	
4	38	37	27	34	136	
5	33	29	24	29	115	
10	35	30	24	31	120	
11	33	30	26	30	119	
*14	35	31	0	27	93	QTR 3 OSL Missing
18	32	30	24	31	117	
19	32	28	22	22	104	
*23	34	29	23	31	117	
24	34	31	25	31	121	

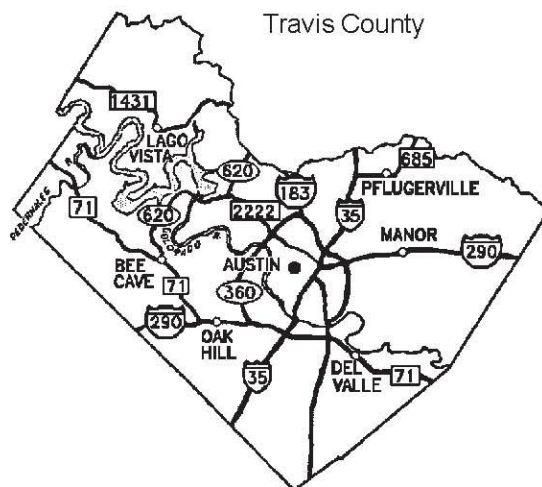
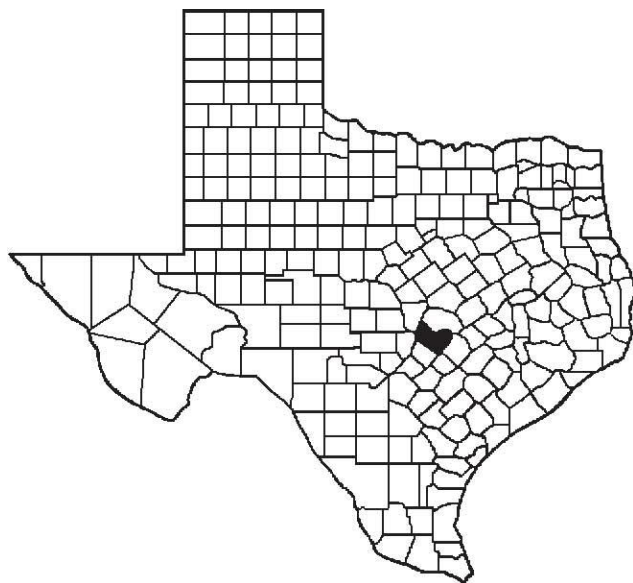
NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

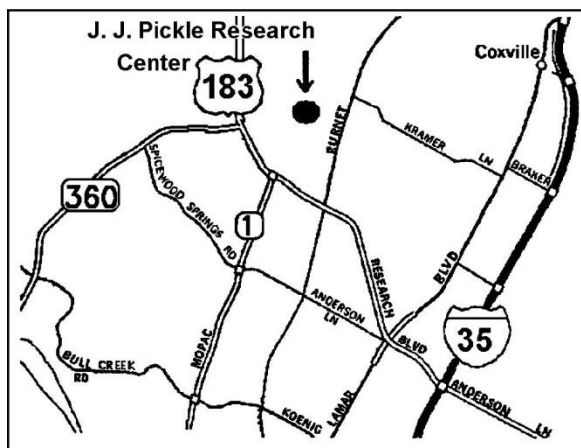
# University of Texas Nuclear Engineering Teaching Laboratory

Radiation Branch Site No. 003

University of Texas Nuclear Engineering Teaching Laboratory (NETL) is located at the J. J. Pickle Research Center, approximately five miles north of the Texas Department of State Health Services main campus. NETL houses an above-ground, fixed-core 1.1 megawatt TRIGA (Testing, Research, Isotope Production, General Atomics) research reactor that came online in 1992. The Radiation Branch Surveillance Program consists of sampling sewage and water and OSL monitoring.



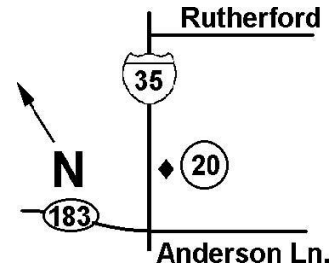
Shaded area indicates location of Travis County



## University of Texas Nuclear Engineering Teaching Laboratory Monitoring Station Locations

◆ TLD Station    ♥ Sample Station    ♣ TLD & Sample Station

Homeland Security -Diagram Removed



## University of Texas Nuclear Engineering Teaching Laboratory

### Optically Stimulated Luminescent Dosimeter (OSL) Monitoring Results<sup>1</sup> (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	26	26	23	26	101	
2	32	28	0	0	60	QTRs 3 and 4 OSLs missing
3	30	27	23	27	107	
4	37	31	25	30	123	
5	35	30	23	27	115	
*20	0	26	22	28	76	QTR 1 OSL missing

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

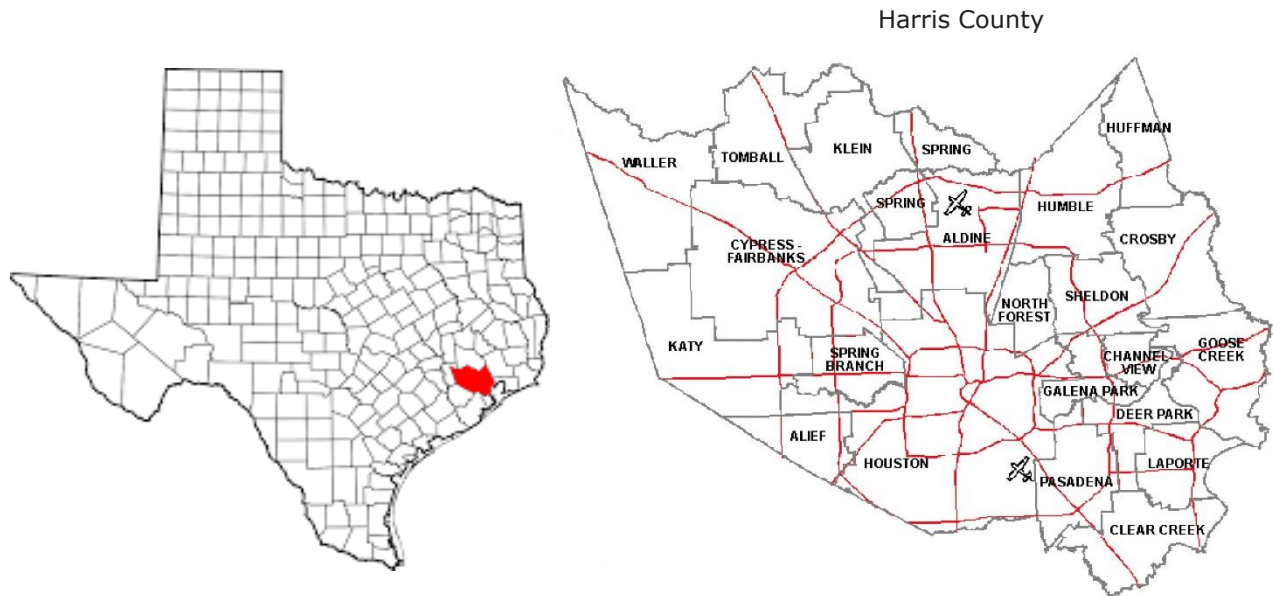
## **Other Facilities**



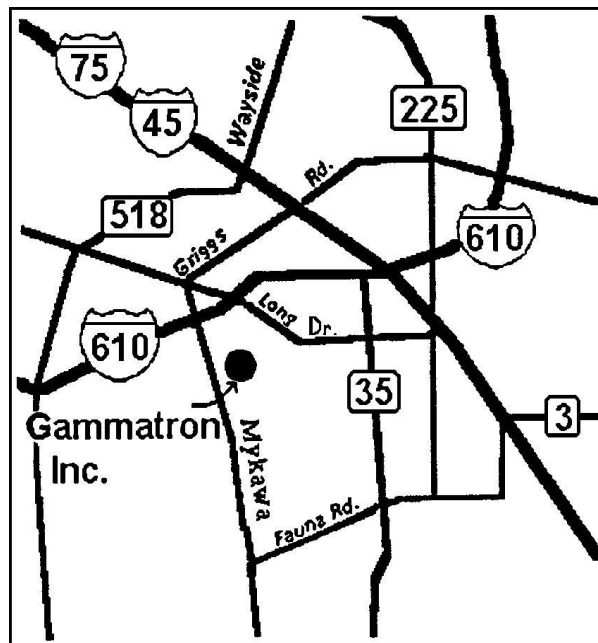
# Gammatron, Inc.

## Radiation Branch Site No. 018

Gammatron, Inc. is a manufacturer of sealed radioactive sources. The facility is located in an industrial area of Houston approximately four miles northwest of William P. Hobby Airport. The Radiation Branch Surveillance Program consists OSL monitoring.



