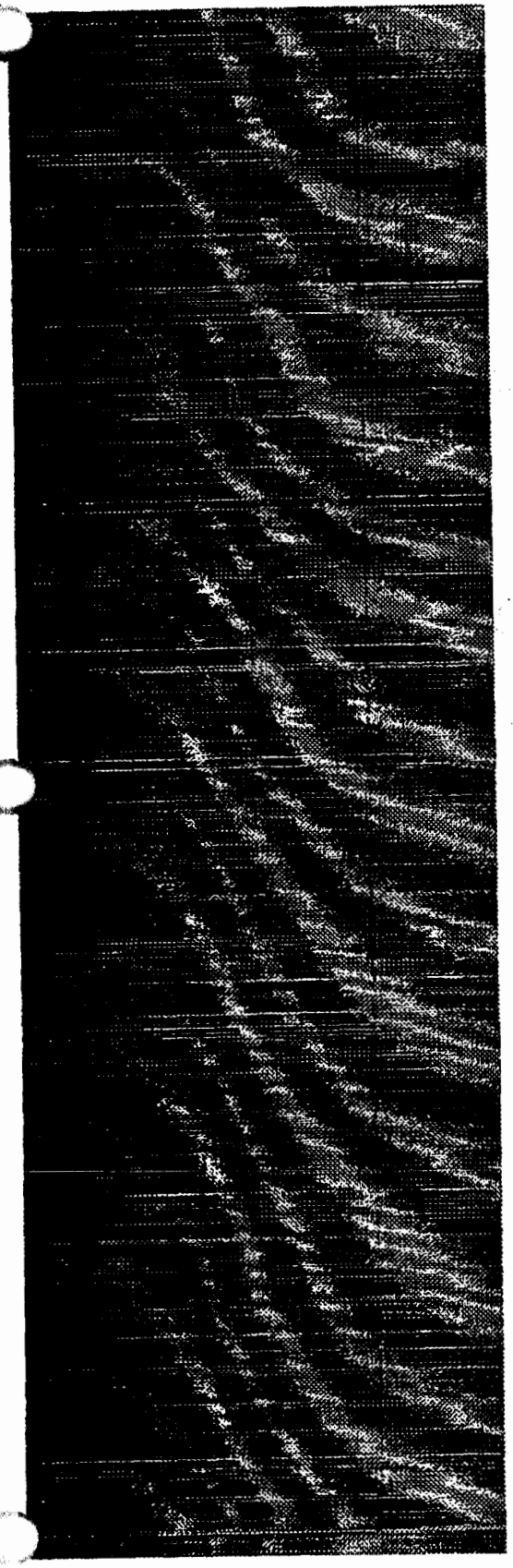
LA-13332-PR
Progress Report

(110)

Fresquez et al. 1997
ER ID 62346



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Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

The previous report in this series, unclassified, is LA-13124-PR.

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LA-13332-PR
Progress Report

UC-2090
Issued: July 1997

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RADIONUCLIDE CONCENTRATIONS IN SOILS AND VEGETATION AT RADIOACTIVE-WASTE DISPOSAL AREA G DURING THE 1996 GROWING SEASON

by

P. R. Fresquez, E. L. Vold, and L. Naranjo, Jr.

ABSTRACT

Soil and overstory and understory vegetation (washed and unwashed) collected at eight locations within and around Area G--a low-level radioactive solid-waste disposal facility at Los Alamos National Laboratory--were analyzed for ^{3}H, ^{90}Sr, ^{238}Pu, ^{239}Pu, ^{137}Cs, ^{234}U, ^{235}U, ^{238}U, ^{tot}U, ^{228}Ac, ^{214}Bi, ^{60}Co, ^{40}K, ^{54}Mn, ^{22}Na, ^{214}Pb, and ^{208}Tl. Also, heavy metals (Ag, As, Ba, Be, Cd, Cr, Hg, Ni, Pb, Sb, Se, and Tl) in soil and vegetation were determined. In general, most radionuclide concentrations, with the exception of ^{3}H and ^{239}Pu, in soils and washed and unwashed overstory and understory vegetation collected from within and around Area G were within upper limit background concentrations. Tritium was detected as high as 14,744 pCi mL^{-1} in understory vegetation collected from transuranic (TRU) waste pad #4, and the TRU waste pad area contained the highest levels of ^{239}Pu in soils and in understory vegetation as compared to other areas at Area G.

