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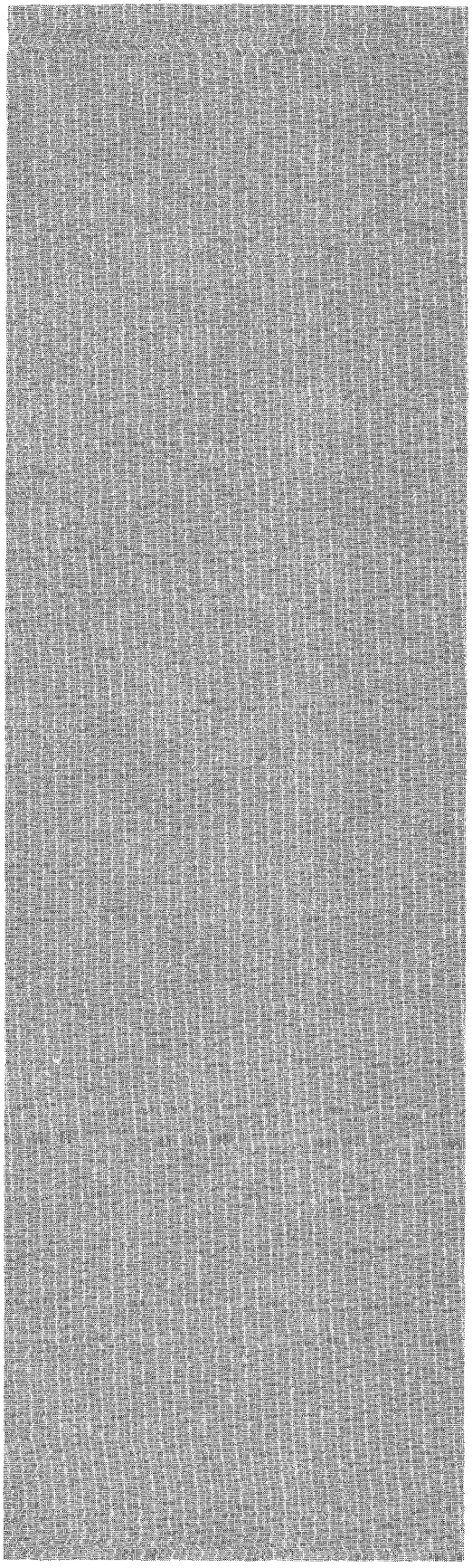

Baseline Concentrations of Radionuclides and Heavy Metals in Soils and Vegetation around the DARHT Facility: Construction Phase (1996)

Los Alamos
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Baseline Concentrations of Radionuclides and Heavy Metals in Soils and Vegetation around the DARHT Facility: Construction Phase (1996)

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BASELINE CONCENTRATIONS OF RADIONUCLIDES AND HEAVY METALS IN SOILS AND VEGETATION AROUND THE DARHT FACILITY: CONSTRUCTION PHASE (1996)

by

P.R. Fresquez, H.T. Haagenstad, and L. Naranjo, Jr.

ABSTRACT

As part of the Department of Energy's Mitigation Action Plan for the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility at Los Alamos National Laboratory (LANL), baseline concentrations of radionuclides (^{3}H, ^{137}Cs, ^{90}Sr, ^{238}Pu, ^{239}Pu, ^{241}Am, total U) and heavy metals (Ag, As, Ba, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se and Tl) in soil, sediment, and vegetation (overstory and understory) around the DARHT facility during the construction phase in 1996 were determined. Also, U and Be concentrations in soil samples collected in 1993 from within the proposed DARHT facility area are reported. Most radionuclides in soils, sediments, and vegetation were within current background and/or long-term regional statistical reference levels.

I. INTRODUCTION

The United States Department of Energy (DOE), in response to a Record of Decision concerning the Environmental Impact Statement for the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility (USDOE 1995a) at Los Alamos National Laboratory (LANL) (USDOE 1995b), prepared and issued a Mitigation Action Plan (MAP)—a plan that documents, in part, the DOE's commitment to protecting natural and cultural resources during the construction, operation, and decommissioning phases of the DARHT facility (USDOE 1996). One of the initial tasks identified in the MAP—section VIII.A.1.(a), "Impacts Affecting the General Environment"—mandates the collection of soils, invertebrates, plants, mammals, birds, and road kill from around the DARHT facility during the construction phase, as well as from a

control site, to determine baseline concentrations of radioactive or toxic materials.

The objective of this study was to determine baseline concentrations of radionuclides and heavy metals in soils, sediments, and vegetation around the DARHT facility during construction activities in 1996, as per the DARHT MAP section VIII.A.1.(a). These data were compared with radionuclide and heavy metal concentrations in soils, sediments, and similar vegetation collected from an off-site background location up-wind from the Laboratory. Also, U and Be concentrations in soil collected from within the proposed DARHT area in 1993 is presented (for completeness).

II. METHODS/MATERIALS

Four composite soil surface samples were collected with a stainless steel soil ring 10 cm (4 in.) in diameter driven 5 cm (2 in.) into the soil (ASTM 1990) approximately 24 m (80 ft) away, but within the large berm wall, from the N, E, S and W side of the DARHT facility (Fresquez 1996) (Figure 1). Samples were collected from the center and corners of a square area 10 m (32 ft) per side; the five subsamples were combined and mixed thoroughly in a three-gallon Ziploc® bag to form a composite sample. In addition, three sediment grab samples were collected at the 0- to 15-cm (0- to 6-in.) depth with a stainless steel scoop within three drainage channel/ponding areas originating from the DARHT facility on the N, W, and SW sides. Most of the sediment material on the N side was a result of erosion off the berm wall, whereas sediments from the other sites were from erosional processes off the grounds themselves. All soil and sediment samples were placed in prelabeled 500-mL polyproplylene bottles for radionuclide analysis and prelabeled 125-mL polyproplylene bottles for inorganic analysis. Bottles were fitted with chain-of-custody tape, placed into individual Ziploc® plastic bags, transported in a locked ice chest cooled to approximately 4°C, and submitted to the Environmental Chemistry Group (CST-9) at LANL for the analysis of radionuclides (^{3}H, ^{137}Cs, ^{238}Pu, $^{239,240}Pu$, ^{90}Sr, ^{241}Am, total uranium), and heavy metals (Ag, As, Ba,

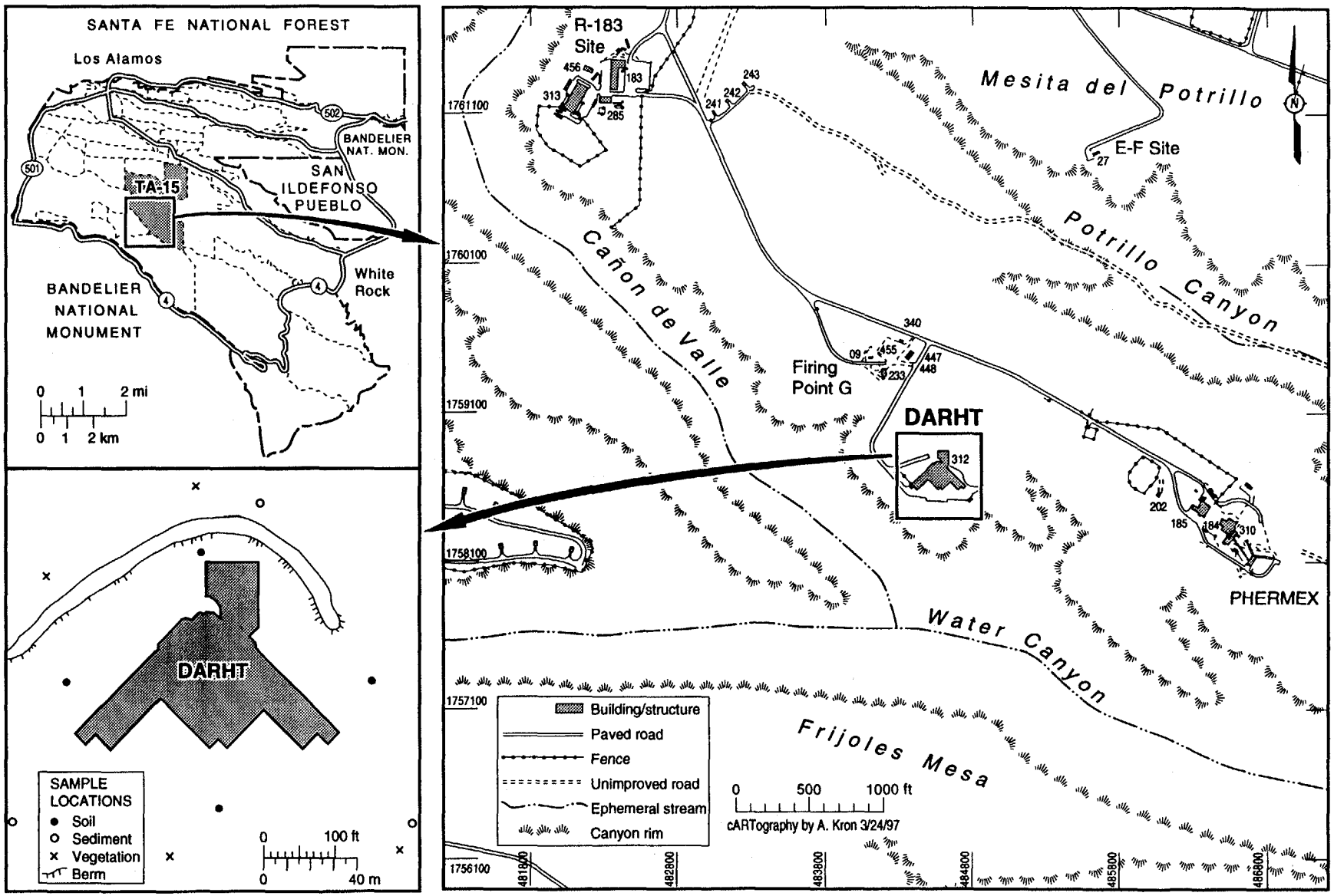

Figure 1. Sampling locations at DARHT at TA-15.

Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se and Tl). All methods of radionuclide (Purtymun et al. 1987, Fresquez et al. 1996a) and heavy metal (Fresquez et al. 1996b) analysis have been previously reported; uranium, however, was analyzed by kinetic phosphorescence analysis (KPA). Results are reported in pCi mL^{-1} (of soil moisture) for tritium, $\mu g\ g^{-1}$ dry for uranium and heavy metals, and pCi g^{-1} dry soil for all the other radioisotopes.

Vegetation samples were collected from overstory (trees) and understory (grasses and forbs) materials as close as possible to the soil sampling locations. Overstory samples, mostly ponderosa pine (*Pinus ponderosa*), consisted of tree-shoot tips approximately 2.5 to 5 cm (1 to 2 in.) in length at the 1.2- to 1.5-m (4- to 5-ft) height (Fresquez et al. 1996c). Understory samples, mostly grasses and forb species (top growth) were collected from the center and corners of a 10- by 10-m (32- by 32-ft) area. The pine tree(s) acted as the center of the square. Samples, consisting of 0.9 to 1.4 kg (2 to 3 lb) of composited material, were double bagged in labeled Ziploc® plastic bags and transported to the Laboratory in locked ice chests. At the Laboratory, unwashed samples from each bag were divided into three subsets to provide analysis material for tritium, heavy metals, and other radionuclides (^{90}Sr, ^{238}Pu, ^{239}Pu, ^{137}Cs, ^{241}Am, and total uranium).

