

**Naturally Occurring Radioactive Materials Located on Terminal
Railroad and Lange-Stegmann Properties**

**Prepared by
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For the
United State Army Corps of Engineers – St. Louis District**

September 22, 2006

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1.0 Introduction

The purpose of this paper is to document the investigation of the various types of natural occurring radioactive material (NORM) identified on a portion of the Formerly Utilized Sites Remedial Action Program (FUSRAP) St. Louis Downtown Site (SLDS) Terminal Railroad Association (TRRA) Vicinity property (DT-9) and Lange-Stegmann Fertilizer Company (Lange-Stegmann) Vicinity property (DT-37). For the purpose of this paper NORM refers to material having radionuclide concentrations greater than that of the average SLDS background soil data. The portion of DT-9 and DT-37 addressed in this paper is located North of Bremen Avenue and east of Hall Street. The portions of DT-9 and DT-37 properties addressed in this paper are hereafter referred to as the "property". The property has an area of approximately 131,860 square meters (m²) and is shown on Figure 1. The majority of the property is owned by TRRA and has been leased by Lange-Stegmann since the early 1980s. Prior to lease by Lange-Stegmann the property was used as a full service railroad switch yard by TRRA. Lange-Stegmann historically has handled and stored NORM such as liquid and dry fertilizer, bauxite (i.e., aluminum ore), salt, and lava rock.

2.0 Historical Information

A review of the available historical aerial photographs was performed to gain information on property usage and land development activities. Approximately forty aerial photographs of the SLDS were reviewed dating back to 1942. The property is located on the northern extremes of the SLDS and therefore, the majority of the photographs did not include or only included the southern portions of the property. Two photographs that best depict historical usage of the property are provided in Figure 2 and Figure 3. The aerial photograph in Figures 2 and 3 date from 1955 and 1968, respectively. The photographs show many railroad tracks that traversed the property from the southwest to the northeast corners and a locomotive service building on the south central portion of the property.

Mr. Rick McQueen of TRRA was contacted and indicated that prior to 1920 through the mid 1970s TRRA operated a full service railroad switch yard on the property. Mr. McQueen indicated that there were hundreds of companies that used the switch yard and that Mallinckrodt was a regular customer. The switch yard included a locomotive service facility. The foundation of the service building has been excavated and the rubble pile still remains on the property. The original location of the service building is shown on Figure 1. The majority of the railroad tracks that traversed the property from the southwest to the northeast corners as shown in the aerial photographs (Figures 2 and 3)

were removed in the early 1980s. These tracks were removed in preparation of the property for lease by Lange-Stegmann.

A phone conversation with Mr. Rich Stegmann, vice-president of Lange-Stegmann, indicated that Lange-Stegmann purchased a small section, in the southeast corner, of the property from St. Louis City and leased the remainder of the property from TRRA in the early 1980s. Lange-Stegmann installed five dry fertilizer storage bins in 1985 and a liquid fertilizer storage bin with containment in approximately 1998 on the property. Since leasing the property from TRRA, Lange-Stegmann has handled various materials that are known to contain NORM and exhibit radiation levels identifiable above the background soils. These materials include; potash, fertilizer, bauxite, lava rock, and salt. Loading ramps used for handling bauxite are still present and are located in the central area of the property where the bulk of the residual bauxite is located as shown on Figure 1. Large piles of salt are located in the southwest portion of the property as shown on Figure 1. There are several small piles of lava rock on the property. The dry fertilizer is located inside the five circular bins located in the north central area of the property. The liquid fertilizer is stored in the circular storage tank located on the west side of the property.

Mr. Stegmann indicated that Lange-Stegmann dredged sand from the Mississippi river and sold it for the use of making concrete. The off specification sand/material was stock piled on the southeast corner of the property where it remains today. Soil from the installation of a storm water sewer at Forest Park in St. Louis is located along the southern portion of the property adjacent to Bremen Avenue. Also, there is a debris pile containing railroad ties and trees on the central portion of the property as shown on Figure 1.

3.0 Scoping Survey and Biased Sampling

In March 2003, a gamma radiation walkover survey was performed on portions of the property. In December 2003, additional gamma radiation walkover surveys were performed and seven biased soil samples were collected. An additional four biased samples were collected in August 2006 at locations that indicated other areas of elevated radioactivity based on the previous walkover surveys. Biased samples were not collected in areas where the source of elevated radioactivity was readily attributed to NORM. Sample locations are shown on Figure 1 and sample results are presented in Table 1. The gamma walkover surveys and soil sampling were conducted in accordance with the guidance in the *Final Status Survey Plan for Accessible Soil Within Mallinckrodt property and the Vicinity Properties, Excluding Plants 1, 2, and the City property at the St. Louis Downtown Site* (USACE 2002).