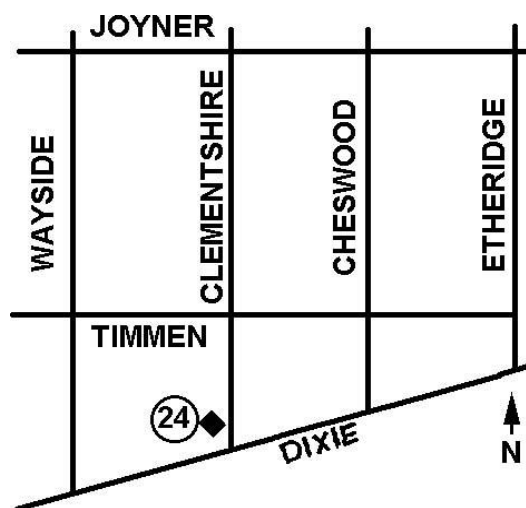
Shaded area indicates location of Harris County



## Gammatron, Inc. Monitoring Station Locations

◆ TLD Station   
 ♥ Sample Station   
 ♣ TLD & Sample Station

Homeland Security -Diagram Removed



## Gammatron, Inc.

### Optically Stimulated Luminescence (OSL) Monitoring Results (quarterly and annual readings are in mrem)

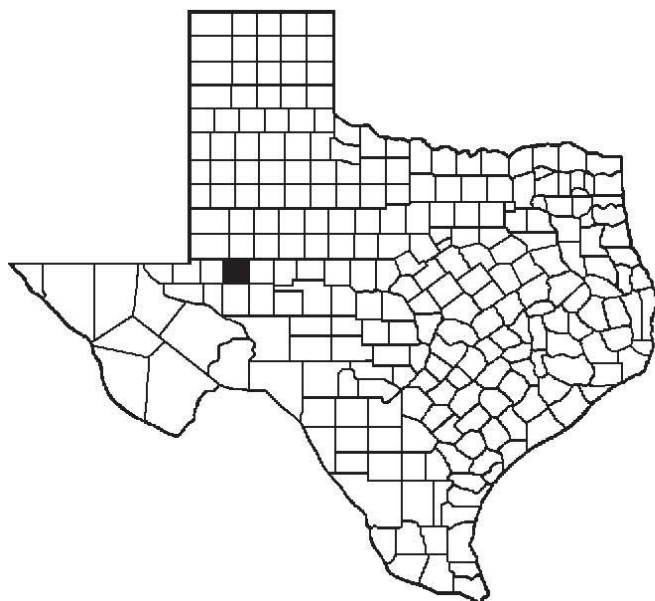
OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
3	148	45	82	116	391	
5	501	315	220	728	1764	
8	452	353	218	325	1348	
*24	0	28	21	27	76	QTR 1 OSL missing
30	69	44	65	109	287	
31	58	135	65	45	303	
34	212	126	149	216	703	
40	211	84	110	276	681	

NOTE: <sup>1</sup>Background is not subtracted from the data

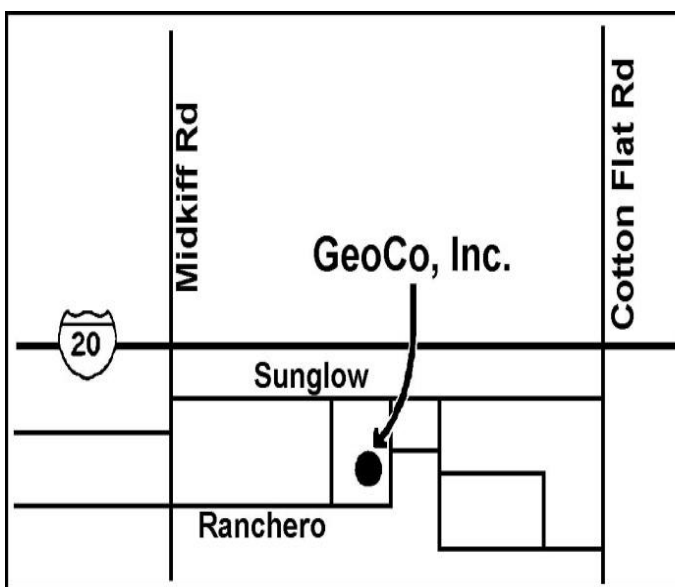
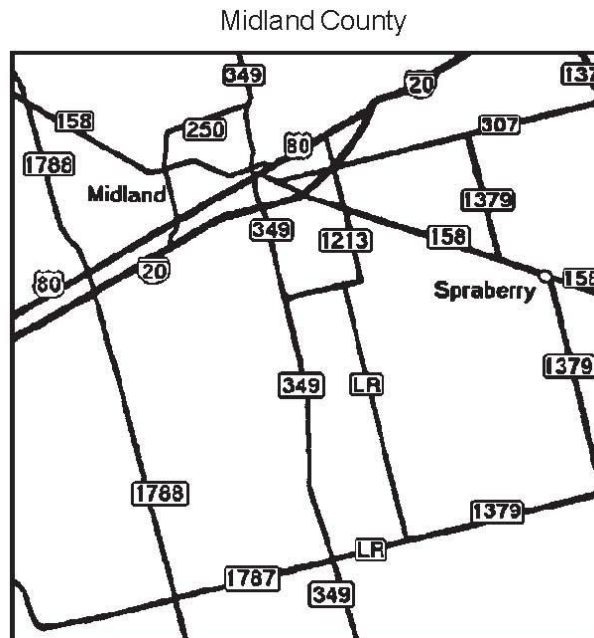
<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

**GeoCo, Inc.**  
Radiation Branch Site No. 051

GeoCo, Inc. is a tracer studies company specializing in oil and gas wells. The facility is located in Midland approximately six miles east of Midland-Odessa International Airport. The Radiation Branch Surveillance Program consists of OSL monitoring



Shaded area indicates location of Midland County



**GeoCo, Inc.**  
**Monitoring Station Locations**

◆ TLD Station    ♥ Sample Station    ♣ TLD & Sample Station

Homeland Security -Diagram Removed



**GeoCo, Inc.**

**Optically Stimulated Luminescence (OSL) Monitoring Results**  
 (quarterly and annual readings are in mrem)

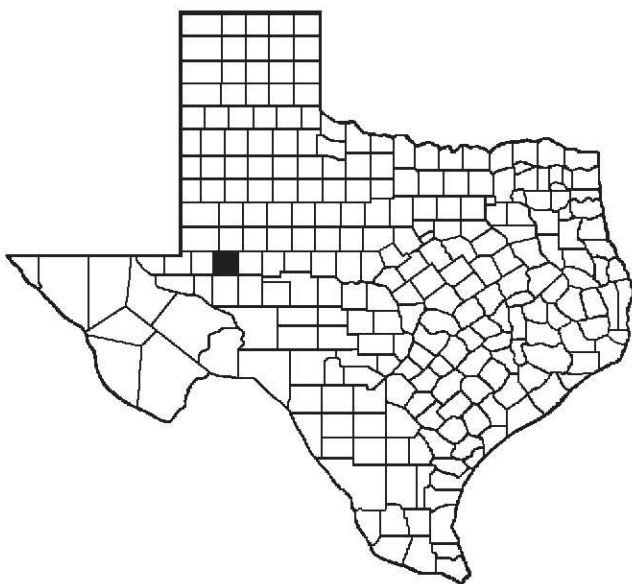
OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	46	34	26	33	139	
*8	43	31	28	30	132	

NOTE: <sup>1</sup>Background is not subtracted from the data

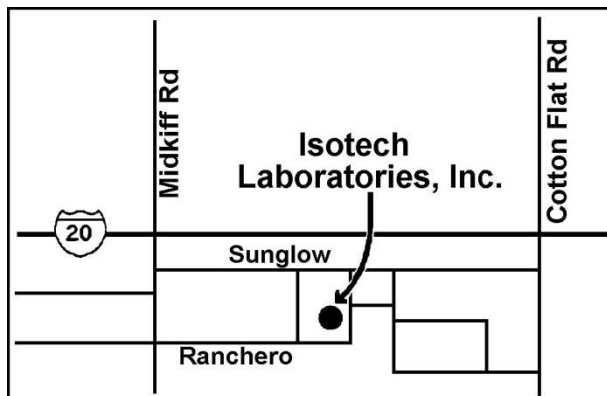
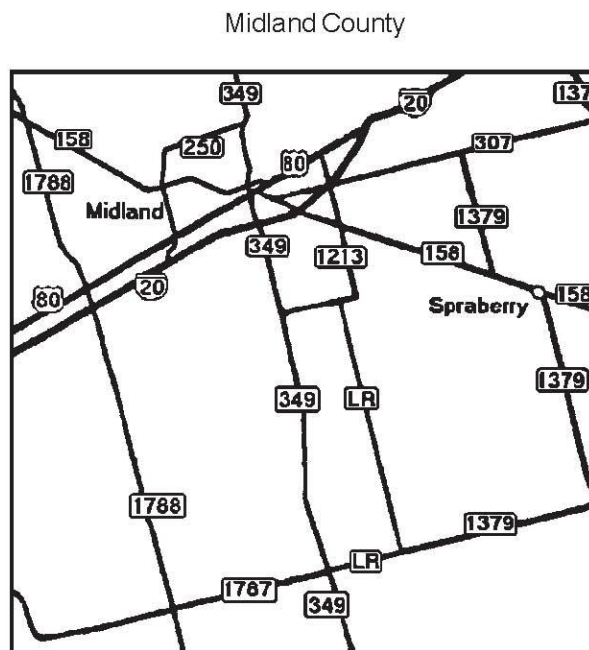
<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

**Isotech Laboratories, Inc.**  
Radiation Branch Site No. 008

Isotech Laboratories, Inc. manufactures tracer material for the oil and gas industry, calibrates radiation detection instruments, and provides radiation safety training for well-logging and tracer services. The facility is located in Midland approximately six miles east of Midland-Odessa International Airport. The Radiation Branch Surveillance Program consists of OSL monitoring.



Shaded area indicates location of Midland County



## Isotech Laboratories, Inc. Monitoring Station Locations

◆ TLD Station    ♥ Sample Station    ♣ TLD & Sample Station

Homeland Security -Diagram Removed




---

### Isotech Laboratories, Inc.

#### Optically Stimulated Luminescence (OSL) Monitoring Results (quarterly and annual readings are in mrem)

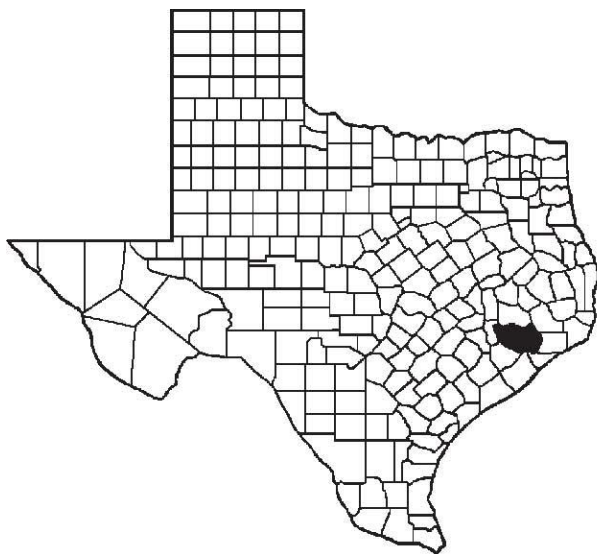
OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	44	32	27	34	137	
2	0	37	34	44	115	QTR 1 OSL missing
3	51	33	30	40	154	
4	60	38	33	40	171	
6	59	33	30	38	160	
*8	43	32	26	32	133	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

**Nuclear Sources and Services, Inc.**  
Radiation Branch Site No. 023

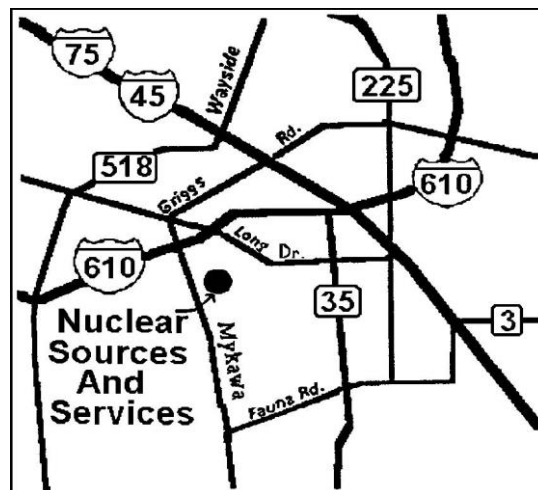
The Nuclear Sources and Services, Inc. (NSSI) facility occupies approximately five acres in a light industrial area of Southeast Houston approximately four miles northwest of William P. Hobby Airport. The primary activities of NSSI currently are waste treatment, storage, and disposal of radioactive and chemical hazardous materials. NSSI receives wastes from a variety of off-site generators both inside and outside of Texas. At the conclusion of treatment or storage, the residues are shipped to permitted off-site facilities for disposal. The Radiation Branch Surveillance Program consists of soil sampling and OSL monitoring.