Subsamples for ^{3}H analysis were placed in a glass beaker apparatus to collect distillate water (Salazar 1984). Vegetation subsamples for heavy metals were dried at 70°C for 48 h before being ground in a Wiley mill (40-mm screen). The rest of the subsample set(s) were placed in 1-L glass beakers and ashed at 500°C for 120 h; after ashing, each sample was pulverized and homogenized, transferred to labeled 500-mL polypropylene bottles, and submitted with the distillate (water) samples under full chain-of-custody to CST-9. Radionuclides and heavy metals in vegetation have been previously reported (Fresquez et al. 1996c, Fresquez et al. 1997a, Fresquez et al. 1997b). Results were reported in pCi mL^{-1} (of tissue moisture) for tritium, $\mu g\ g^{-1}$ ash for uranium, and pCi g^{-1} of ash for all the other isotopes. Results in grams of ash

are usually two to four orders of magnitude higher than live (wet) weight. Also, heavy metals are reported as $\mu g\ g^{-1}$ dry.

III. RESULTS

A summary report and original analytical data for U and Be in soils collected from the proposed DARHT facility area in 1993 can be found in Appendix A; these data are presented in this paper for record completeness. Similarly, a summarization of baseline radionuclide and heavy metal concentrations in soils, sediments, and vegetation collected around the DARHT facility during the initial stages of construction in 1996 can be found in Tables 1 through 4 (original analytical data reports can be found in Appendixes B through E). These data were compared to current (samples collected in 1996 from an off-site background location up-wind of LANL) and long-term (Regional Statistical Reference Levels [RSRLs]) sample data sets collected as part of the Soil (Fresquez et al. 1996a) and Vegetation (Fresquez et al. 1997a) Surveillance Programs. Also, soils radiological and heavy metal data were compared to LANL Screening Action Levels (SALs)—a concentration (s) derived from a risk assessment exposure model (FIMAD 1997).

Most radionuclides (Table 1), with the exception of ^{90}Sr, and heavy metals (Table 2) in soils and sediments collected around the DARHT facility in 1996 were equal to current background and/or to long-term RSRLs. All radionuclides and heavy metals in soils were below LANL SALs. Similarily, most radionuclides (Table 3) and heavy metals (Table 4) in vegetation (overstory and understory) collected around the DARHT facility were within current and/or long-term RSRLs.

Only one area, a sediment sample collected on the north side of the DARHT facility (and berm), contained an abnormally high amount of ^{90}Sr (4.3 pCi g^{-1} dry); this level is suspiciously high as all the other soil/sediment samples collected in the area, particularly a soil sample collected just 75 ft south of the suspect sample (on the south side of the berm), contained levels of ^{90}Sr well within background concentrations. This sediment sample result, for now, is being considered an

Table 1. Radionuclide concentrations in soils collected around the DARHT facility in 1996.

Location	^{3}H pCi mL^{-1}	^{90}Sr pCi g^{-1} dry	^{tot}U µg g^{-1} dry	^{137}Cs pCi g^{-1} dry	^{238}Pu pCi g^{-1} dry	^{239}Pu pCi g^{-1} dry	^{241}Am pCi g^{-1} dry
Soil							
North	0.01 (0.28)[1]	-0.4 (1.4)	1.71 (0.34)	0.10 (0.02)	0.001 (0.001)	0.003 (0.002)	0.006 (0.004)
East	0.33 (0.28)	-0.1 (0.4)	1.12 (0.22)	0.01 (0.04)	0.001 (0.001)	0.002 (0.001)	0.003 (0.004)
South	0.15 (0.28)	0.1 (0.4)	1.08 (0.22)	0.01 (0.04)	-0.001 (0.001)	-0.001 (0.002)	0.001 (0.002)
West	0.14 (0.28)	0.1 (0.4)	2.10 (0.42)	0.09 (0.04)	0.001 (0.001)	0.002 (0.002)	0.005 (0.004)
X (±2 std dev)	0.16 (0.26)	-0.1 (0.5)	1.50 (0.98)	0.05 (0.10)	0.001 (0.002)	0.002 (0.003)	0.004 (0.004)
Sediment							
North	-0.15 (0.28)	4.3 (0.8)[2]	3.67 (0.74)	0.13 (0.04)	0.001 (0.002)	0.004 (0.002)	0.006 (0.002)
East	0.07 (0.28)	-0.1 (0.4)	5.61 (1.12)	0.28 (0.06)	0.003 (0.002)	0.016 (0.004)	0.009 (0.004)
South West	0.05 (0.28)	0.0 (0.4)	4.30 (0.86)	0.31 (0.06)	0.002 (0.001)	0.010 (0.003)	0.005 (0.002)
X (±2 std dev)	-0.01 (0.24)	1.4 (5.0)	4.53 (1.98)	0.24 (0.19)	0.002 (0.002)	0.010 (0.012)	0.007 (0.004)
BG[3]	0.13 (0.26)	0.3 (0.4)	3.60 (0.16)	0.44 (0.05)	0.000 (0.000)	0.015 (0.002)	0.006 (0.002)
RSRL[4]	6.34	0.82	4.05	1.13	0.008	0.028	0.208
LANL SAL[5]	260.00	4.40	29.00	5.10	27.000	24.000	22.000

[1](± 2 counting uncertainties; values are the uncertainity in the analytical result at the 0.95% level).

[2]This result is suspected of being an outlier and will be compared to results obtained in 1997 and will be reevaluated.

[3]Background from Fresquez et al. (1997a). ^{241}Am background from ESR (1997).

[4]Regional Statistical Reference Level; this is the upper limit background concentration (mean + 2 std dev) from Fresquez et al. (1996a).

[5]Los Alamos National Laboratory Screening Action Level (FIMAD 1997).

Table 2. Total heavy metal concentrations (μg g^{-1} dry) in soils collected around the DARHT facility in 1996.

Location	Ag	As	Ba	Be	Cd	Cr	Cu	Hg	Ni	Pb	Sb	Se	Tl
Soil													
North	0.13[1]	1.7	109	0.86	0.13[1]	7.9	6.5	0.03[1]	6.2	11.5	0.3[1]	0.3	0.3[1]
East	0.13[1]	0.9	59	0.47	0.13[1]	5.5	2.0	0.03[1]	6.4	3.4	0.3[1]	0.3	0.3[1]
South	0.13[1]	0.8	45	0.51	0.13[1]	4.3	4.4	0.03[1]	6.0	3.0	0.3[1]	0.3	0.3[1]
West	0.13[1]	2.3	106	0.82	0.26	7.9	3.9	0.03[1]	7.2	7.8	0.3[1]	0.4	0.3[1]
X (±2SD)	0.13	1.4	80	0.67	0.16	6.4	4.2	0.03	6.5	6.4	0.3	0.3	0.3
	(0.00)	(1.4)	(65)	(0.41)	(0.13)	(3.6)	(3.7)	(0.00)	(1.1)	(8.0)	(0.0)	(0.1)	(0.0)
Sediment													
North	0.13[1]	1.4	89	0.50	0.13[1]	5.2	4.5	0.03[1]	5.7	5.8	0.3[1]	0.4	0.3[1]
East	0.13[1]	2.7	168	1.10	0.50	8.9	3.4	0.03[1]	9.7	9.7	0.3[1]	0.4	0.3[1]
South West	0.13[1]	1.7	110	0.70	0.13[1]	8.0	6.4	0.03[1]	6.4	7.1	0.3[1]	0.4	0.3[1]
X (±2SD)	0.13	1.9	122	0.80	0.25	7.4	4.8	0.03	7.3	7.5	0.3	0.4	0.3
	(0.00)	(1.4)	(82)	(0.61)	(0.43)	(3.9)	(3.0)	(0.00)	(4.3)	(4.0)	(0.0)	(0.0)	(0.0)
BG[2]	0.13	2.4	192	0.99	0.33	12.9	7.5	0.03	11.0	9.3	0.3	0.4	0.3
RSRL[3]	2.00	5.9	187	0.71	0.25	14.6	10.8	0.03	10.8	15.2	0.2	0.8	1.4
LANL SAL[4]	400.00	5.9	5600	0.99	80.00	400.0	3000.0	24.00	1600.0	500.0	32.0	400.0	6.4

[1]Less than values were reduced by one-half the concentration.

[2]Background from Fresquez et al. (1997a).

[3]Regional Statistical Reference Level; this is the upper limit background concentration (mean + 2 std dev) from Fresquez et al. (1997a).

[4]Los Alamos National Laboratory Screening Action Level (FIMAD 1997).

Table 3. Radionuclide concentrations in overstory (OS) and understory (US) vegetation collected around the DARHT facility in 1996.

Location	^{3}H pCi mL^{-1}	^{90}Sr pCi g^{-1} ash	^{tot}U µg g^{-1} ash	^{137}Cs pCi g^{-1} ash	^{238}Pu pCi g^{-1} ash	^{239}Pu pCi g^{-1} ash	^{241}Am pCi g^{-1} ash
North							
OS	0.12 (0.14)[1]	3.0 (0.4)	1.08 (0.11)	0.47 (0.08)	-0.001 (0.000)	0.005 (0.002)	0.003 (0.005)
US	-0.14 (0.14)	2.4 (0.4)	3.70 (0.37)	0.49 (0.08)	0.000 (0.000)	0.018 (0.002)	0.008 (0.003)
East							
OS	-0.20 (0.13)	5.3 (0.8)	0.71 (0.07)	0.69 (0.13)	0.001 (0.001)	0.004 (0.002)	0.008 (0.006)
US	-0.36 (0.13)	1.6 (0.4)	2.43 (0.24)	0.44 (0.39)	0.001 (0.001)	0.004 (0.001)	0.006 (0.004)
South							
OS	0.06 (0.14)	5.8 (0.8)	0.52 (0.05)	0.60 (0.53)	0.000 (0.002)	0.004 (0.002)	0.013 (0.028)
US	0.30 (0.14)	3.1 (0.4)	1.72 (0.17)	0.37 (0.06)	0.000 (0.000)	0.003 (0.001)	0.004 (0.004)
West							
OS	0.27 (0.14)	5.9 (0.8)	2.22 (0.22)	0.22 (0.06)	0.004 (0.002)	0.001 (0.001)	0.020 (0.012)
US	0.08 (0.14)	2.3 (1.8)	0.60 (0.06)	0.27 (0.24)	0.001 (0.001)	0.003 (0.001)	0.003 (0.005)
BG[2]							
OS	-0.25 (0.28)	7.9 (1.2)	1.21 (0.10)	0.27 (0.12)	0.025 (0.006)	0.051 (0.009)	0.002 (0.002)
US	0.37 (0.28)	3.0 (0.8)	1.16 (0.11)	0.61 (0.22)	0.001 (0.001)	0.008 (0.003)	0.002 (0.002)
RSRL[3]							
OS	1.87	13.3	1.63	1.65	0.038	0.075	0.004
US	1.56	4.1	1.53	0.93	0.005	0.011	0.004

[1](± 2 counting uncertainties; values are the uncertainty in the analytical results at the 0.95% level).

[2]Background from Fresquez et al. (1997a). ^{241}Am background from Fresquez et al. (1996c).

[3]Regional Statistical Reference Level; this is the upper limit background concentration (mean + 2 std dev) from Fresquez et al. (1997a).

Table 4. Total heavy metal concentrations (μg g^{-1} dry) in overstory (OS) and understory (US) vegetation collected around the DARHT facility in 1996.