Where multiple radiological contaminants are present, the concentration-based soil RGs, for SLDS, are expressed and evaluated using a "unity rule". The result of a unity rule calculation is referred to as a SOR. Due to the potential presence of multiple radionuclides at the SLDS, concentration-based RGs are defined using SOR calculations

for the major radionuclides of interest which are Ra-226, Ra-228, Th-230, Th-232, and U-238.

The SOR calculations are performed according to the *Record of Decision for the St. Louis Downtown Site* (USACE 1998). The SOR calculations for surface (upper 0.15 m or 0.5 ft) and subsurface (below 0.15 m or 0.5 ft) soils are provided in the expressions below.

$$SOR_{N-\text{less than } 0.15 \text{ m}} = \frac{(\text{greater of Th - 230}_N \text{ or Ra - 226}_N)}{5 \text{ pCi/g}} + \frac{(\text{greater of Th - 232}_N \text{ or Ra - 228}_N)}{5 \text{ pCi/g}} + \frac{U - 238_N}{50 \text{ pCi/g}}$$

$$SOR_{N-\text{greater than } 0.15 \text{ m}} = \frac{(\text{greater of Th - 230}_N \text{ or Ra - 226}_N)}{15 \text{ pCi/g}} + \frac{(\text{greater of Th - 232}_N \text{ or Ra - 228}_N)}{15 \text{ pCi/g}} + \frac{U - 238_N}{50 \text{ pCi/g}}$$

The subscript "N" in the SOR_N equations represents net concentration(s) above background soil. Background soil (i.e., reference area) was determined using 32 samples collected near the SLDS. A summary of the SLDS reference area data is presented in Table 1 and Table 2.

The net sum-of ratios (SOR_N) for the biased sample ranged from approximately 0.3 to 162. Five of the biased samples have results that exceed an $SOR_N > 1$. All of the biased samples with $SOR_N > 1$ are located by the railroad tracks as indicated on Figure 1. The majority of the biased samples appear to be roughly in equilibrium with respect to the uranium series, suggesting unprocessed uranium ore or natural soils.

4.0 Naturally Occurring Radioactive Materials

During the walkover survey, areas of elevated activity were noted that contained red brick, lava rocks, granite blocks/curbs, and bauxite. All of these materials are common with the exception of bauxite which was identified by Lange-Stegmann personnel. No areas containing potash and/or fertilizer were noted on the ground surface.

Bauxite (i.e., aluminum ore) naturally contains U-238 series and Th-232 series radionuclides at concentrations ranging up to approximately 9 pCi/g and approximately 28 pCi/g, respectively (Cooper, 2005). In March and April, 2003 seven surface samples were collected from the piles of bauxite material from the central portion of the property to characterize this ore for comparison purposes. Sample locations are shown on Figure 1 and sample results are presented in Table 2.

Seven soil samples (HTZ75282 through HTZ75288) were collected on the property for comparison to the bauxite samples. The comparison soil samples were collected in areas that indicated background activity based on the walkover surveys. These comparison soil sample locations are shown on Figure 1 and the results are presented in Table 2. The bauxite material results indicated elevated concentrations of Th-232 and daughter products (e.g., Th-228 and Ra-228) as compared to the comparison soil samples, SLDS reference area soil samples, and typical uranium residues resulting from AEC/MED

operations. Analysis of the bauxite material indicated Th-232 concentrations that range from approximately 3.4 to 10.0 pCi/g with an average of approximately 7.2 pCi/g. The SOR_N calculations ranged from 0.7 to 1.88. A review of the comparison soil samples and bauxite samples indicated that the bauxite has a low level of potassium-40 (K-40) (i.e., mean < 2 pCi/g) as compared to soil (i.e., mean ~10 pCi/g).

Two samples (HTZ94922 and HTZ94923) of red brick rubble mixed with soil were collected on the property at locations that indicated elevated activity during the gamma walkover survey. Both brick material samples had SOR_N results of approximately 0.5. Analysis of the brick material indicated that Th-230 is the only radionuclide with concentrations greater than that of the mean radionuclide concentrations of the SLDS reference area soil sample results. The brick samples have an average Th-230 result of approximately 3.7 pCi/g as compared to the SLDS reference area average Th-230 result of 1.94 pCi/g. However, two samples in the reference area data set exceed the average with a maximum Th-230 concentration of 4.15 pCi/g. The brick does contain levels of Ra-226 that are greater than typical background soils. This could result in elevated activity as indicated by gamma walkover survey. Sample locations are shown on Figure 1. The results are presented in Table 2.