Harris County

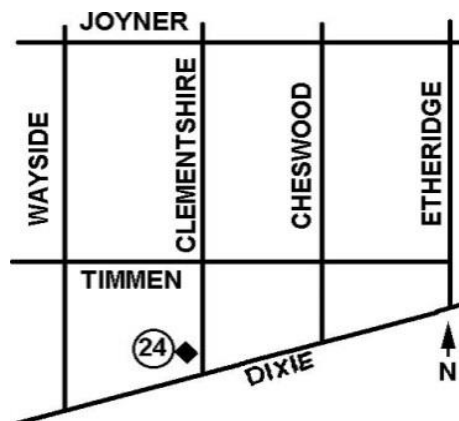


Shaded area indicated location of Harris County



## Nuclear Sources and Services, Inc. Monitoring Station Locations

Homeland Security -Diagram Removed




---

## Nuclear Sources and Services, Inc.

### Optically Stimulated Luminescence (OSL) Monitoring Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
3	316	446	1179	2216	4157	
4	68	38	32	50	188	
6	164	91	101	38	394	
7	114	42	124	1621	1901	
11	38	35	26	31	130	
12	237	42	81	146	506	
16	47	37	33	71	188	
18	87	34	32	44	197	
19	92	38	32	98	260	
20	92	37	30	40	199	
21	1402	390	702	646	3140	QTR 1 OSL over exposure
22	63	31	22	30	146	
23	36	32	25	30	123	
*24	50	28	21	27	126	
25	89	36	27	36	188	
41	86	54	88	144	372	

NOTE: <sup>1</sup>Background is not subtracted from the data

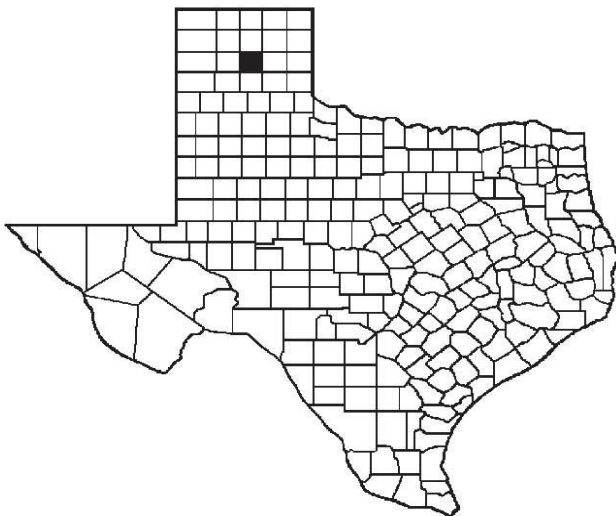
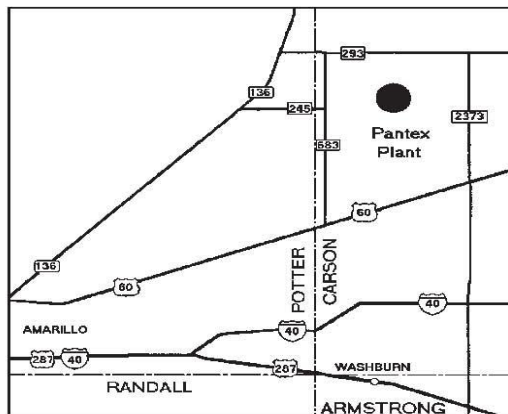
<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.



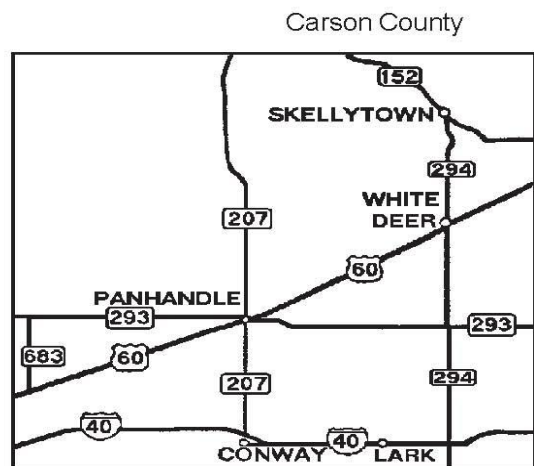
## Pantex Radiation Branch Site No. 005

The Pantex plant site is located in Carson County in the Texas Panhandle, north of U.S. Highway 60. The plant is located 17 miles (27 kilometers) northeast of downtown Amarillo. It is centered on a 18,000-acre site. The Pantex facility consists of 11,703 acres of United States Department of Energy (USDOE) owned land and 5,800 acres of land leased from Texas Tech University used as a safety and security buffer zone. The buffer area is managed by Texas Tech Research Farm and is used as rangeland and farmland. An additional 1,080 acres northwest of the plant is called Pantex Lake. Pantex Lake was formally used as the receiving area for treated wastewater discharges and is now managed by Texas Tech University. An additional 7,926 acres to the east of the plant is USDOE-owned and is used for agricultural purposes through a cooperative agreement.

The Radiation Branch Surveillance Program consists of OSL monitoring and sampling air, food products, sediment, soil, vegetation, and water. Analysis of samples is performed to determine the presence of any special nuclear material.

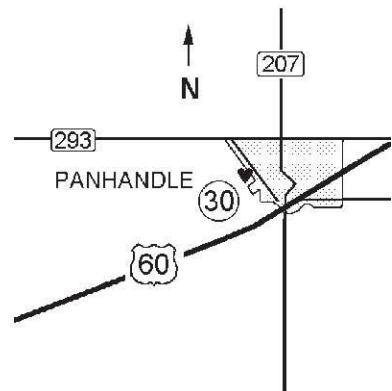
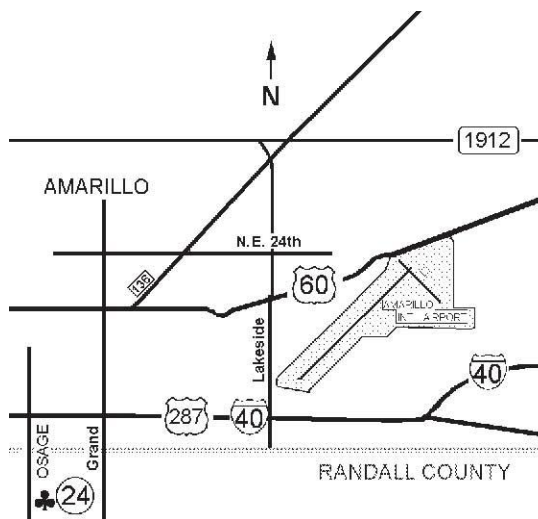
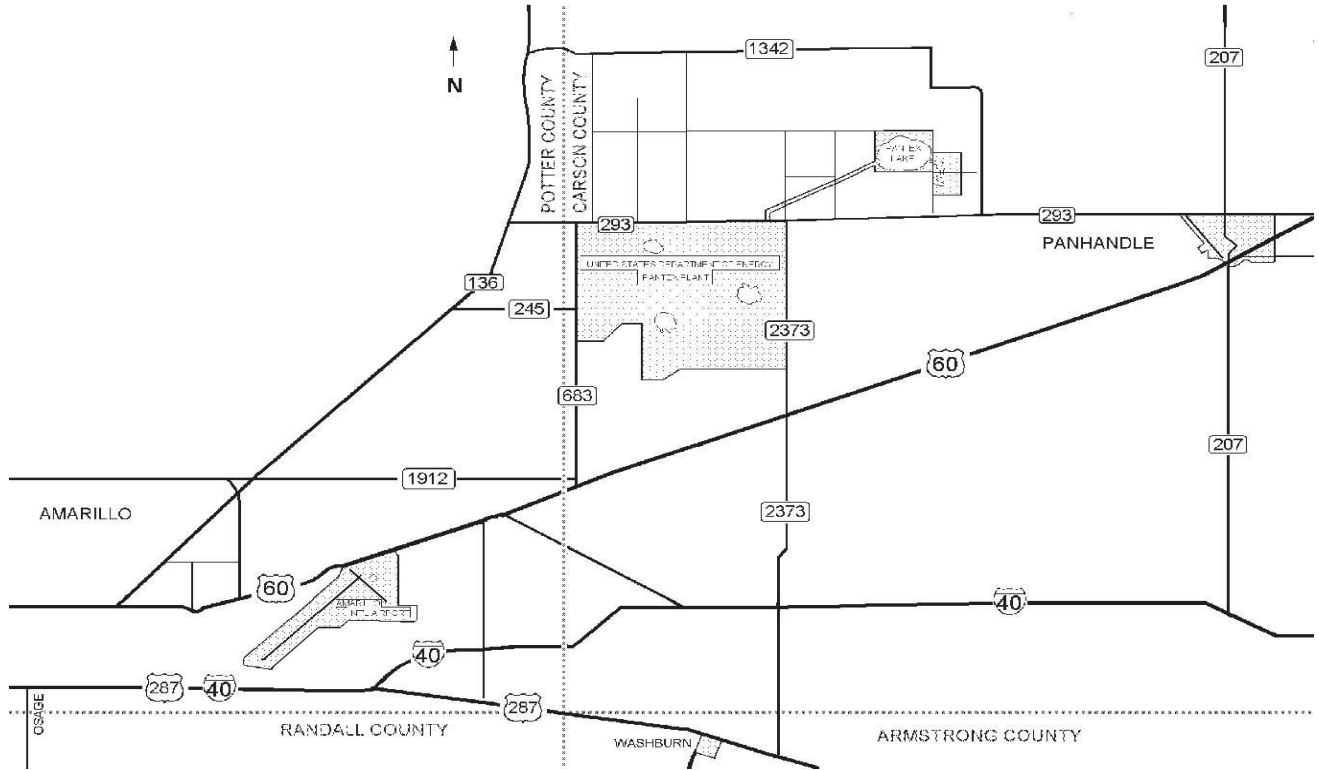