Location	Ag	As	Ba	Be	Cd	Cr	Cu	Hg	Ni	Pb	Sb	Se	Tl
North													
OS	0.25[1]	0.10[1]	15.8	0.09[1]	0.19[1]	0.33	3.8	0.05[1]	30.8	7.4	7.5[1]	0.10[1]	0.15[1]
US	0.25[1]	0.10[1]	34.8	0.10[1]	0.19[1]	0.37	10.0	0.05[1]	2.6	0.9	7.5[1]	0.10[1]	0.15[1]
East													
OS	0.25[1]	0.10[1]	9.7	0.10[1]	0.19[1]	0.21	3.2	0.05[1]	6.5	3.0	7.5[1]	0.30	0.15[1]
US	0.25[1]	0.20	130.0	0.10[1]	0.19[1]	0.57	9.2	0.10	2.5	1.4	7.5[1]	0.10[1]	0.15[1]
South													
OS	0.25[1]	0.20	8.3	0.10[1]	0.19[1]	0.13[1]	3.5	0.05[1]	16.6	1.0	7.5[1]	0.20	0.15[1]
US	0.25[1]	0.10[1]	27.7	0.09[1]	0.19[1]	0.23	6.9	0.05[1]	1.7	0.5	7.5[1]	0.20	0.15[1]
West													
OS	0.25[1]	0.20	9.7	0.10[1]	0.19[1]	0.36	2.9	0.05[1]	1.6	1.7	7.5[1]	0.30	0.15[1]
US	0.25[1]	0.20	82.0	0.10[1]	0.19[1]	0.41	9.7	0.05[1]	8.0	2.0	7.5[1]	0.10[1]	0.15[1]
BG[2]													
OS	0.13[1]	0.10[1]	32.5	0.06[1]	0.13[1]	0.63		0.05[1]	1.1[1]	0.4	0.2[1]	0.20	0.50[1]
US	0.13[1]	0.10[1]	69.0	0.06[1]	0.25	0.63[1]	4.8[4]	0.05[1]	1.1[1]	0.7	0.2[1]	0.20	0.50[1]
RSRL[3]													
OS	0.84	0.10	52.2	0.08	0.26	0.98		0.05	1.7	3.5	0.8	0.29	19.36
US	0.84	0.10	122.0	0.08	0.30	0.98	8.5[4]	0.05	1.7	3.2	0.8	3.65	19.36

[1]Less than values were reduced by one-half the concentration.
[2]Background from Fresquez et al. (1997a).
[3]Regional Statistical Reference Level; this is the upper limit background concentration (mean + 2 std dev) from Fresquez et al. (1997a).
[4]Background from Fresquez et al. (1990).

outlier, and will be compared with sediment samples collected from the same location in 1997 and reevaluated.

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APPENDIX A

BASELINE SOIL URANIUM AND BERYLLIUM CONCENTRATIONS WITHIN THE PROPOSED DARHT FACILITY AT TA-15 IN 1993: SUMMARY REPORT AND ANALYTICAL DATA REPORT

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO: Ann Pendergrass, ESH-20 DATE: October 27, 1994

FROM: Phil Fresquez, ESH-20 MAIL STOP/TELEPHONE: M887/7-0815

SYMBOL: ESH-20/EARE-95-0081

SUBJECT: **BASELINE SOIL URANIUM AND BERYLLIUM CONCENTRATIONS AROUND THE PROPOSED DARHT FACILITY AT TA-15**

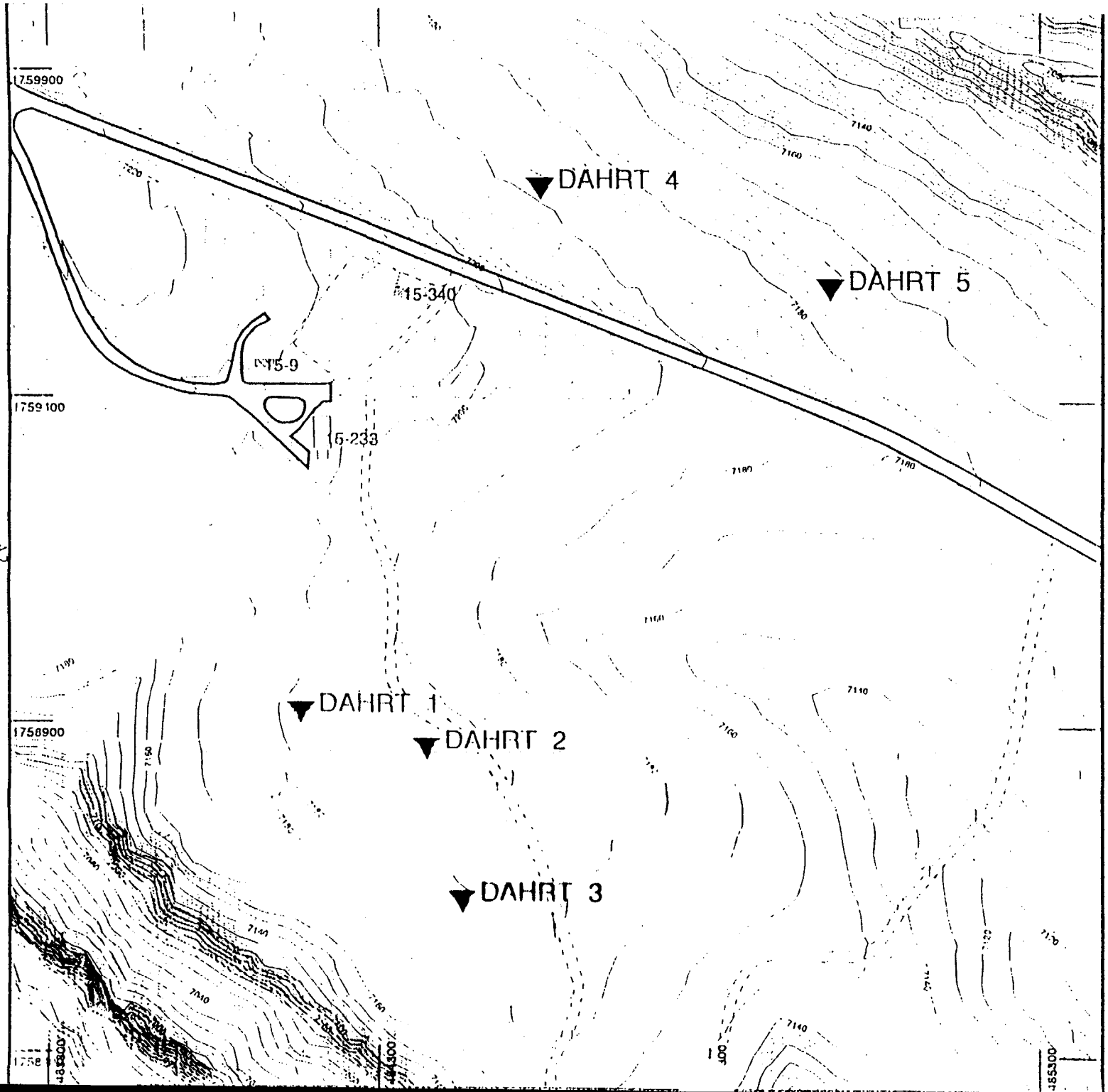
On August 18, 1993, the Environmental Protection Group (ESH-8) collected five soil surface composite samples for chemical analysis of total uranium and beryllium around the proposed site of the DARHT facility at TA-15, as per DOE Order 5400.1 (i.e., preoperational monitoring of facilities, sites, and operations). Enclosed you will find a map depicting the soil sampling location and preliminary results show:

	Total Uranium (ug/g)	Total Beryllium (ug/g)
DARHT-1	6.2	0.84
DARHT-2	4.6	0.94
DARHT-3	1.7	0.96
DARHT-4	6.6	0.89
DARHT-5	2.4	0.91
Mean (2SD)	4.3 (±4.4)	0.91 (±1.82)
RSRL[1]	3.4[2]	2.88[3]

[1] RSRL (Regional Statistical Reference Level).
[2] Purtymun et. Al. 1987. Background Concentrations of Radionuclides in Soils and River Sediments in Northern New Mexico, 1974-1986, "LANL report LA-10186-MS.
[3] Ferenbaugh et. Al. 1990. "Sigma Mesa: Background Elemental Concentrations in Soil and Vegetation. 1979," LANL report LA-11941-MS

As you can see, total uranium is just above the regional statistical (natural and worldwide fallout) reference level, whereas, total beryllium is within soil standards measured around the Los Alamos area.

Cy: M. Burns, DX-DO, MS P940
T. Foxx, ESH-20, MS M887
K. Bennett, ESH-20, MS M887
J. Siino, ESH-20, MS M887
D. Chastain, ENG-DO, MNS P940)



OU-1086 DAHRT 1PLES

LEGEND

- Contours, 2 foot
- Contours, 10 foot
- Roads, Dirt
- Roads, Paved
- Permanent Structure
- Temporary Structure
- Underground Structure
- DAHRT Sample

University of California
Los Alamos National Laboratory
Earth and Environmental Sciences
FIMAD

Map Coordinates in New Mexico State Plane East
Grid interval, in feet: 1.25
Feet per inch on map = 200

Produced by M Jones
FIMAD G10141

REPORT NUMBER: 22744

********** EM-9 ANALYTICAL REPORT **********

Prepared by: MKOBY on 9-Feb-1994

REQUEST NUMBER: 15472 MATRIX: SS ANALYST: MET PROGRAM CODE: Y463

OWNER: Philip R. Fresquez GROUP: ESH-8 MAIL-STOP: K490 PHONE: 7-0815

NOTEBOOK: Y04156 PAGE: 24

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
DARHT-1	93.17052	BE	ICPES	0.84	0.08	UG/G	12/13/93	
DARHT-1	93.17052	U	ICPMS	6.2	0.8	UG/G	11/17/93	
DARHT-2	93.17053	BE	ICPES	0.94	0.09	UG/G	12/13/93	
DARHT-2	93.17053	U	ICPMS	4.6	0.5	UG/G	11/17/93	
DARHT-3	93.17054	BE	ICPES	0.96	0.09	UG/G	12/13/93	
DARHT-3	93.17054	U	ICPMS	1.7	0.2	UG/G	11/17/93	
DARHT-4	93.17055	BE	ICPES	0.89	0.09	UG/G	12/13/93	
DARHT-4	93.17055	U	ICPMS	6.6	0.4	UG/G	11/17/93	
DARHT-5	93.17056	BE	ICPES	0.91	0.09	UG/G	12/13/93	
DARHT-5	93.17056	U	ICPMS	2.4	0.2	UG/G	11/17/93	

****

REPORT NUMBER: 22744 (continued)

********** EM-9 QUALITY ASSURANCE REPORT **********

Prepared by: MKOBY on 9-Feb-1994

REQUEST NUMBER: 15472 MATRIX: SS ANALYST: MET PROGRAM CODE: Y463

OWNER: Philip R. Fresquez GROUP: ESH-8 MAIL-STOP: K490 PHONE: 7-0815

NOTEBOOK: Y04156 PAGE: 24

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reason

___ Only qualitative data requested

X Only Blind QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
93.17051	U	98.	27.	UG/L	90.	3.9	11/17/93	UNDER CONTROL

REPORT NUMBER: 22744

Analyst	Reviewer	Section Leader	QA Officer
2/9/94	2/9/94	2/10/94	2/10/94
Date	Date	Date	Date

* Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

APPENDIX B

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN SOILS COLLECTED AROUND THE DARHT FACILITY DURING 1996

To: Phil Fresquez

Date: Nov. 18, 1996

From: Richard Robinson

Subject: Report No 41729

The blind QC 96.06367 for H-3 was reported out of control in report number 41729 for RN 23680. These samples were batched in the analytical instrument with your samples. We have analyzed 96.06367 three times, obtaining similar data but all results (1932, 2424, and 2377) were out of control. We have not been able to determine the cause for 96.06367 being out of control but do not believe the data for your samples has been compromised. Both the open QC's (00.23494 and 00.34098) were in control. Two other blind QC's run with this batch of samples were in control. Therefor we believe these results are within the CST-9 criteria for reporting. Please contact me if I can be of assistance with interpretation of this data.