One sample of lava rock was collected on the property. Analysis of the lava rock indicated an SOR_N of 0.24. This is comparable with the SLDS reference area soil sample results. The lava rock does contain levels of Ra-226 that are greater than typical background soils. This could result in elevated activity as indicated by gamma walkover survey. The lava rock sample location is shown on Figure 1. The results are presented in Table 2.

A small fraction of all potassium chloride contains radioactive K-40, which is primarily a beta radiation emitter but, also emits gamma radiation. Salt (i.e., potassium chloride) is located primarily in the large pile on the western side of the property as shown on Figure 1. No samples of salt were collected on the property. K-40 is not a contaminant of concern for SLDS. Based on previous soil samples collected at SLDS the average soil concentration of K-40 is approximately 10 pCi/g.

Fertilizer commonly contains radionuclides from the uranium series, thorium series, and K-40. The uranium and thorium series radionuclides originate from phosphate ores used to make fertilizer. The concentration of each radionuclide in fertilizers products depends on the origin of the phosphate ore and the specific blend of the materials in the fertilizer product. The K-40 primarily originates from potash which is typically used as the source of potassium in fertilizer. The potassium portion has a small concentration of K-40 driven by its concentration in nature.

Measurements provided in the National Council on Radiation Protection and Measurements (NCRP) Report No. 95 (NCRP 1995) indicates that the raw phosphate materials incorporated in fertilizers may contain:

U-238: 20 – 62 pCi/g
Th-230: 5.4 – 65 pCi/g
Ra-226: 0.7 – 22 pCi/g
Th-232: 0.1 – 4.6 pCi/g

During processing, much of the uranium, up to 67% of the initial concentration, and thorium will remain with the fertilizer, while radium will be contained primarily in the phosphogypsum by-product (EPA 1999). The NCRP reports that typical concentrations in fertilizer are expected to be 10% – 50% of the concentrations listed above (NCRP 1995).

5.0 Conclusion

There are several sources of NORM on the property that are readily visible. With the exception of potassium chloride, potash, and fertilizer the NORMs identified on the property were sampled. Potassium chloride and potash, although not sampled, contains K-40 which is not a contaminant of concern for SLDS. The radiological content of fertilizer is relatively well characterized in scientific literature.

The lava rock and red brick material identified have radiological constituents consistent with background soils, however, the concentration levels are at the upper end of the SLDS reference area data set. The bauxite material has concentrations of Th-232 and associated daughter products, which are contaminants of concern for the SLDS and are above surface criteria. The bauxite material sampled is easily identified by sight, by low levels of K-40, and by elevated levels of Th-232 series radionuclides which are not generally present in uranium feed or waste material handled during MED/AEC operations.

Fertilizer products including potash are known to be handled and stored in storage bins on the property. Fertilizer is known to contain uranium and thorium series radionuclides at levels that may cause an exceedance of the FUSRAP remedial goals if not taken into account. The Ra-226 concentration in fertilizer would be expected to be significantly less than U-238 and Th-230 concentrations based on the radionuclide concentrations in the raw materials (i.e., phosphate ore) and that the radium during processing is primarily removed with the waste stream. Analysis indicated that the biased samples appear to be roughly in equilibrium with respect to the uranium series, indicating that the elevated biased samples are not attributed to NORM associated with fertilizer.

Table 3 and Table 4 compare the reference area soil, comparison soil, bauxite, brick-lava rock, and biased sample mean and median results, respectively. The concentrations and ratios of radionuclides in the biased soil samples that were collected on or near the railroad spurs on the property are not consistent with bauxite, lava rock, red brick, or fertilizer materials that have been identified and sampled on the property.

6.0 References

- EPA 1999, *Background Report on Fertilizer Use, Contaminants and Regulations*, United States Environmental Protection Agency, January.
- Cooper, Malcolm B. 2005, *Naturally Occurring Radioactive Materials (NORM) in Australian Industries – Review of current Inventories and Future Generation*, EnviroRad Servcies Pty. Ltd., September.
- NCRP 1995, *Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources*, National Council on Radiation Protection and Measurements, June.
- USACE 1998, *Record of Decision for the St. Louis Downtown Site, St. Louis, Missouri, Formerly Utilized Sites Remedial Action Program*, Final, U.S. Army Corps of Engineers, October.
- USACE 2002, *Final Status Survey Plan for Accessible Soils within Mallinckrodt Property and the Vicinity Properties, Excluding Plants 1 and 2, and the City Property at the St. Louis Downtown Site, St. Louis, Missouri*. U.S. Army Corps of Engineers, February.