Shaded area indicates location of Carson County



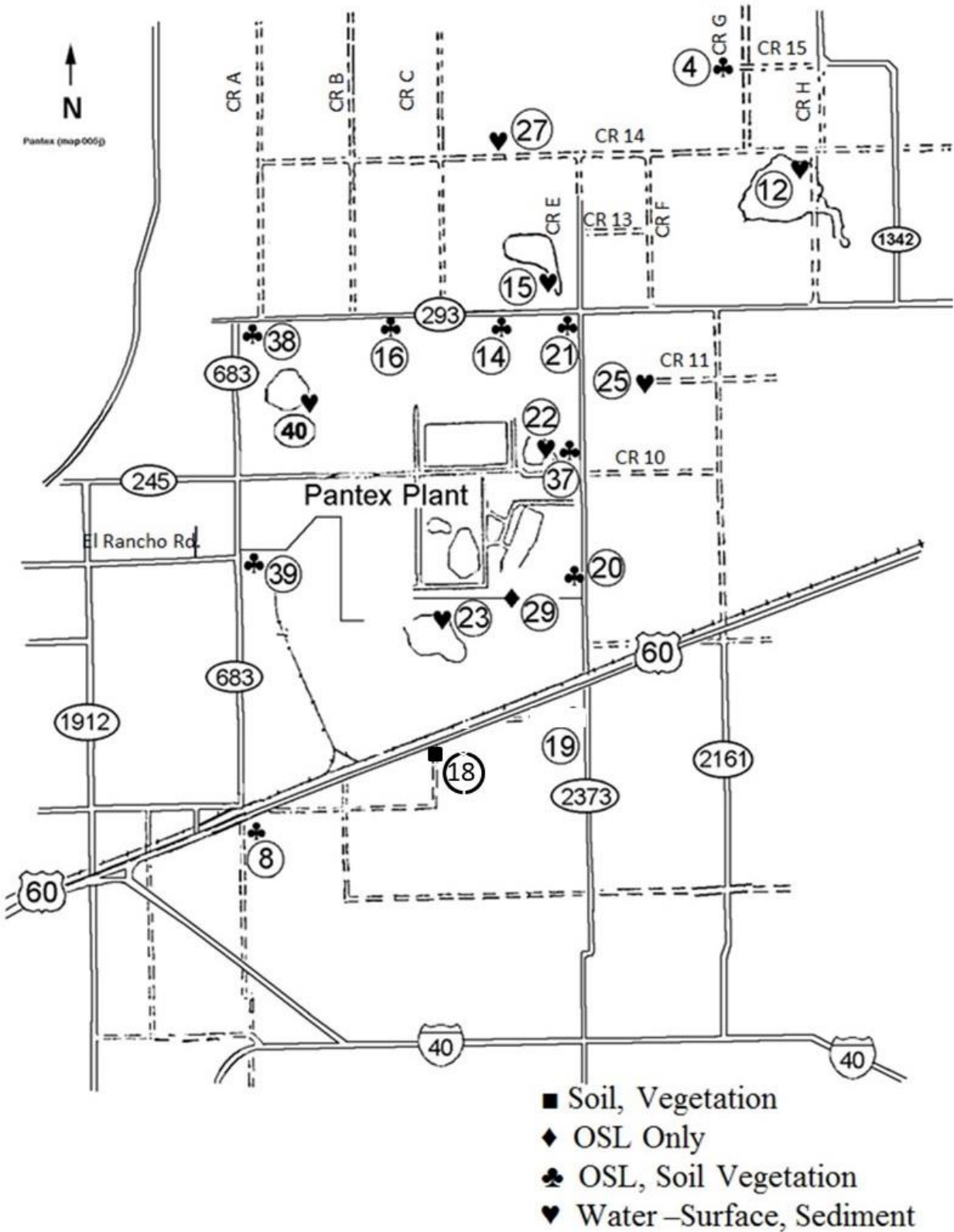
# Pantex Monitoring Station Locations

◆ TLD Station   
  ♥ Sample Station   
  ♣ TLD & Sample Station



# Pantex Monitoring Station Locations

Homeland Security -Diagram Removed



## Pantex Environmental Sample Results

### Optically Stimulated Luminescence (OSL) Monitoring Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
4	40	39	30	42	151	
8	45	38	30	39	152	
14	43	39	32	46	160	
16	42	42	30	43	157	
19	41	42	31	43	157	
20	43	42	31	43	159	
21	41	39	28	41	149	
*24	38	34	30	38	140	
29	70	0	30	41	141	QTR 2 OSL was not exchanged due to no access to plant/Covid-19
37	41	43	34	48	166	
38	41	38	30	42	151	
39	41	38	31	41	151	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

## Pantex Environmental Air Sample Results

Date	Lab	Station	Be-7	Gross Beta	Plutonium-239	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Air Particulate Samples</b>										
1/23/2020	AE9988	105	7.99e-	<3.6e-14	<5.2e-17	<1.1e-15	<5.2e-16	<5.2e-16	<5.2e-16	µCi/mL
1/31/2020	AE9988	105	6.75e-	<3.7e-14	<5.2e-17	<1.1e-15	<5.2e-16	<5.2e-16	<5.2e-16	µCi/mL

Date	Lab	Station	Be-7	K-40	Pb-212	Pb-214	Tl-208	Plutonium-239	H-3	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Food Product Samples</b>														
8/11/2020	AF23643	025	3.01e-6	2.76e-5	1.50e-7	2.45e-7	8.6e-8	<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30983	025	5.7e-7	1.75e-5				<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g

Date	Lab	Station	Cs-137	K-40	Pb-212	Pb-214	Tl-208	Plutonium-239	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Sediment Samples</b>													
1/15/2020	AE9385	022		1.65e-5	1.48e-6		3.77e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/12/2020	AF23649	015		1.54e-5	9.2e-7	7.9e-7	3.97e-7	<4.0e-7	2.2e-6	1.12e-6	<1.0e-6	1.07e-6	µCi/g
8/12/2020	AF23650	040		1.70e-5	9.2e-7	8.6e-7	4.63e-7	<4.0e-7	2.1e-6	<1.0e-6	<1.0e-6	1.15e-6	µCi/g
10/14/2020	AF30976	022	1.11e-7	1.60e-5	8.9e-7	8.34e-7	4.09e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g

Date	Lab	Station	Cs-137	K-40	Pb-212	Pb-214	Tl-208	Plutonium-239	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Soil Samples</b>													
1/15/2020	AE9384	014		1.79e-5	1.08e-6		4.91e-7	<4.0e-7	2.30e-6	1.09e-6	<1.0e-6	1.17e-6	µCi/g
1/15/2020	AE9385	018		1.64e-5	1.58e-6		3.30e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	020		1.82e-5	1.57e-6	8.0e-7	4.37e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	037		1.99e-5	1.91e-6	9.9e-7	4.5e-7	<4.0e-7	2.39e-6	1.29e-6	<1.0e-6	1.06e-6	µCi/g
1/15/2020	AE9385	039		1.64e-5	1.04e-6	7.8e-7	4.31e-7	<4.0e-7	2.13e-6	<1.0e-6	<1.0e-6	1.18e-6	µCi/g
8/11/2020	AF23621	004	2.79e-7	1.73e-5	1.10e-6	1.38e-6	4.5e-7	<4.0e-7	2.2e-6	<1.0e-6	<1.0e-6	1.16e-6	µCi/g
8/11/2020	AF23622	008		1.39e-5	1.31e-6	7.6e-7	3.21e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23623	014		1.80e-5	1.37e-6	8.9e-7	3.97e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23624	016		1.62e-5	1.11e-6	1.08e-6	4.5e-7	<4.0e-7	2.2e-6	1.00e-6	<1.0e-6	1.14e-6	µCi/g
8/11/2020	AF23625	018		1.55e-5	1.01e-6	9.6e-7	4.00e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23626	019		1.72e-5	1.17e-6		4.41e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23627	020		1.79e-5	1.02e-6	9.1e-7	4.65e-7	<4.0e-7	2.0e-6	<1.0e-6	<1.0e-6	1.01e-6	µCi/g
8/11/2020	AF23629	037		1.54e-5	1.13e-6	7.5e-7	4.5e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23630	038		1.82e-5	1.29e-6	1.14e-6	5.1e-7	<4.0e-7	2.0e-6	<1.0e-6	<1.0e-6	1.07e-6	µCi/g
8/11/2020	AF23631	039		1.87e-5	1.08e-6	1.11e-6	4.4e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30970	004	1.17e-7	1.81e-5	1.10e-6		4.0e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	1.08e-6	µCi/g
10/14/2020	AF30971	008	7.7e-8	1.55e-5	9.1e-7	8.8e-7	3.63e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30972	016		1.71e-5	1.09e-6	9.9e-7	4.54e-7	<4.0e-7	2.08e-6	<1.0e-6	<1.0e-6	1.06e-6	µCi/g
10/14/2020	AF30973	019		1.64e-5	9.8e-7	8.8e-7	4.26e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30974	021		1.45e-5	1.03e-6	6.9e-7	3.01e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30975	038		1.70e-5	1.73e-6		4.65e-7	<4.0e-7	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g