REPORT NUMBER: 41729 Page: C

********** CST ANALYTICAL REPORT **********

Prepared by: ROBINSON on 26-Sep-1996

ANALYSIS: H-3 REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: LS ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	7.	139.	PCI/L	9/24/96	
S	96.06369	151.	140.	PCI/L	9/24/96	
W	96.06370	143.	140.	PCI/L	9/24/96	
E	96.06371	334.	141.	PCI/L	9/24/96	
SED-E	96.06372	74.	140.	PCI/L	9/24/96	
SED-S/W	96.06373	53.	139.	PCI/L	9/24/96	
SED-N	96.06374	- 148.	138.	PCI/L	9/24/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
SED-E	96.06372	283.	141.	PCI/L	9/24/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: ROBINSON on 26-Sep-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.34094	62.	139.	PCI/L	0.0		9/24/96	UNDER CONTROL
00.34094	283.	141.	PCI/L	0.0		9/24/96	WARNING 2-3 SIG
00.34094	74.	140.	PCI/L	0.0		9/24/96	UNDER CONTROL
00.34094	- 553.	139.	PCI/L	0.0		9/24/96	UNDER CONTROL
00.34094	- 376.	136.	PCI/L	0.0		9/24/96	UNDER CONTROL
00.34094	289.	141.	PCI/L	0.0		9/24/96	WARNING 2-3 SIG
00.34098	13572.	141.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL
00.34098	12779.	202.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL
00.34098	13920.	206.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL
00.34098	13315.	204.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL
00.34098	13356.	204.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL
00.34098	13427.	205.	PCI/L	14014.	1401.	9/24/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.05366	17.642	0.219	NCI/L	18.59	0.69	9/24/96	UNDER CONTROL
96.05367	15.225	0.211	NCI/L	16.06	0.59	9/24/96	UNDER CONTROL
96.06305	9.237	0.188	NCI/L	9.45	0.35	9/24/96	UNDER CONTROL
96.06367	1932.	152.	PCI/L	850.	22.	9/24/96	OUT OF CONTROL

2424

REPORT NUMBER: 41729

Analyst	Reviewer	Team Leader	QA Officer
092696	111826	11/19/96	11/20/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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********** CST ANALYTICAL REPORT **********

Prepared by: CAH on 15-Oct-1996

ANALYSIS: AM-241 REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: RAS ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE		COMMENT
N	96.06368	0.006	0.002	PCI/G	10/08/96	15%	5-6
S	96.06369	0.001	0.001	PCI/G	10/08/96	46%	
W	96.06370	0.005	0.002	PCI/G	10/08/96	46%	
E	96.06371	0.003	0.002	PCI/G	10/08/96	52%	
SED-E	96.06372	0.009	0.002	PCI/G	10/08/96	48%	
SED-S/W	96.06373	0.0051	0.0012	PCI/G	10/08/96	64%	
SED-N	96.06374	0.0063	0.0012	PCI/G	10/08/96	75%	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE		COMMENT
S	96.06369	0.016	0.007	PCI/G	10/08/96	40%	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: CAH on 15-Oct-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF TRACER RECOVERY IN CUSTOMER AND QA SAMPLES

CUSTOMER NUMBER	CST SAMPLE NUMBER	ANALYSIS	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COLLECTION DATE	COMMENT
00.33911	96.06365	AM-243T	6.08	4.1952	PCI/SAMPLE	7/31/96	69%
N	96.06368	AM-243T	6.08	0.912	PCI/SAMPLE	7/31/96	15%
S	96.06369	AM-243T	6.08	2.7968	PCI/SAMPLE	7/31/96	46%
W	96.06370	AM-243T	6.08	2.7968	PCI/SAMPLE	7/31/96	46%
E	96.06371	AM-243T	6.08	3.1616	PCI/SAMPLE	7/31/96	52%
SED-E	96.06372	AM-243T	6.08	2.9184	PCI/SAMPLE	7/31/96	48%
SED-S/W	96.06373	AM-243T	6.08	3.8912	PCI/SAMPLE	7/31/96	64%
SED-N	96.06374	AM-243T	6.08	4.56	PCI/SAMPLE	7/31/96	75%

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.22777	0.001	0.001	PCI/G	0.0		10/08/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06365	0.82	0.04	PCI/G	0.78	0.035	10/08/96	UNDER CONTROL

REPORT NUMBER: 41945

Analyst	Reviewer	Team Leader	QA Officer
15 Oct 96	10/17/96	10/17/96	10/18/96

RJP	SG	SG	mag
15 Oct 96	10/17/96	10/17/96	10/18/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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********** CST ANALYTICAL REPORT **********

Prepared by: SRG on 24-Oct-1996

ANALYSIS: CS-137 REQUEST NUMBER: 23680 MATRIX: SS ANALYST: SAMMY GARCIA PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: G ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	0.1	0.01	PCI/G	10/24/96	
S	96.06369	0.01	0.02	PCI/G	10/24/96	
W	96.06370	0.09	0.02	PCI/G	10/24/96	
E	96.06371	0.01	0.02	PCI/G	10/24/96	
SED-E	96.06372	0.28	0.03	PCI/G	10/24/96	
SED-S/W	96.06373	0.31	0.03	PCI/G	10/24/96	
SED-N	96.06374	0.13	0.02	PCI/G	10/24/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	0.05	0.01	PCI/G	10/24/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: SRG on 24-Oct-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: SAMMY GARCIA PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.22777	0.0	0.08	PCI/G	0.0		10/24/96	UNDER CONTROL
00.33404	4.71	0.29	PCI/G	4.98	0.16	10/24/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06366	50.6	2.7	PCI/G	51.6	1.702	10/24/96	UNDER CONTROL

REPORT NUMBER: 42017

Analyst	Reviewer	Team Leader	QA Officer
10/24/96	10/24/96	10/24/96	10/24/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

REPORT NUMBER: 41591

********** CST ANALYTICAL REPORT **********

Prepared by: CAH on 16-Sep-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	PU-238	RAS	0.0009	0.0006	PCI/G	9/13/96	70%
N	96.06368	PU-239	RAS	0.0027	0.0009	PCI/G	9/13/96	70%
S	96.06369	PU-238	RAS	- 0.0008	0.0007	PCI/G	9/13/96	27%
S	96.06369	PU-239	RAS	- 0.0012	0.0005	PCI/G	9/13/96	27%
W	96.06370	PU-238	RAS	0.0011	0.0007	PCI/G	9/13/96	79%
W	96.06370	PU-239	RAS	0.0022	0.0008	PCI/G	9/13/96	79%
E	96.06371	PU-238	RAS	0.0011	0.0006	PCI/G	9/13/96	88%
E	96.06371	PU-239	RAS	0.0023	0.0007	PCI/G	9/13/96	88%
SED-E	96.06372	PU-238	RAS	0.0027	0.0009	PCI/G	9/13/96	91%
SED-E	96.06372	PU-239	RAS	0.0162	0.0018	PCI/G	9/13/96	91%
SED-S/W	96.06373	PU-238	RAS	0.0015	0.0006	PCI/G	9/13/96	80%
SED-S/W	96.06373	PU-239	RAS	0.0098	0.0015	PCI/G	9/13/96	80%
SED-N	96.06374	PU-238	RAS	0.0008	0.0008	PCI/G	9/13/96	70%
SED-N	96.06374	PU-239	RAS	0.0039	0.0011	PCI/G	9/13/96	70%

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
S	96.06369	PU-238	RAS	0.044	0.004	PCI/G	9/16/96	58%
S	96.06369	PU-239	RAS	0.042	0.004	PCI/G	9/16/96	58%

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REPORT NUMBER: 41591 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: CAH on 16-Sep-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF TRACER RECOVERY IN CUSTOMER AND QA SAMPLES

CUSTOMER NUMBER	CST SAMPLE NUMBER	ANALYSIS	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COLLECTION DATE	COMMENT
00.33911	96.06365	PU-242T	4.11	3.4113	PCI/SAMPLE	7/31/96	83%
N	96.06368	PU-242T	4.11	2.877	PCI/SAMPLE	7/31/96	70%
S	96.06369	PU-242T	4.11	1.1097	PCI/SAMPLE	7/31/96	27%
W	96.06370	PU-242T	4.11	3.2469	PCI/SAMPLE	7/31/96	79%
E	96.06371	PU-242T	4.11	3.6168	PCI/SAMPLE	7/31/96	88%
SED-E	96.06372	PU-242T	4.11	3.7401	PCI/SAMPLE	7/31/96	91%
SED-S/W	96.06373	PU-242T	4.11	3.288	PCI/SAMPLE	7/31/96	80%
SED-N	96.06374	PU-242T	4.11	2.877	PCI/SAMPLE	7/31/96	70%

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.22777	PU-238	0.0	0.001	PCI/G	0.0		9/16/96	UNDER CONTROL
00.22777	PU-239	0.0	0.001	PCI/G	0.0		9/16/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06365	PU-238	0.5613	0.0182	PCI/G	0.64	0.022	9/13/96	WARNING 2-3 SIG
96.06365	PU-239	0.5814	0.0187	PCI/G	0.63	0.02	9/13/96	UNDER CONTROL

REPORT NUMBER: 41591

Analyst	Reviewer	Team Leader	QA Officer
RJP	SJG	SJG	mag
17 Sept 96	9/17/96	9/17/96	9/19/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

REPORT NUMBER: 42236

********** CST ANALYTICAL REPORT **********

Prepared by: EBAID on 14-Nov-1996

ANALYSIS: SR-90 REQUEST NUMBER: 23680 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: PC ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER		ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	-	0.4	0.7	PCI/G	11/04/96	
S	96.06369		0.1	0.2	PCI/G	11/04/96	
W	96.06370		0.1	0.2	PCI/G	11/04/96	
E	96.06371	-	0.1	0.2	PCI/G	11/04/96	
SED-E	96.06372	-	0.1	0.2	PCI/G	11/04/96	
SED-S/W	96.06373		0.0	0.2	PCI/G	11/04/96	
SED-N	96.06374		4.3	0.4	PCI/G	11/04/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
E	96.06371	0.1	0.2	PCI/G	11/04/96	
E	96.06371	0.1	0.2	PCI/G	11/04/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: EBAID on 14-Nov-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

Y ___ Only Blind QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06363	27.1	1.8	PCI/G	29.3	0.88	11/04/96	UNDER CONTROL

REPORT NUMBER: 42236

Analyst	Reviewer	Team Leader	QA Officer
Nov. 14 96	12/2/96	12/3/96	12/3/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

Los Alamos
NATIONAL LABORATORY
memorandum
Chemical Science and Technology
Responsible Chemistry for America

CST-9/Inorganic Trace Analysis
Los Alamos, New Mexico 87545

To/MS: Phil Fresquez/M887
From/MS: Alice Slemmons, CST-9/K484
Phone/FAX: 7-5233/5-5982
Symbol:
Date: September 25,1996

Re: Request number 23680
Analyte: U by KPA

Request number 23680 contains seven samples, a duplicate, a blank, and two QC's. The open QC, 00.33291, is a water that was run as a calibration check. It was Under Control, thus ensuring accurate instrument response. However, the blind QC, 96.06364, was Out of Control . This QC is one for which we historically have low results. The problem does not appear to be in the procedure, but rather in the dissolution of this particular QC sample.