Figures

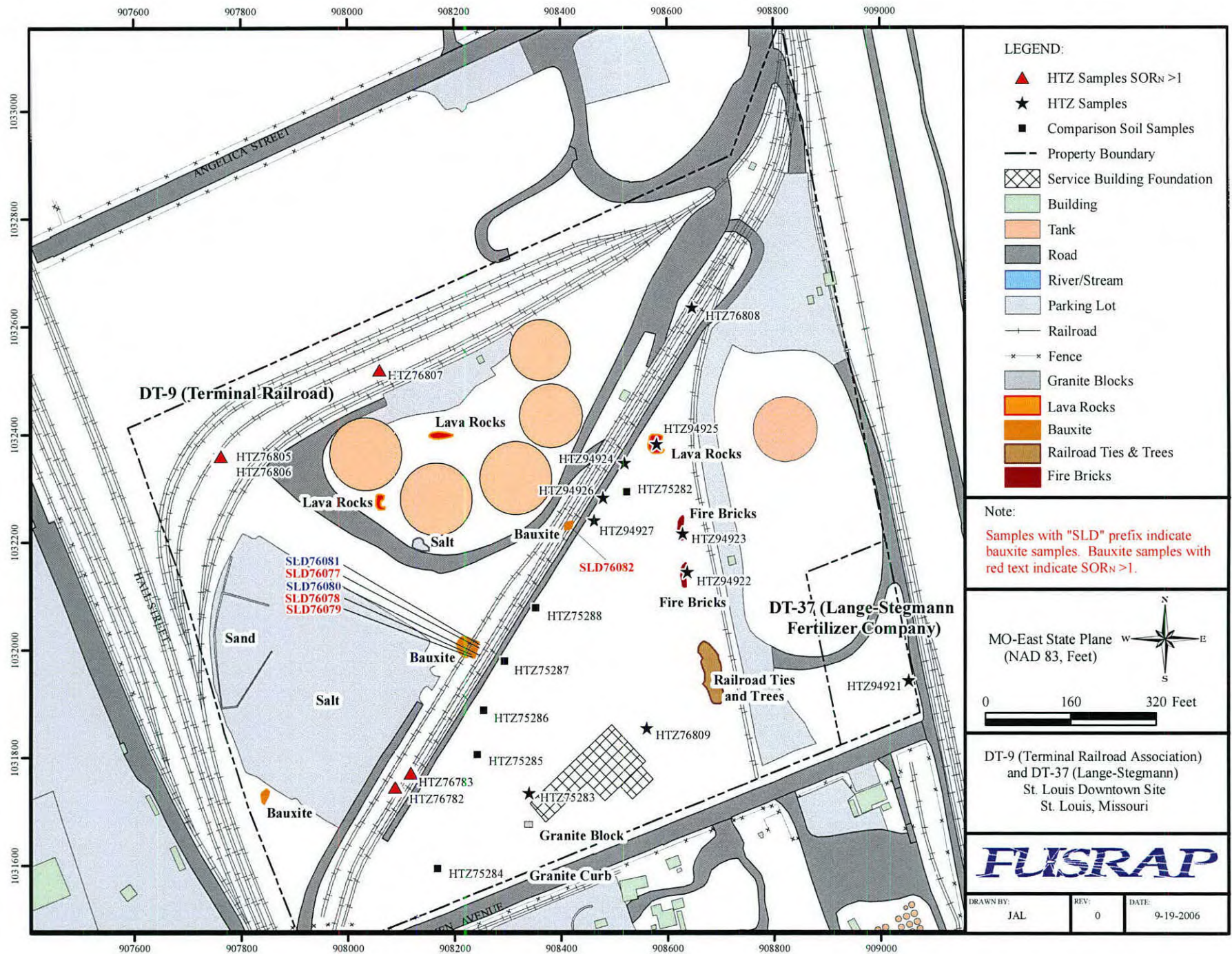


Figure 1. DT-9 (Terminal Railroad Association) and DT-37 (Lange-Stegmann)



Figure 2. SLDS Aerial Photograph, 1955.



Figure 3. SLDS Aerial Photograph, 1968.