## Pantex Environmental Sample Results

Date	Lab	Station	Be-7	K-40	Tl-208	Plutonium-239	H-3	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Vegetation Samples</b>												
1/15/2020	AE9385	014	6.43e-6	3.26e-6				<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	018		4.25e-6		<4.0e-7		<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	020	7.28e-6	7.45e-6	4.5e-8	<4.0e-7		<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	037	6.97e-6	2.63e-6		<4.0e-7		<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
1/15/2020	AE9385	039	7.50e-6	1.90e-6		<4.0e-7		<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23639	021	4.16e-6	5.28e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23640	037	8.89e-6	1.89e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/11/2020	AF23641	038	4.38e-6	5.85e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
8/12/2020	AF23642	039	5.70e-6	2.47e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30978	008	1.67e-6	2.57e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30979	016	1.64e-6	2.68e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30980	019	3.83e-6	2.78e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30981	021	1.92e-6	4.65e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/14/2020	AF30982	038	1.57e-6	2.72e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g
10/19/2020	AF30977	004	4.77e-6	1.60e-5		<4.0e-7	<1.0e-6	<2.0e-6	<1.0e-6	<1.0e-6	<1.0e-6	µCi/g

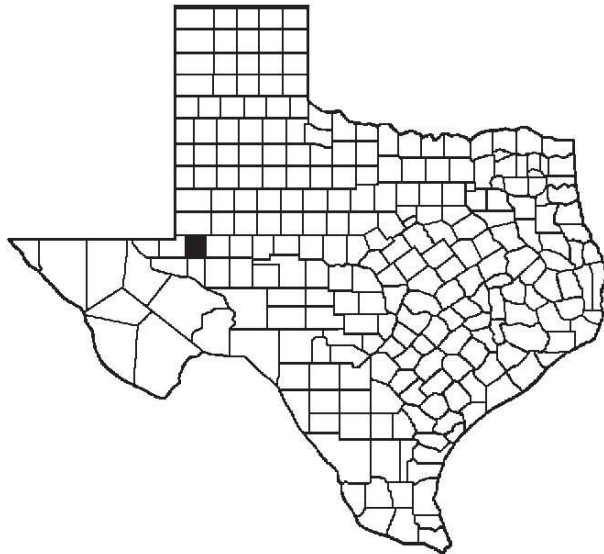
Date	Lab	Station	H-3	Plutonium-239	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Water-Surface Samples</b>									
1/15/2020	AE9386	022	<1.0e-6	<4.0e-10	<2.0e-9	<1.0e-9	<1.0e-9	<1.0e-9	µCi/mL
1/15/2020	AE9386	024	<1.0e-6	<4.0e-10	6.2e-9	4.11e-9	<1.0e-9	1.74e-9	µCi/mL
6/9/2020	AF23644	024	<1.0e-6	<4.0e-10	5.6e-9	3.85e-9	<1.0e-9	1.71e-9	µCi/mL
8/12/2020	AF23647	024	<1.0e-6	<4.0e-10	5.9e-9	4.12e-9	<1.0e-9	1.73e-9	µCi/mL
10/14/2020	AF30984	024	<1.0e-6	<4.0e-10	4.0e-9	2.77e-9	<1.0e-9	<1.0e-9	µCi/mL

Date	Lab	Station	Bi-214	Pb-214	Plutonium-239	H-3	Total Uranium	Uranium-234	Uranium-235	Uranium-238	Units
<b>Water-Ground Samples</b>											
1/15/2020	AE9386	027	2.14e-8	1.68e-8	<4.0e-10	<1.0e-6	8.4e-9	5.7e-9	<1.0e-9	2.64e-9	µCi/mL
1/15/2020	AE9386	030	1.05e-8	9.9e-9	<4.0e-10	<1.0e-6	6.2e-9	4.04e-9	<1.0e-9	2.06e-9	µCi/mL
6/9/2020	AF23645	027			<4.0e-10	<1.0e-6	5.1e-9	3.44e-9	<1.0e-9	1.50e-9	µCi/mL
6/9/2020	AF23646	030			<4.0e-10	<1.0e-6	7.0e-9	5.0e-9	<1.0e-9	1.87e-9	µCi/mL
8/12/2020	AF23648	027			<4.0e-10	<1.0e-6	6.7e-9	4.48e-9	<1.0e-9	2.23e-9	µCi/mL
10/14/2020	AF30985	027			<4.0e-10	<1.0e-6	6.1e-9	3.77e-9	<1.0e-9	2.26e-9	µCi/mL
10/14/2020	AF30986	030			<4.0e-10	<1.0e-6	7.5e-9	4.5e-9	<1.0e-9	2.90e-9	µCi/mL

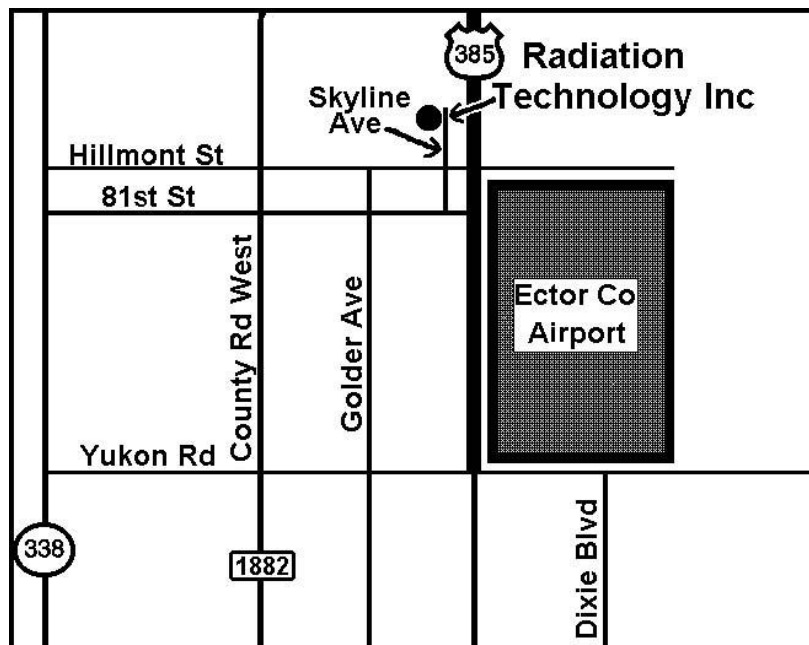
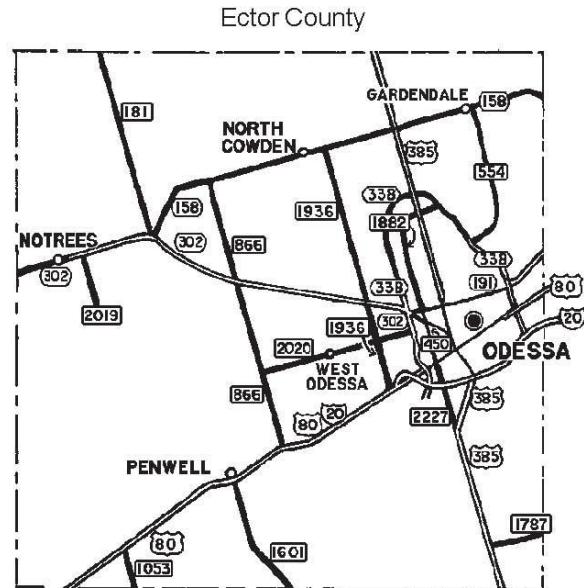
NOTE: \* indicates the analysis was by alpha spectrometry, or Ra-226, analysis by radon emanation.  
 \*\*Indicates the tritium (H-3) analysis for food product, sediment, and vegetation is reported in UCI/ml

**Radiation Technology, Inc.**  
Radiation Branch Site No. 050

Radiation Technology, Inc. (RTI), located six miles north of downtown Odessa, provides installation, repair, and maintenance of nuclear gauging devices and services for loading and unloading radioactive sources in nuclear gauges. The Radiation Branch Surveillance Program consists of OSL monitoring.



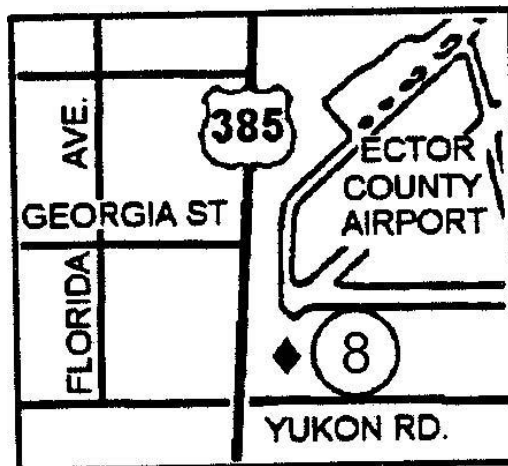
Shaded area indicates location of Ector County



## Radiation Technology, Inc. Monitoring Station Locations

◆ TLD Station    ♥ Sample Station    ♣ TLD & Sample Station

Homeland Security -Diagram Removed



### Radiation Technology, Inc.

#### Optically Stimulated Luminescence (OSL) Monitoring Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	66	45	42	39	192	
2	727	396	480	279	1882	
3	155	72	81	67	375	
4	53	36	33	36	158	
*8	43	31	28	30	132	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.



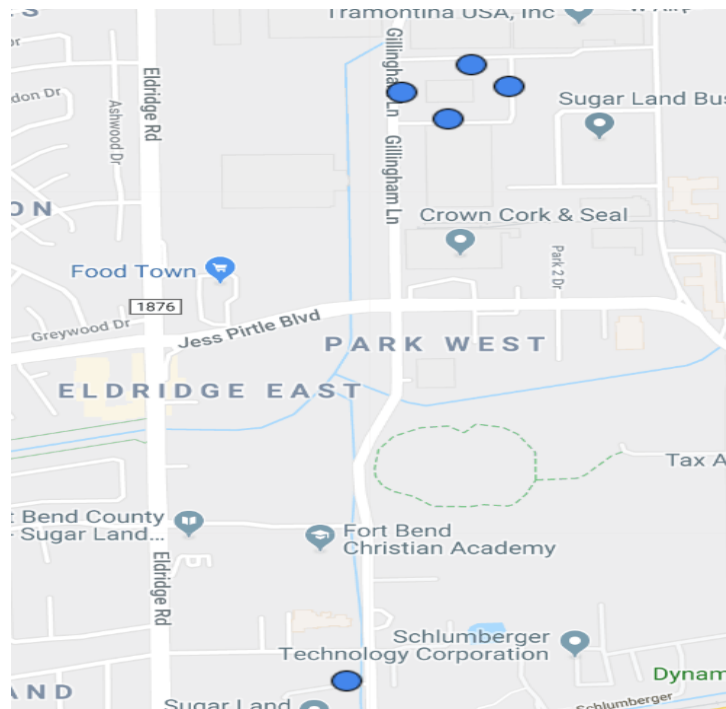
# Thermo Fisher

## Radiation Branch Site No. 054

Thermo Fisher, located in Sugarland Texas, southwest of Houston Texas, formerly provides installation, repair, and maintenance of nuclear gauging devices and services for loading and unloading radioactive sources in nuclear gauges. The facility is being decommissioned at this time. The Radiation Branch Surveillance Program consists of OSL monitoring that ended December 31, 2020.