********** CST ANALYTICAL REPORT **********

Prepared by: AKS on 20-Sep-1996

ANALYSIS: U REQUEST NUMBER: 23680 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: KPA ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06368	1.71	0.17	UG/G	9/20/96	
S	96.06369	1.08	0.11	UG/G	9/20/96	
W	96.06370	2.1	0.21	UG/G	9/20/96	
E	96.06371	1.12	0.11	UG/G	9/20/96	
SED-E	96.06372	5.61	0.56	UG/G	9/20/96	
SED-S/W	96.06373	4.3	0.43	UG/G	9/20/96	
SED-N	96.06374	3.67	0.37	UG/G	9/20/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
SED-S/W	96.06373	5.37	0.54	UG/G	9/20/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: AKS on 20-Sep-1996

REQUEST NUMBER: 23680 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.22777 -	0.01	0.01	PCI/G	0.0		9/20/96	UNDER CONTROL
00.33291	4.48	0.45	UG/L	4.5	0.45	9/20/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06364	0.6	0.06	UG/G	0.98	0.05	9/20/96	OUT OF CONTROL

REPORT NUMBER: 41700				
	Analyst	Reviewer	Team Leader	QA Officer
	9/23/96 Date	9/26/96 Date	10/01/96 Date	10/4/96 Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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APPENDIX C

ANALYTICAL DATA REPORTS OF HEAVY METAL CONCENTRATIONS IN SOILS COLLECTED AROUND THE DARHT FACILITY DURING 1996

REPORT NUMBER: 41798

********** CST ANALYTICAL REPORT **********

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: OES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: 90126 PAGE: 130

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AG	ICPES	< 0.25		UG/G	9/30/96	
N	96.06381	BA	ICPES	109.	5.	UG/G	9/30/96	
N	96.06381	BE	ICPES	0.86	0.12	UG/G	9/30/96	
N	96.06381	CD	ICPES	< 0.25		UG/G	9/30/96	
N	96.06381	CR	ICPES	7.9	1.2	UG/G	9/30/96	
N	96.06381	CU	ICPES	6.5	6.	UG/G	9/30/96	
N	96.06381	NI	ICPES	6.2	6.2	UG/G	9/30/96	
S	96.06382	AG	ICPES	< 0.25		UG/G	9/30/96	
S	96.06382	BA	ICPES	45.3	0.7	UG/G	9/30/96	
S	96.06382	BE	ICPES	0.51	0.12	UG/G	9/30/96	
S	96.06382	CD	ICPES	< 0.25		UG/G	9/30/96	
S	96.06382	CR	ICPES	4.28	1.25	UG/G	9/30/96	
S	96.06382	CU	ICPES	4.39	1.63	UG/G	9/30/96	
S	96.06382	NI	ICPES	6.	3.	UG/G	9/30/96	
W	96.06383	AG	ICPES	< 0.25		UG/G	9/30/96	
W	96.06383	BA	ICPES	106.	1.	UG/G	9/30/96	
W	96.06383	BE	ICPES	0.82	0.12	UG/G	9/30/96	
W	96.06383	CD	ICPES	0.26	0.26	UG/G	9/30/96	
W	96.06383	CR	ICPES	7.9	1.6	UG/G	9/30/96	
W	96.06383	CU	ICPES	3.88	1.63	UG/G	9/30/96	
W	96.06383	NI	ICPES	7.2	2.	UG/G	9/30/96	
E	96.06384	AG	ICPES	< 0.25		UG/G	9/30/96	
E	96.06384	BA	ICPES	59.1	1.8	UG/G	9/30/96	
E	96.06384	BE	ICPES	0.47	0.12	UG/G	9/30/96	
E	96.06384	CD	ICPES	< 0.25		UG/G	9/30/96	
E	96.06384	CR	ICPES	5.5	2.	UG/G	9/30/96	
E	96.06384	CU	ICPES	1.97	1.63	UG/G	9/30/96	
E	96.06384	NI	ICPES	6.4	3.9	UG/G	9/30/96	
SED-E	96.06385	AG	ICPES	< 0.25		UG/G	9/30/96	
SED-E	96.06385	BA	ICPES	168.	4.	UG/G	9/30/96	
SED-E	96.06385	BE	ICPES	1.1	0.12	UG/G	9/30/96	
SED-E	96.06385	CD	ICPES	0.5	0.5	UG/G	9/30/96	
SED-E	96.06385	CR	ICPES	8.9	1.2	UG/G	9/30/96	
SED-E	96.06385	CU	ICPES	3.38	1.63	UG/G	9/30/96	
SED-E	96.06385	NI	ICPES	9.7	3.3	UG/G	9/30/96	
SED S/W	96.06386	AG	ICPES	< 0.25		UG/G	9/30/96	
SED S/W	96.06386	BA	ICPES	110.	4.	UG/G	9/30/96	

SED S/W	96.06386	BE	ICPES	0.7	0.12	UG/G	9/30/96
SED S/W	96.06386	CD	ICPES	< 0.25		UG/G	9/30/96
SED S/W	96.06386	CR	ICPES	8.	1.	UG/G	9/30/96
SED S/W	96.06386	CU	ICPES	6.38	6.38	UG/G	9/30/96
SED S/W	96.06386	NI	ICPES	6.4	2.7	UG/G	9/30/96
SED-N	96.06387	AG	ICPES	< 0.25		UG/G	9/30/96
SED-N	96.06387	BA	ICPES	89.	1.	UG/G	9/30/96
SED-N	96.06387	BE	ICPES	0.5	0.12	UG/G	9/30/96
SED-N	96.06387	CD	ICPES	< 0.25		UG/G	9/30/96
SED-N	96.06387	CR	ICPES	5.2	1.7	UG/G	9/30/96
SED-N	96.06387	CU	ICPES	4.48	4.48	UG/G	9/30/96
SED-N	96.06387	NI	ICPES	5.7	5.7	UG/G	9/30/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AG	ICPES	< 0.25		UG/G	9/30/96	
N	96.06381	BA	ICPES	118.	2.	UG/G	9/30/96	
N	96.06381	BE	ICPES	0.91	0.12	UG/G	9/30/96	
N	96.06381	CD	ICPES	< 0.25		UG/G	9/30/96	
N	96.06381	CR	ICPES	10.1	1.3	UG/G	9/30/96	
N	96.06381	CU	ICPES	3.8	1.6	UG/G	9/30/96	
N	96.06381	NI	ICPES	9.1	2.2	UG/G	9/30/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AG	ICPES	30.3	22.6	UG/G	9/30/96	
N	96.06381	BA	ICPES	30.	40.	UG/G	9/30/96	
N	96.06381	BE	ICPES	30.3	33.	UG/G	9/30/96	
N	96.06381	CD	ICPES	30.3	33.9	UG/G	9/30/96	
N	96.06381	CR	ICPES	30.3	32.9	UG/G	9/30/96	
N	96.06381	CU	ICPES	30.3	31.2	UG/G	9/30/96	
N	96.06381	NI	ICPES	30.3	35.7	UG/G	9/30/96	

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REPORT NUMBER: 41798 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: OES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: 90126 PAGE: 130

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	AG	65.	1.	MG/KG	92.5	49.5	9/30/96	UNDER CONTROL
00.30469	BA	264.	7.	MG/KG	276.	82.5	9/30/96	UNDER CONTROL
00.30469	BE	86.	2.	MG/KG	95.1	43.	9/30/96	UNDER CONTROL
00.30469	CD	93.	3.	MG/KG	102.	56.5	9/30/96	UNDER CONTROL
00.30469	CR	142.	4.	MG/KG	154.	73.	9/30/96	UNDER CONTROL
00.30469	CU	110.	3.	MG/KG	119.	59.5	9/30/96	UNDER CONTROL
00.30469	NI	147.	6.	MG/KG	163.	85.5	9/30/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06379	AG	< 0.25		UG/G	4.63	0.39	9/30/96	OUT OF CONTROL
96.06379	BA	203.	3.5	UG/G	726.	38.	9/30/96	OUT OF CONTROL
96.06379	CD	40.3	1.5	UG/G	41.7	0.25	9/30/96	UNDER CONTROL
96.06379	CU	104.	2.	UG/G	114.	2.	9/30/96	OUT OF CONTROL
96.06379	NI	17.2	2.3	UG/G	20.6	1.1	9/30/96	UNDER CONTROL

The following analyst QC's have no CV data for comparison

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
00.01450	96.06379	BE	1.1	0.12	UG/G	9/30/96	NO DATA AVAIL.
00.01450	96.06379	CR	22.	1.2	UG/G	9/30/96	NO DATA AVAIL.

REPORT NUMBER: 41798

Analyst	Reviewer	Team Leader	QA Officer
10-1-96	9-30-96	10/3/96	10/4/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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REPORT NUMBER: 41833

********** CST ANALYTICAL REPORT **********

Prepared by: LRB on 2-Oct-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: AAS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: CST9130 PAGE: 55

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AS	ETVAA	1.7	0.3	UG/G	9/21/96	
N	96.06381	HG	CVAA	< 0.05		UG/G	10/01/96	
N	96.06381	SE	ETVAA	0.3	0.1	UG/G	9/19/96	
S	96.06382	AS	ETVAA	0.8	0.3	UG/G	9/21/96	
S	96.06382	HG	CVAA	< 0.05		UG/G	10/01/96	
S	96.06382	SE	ETVAA	0.3	0.2	UG/G	9/19/96	
W	96.06383	AS	ETVAA	2.3	0.3	UG/G	9/21/96	
W	96.06383	HG	CVAA	< 0.05		UG/G	10/01/96	
W	96.06383	SE	ETVAA	0.4	0.1	UG/G	9/19/96	
E	96.06384	AS	ETVAA	0.9	0.8	UG/G	9/21/96	
E	96.06384	HG	CVAA	< 0.05		UG/G	10/01/96	
E	96.06384	SE	ETVAA	0.3	0.1	UG/G	9/19/96	
SED-E	96.06385	AS	ETVAA	2.7	0.3	UG/G	9/21/96	
SED-E	96.06385	HG	CVAA	< 0.05		UG/G	10/01/96	
SED-E	96.06385	SE	ETVAA	0.4	0.3	UG/G	9/19/96	
SED S/W	96.06386	AS	ETVAA	1.7	0.3	UG/G	9/21/96	
SED S/W	96.06386	HG	CVAA	< 0.05		UG/G	10/01/96	
SED S/W	96.06386	SE	ETVAA	0.4	0.1	UG/G	9/19/96	
SED-N	96.06387	AS	ETVAA	1.4	0.3	UG/G	9/21/96	
SED-N	96.06387	HG	CVAA	< 0.05		UG/G	10/01/96	
SED-N	96.06387	SE	ETVAA	0.4	0.1	UG/G	9/19/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AS	ETVAA	1.9	0.3	UG/G	9/21/96	
N	96.06381	HG	CVAA	< 0.05		UG/G	10/01/96	
N	96.06381	HG	CVAA	< 0.05		UG/G	10/01/96	
N	96.06381	SE	ETVAA	0.4	0.1	UG/G	9/19/96	
S	96.06382	HG	CVAA	< 0.05		UG/G	10/01/96	
S	96.06382	HG	CVAA	< 0.05		UG/G	10/01/96	
W	96.06383	HG	CVAA	< 0.05		UG/G	10/01/96	
W	96.06383	HG	CVAA	< 0.05		UG/G	10/01/96	
W	96.06383	HG	CVAA	< 0.05		UG/G	10/01/96	

E	96.06384	HG	CVAA	< 0.05	UG/G	10/01/96
E	96.06384	HG	CVAA	< 0.05	UG/G	10/01/96
SED-E	96.06385	HG	CVAA	< 0.05	UG/G	10/01/96
SED-E	96.06385	HG	CVAA	< 0.05	UG/G	10/01/96
SED S/W	96.06386	HG	CVAA	< 0.05	UG/G	10/01/96
SED S/W	96.06386	HG	CVAA	< 0.05	UG/G	10/01/96
SED-N	96.06387	HG	CVAA	< 0.05	UG/G	10/01/96
SED-N	96.06387	HG	CVAA	< 0.05	UG/G	10/01/96

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
N	96.06381	AS	ETVAA	6.05	5.22	UG/G	9/24/96	
N	96.06381	HG	CVAA	0.46	0.46	UG/G	10/01/96	
N	96.06381	SE	ETVAA	6.05	3.63	UG/G	9/24/96	

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REPORT NUMBER: 41833 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: LRB on 2-Oct-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: AAS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: CST9130 PAGE: 55