Tables

Table 1
Soil Sample Results

SLDS Reference Area Data Summary											
Statistic	Ac-227 (pCi/g)	Pa-231 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Th-228 (pCi/g)	Th-230 (pCi/g)	Th-232 (pCi/g)	U-235 (pCi/g)	U-238 (pCi/g)	SOR _B (5/5/50)	SOR _B (15/15/50)
Mean	0.14	0.89	2.78	0.95	1.16	1.94	1.09	0.09	1.44	0.82	0.29
Median	0.11	0.98	2.53	0.97	1.10	1.66	1.07	0.08	1.16	0.76	0.27
UCL-95	0.18	1.12	3.04	1.00	1.26	2.18	1.18	0.12	1.67	-	-
St. Dev	0.14	0.76	0.89	0.17	0.35	0.76	0.29	0.08	0.75	0.21	0.08
Range	0.80	2.55	3.93	0.82	1.59	3.19	1.25	0.33	3.19	0.95	0.35
Detects	7	13	32	32	32	32	32	0	32	-	-
No. Samples	32	32	32	32	32	32	32	32	32	32	32

Biased Samples												
Statistic	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
Mean	8.34	5.06	3.47	87.96	0.99	1.41	61.15	1.15	3.86	52.93	17.75	17.11
Median	8.47	0.16	0.66	4.30	0.80	1.41	3.66	0.97	0.29	4.20	1.14	0.39
Standard Deviation	1.52	10.86	6.56	225.76	0.61	0.57	169.71	0.62	10.68	148.54	48.33	48.28
Number of samples	11	11	11	11	11	11	11	11	11	11	11	11
Maximum	10.65	35.80	21.30	763.00	2.69	2.69	572.00	2.69	36.00	500.00	163.14	162.36
Range	5.20	35.80	21.30	761.12	2.23	1.90	569.35	2.26	35.89	497.94	162.40	162.21

SampleID	Sample Type	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
HTZ76782	Soil	10.40	35.80	21.30	763.00	2.69	2.69	572.00	2.69	36.00	500.00	163.14	162.36
HTZ76783	Soil	6.21	2.13	0.88	46.10	0.66	0.79	12.60	0.59	1.91	30.60	9.96	9.25
HTZ76805	Soil	8.25	3.36	3.32	12.70	1.16	1.76	12.90	1.64	0.29	4.32	2.99	2.36
HTZ76806	Soil	8.66	12.70	9.72	96.30	1.35	1.94	27.60	1.39	1.51	7.32	6.66	6.38
HTZ76807	Soil	8.84	1.80	1.25	31.50	0.46	0.84	28.50	0.87	1.30	19.60	6.87	6.11
HTZ76808	Soil	5.45	-0.01	0.00	2.15	0.71	1.47	3.01	0.80	0.27	3.98	0.84	0.26
HTZ76809	Soil	8.42	0.02	0.32	4.30	0.75	1.53	3.49	1.08	0.26	3.01	1.14	0.34
HTZ94921	Soil	10.65	-0.11	0.66	1.88	0.65	1.12	2.65	0.83	0.20	2.06	0.74	0.15
HTZ94924	Soil	8.47	0.16	0.42	2.99	0.83	0.93	3.36	1.36	0.11	3.26	1.01	0.37
HTZ94926	Soil	7.89	-0.17	0.23	3.22	0.80	1.05	2.87	0.43	0.40	4.20	0.89	0.24
HTZ94927	Soil	8.49	0.03	0.06	3.39	0.84	1.41	3.66	0.97	0.20	3.83	1.00	0.39

Comparison Soil Samples												
Statistic	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
Mean	9.76	0.27	0.36	3.50	1.00	1.52	3.36	1.24	0.08	3.09	1.06	0.38
Median	9.34	0.21	0.34	3.49	0.97	1.69	3.23	1.43	0.11	3.24	1.10	0.37
Standard Deviation	1.13	0.12	0.30	1.00	0.26	0.74	0.55	0.55	0.16	0.52	0.23	0.15
Number of samples	7	7	7	7	7	7	7	7	7	7	7	7
Maximum	11.60	0.46	0.82	4.85	1.45	2.75	4.27	1.74	0.22	3.61	1.38	0.63
Range	3.15	0.31	0.82	2.90	0.84	2.23	1.73	1.32	0.22	1.39	0.71	0.49

SampleID	Sample Type	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
HTZ75282	Soil	9.09	0.15	0.20	1.95	0.61	0.52	2.54	0.42	0.11	2.22	0.67	0.14
HTZ75283	Soil	9.34	0.46	0.82	4.45	1.06	1.15	3.73	1.43	0.20	3.48	1.25	0.47
HTZ75284	Soil	11.6	0.36	0.64	3.49	1.45	2.75	3.06	1.74	0.22	2.53	1.10	0.37
HTZ75285	Soil	10.5	0.21	-0.07	2.67	0.84	1.69	3.23	0.48	0.11	3.24	0.88	0.29
HTZ75286	Soil	10.5	0.33	0.16	4.85	1.13	1.84	4.27	1.69	-0.25	3.61	1.38	0.63
HTZ75287	Soil	8.87	0.19	0.43	3.28	0.94	0.86	3.53	1.50	0.03	3.15	1.07	0.43
HTZ75288	Soil	8.45	0.16	0.34	3.78	0.97	1.84	3.19	1.39	0.11	3.39	1.10	0.35

Notes:

SOR_B = sum of ratios for the background soils.