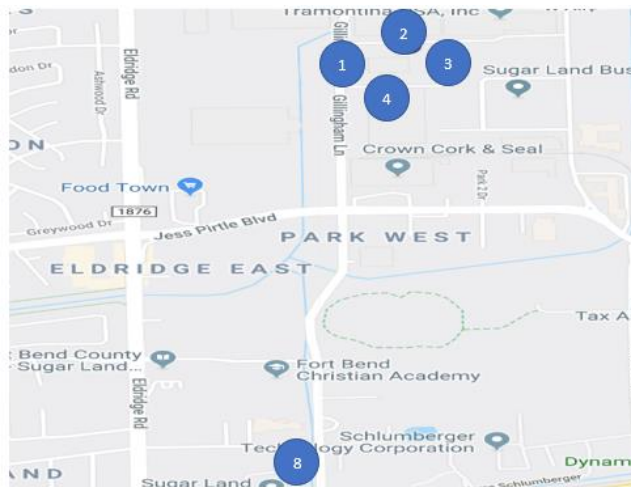


Shaded area indicates Fort Bend County



## Thermo Fisher Monitoring Station Locations

Homeland Security Diagram Removed




---

### Thermo Fisher

#### Optically Stimulated Luminescence (OSL) Monitoring Results and Environmental Sampling Results (quarterly and annual readings are in mrem)

OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	32	28	23	26	109	
2	32	29	0	27	88	Q3 OSL missing
3	0	29	0	0	29	Q1, Q3 and Q4 OSL missing
4	34	30	24	27	115	
*6	35	31	25	33	124	

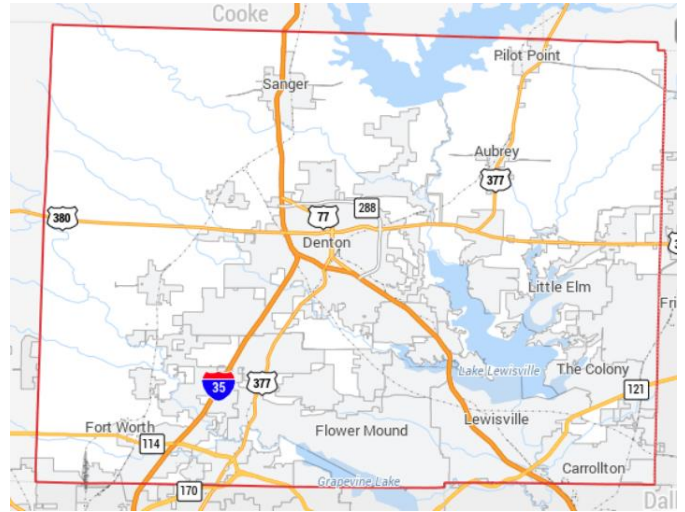
NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

## Trace Life Sciences

Radiation Branch Site No. 055 & 056

U.S. Radiopharmaceuticals, formerly Trace Life Sciences, has two sites located in Denton Texas, which consists of a medical radioisotope production facility which also stores contaminated accelerator parts. The Radiation Branch surveillance program consists of OSL monitoring.



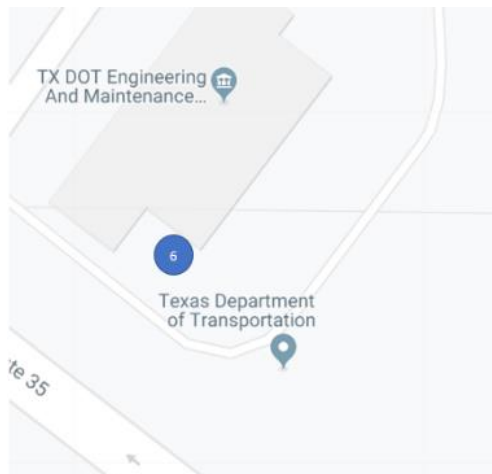
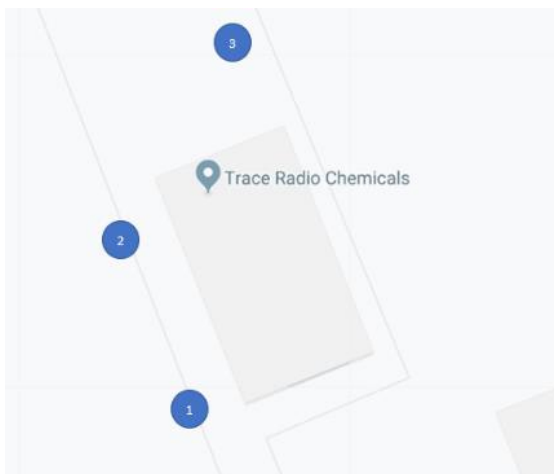
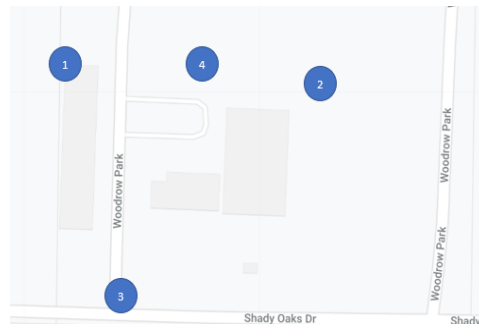
Shaded area indicates Denton County



## Trace Life Sciences Monitoring Station Locations

◆ TLD Station   
 ♥ Sample Station   
 ♣ TLD & Sample Station

Homeland Security -Diagram Removed



### Trace Life Sciences

#### Optically Stimulated Luminescence (OSL) Monitoring Results and Environmental Sampling Results (quarterly and annual readings are in mrem)

Site 55 OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	31	27	24	28	110	
2	31	26	22	29	108	
3	32	27	22	28	109	
4	32	27	24	30	113	
*6	36	30	25	30	121	

Site 56 OSL Stations	Q1	Q2	Q3	Q4	Annual Dose	Notes
1	32	28	23	30	113	
2	34	29	25	31	119	
3	31	27	23	28	109	

NOTE: <sup>1</sup>Background is not subtracted from the data

<sup>2</sup>An occupancy factor of 1/16 may be applied to this number to obtain radiation dose to members of the public.

# Appendices



**Mixed Analyte  
Performance Evaluation Program**

Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

*Laboratory Results For MAPEP Series 26*  
(TDHL01) Texas Department of State Health Services Laboratory  
1100 W 49th Street  
Austin, TX 78756

**MAPEP-12-MaS26: Radiological and inorganic combined soil standard**

Inorganic							Units: (mg/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Arsenic	NR	48.2				33.7 - 62.7		
Barium	NR	655				459 - 852		
Beryllium	NR	47.5				33.3 - 61.8		
Cadmium	NR	10.6				7.4 - 13.8		
Chromium	NR	89.3				62.5 - 116.1		
Cobalt	NR	113				79 - 147		
Copper	NR	206				144 - 268		
Lead	NR	74.4				52.1 - 96.7		
Mercury	NR	0.0733				0.0513 - 0.0953		
Nickel	NR	186				130 - 242		
Selenium	NR	14.2				9.9 - 18.5		
Silver	NR	85.5				59.9 - 111.2		
Technetium-99	NR	0.000596				0.000417 - 0.000775		
Thallium	NR	14.4				10.1 - 18.7		
Uranium-235	NR	0.0653				0.0457 - 0.0849		
Uranium-238	NR	26.5				18.6 - 34.5		
Uranium-Total	NR	26.5				18.6 - 34.5		
Vanadium	NR	104				73 - 135		
Zinc	NR	286				200 - 372		

Radiological							Units: (Bq/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	145	159	A		-8.8	111 - 207	9	
Cesium-134	748	828	A		-9.7	580 - 1076	10	L
Cesium-137	2.15		A			False Positive Test	2.15	
Cobalt-57	1160	1179	A		-1.6	825 - 1533	20	L
Cobalt-60	0.93	1.56	A	(17)		Sensitivity Evaluation	0.93	
Iron-55	NR	1370				959 - 1781		
Manganese-54	578	558	A		3.6	391 - 725	14	L
Nickel-63	NR	862				603 - 1121		
Plutonium-238	128	136	A		-5.9	95 - 177	12	
Plutonium-239/240	59.0	65.8	A		-10.3	46.1 - 85.5	6.5	
Potassium-40	1520	1491	A		1.9	1044 - 1938	40	L
Strontium-90	414	392	A		5.6	274 - 510	20	
Technetium-99	NR	374				262 - 486		

Radiological							Units: (Bq/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Uranium-234/233	61.8	68.1	A		-9.3	47.7 - 88.5	5.2	
Uranium-238	326	329	A		-0.9	230 - 428	23	
Zinc-65	682	642	A		6.2	449 - 835	17	L

Radiological Reference Date: February 1, 2012

MAPEP-12-MaW26: Radiological and inorganic combined water standard							Units: (mg/L)	
Inorganic								
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Antimony	NR	2.71				1.90 - 3.52		
Arsenic	NR	<0.01				False Positive Test		
Barium	NR	0.808				0.566 - 1.050		
Beryllium	NR	0.808				0.566 - 1.050		
Cadmium	NR	0.418				0.293 - 0.543		
Chromium	NR	1.73				1.21 - 2.25		
Cobalt	NR	1.45				1.02 - 1.89		
Copper	NR	0.929				0.650 - 1.208		
Lead	NR	0.779				0.545 - 1.013		
Mercury	NR	3.75E-3				0.00263 - 0.00488		
Nickel	NR	<0.01				False Positive Test		
Selenium	NR	0.223				0.156 - 0.290		
Technetium-99	NR	4.45E-5				0.00003 - 0.00006		
Thallium	NR	0.846				0.592 - 1.100		
Uranium-235	NR	4.50E-4				0.00032 - 0.00059		
Uranium-238	NR	0.222				0.155 - 0.289		
Uranium-Total	NR	0.222				0.155 - 0.289		
Vanadium	NR	1.44				1.01 - 1.87		
Zinc	NR	2.28				1.60 - 2.96		