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	AS	123.	4.	MG/KG	128.	71.	9/21/96	UNDER CONTROL
00.30469	HG	4.4	0.4	MG/KG	4.85	2.4	10/01/96	UNDER CONTROL
00.30469	SE	77.	1.	MG/KG	101.	55.	9/21/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06379	AS	123.	5.	UG/G	105.	8.	9/21/96	UNDER CONTROL
96.06379	SE	1.5	0.1	UG/G	1.52	0.14	9/19/96	UNDER CONTROL
96.06380	HG	200.	100.	NG/G	165.		10/01/96	UNDER CONTROL

REPORT NUMBER: 41833

Analyst	Reviewer	Team Leader	QA Officer
10-2-96	10/2/96	10/3/96	10/3/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

REPORT NUMBER: 41793

********** CST ANALYTICAL REPORT **********

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: IMS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	PB	ICPMS	11.5	0.6	UG/G	9/27/96	
N	96.06381	SB	ICPMS	< 0.6		UG/G	9/27/96	
N	96.06381	TL	ICPMS	< 0.6		UG/G	9/27/96	
S	96.06382	PB	ICPMS	3.	0.6	UG/G	9/27/96	
S	96.06382	SB	ICPMS	< 0.6		UG/G	9/27/96	
S	96.06382	TL	ICPMS	< 0.6		UG/G	9/27/96	
W	96.06383	PB	ICPMS	7.8	0.6	UG/G	9/27/96	
W	96.06383	SB	ICPMS	< 0.6		UG/G	9/27/96	
W	96.06383	TL	ICPMS	< 0.6		UG/G	9/27/96	
E	96.06384	PB	ICPMS	3.4	0.6	UG/G	9/27/96	
E	96.06384	SB	ICPMS	< 0.6		UG/G	9/27/96	
E	96.06384	TL	ICPMS	< 0.6		UG/G	9/27/96	
SED-E	96.06385	PB	ICPMS	9.7	0.6	UG/G	9/27/96	
SED-E	96.06385	SB	ICPMS	< 0.6		UG/G	9/27/96	
SED-E	96.06385	TL	ICPMS	< 0.6		UG/G	9/27/96	
SED S/W	96.06386	PB	ICPMS	7.1	0.6	UG/G	9/27/96	
SED S/W	96.06386	SB	ICPMS	< 0.6		UG/G	9/27/96	
SED S/W	96.06386	TL	ICPMS	< 0.6		UG/G	9/27/96	
SED-N	96.06387	PB	ICPMS	5.8	0.6	UG/G	9/27/96	
SED-N	96.06387	SB	ICPMS	< 0.6		UG/G	9/27/96	
SED-N	96.06387	TL	ICPMS	< 0.6		UG/G	9/27/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N	96.06381	PB	ICPMS	6.5	0.6	UG/G	9/27/96	
N	96.06381	SB	ICPMS	< 0.6		UG/G	9/27/96	
N	96.06381	TL	ICPMS	< 0.6		UG/G	9/27/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT

N	96.06381	PB	ICPMS	6.05		UG/G	9/27/96
N	96.06381	SB	ICPMS	6.05		UG/G	9/27/96
N	96.06381	TL	ICPMS	6.05	4.2	UG/G	9/27/96

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REPORT NUMBER: 41793 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23682 MATRIX: SS ANALYST: IMS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	PB	109.	4.	MG/KG	147.	73.5	9/27/96	UNDER CONTROL
00.30469	SB	2.	0.6	MG/KG	43.9	93.5	9/27/96	UNDER CONTROL
00.30469	TL	69.	2.	MG/KG	102.	50.5	9/27/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06379	PB	840.	10.	UG/G	1162.	31.	9/27/96	OUT OF CONTROL
96.06379	SB	< 0.6		UG/G	19.4	1.8	9/27/96	OUT OF CONTROL
96.06379	TL	1.4	0.6	UG/G	2.47	0.15	9/27/96	UNDER CONTROL

REPORT NUMBER: 41793

Analyst	Reviewer	Team Leader	QA Officer
9/30/96	10/1/96	10/3/96	10/4/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

APPENDIX D

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN UNDERSTORY AND OVERSTORY VEGETATION COLLECTED AROUND THE DARHT FACILITY DURING 1996

To: Phil Fresquez
From: Richard Robinson- CST-9
Date: Sept 29, 1996
Subject: Rept No 041732

The H-3 report 41732 for RN23686 has two open "zero" QC's labeled "out of control." The out of control resulted by assessing the counting statistics only and does not consider that the samples are within the curries detection limit. This data meets all the CST-9 QA requirements. Should you have any questions please contact me at 667-7682.

Richard Robinson

092996

********** CST ANALYTICAL REPORT **********

Prepared by: ROBINSON on 26-Sep-1996

ANALYSIS: H-3 REQUEST NUMBER: 23686 MATRIX: W ANALYST: RICHARD ROBINSON PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: LS ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06412	- 140.	135.	PCI/L	9/25/96	
N-O	96.06413	115.	137.	PCI/L	9/25/96	
S-U	96.06414	300.	138.	PCI/L	9/25/96	
S-O	96.06415	60.	136.	PCI/L	9/25/96	
E-U	96.06416	- 364.	133.	PCI/L	9/25/96	
E-O	96.06417	- 197.	134.	PCI/L	9/25/96	
W-U	96.06418	82.	137.	PCI/L	9/25/96	
W-O	96.06419	271.	138.	PCI/L	9/25/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: ROBINSON on 26-Sep-1996

REQUEST NUMBER: 23686 MATRIX: W ANALYST: RICHARD ROBINSON PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.34094	776.	141.	PCI/L	0.0		9/25/96	OUT OF CONTROL
00.34094	- 145.	135.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	- 304.	134.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	- 157.	135.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	55.	136.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	849.	142.	PCI/L	0.0		9/25/96	OUT OF CONTROL
00.34094	- 393.	133.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	24.	136.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	- 277.	134.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34098	13501.	203.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	14783.	207.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13491.	203.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	14782.	207.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13371.	202.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13582.	203.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13443.	202.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13132.	201.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	14071.	205.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06268	17.252	0.216	NCI/L	18.08	0.67	9/25/96	UNDER CONTROL
96.06269	11.97	0.197	NCI/L	13.15	0.49	9/25/96	WARNING 2-3 SIG
96.06411	11.156	0.194	NCI/L	11.92	0.44	9/25/96	UNDER CONTROL
96.06639	17.756	0.218	NCI/L	16.85	0.62	9/25/96	UNDER CONTROL
96.06640	15.146	0.209	NCI/L	15.62	0.58	9/25/96	UNDER CONTROL
96.06843	14.987	0.208	NCI/L	16.85	0.62	9/25/96	WARNING 2-3 SIG

REPORT NUMBER: 41732

Analyst	Reviewer	Team Leader	QA Officer
9/26/96	092796	10/01/96	10/1/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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Los Alamos
NATIONAL LABORATORY
memorandum
Chemical Science and Technology
Responsible Chemistry for America

CST-9/Inorganic Trace Analysis
Los Alamos, New Mexico 87545

To/MS: Philip R. Fresquez/MS 887
From/MS: Claudine Armenta, CST-9/K484
Phone/FAX: 7-3269/5-5982
Symbol: CST-9/97
Date: February 18, 1997

This is a Case Narrative for the following:

Request Number : 23697
Analysis : Americium in Biological Samples

I. Introduction
On August 5, 1996 (9) samples were received for analysis.

II. Analytical Results/Methodology
The analytical results are presented as indicated by the terms on the CST-3 Analytical Service Agreement. Each set of data will include sample identification information, the analytical results, and other information as required by ESH-20.

The analysis requested is: Isotopic Americium LA-10300-M, Vol. III, Americium in Environmental Matrices-Alpha Spectrometry, Method ER-121.

III. Quality Control
Laboratory control samples are prepared and analyzed with each sample request.

IV. Comments
Nine samples were analyzed for Americium-241. These samples were spiked with Americium-243. Sample numbers 96.06493, 96.06496 and 96.06489 have low recoveries. We have a standard percent recovery that we maintain. I have re-run these samples and the recoveries improved. Sample number 96.06489 is a Q.C. not only was the recovery low but the unknown tracer, Am-241 was also lost. The First run on these samples was a precipitation method was used to concentrate the sample. This technique did not work well with this matrix we had too much calcium or interference with the counter. Re-analyzed set but had exhausted the Q.C. therefore, I put an open Q.C. to ensure that the chemistry was good. The known value for Q.C. 00.33824 is 1.97 pci/ml, I recovered 2.2575 uncertainty 0.1057 this is under control. At this time I've exhausted the samples, I am unable to re-run them. I don't feel that there was any problem with the chemistry on the second run.

I verify, to the best of my knowledge, that the listed results are and both complete and technically correct, with the exception of the items detailed above.

Claudine E. Armenta 2/18/97

REPORT NUMBER: 43131

********** CST ANALYTICAL REPORT **********

Prepared by: CEA on 18-Feb-1997

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06490	AM-241	RAS	0.0075	0.0015	PCI/G	2/18/97	74%
N-O	96.06491	AM-241	RAS	0.0034	0.0025	PCI/G	2/18/97	49%
S-U	96.06492	AM-241	RAS	0.004	0.0019	PCI/G	2/18/97	51%
S-O	96.06493	AM-241	RAS	0.0127	0.0141	PCI/G	2/18/97	24%
E-U	96.06494	AM-241	RAS	0.006	0.002	PCI/G	2/18/97	37%
E-O	96.06495	AM-241	RAS	0.0079	0.0029	PCI/G	2/18/97	38%
W-U	96.06496	AM-241	RAS	0.0034	0.0023	PCI/G	2/18/97	25%
W-O	96.06497	AM-241	RAS	0.0198	0.0059	PCI/G	2/18/97	70%

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REPORT NUMBER: 43131 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: CEA on 18-Feb-1997

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF TRACER RECOVERY IN CUSTOMER AND QA SAMPLES

CUSTOMER NUMBER	CST SAMPLE NUMBER	ANALYSIS	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COLLECTION DATE	COMMENT
00.34720	96.06489	AM-243T	2.34	0.211	PCI/SAMPLE	8/05/96	9%
N-U	96.06490	AM-243T	3.9	2.886	PCI/SAMPLE	8/05/96	74%
N-O	96.06491	AM-243T	3.9	1.911	PCI/SAMPLE	8/05/96	49%
S-U	96.06492	AM-243T	3.9	1.989	PCI/SAMPLE	8/05/96	51%
S-O	96.06493	AM-243T	3.9	0.936	PCI/SAMPLE	8/05/96	24%
E-U	96.06494	AM-243T	3.9	1.443	PCI/SAMPLE	8/05/96	37%
E-O	96.06495	AM-243T	2.34	0.889	PCI/SAMPLE	8/05/96	38%
W-U	96.06496	AM-243T	2.34	0.59	PCI/SAMPLE	8/05/96	25%
W-O	96.06497	AM-243T	3.9	2.73	PCI/SAMPLE	8/05/96	70%

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

_X_ Only Blind QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT

96.06489 AM-241	-	0.0129	0.0041	PCI/G	8.5	0.38	2/18/97 OUT OF CONTROL

REPORT NUMBER: 43131

Analyst	Reviewer	Team Leader	QA Officer
2/18/97	2/19/97	2/19/97	2/19/97
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

CBR 2/18/97 Please Look at Data on B-12-97 Am - Reruns for Open Q.C Data

To: Phil Fresquez
From: Alice Slemmons
Date: February 10, 1997
Subject: Request number 23697
Analyte: Sr-90

The QC result for request number 23697 is low and has been flagged as Out of Control. It appears that this problem was caused by sample loss which occurred when the QC was transferred from its original container to the dissolution vessel. This problem has been addressed.