Results are expressed in picoCuries/gram (pCi/g); SOR values are unitless.

Table 2
NORM Sample Results

SLDS Reference Area Data Summary											
Statistic	Ac-227 (pCi/g)	Pa-231 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Th-228 (pCi/g)	Th-230 (pCi/g)	Th-232 (pCi/g)	U-235 (pCi/g)	U-238 (pCi/g)	SOR _B (5/5/50)	SOR _B (15/15/50)
Mean	0.14	0.89	2.78	0.95	1.16	1.94	1.09	0.09	1.44	0.82	0.29
Median	0.11	0.98	2.53	0.97	1.10	1.66	1.07	0.08	1.16	0.76	0.27
UCL-95	0.18	1.12	3.04	1.00	1.26	2.18	1.18	0.12	1.67	-	-
St. Dev	0.14	0.76	0.89	0.17	0.35	0.76	0.29	0.08	0.75	0.21	0.08
Range	0.80	2.55	3.93	0.82	1.59	3.19	1.25	0.33	3.19	0.95	0.35
Detects	7	13	32	32	32	32	32	0	32	-	-
No. Samples	32	32	32	32	32	32	32	32	32	32	32

Bauxite Samples												
Statistic	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
Mean	1.75	3.40	1.50	1.71	5.95	7.98	2.60	7.23	-0.12	2.07	2.01	1.39
Median	1.27	1.40	1.08	1.65	6.87	9.04	2.36	8.25	-0.07	1.90	2.23	1.59
Standard Deviation	1.48	6.01	1.13	0.16	2.02	2.78	0.68	2.52	0.34	2.01	0.48	0.47
Number of samples	7	7	7	7	7	7	7	7	7	7	7	7
Maximum	4.30	17.00	3.85	1.97	8.04	11.00	3.68	10.00	0.44	5.75	2.52	1.88
Range	3.69	16.36	3.19	0.45	5.18	6.99	2.12	6.59	0.44	5.75	1.18	1.18

SampleID	Sample Type	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
SLD75920	Bauxite	0.63	17.00	3.85	1.64	6.87	7.79	1.56	6.97	-0.56	-1.05	1.70	1.18
SLD76077	Bauxite	1.27	1.43	1.22	1.82	7.04	9.04	2.94	9.17	0.44	1.32	2.45	1.81
SLD76078	Bauxite	0.73	1.46	2.02	1.78	8.04	11.00	3.05	8.25	-0.44	2.50	2.31	1.67
SLD76079	Bauxite	0.61	1.14	0.87	1.56	6.69	9.87	2.31	8.63	-0.07	1.90	2.23	1.59
SLD76080	Bauxite	4.30	0.64	0.66	1.97	2.86	4.01	3.68	3.41	0.12	5.75	1.53	0.90
SLD76081	Bauxite	3.40	0.73	0.78	1.52	3.29	4.33	2.32	4.21	-0.04	1.70	1.34	0.70
SLD76082	Bauxite	1.34	1.40	1.08	1.65	6.88	9.80	2.36	10.00	-0.26	2.38	2.52	1.88

Brick and Lava Rock Samples												
Statistic	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
Mean	5.95	-0.13	0.40	2.64	1.36	2.02	3.45	1.71	0.13	2.28	1.08	0.44
Median	7.20	-0.12	0.38	2.46	1.47	2.39	3.62	1.72	0.08	2.21	1.16	0.54
Standard Deviation	2.53	0.04	0.42	0.40	0.33	0.70	0.51	0.39	0.10	0.19	0.17	0.17
Number of samples	3	3	3	3	3	3	3	3	3	3	3	3
Maximum	7.63	-0.09	0.84	3.09	1.63	2.46	3.84	2.09	0.24	2.50	1.19	0.55
Range	4.59	-0.09	0.84	0.73	0.63	1.24	0.97	0.78	0.17	0.37	0.31	0.31

SampleID	Sample Type	K-40	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR _G	SOR _N
HTZ94922	Red brick	7.20	-0.17	-0.01	2.37	1.47	2.46	3.62	2.09	0.08	2.21	1.19	0.55
HTZ94923	Red brick	7.63	-0.09	0.84	3.09	1.63	2.39	3.84	1.72	0.24	2.50	1.16	0.54
HTZ94925	Lava rock	3.04	-0.12	0.38	2.46	1.00	1.22	2.88	1.31	0.07	2.12	0.88	0.24

Notes:

SOR_B = sum of ratios for the background soils.