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	1.62	1.63	A		-0.6	1.14 - 2.12	0.10	
Cesium-134	-0.20		A			False Positive Test	0.20	
Cesium-137	42.0	39.9	A		5.3	27.9 - 51.9	1.2	L
Cobalt-57	33.8	32.9	A		2.7	23.0 - 42.8	0.8	L
Cobalt-60	24.9	23.72	A		5.0	16.60 - 30.84	0.5	L
Hydrogen-3	441	437	A		0.9	306 - 568	11	L
Iron-55	NR	81.9				57.3 - 106.5		
Manganese-54	33.4	31.8	A		5.0	22.3 - 41.3	0.9	L
Nickel-63	NR	60.0				42.0 - 78.0		
Plutonium-238	0.581	0.629	A		-7.6	0.440 - 0.818	0.058	
Plutonium-239/240	1.14	1.34	A		-14.9	0.94 - 1.74	0.10	
Potassium-40	151	142	A		6.3	99 - 185	5	

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Strontium-90	-0.012		A			False Positive Test	0.036	
Technetium-99	NR	27.9				19.5 - 36.3		
Uranium-234/233	0.371	0.392	A		-5.4	0.274 - 0.510	.039	
Uranium-238	2.95	2.76	A		6.9	1.93 - 3.59	0.21	
Zinc-65	-0.170		A			False Positive Test	0.170	

Radiological Reference Date: February 1, 2012

MAPEP-12-GrW26: Gross alpha/beta water							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	1.70	2.14	A		-20.6	0.64 - 3.64	0.07	
Gross beta	6.12	6.36	A		-3.8	3.18 - 9.54	0.12	L

Radiological Reference Date: February 1, 2012

MAPEP-12-RdF26: Radiological air filter							Units: (ug/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Uranium-235	NR	0.0187				0.0131 - 0.0243		
Uranium-238	NR	10.0				7.0 - 13.0		
Uranium-Total	NR	10.0				7.0 - 13.0		

Radiological							Units: (Bq/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	0.073	0.073	A		0.0	0.051 - 0.095	0.007	
Cesium-134	2.14	2.38	A		-10.1	1.67 - 3.09	0.04	L
Cesium-137	1.94	1.79	A		8.4	1.25 - 2.33	0.08	
Cobalt-57	0.027		A			False Positive Test	0.027	
Cobalt-60	2.25	2.182	A		3.1	1.527 - 2.837	0.06	L
Manganese-54	3.51	3.24	A		8.3	2.27 - 4.21	0.10	L
Plutonium-238	0.001	0.0015	A	(17)		Sensitivity Evaluation	0.001	
Plutonium-239/240	0.104	0.097	A		7.2	0.068 - 0.126	0.012	
Strontium-90	0.013		A			False Positive Test	0.008	
Uranium-234/233	0.019	0.0188	A		1.1	0.0132 - 0.0244	0.004	H
Uranium-238	0.131	0.124	A		5.6	0.087 - 0.161	0.013	
Zinc-65	3.19	2.99	A		6.7	2.09 - 3.89	0.13	

Radiological Reference Date: February 1, 2012



**MAPEP-12-GrF26: Gross alpha/beta air filter**

Radiological Units: (Bq/sample)

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.759	1.2	A		-36.8	0.4 - 2.0	0.024	
Gross beta	2.25	2.4	A		-6.3	1.2 - 3.6	0.03	L

*Radiological Reference Date: February 1, 2012*

**MAPEP-12-RdV26: Radiological vegetation**

Inorganic Units: (ug/sample)

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Uranium-235	NR	0.0434				0.0304 - 0.0564		
Uranium-238	NR	22.4				15.7 - 29.1		
Uranium-Total	NR	22.4				15.7 - 29.1		

Radiological Units: (Bq/sample)

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	0.007		N	(1)		False Positive Test	0.002	
Cesium-134	9.84	8.43	A		16.7	5.90 - 10.96	0.17	L
Cesium-137	-0.064		A			False Positive Test	0.064	
Cobalt-57	15.4	12.0	W		28.3	8.4 - 15.6	0.4	L
Cobalt-60	6.69	6.05	A		10.6	4.24 - 7.87	0.17	L
Manganese-54	0.009		A			False Positive Test	0.009	
Plutonium-238	0.179	0.219	A		-18.3	0.153 - 0.285	0.021	
Plutonium-239/240	0.148	0.152	A		-2.6	0.106 - 0.198	0.018	
Strontium-90	1.98	2.11	A		-6.2	1.48 - 2.74	0.04	L
Uranium-234/233	0.086	0.0411	N		109.2	0.0288 - 0.0534	0.011	
Uranium-238	0.307	0.278	A		10.4	0.195 - 0.361	0.026	
Zinc-65	9.60	8.90	A		7.9	6.23 - 11.57	0.42	

*Radiological Reference Date: February 1, 2012*

**Notes:**

- (1) = False Positive
- (17) = NOT DETECTED - reported a statistically zero result

**Laboratory Results For MAPEP Series 27**

 (TDHL01) Texas Department of State Health Services Laboratory  
 1100 W 49th Street  
 Austin, TX 78756

**MAPEP-12-MaS27: Radiological and inorganic combined soil standard**

Inorganic							Units: (mg/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Antimony	NR	111.5				78.1 - 145.0		
Arsenic	NR	55.7				39.0 - 72.4		
Barium	NR	896				627 - 1165		
Beryllium	NR	47.0				32.9 - 61.1		
Cadmium	NR	15.4				10.8 - 20.0		
Chromium	NR	99.0				69.3 - 128.7		
Cobalt	NR	127				89 - 165		
Copper	NR	204				143 - 265		
Lead	NR	97.6				68.3 - 126.9		
Mercury	NR	0.172				0.120 - 0.224		
Nickel	NR	300				210 - 390		
Selenium	NR	17.7				12.4 - 23.0		
Silver	NR	95.5				66.9 - 124.2		
Technetium-99	NR	0.000748				0.000524 - 0.000972		
Thallium	NR	91.0				63.7 - 118.3		
Uranium-235	NR	0.0533				0.0373 - 0.0693		
Uranium-238	NR	21.1				14.8 - 27.4		
Uranium-Total	NR	21.2				14.8 - 27.6		
Vanadium	NR	271				190 - 352		
Zinc	NR	549				384 - 714		

Radiological							Units: (Bq/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	106	111	A		-4.5	78 - 144	8	
Cesium-134	896	939	A		-4.6	657 - 1221	11	L
Cesium-137	1106	1150	A		-3.8	805 - 1495	31	L
Cobalt-57	1246	1316	A		-5.3	921 - 1711	26	L
Cobalt-60	520	531	A		-2.1	372 - 690	9	L
Iron-55	NR	508				356 - 660		
Manganese-54	911	920	A		-1.0	644 - 1196	22	L
Nickel-63	NR	406				284 - 528		
Plutonium-238	91.3	105.8	A		-13.7	74.1 - 137.5	8.7	
Plutonium-239/240	117	134	A		-12.7	94 - 174	11	
Potassium-40	625	632	A		-1.1	442 - 822	19	
Strontium-90	565	508	A		11.2	356 - 660	21	

Radiological							Units: (Bq/kg)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Technetium-99	NR	469				328 - 610		
Uranium-234/233	59	60.3	A		-2.2	42.2 - 78.4	5	
Uranium-238	248	263	A		-5.7	184 - 342	17	
Zinc-65	625	606	A		3.1	424 - 788	15	L

Radiological Reference Date: August 1, 2012

MAPEP-12-MaW27: Radiological and inorganic combined water standard								
Inorganic							Units: (mg/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Antimony	NR	3.38				2.37 - 4.39		
Arsenic	NR	1.13				0.79 - 1.47		
Barium	NR	4.00				2.80 - 5.20		
Beryllium	NR					False Positive Test		
Cadmium	NR	0.506				0.354 - 0.658		
Chromium	NR	0.561				0.393 - 0.729		
Cobalt	NR	3.11				2.18 - 4.04		
Copper	NR					False Positive Test		
Lead	NR	2.06				1.44 - 2.68		
Mercury	NR	0.00349				0.00244 - 0.00454		
Nickel	NR	3.99				2.79 - 5.19		
Selenium	NR					False Positive Test		
Technetium-99	NR	7.30E-06				0.000005 - 0.000009		
Thallium	NR	2.47				1.73 - 3.21		
Uranium-235	NR	0.00052				0.00036 - 0.00068		
Uranium-238	NR	0.268				0.188 - 0.348		
Uranium-Total	NR	0.268				0.188 - 0.348		
Vanadium	NR	1.59				1.11 - 2.07		
Zinc	NR	3.27				2.29 - 4.25		

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	1.02	1.06	A		-3.8	0.74 - 1.38	0.08	
Cesium-134	22.5	23.2	A		-3.0	16.2 - 30.2	0.3	L
Cesium-137	17.9	16.7	A		7.2	11.7 - 21.7	0.5	L
Cobalt-57	31.2	29.3	A		6.5	20.5 - 38.1	0.7	L
Cobalt-60	0.21		A			False Positive Test	0.10	
Hydrogen-3	333	334	A		-0.3	234 - 434	5	L
Iron-55	NR	89.3				62.5 - 116.1		
Manganese-54	19.3	17.8	A		8.4	12.5 - 23.1	0.5	L
Nickel-63	NR	66.3				46.4 - 86.2		
Plutonium-238	0.024	0.013	A	(17)		Sensitivity Evaluation	0.009	
Plutonium-239/240	1.30	1.61	A		-19.3	1.13 - 2.09	0.12	