********** CST ANALYTICAL REPORT **********

Prepared by: AKS on 7-Feb-1997

ANALYSIS: SR-90 REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: PC ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06490	2.4	0.2	PCI/G	2/05/97	
N-O	96.06491	3.	0.2	PCI/G	2/05/97	
S-U	96.06492	3.1	0.2	PCI/G	2/05/97	
S-O	96.06493	5.8	0.4	PCI/G	2/05/97	
E-U	96.06494	1.6	0.2	PCI/G	2/05/97	
E-O	96.06495	5.3	0.4	PCI/G	2/05/97	
W-U	96.06496	2.3	0.9	PCI/G	2/05/97	
W-O	96.06497	5.9	0.4	PCI/G	2/05/97	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: AKS on 7-Feb-1997

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

X Only Blind QC samples run with this sample batch.

X No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06488	6.6	0.4	PCI/G	8.12	0.26	2/05/97	OUT OF CONTROL

REPORT NUMBER: 43041

Analyst	Reviewer	Team Leader	QA Officer
2/7/97	2-13-97	2/14/97	2/14/97
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

REPORT NUMBER: 42371 Page: 01

********** CST ANALYTICAL REPORT **********

Prepared by: YIG on 26-Nov-1996

ANALYSIS: CS-137 REQUEST NUMBER: 23697 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: G ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06490	0.49	0.08	PCI/G	11/25/96	SECOND REPORT
N-O	96.06491	0.47	0.08	PCI/G	11/25/96	SECOND REPORT
S-U	96.06492	0.37	0.06	PCI/G	11/25/96	SECOND REPORT
S-O	96.06493	0.6	0.53	PCI/G	11/25/96	SECOND REPORT
E-U	96.06494	0.44	0.39	PCI/G	11/25/96	SECOND REPORT
E-O	96.06495	0.69	0.13	PCI/G	11/25/96	SECOND REPORT
W-U	96.06496	0.27	0.24	PCI/G	11/25/96	SECOND REPORT
W-O	96.06497	0.22	0.06	PCI/G	11/25/96	SECOND REPORT

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: YIG on 26-Nov-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch. NA

____ No QC samples for this constituent and matrix type available within CST

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Open (non-blind) QC samples run with this sample batch. NA

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within CST

REPORT NUMBER: 42371

Analyst	Reviewer	for Team Leader	QA Officer
11/26/96	11/27/96	11/27/96	11/27/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

Los Alamos
NATIONAL LABORATORY
memorandum
Chemical Science and Technology
Responsible Chemistry for America

CST-9/Inorganic Trace Analysis
Los Alamos, New Mexico 87545

To/MS: Philip R. Fresquez/MS 887
From/MS: Claudine Armenta, CST-9/K484
Phone/FAX: 7-3269/5-5982
Symbol: CST-9/96
Date: October 15, 1996

This is a Case Narrative for the following:

Request Number : 23697
Analysis : Plutonium in Biological Samples

I. Introduction
On August 5, 1996 (9) samples were received for analysis.

II. Analytical Results/Methodology
The analytical results are presented as indicated by the terms on the CST-3 Analytical Service Agreement. Each set of data will include sample identification information, the analytical results, and other information as required by ESH-20.

The analysis requested is: Isotopic Plutonium LA-10300-M, Vol. III, Plutonium in Environmental Matrices-Alpha Spectrometry, Method ER-160.

III. Quality Control
Laboratory control samples are prepared and analyzed with each sample request.

IV. Comments
As per instructions from ESH-20 nine samples were analyzed for Pu-238 and Pu-239. All samples were spiked with Pu-242 to determine recoveries. All samples met the required recovery in order to report. Blind Q.C.'s were run with this request Q.C. number 96.06489 was out of control for isotope Pu-239. The Uncertainty for this isotope is very narrow and is not a true representative of the true error. The recovery for this Q.C. was 97%. An open Q.C. was also run with this request and it fell in the 2-3 sigma warning thus showing that there was no problem with the chemistry.

I verify, to the best of my knowledge, that the listed results are and both complete and technically correct, with the exception of the item detailed above.

Claudine E. Armenta
10/15/96

REPORT NUMBER: 41944

********** CST ANALYTICAL REPORT **********

Prepared by: CEA on 15-Oct-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06490	PU-238	RAS	0.0001	0.0003	PCI/G	10/15/96	85%
N-U	96.06490	PU-239	RAS	0.0176	0.0018	PCI/G	10/15/96	85%
N-O	96.06491	PU-239	RAS	0.0047	0.002	PCI/G	10/15/96	84%
S-U	96.06492	PU-238	RAS	0.0001	0.0004	PCI/G	10/15/96	84%
S-U	96.06492	PU-239	RAS	0.0026	0.0009	PCI/G	10/15/96	84%
S-O	96.06493	PU-238	RAS	0.0004	0.0017	PCI/G	10/15/96	40%
S-O	96.06493	PU-239	RAS	0.004	0.0022	PCI/G	10/15/96	40%
E-U	96.06494	PU-238	RAS	0.001	0.0006	PCI/G	10/15/96	79%
E-U	96.06494	PU-239	RAS	0.0041	0.001	PCI/G	10/15/96	79%
E-O	96.06495	PU-238	RAS	0.0005	0.0008	PCI/G	10/15/96	65%
E-O	96.06495	PU-239	RAS	0.0036	0.0016	PCI/G	10/15/96	65%
W-U	96.06496	PU-238	RAS	0.0008	0.0008	PCI/G	10/15/96	74%
W-U	96.06496	PU-239	RAS	0.0027	0.0011	PCI/G	10/15/96	74%
W-O	96.06497	PU-238	RAS	0.0043	0.0016	PCI/G	10/15/96	75%
W-O	96.06497	PU-239	RAS	0.0007	0.0008	PCI/G	10/15/96	75%

****

N-O Pu-238 −0.0011 0.0002

REPORT NUMBER: 41944 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: CEA on 15-Oct-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF TRACER RECOVERY IN CUSTOMER AND QA SAMPLES

CUSTOMER NUMBER	CST SAMPLE NUMBER	ANALYSIS	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COLLECTION DATE	COMMENT
00.34720	96.06489	PU-242T	3.89	3.7733	PCI/SAMPLE	8/05/96	97%
N-U	96.06490	PU-242T	3.89	3.3065	PCI/SAMPLE	8/05/96	85%
N-O	96.06491	PU-242T	3.89	3.2676	PCI/SAMPLE	8/05/96	84%
S-U	96.06492	PU-242T	3.89	3.2676	PCI/SAMPLE	8/05/96	84%
S-O	96.06493	PU-242T	3.89	1.556	PCI/SAMPLE	8/05/96	40%
E-U	96.06494	PU-242T	3.89	3.0731	PCI/SAMPLE	8/05/96	79%
E-O	96.06495	PU-242T	3.89	2.5285	PCI/SAMPLE	8/05/96	65%
W-U	96.06496	PU-242T	3.89	2.8786	PCI/SAMPLE	8/05/96	74%
W-O	96.06497	PU-242T	3.89	2.9175	PCI/SAMPLE	8/05/96	75%

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.33824	PU-238	2.8292	0.0951	PCI/SAMPLE	3.2	0.1	10/15/96	WARNING 2-3 SIG

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06489	PU-238	4.406	0.1232	PCI/G	4.9	0.17	10/15/96	WARNING 2-3 SIG
96.06489	PU-239	5.653	0.152	PCI/G	6.5	0.21	10/15/96	OUT OF CONTROL

REPORT NUMBER: 41944

Analyst	Reviewer	Team Leader	QA Officer
10/15/96	10-19-96	10/21/96	10/22/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

REPORT NUMBER: 42055

********** CST ANALYTICAL REPORT **********

Prepared by: CEA on 28-Oct-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE		ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-0	96.06491	PU-238	RAS	-	0.0011	0.0002	PCI/G	10/15/96	84%

****

Phil,

When Sample was Recieved the Analyst and Analytical Technique were in error, Thus all Other Data that was For Ras and ERG got transfered to you. This one Sample was Left Behind. Sorry for the inconvenience this has Caused.

CEA
10/28/96

REPORT NUMBER: 42055 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: CEA on 28-Oct-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

_X_ Only Blind QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

___ Only Open (non-blind) QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

REPORT NUMBER: 42055				
	Analyst	Reviewer	Team Leader	QA Officer
	10/28/96	10/28/96	10-28-96	10/28/96
	Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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********** CST ANALYTICAL REPORT **********

Prepared by: AKS on 1-Oct-1996

ANALYSIS: U REQUEST NUMBER: 23697 MATRIX: SV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: KPA ANALYTICAL PROCEDURE: NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06490	3.7	0.37	UG/G	10/01/96	
N-O	96.06491	1.08	0.11	UG/G	10/01/96	
S-U	96.06492	1.72	0.17	UG/G	10/01/96	
S-O	96.06493	0.52	0.05	UG/G	10/01/96	
E-U	96.06494	2.43	0.24	UG/G	10/01/96	
E-O	96.06495	0.71	0.07	UG/G	10/01/96	
W-U	96.06496	0.6	0.06	UG/G	10/01/96	
W-O	96.06497	2.22	0.22	UG/G	10/01/96	

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: AKS on 1-Oct-1996

REQUEST NUMBER: 23697 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.33291	4.13	0.41	UG/L	4.5	0.45	10/01/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06487	0.21	0.02	UG/G	0.25	0.025	10/01/96	UNDER CONTROL

REPORT NUMBER: 41815

Analyst	Reviewer	Team Leader	QA Officer
10/2/96	10/4/96	10/07/96	10/7/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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APPENDIX E

ANALYTICAL DATA REPORTS OF HEAVY METAL CONCENTRATIONS IN UNDERSTORY AND OVERSTORY VEGETATION COLLECTED AROUND THE DARHT FACILITY DURING 1996

REPORT NUMBER: 42079

********** CST ANALYTICAL REPORT **********

Prepared by: J.A. KENNISON on 29-Oct-1996

REQUEST NUMBER: 23753 MATRIX: BV ANALYST: OES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: 9138 PAGE: 77

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
								< reduced by 1/2
N-U	96.06987	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
N-U	96.06987	BA	ICPES	34.8	1.2	UG/G	10/28/96	
N-U	96.06987	BE	ICPES	< 0.19		UG/G	10/28/96	0.10
N-U	96.06987	CD	ICPES	< 0.37		UG/G	10/28/96	0.19
N-U	96.06987	CR	ICPES	0.37	0.09	UG/G	10/28/96	
N-U	96.06987	CU	ICPES	10.	0.32	UG/G	10/28/96	
N-U	96.06987	NI	ICPES	2.64	1.2	UG/G	10/28/96	
N-O	96.06988	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
N-O	96.06988	BA	ICPES	15.8	0.6	UG/G	10/28/96	
N-O	96.06988	BE	ICPES	< 0.17		UG/G	10/28/96	0.09
N-O	96.06988	CD	ICPES	< 0.37		UG/G	10/28/96	0.19
N-O	96.06988	CR	ICPES	0.33	0.2	UG/G	10/28/96	
N-O	96.06988	CU	ICPES	3.57	0.86	UG/G	10/28/96	
N-O	96.06988	NI	ICPES	30.8	1.5	UG/G	10/28/96	
S-U	96.06989	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
S-U	96.06989	BA	ICPES	27.7	1.1	UG/G	10/28/96	
S-U	96.06989	BE	ICPES	< 0.17		UG/G	10/28/96	0.09
S-U	96.06989	CD	ICPES	< 0.37		UG/G	10/28/96	0.19
S-U	96.06989	CR	ICPES	0.23	0.2	UG/G	10/28/96	
S-U	96.06989	CU	ICPES	6.9	0.26	UG/G	10/28/96	
S-U	96.06989	NI	ICPES	1.7	1.2	UG/G	10/28/96	
S-O	96.06990	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
S-O	96.06990	BA	ICPES	8.3	0.22	UG/G	10/28/96	
S-O	96.06990	BE	ICPES	< 0.19		UG/G	10/28/96	0.10
S-O	96.06990	CD	ICPES	< 0.37		UG/G	10/28/96	0.19
S-O	96.06990	CR	ICPES	< 0.25		UG/G	10/28/96	0.13
S-O	96.06990	CU	ICPES	3.47	0.26	UG/G	10/28/96	
S-O	96.06990	NI	ICPES	16.6	3.5	UG/G	10/28/96	
E-U	96.06991	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
E-U	96.06991	BA	ICPES	130.	4.4	UG/G	10/28/96	
E-U	96.06991	BE	ICPES	< 0.19		UG/G	10/28/96	0.10
E-U	96.06991	CD	ICPES	< 0.37		UG/G	10/28/96	0.19
E-U	96.06991	CR	ICPES	0.57	0.25	UG/G	10/28/96	
E-U	96.06991	CU	ICPES	9.2	0.42	UG/G	10/28/96	
E-U	96.06991	NI	ICPES	2.5	3.5	UG/G	10/28/96	
E-O	96.06992	AG	ICPES	< 0.5		UG/G	10/28/96	0.25
E-O	96.06992	BA	ICPES	9.7	0.29	UG/G	10/28/96	