Results are expressed in picoCuries/gram (pCi/g); SOR values are unitless.

Table 3

Comparison of Mean Results

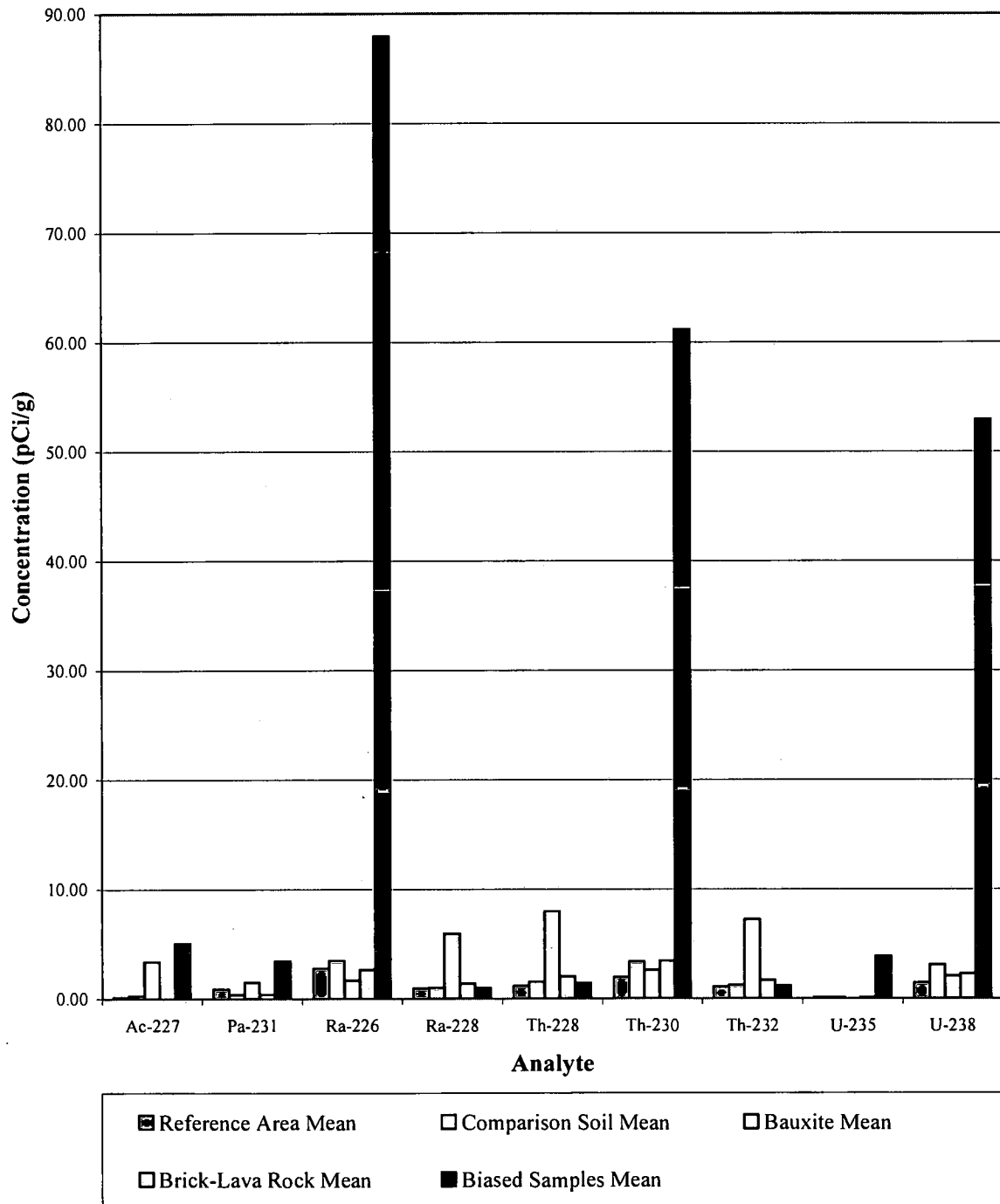
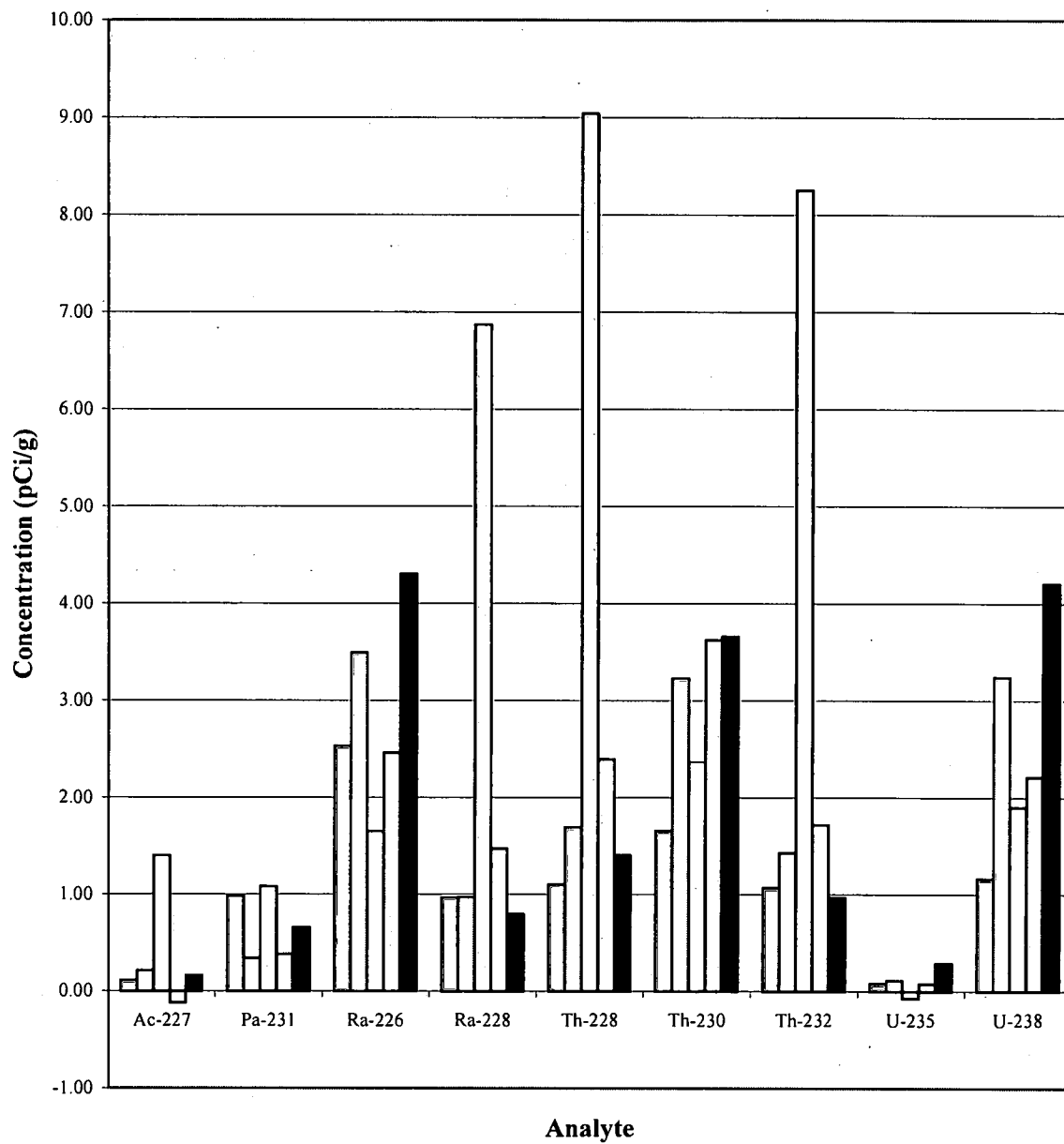


Table 4

Comparison of Median Results



Reference Area Median Comparison Soil Median Bauxite Median
 Brick-Lava Rock Median Biased Samples Median



1526.20060925.006

FUSRAP TRANSMITTAL MEMORANDUM

Date: 09/25/06

Transmittal Description:

- Naturally Occurring Radioactive Materials Located on Terminal Railroad and Lange-Stegmann Properties

Revision / Document Date:

- 9/22/06–Naturally Occurring Radioactive Materials Located on Terminal Railroad and Lange-Stegmann Properties

Number of Copies: 2-original enclosed.

Transmitted To: Sharon Cotner

For Technical POC: Jon Rankins

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AR-068