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Potassium-40	146	134	A		9.0	94 - 174	5	
Strontium-90	11.8	12.2	A		-3.3	8.5 - 15.9	0.2	L
Technetium-99	NR	4.58				3.21 - 5.95		
Uranium-234/233	0.426	0.451	A		-5.5	0.316 - 0.586	0.041	
Uranium-238	2.99	3.33	A		-10.2	2.33 - 4.33	0.21	
Zinc-65	29.2	25.9	A		12.7	18.1 - 33.7	0.8	L

Radiological Reference Date: August 1, 2012

### MAPEP-12-GrW27: Gross alpha/beta water

Radiological							Units: (Bq/L)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	1.94	1.79	A		8.4	0.54 - 3.04	0.07	
Gross beta	9.40	9.1	A		3.3	4.6 - 13.7	0.14	L

Radiological Reference Date: August 1, 2012

### MAPEP-12-RdF27: Radiological air filter

Inorganic							Units: (ug/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Uranium-235	NR	0.0148				0.0104 - 0.0192		
Uranium-238	NR	8.0				5.6 - 10.4		
Uranium-Total	NR	8.1				5.7 - 10.5		

Radiological							Units: (Bq/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	0.080	0.0780	A		2.6	0.0546 - 0.1014	0.008	
Cesium-134	2.44	2.74	A		-10.9	1.92 - 3.56	0.05	L
Cesium-137	0.023		A			False Positive Test	0.012	
Cobalt-57	1.98	1.91	A		3.7	1.34 - 2.48	0.06	
Cobalt-60	1.79	1.728	A		3.6	1.210 - 2.246	0.05	L
Manganese-54	2.56	2.36	A		8.5	1.65 - 3.07	0.08	
Plutonium-238	0.053	0.0625	A		-15.2	0.0438 - 0.0813	0.007	
Plutonium-239/240	0.001	0.00081	A	(17)		Sensitivity Evaluation	0.001	
Strontium-90	1.11	1.03	A		7.8	0.72 - 1.34	0.03	L
Uranium-234/233	0.014	0.0141	A		-0.7	0.0099 - 0.0183	0.003	H
Uranium-238	0.093	0.100	A		-7.0	0.070 - 0.130	0.010	
Zinc-65	-0.006		A			False Positive Test	0.003	

Radiological Reference Date: August 1, 2012

**MAPEP-12-GrF27: Gross alpha/beta air filter**

Radiological							Units: (Bq/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Gross alpha	0.873	0.97	A		-10.0	0.29 - 1.65	0.026	L
Gross beta	1.88	1.92	A		-2.1	0.96 - 2.88	0.03	L

Radiological Reference Date: August 1, 2012

**MAPEP-12-RdV27: Radiological vegetation**

Inorganic							Units: (ug/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Uranium-235	NR	0.0240				0.0168 - 0.0312		
Uranium-238	NR	12.7				8.9 - 16.5		
Uranium-Total	NR	12.7				8.9 - 16.5		

Radiological							Units: (Bq/sample)	
Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag
Americium-241	0.168	0.163	A		3.1	0.114 - 0.212	0.017	
Cesium-134	6.79	6.51	A		4.3	4.56 - 8.46	0.17	L
Cesium-137	4.85	4.38	A		10.7	3.07 - 5.69	0.20	
Cobalt-57	6.71	5.66	A		18.6	3.96 - 7.36	0.21	
Cobalt-60	5.34	5.12	A		4.3	3.58 - 6.66	0.15	L
Manganese-54	3.43	3.27	A		4.9	2.29 - 4.25	0.15	
Plutonium-238	0.201	0.187	A		7.5	0.131 - 0.243	0.025	
Plutonium-239/240	0.149	0.123	W		21.1	0.086 - 0.160	0.020	
Strontium-90	0.064		N	(1)		False Positive Test	0.014	
Uranium-234/233	0.093	0.0257	N		261.9	0.0180 - 0.0334	0.013	
Uranium-238	0.256	0.158	N		62.0	0.111 - 0.205	0.026	
Zinc-65	0.456		A			False Positive Test	0.228	

Radiological Reference Date: August 1, 2012

**Notes:**

- (1) = False Positive
- (17) = NOT DETECTED - reported a statistically zero result

**Laboratory Services Section  
Environmental Sciences Branch**

Each laboratory procedure is performed under unique analysis conditions. Variations occur in volumes, counting efficiencies, detector backgrounds, count times, decay factors, chemical recoveries, and other analysis parameters which affect the sensitivity of the measurement. The detection limits listed in the following tables were derived using standard analysis conditions and are routinely achievable on normal samples. If greater sensitivity is required, it is usually possible to adjust detection limits by changing one or more of these parameters.

**Detection Limits for Gamma Spectroscopy  
Sample Type**

Isotope	Soil - Sediment		Air Filter		Water - Milk		Vegetation - Fish	
	μCi/g	pCi/kg	μCi/filter	pCi/filter	μCi/ml	pCi/l	μCi/g	pCi/kg
Ac-228	2.0E-07	2.0E+02	2.0E-05	2.0E+01	2.0E-08	2.0E+01	1.0E-07	1.0E+02
Ag-110m	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Am-241	1.0E-07	1.0E+02	5.0E-06	5.0E+00	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Ba-140	4.0E-07	4.0E+02	2.0E-05	2.0E+01	2.0E-08	2.0E+01	1.0E-07	1.0E+02
Be-7	1.0E-06	1.0E+03	3.0E-05	3.0E+01	3.0E-08	3.0E+01	1.0E-07	1.0E+02
Bi-212	5.0E-07	5.0E+02	3.0E-05	3.0E+01	1.0E-07	1.0E+02	1.0E-07	1.0E+02
Bi-214	2.0E-07	2.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Co-57	1.0E-07	1.0E+02	2.0E-06	2.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Co-58	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Co-60	1.0E-07	1.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Cr-51	1.0E-06	1.0E+03	3.0E-05	3.0E+01	3.0E-08	3.0E+01	1.0E-07	1.0E+02
Cs-134	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Cs-137	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Fe-59	1.0E-07	1.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02
I-125	1.0E-06	1.0E+03	1.0E-05	1.0E+01	2.0E-08	2.0E+01	1.0E-07	1.0E+02
I-131*	1.0E-07	1.0E+02	5.0E-06	5.0E+00	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Ir-192	1.0E-07	1.0E+02	5.0E-06	5.0E+00	1.0E-08	1.0E+01	1.0E-07	1.0E+02
K-40	2.0E-06	2.0E+03	1.0E-04	1.0E+02	4.0E-08	4.0E+01	1.0E-07	1.0E+02
La-140	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Mn-54	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Nb-95	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Pb-210	4.0E-07	4.0E+02	2.0E-05	2.0E+01	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Pb-212	2.0E-07	2.0E+02	1.0E-05	1.0E+01	3.0E-08	3.0E+01	1.0E-07	1.0E+02
Pb-214	2.0E-07	2.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Ra-226	2.0E-06	2.0E+03	1.0E-04	1.0E+02	1.0E-07	1.0E+02	2.0E-07	2.0E+02
Sb-124	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Sc-46	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
Th-230	1.0E-05	1.0E+04	3.0E-04	3.0E+02	1.0E-06	1.0E+03	2.0E-06	2.0E+03
Th-234	1.0E-06	1.0E+03	4.0E-05	4.0E+01	1.0E-07	1.0E+02	2.0E-07	2.0E+02
Tl-208	1.0E-07	1.0E+02	5.0E-06	5.0E+00	5.0E-09	5.0E+00	1.0E-07	1.0E+02
U-235	4.0E-07	4.0E+02	2.0E-05	2.0E+01	3.0E-08	3.0E+01	1.0E-07	1.0E+02
U-238	1.0E-06	1.0E+03	3.0E-05	3.0E+01	6.0E-08	6.0E+01	2.0E-07	2.0E+02
Zn-65	2.0E-07	2.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02
Zr-95	1.0E-07	1.0E+02	1.0E-05	1.0E+01	1.0E-08	1.0E+01	1.0E-07	1.0E+02

\*Air iodine can be determined by using cartridges. Detection limits are 2.0E-14μCi/ml or 2.0E-02 pCi/m<sup>3</sup>.

**Laboratory Services Section  
Environmental Sciences Branch**

**Detection Limits for Chemical Analysis Procedures  
Sample Type**

Isotope	Soil - Sediment		Air Filter		Water - Milk		Vegetation - Fish	
	μCi/g	pCi/kg	μCi/filter	pCi/filter	μCi/ml	pCi/l	μCi/g	pCi/kg
Alpha	6.1E-06	6.1E+03	7.0E-07	7.0E-01	3.3E-09	3.3E+00	3.3E-06	3.3E+03
Beta	1.2E-05	1.2E+04	1.3E-06	1.3E+00	6.6E-09	6.6E+00	6.6E-06	6.6E+03
C-14					3.0E-07	3.0E+02		
H-3			2.0E-06	2.0E+00	1.0E-06	1.0E+03		
Ra-226	4.0E-07	4.0E+02	8.0E-07	8.0E-01	8.0E-10	8.0E-01	4.0E-07	4.0E+02
Ra-228	1.9E-06	1.9E+03	3.9E-06	3.9E+00	3.9E-09	3.9E+00	1.9E-06	1.9E+03
Sr-89	9.0E-07	9.0E+02	1.7E-06	1.7E+00	1.7E-09	1.7E+00	9.0E-07	9.0E+02
Sr-90	1.3E-06	1.3E+03	2.7E-06	2.7E+00	2.7E-09	2.7E+00	1.3E-06	1.3E+03

**Detection Limits for Alpha Spectroscopy  
Sample Type**

Isotope	Soil - Sediment		Air Filter		Water - Milk		Vegetation - Fish	
	μCi/g	pCi/kg	μCi/filter	pCi/filter	μCi/ml	pCi/l	μCi/g	pCi/kg
Am-241	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03
Pu-239	2.0E-07	2.0E+02	2.0E-07	2.0E-01	2.0E-10	2.0E-01	2.0E-07	2.0E+02
Th-228	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03
Th-230	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03
Th-232	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03
U-234	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03
U-238	1.0E-06	1.0E+03	1.0E-06	1.0E+00	1.0E-09	1.0E+00	1.0E-06	1.0E+03

**Texas Department of State Health Services  
P.O. Box 149347  
Austin, Texas 78714-9347  
512-834-6770**