E-O	96.06992	BE	ICPES	< 0.19		UG/G	10/28/96 0.10
E-O	96.06992	CD	ICPES	< 0.37		UG/G	10/28/96 0.19
E-O	96.06992	CR	ICPES	0.21	0.2	UG/G	10/28/96
E-O	96.06992	CU	ICPES	3.2	0.26	UG/G	10/28/96
E-O	96.06992	NI	ICPES	6.5	1.7	UG/G	10/28/96
W-U	96.06993	AG	ICPES	< 0.5		UG/G	10/28/96 0.25
W-U	96.06993	BA	ICPES	82.	2.7	UG/G	10/28/96
W-U	96.06993	BE	ICPES	< 0.19		UG/G	10/28/96 0.10
W-U	96.06993	CD	ICPES	< 0.37		UG/G	10/28/96 0.19
W-U	96.06993	CR	ICPES	0.41	0.3	UG/G	10/28/96
W-U	96.06993	CU	ICPES	9.7	0.26	UG/G	10/28/96
W-U	96.06993	NI	ICPES	8.	0.94	UG/G	10/28/96
W-O	96.06994	AG	ICPES	< 0.5		UG/G	10/28/96 0.25
W-O	96.06994	BA	ICPES	9.7	0.18	UG/G	10/28/96
W-O	96.06994	BE	ICPES	< 0.19		UG/G	10/28/96 0.10
W-O	96.06994	CD	ICPES	< 0.37		BA/G	10/28/96 0.19
W-O	96.06994	CR	ICPES	0.36	0.3	UG/G	10/28/96
W-O	96.06994	CU	ICPES	2.9	0.26	UG/G	10/28/96
W-O	96.06994	NI	ICPES	1.6	0.97	UG/G	10/28/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	AG	ICPES	< 0.5		UG/G	10/28/96	
N-U	96.06987	BA	ICPES	34.6	0.93	UG/G	10/28/96	
N-U	96.06987	BE	ICPES	< 0.19		UG/G	10/28/96	
N-U	96.06987	CD	ICPES	< 0.37		UG/G	10/28/96	
N-U	96.06987	CR	ICPES	0.313	0.54	UG/G	10/28/96	
N-U	96.06987	CU	ICPES	10.3	0.2	UG/G	10/28/96	
N-U	96.06987	NI	ICPES	1.4	1.7	UG/G	10/28/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	AG	ICPES	24.9	22.3	UG/G	10/28/96	
N-U	96.06987	BA	ICPES	24.9	27.	UG/G	10/28/96	
N-U	96.06987	BE	ICPES	24.9	22.5	UG/G	10/28/96	
N-U	96.06987	CD	ICPES	24.9	23.	UG/G	10/28/96	
N-U	96.06987	CR	ICPES	24.9	24.6	UG/G	10/28/96	
N-U	96.06987	CU	ICPES	24.9	25.1	UG/G	10/28/96	
N-U	96.06987	NI	ICPES	24.9	18.3	UG/G	10/28/96	

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REPORT NUMBER: 42079 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: J.A. KENNISON on 29-Oct-1996

REQUEST NUMBER: 23753 MATRIX: BV ANALYST: OES PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: 9138 PAGE: 77

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.00580	BA	16.5	1.6	UG/G	21.	3.	10/28/96	UNDER CONTROL
00.00580	BE	150.	150.	NG/G	6.9	0.8	10/28/96	UNDER CONTROL
00.00580	CD	300.	300.	NG/G	30.	10.	10/28/96	UNDER CONTROL
00.00580	CR	137.	200.	NG/G	800.	200.	10/28/96	WARNING 2-3 SIG
00.00580	CU	12.5	1.2	UG/G	16.5	1.	10/28/96	WARNING 2-3 SIG
00.00580	NI	880.	1200.	NG/G	600.	300.	10/28/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

✓ Only Open (non-blind) QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

REPORT NUMBER: 42079

Analyst	Reviewer	Team Leader	QA Officer
10/29/96	10-29-96	11/21/96	11/25/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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REPORT NUMBER: 42300

********** CST ANALYTICAL REPORT **********

Prepared by: LRB on 21-Nov-1996

REQUEST NUMBER: 23753 MATRIX: BV ANALYST: AAS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: CST9130 PAGE: 68

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
								< reduced by 1/2
N-U	96.06987	AS	ETVAA	< 0.2		UG/G	10/24/96	0.10
N-U	96.06987	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
N-U	96.06987	SE	ETVAA	< 0.2		UG/G	10/22/96	0.10
N-O	96.06988	AS	ETVAA	< 0.2		UG/G	10/24/96	0.10
N-O	96.06988	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
N-O	96.06988	SE	ETVAA	< 0.2		UG/G	10/22/96	0.10
S-U	96.06989	AS	ETVAA	< 0.2		UG/G	10/24/96	0.10
S-U	96.06989	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
S-U	96.06989	SE	ETVAA	0.2	0.2	UG/G	10/22/96	
S-O	96.06990	AS	ETVAA	0.2	0.2	UG/G	10/24/96	
S-O	96.06990	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
S-O	96.06990	SE	ETVAA	0.2	0.2	UG/G	10/22/96	
E-U	96.06991	AS	ETVAA	0.2	0.2	UG/G	10/24/96	
E-U	96.06991	HG	CVAA	0.1	0.1	UG/G	11/19/96	
E-U	96.06991	SE	ETVAA	< 0.2		UG/G	10/22/96	0.10
E-O	96.06992	AS	ETVAA	< 0.2		UG/G	10/24/96	0.10
E-O	96.06992	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
E-O	96.06992	SE	ETVAA	0.3	0.2	UG/G	10/22/96	
W-U	96.06993	AS	ETVAA	0.2	0.2	UG/G	10/24/96	
W-U	96.06993	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
W-U	96.06993	SE	ETVAA	< 0.2		UG/G	10/22/96	0.10
W-O	96.06994	AS	ETVAA	0.2	0.2	UG/G	10/24/96	
W-O	96.06994	HG	CVAA	< 0.1		UG/G	11/19/96	0.05
W-O	96.06994	SE	ETVAA	0.3	0.2	UG/G	10/22/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	AS	ETVAA	< 0.3		UG/G	10/24/96	
N-U	96.06987	HG	CVAA	< 0.1		UG/G	11/19/96	
N-U	96.06987	SE	ETVAA	< 0.2		UG/G	10/22/96	
N-O	96.06988	HG	CVAA	< 0.1		UG/G	11/19/96	
S-U	96.06989	HG	CVAA	< 0.1		UG/G	11/19/96	
S-O	96.06990	HG	CVAA	< 0.1		UG/G	11/19/96	

E-U	96.06991	HG	CVAA	< 0.1	UG/G	11/19/96
E-O	96.06992	HG	CVAA	< 0.1	UG/G	11/19/96
W-U	96.06993	HG	CVAA	< 0.1	UG/G	11/19/96
W-O	96.06994	HG	CVAA	< 0.1	UG/G	11/19/96

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	AS	ETVAA	5.	6.4	UG/G	10/24/96	
N-U	96.06987	HG	CVAA	0.985	1.2	UG/G	11/19/96	
N-U	96.06987	SE	ETVAA	5.	4.5	UG/G	10/22/96	

REPORT NUMBER: 42300 (continued)

********** CST QUALITY ASSURANCE REPORT **********

Prepared by: LRB on 21-Nov-1996

REQUEST NUMBER: 23753 MATRIX: BV ANALYST: AAS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: CST9130 PAGE: 68

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.00580	AS	4.5	0.6	UG/G	3.1	0.3	10/24/96	WARNING 2-3 SIG
00.00580	SE	< 200.		NG/G	25.		10/22/96	UNDER CONTROL
00.35052	HG	5.7	0.1	UG/L	5.85	1.	11/19/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

✓ Only Open (non-blind) QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

REPORT NUMBER: 42300

Analyst	Reviewer	Team Leader	QA Officer
11/21/96	11/21/96	11/21/96	11/25/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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REPORT NUMBER: 41990

********** CST ANALYTICAL REPORT **********

Prepared by: KLAO on 22-Oct-1996

REQUEST NUMBER: 23753 MATRIX: SV ANALYST: IMS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
								< reduced by 1/2
N-U	96.06987	PB	ICPMS	0.9	0.3	UG/G	10/22/96	
N-U	96.06987	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
N-U	96.06987	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
N-O	96.06988	PB	ICPMS	7.4	0.3	UG/G	10/22/96	
N-O	96.06988	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
N-O	96.06988	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
S-U	96.06989	PB	ICPMS	0.5	0.3	UG/G	10/22/96	
S-U	96.06989	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
S-U	96.06989	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
S-O	96.06990	PB	ICPMS	1.	0.3	UG/G	10/22/96	
S-O	96.06990	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
S-O	96.06990	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
E-U	96.06991	PB	ICPMS	1.4	0.3	UG/G	10/22/96	
E-U	96.06991	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
E-U	96.06991	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
E-O	96.06992	PB	ICPMS	3.	0.3	UG/G	10/22/96	
E-O	96.06992	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
E-O	96.06992	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
W-U	96.06993	PB	ICPMS	2.	0.3	UG/G	10/22/96	
W-U	96.06993	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
W-U	96.06993	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15
W-O	96.06994	PB	ICPMS	1.7	0.3	UG/G	10/22/96	
W-O	96.06994	SB	ICPMS	< 15.		UG/G	10/22/96	7.5
W-O	96.06994	TL	ICPMS	< 0.3		UG/G	10/22/96	0.15

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	PB	ICPMS	0.8	0.3	UG/G	10/22/96	
N-U	96.06987	SB	ICPMS	< 15.		UG/G	10/22/96	
N-U	96.06987	TL	ICPMS	< 0.3		UG/G	10/22/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
N-U	96.06987	PB	ICPMS	4.98	5.5	UG/G	10/22/96	
N-U	96.06987	SB	ICPMS	4.98	3.4	UG/G	10/22/96	
N-U	96.06987	TL	ICPMS	4.98	5.5	UG/G	10/22/96	

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REPORT NUMBER: 41990 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: KLAO on 22-Oct-1996

REQUEST NUMBER: 23753 MATRIX: BV ANALYST: IMS PROGRAM CODE: P512

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: M887 PHONE: 7-0815

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.00580	PB	13.1	0.4	UG/G	13.	2.	10/22/96	UNDER CONTROL
00.00580	SB	< 15000.		NG/G	40.		10/22/96	UNDER CONTROL
00.00580	TL	< 300.		NG/G	< 10.		10/22/96	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

___ Only qualitative data requested

✓ Only Open (non-blind) QC samples run with this sample batch.

___ No QC samples run with this sample batch.

___ No QC samples for this constituent and matrix type available within CST

REPORT NUMBER: 41990

Analyst	Reviewer	Team Leader	QA Officer
10/22/96	10/22/96	11/21/96	11/22/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

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