I. INTRODUCTION

Solid radioactive wastes have been buried by Los Alamos National Laboratory (LANL) since the early 1940s (Purtymun et al. 1980). Area G—a 25.5-hectare (63-acre), low-level radioactive waste management and disposal area located on the east end of Mesa del Buey at Technical Area (TA) 54—was established in 1957 and, at present, is the Laboratory's primary radioactive-solid-waste burial and storage site (Soholt 1990) (Figure 1). In general, wastes (contaminated equipment, paper, plastics, clothing, building materials, soils, and process wastes) are placed in either pits, trenches, or shafts and then covered with fill material (Hanson et al. 1980). Tritium, uranium, plutonium, and a variety of fission and activation products are the main isotopes in waste materials deposited at Area G (U.S. DOE 1979).

As part of the Environmental Surveillance Program at LANL, air

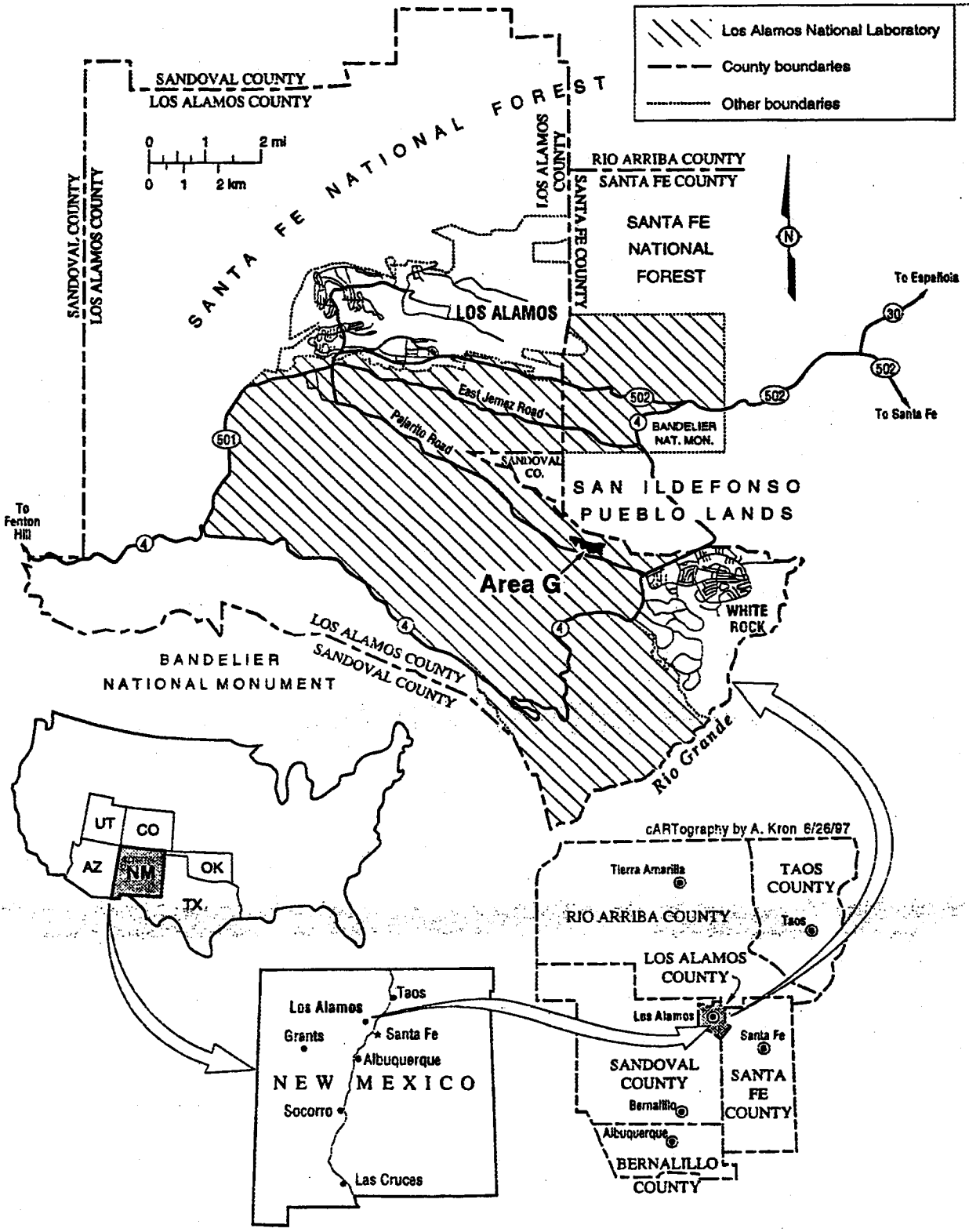

Figure 1. The location of Area G at Los Alamos National Laboratory.

(EPG 1995), water (Mullen et al. 1996), soils/sediment (Conrad et al. 1995, Fresquez et al. 1996a), vegetation (Fresquez et al. 1995 and 1996b), biota (Biggs et al. 1995), and bees and honey (Fresquez et al. 1997) are collected from within and around radioactive waste disposal site Area G on an annual basis to help monitor and assess the site's impact on the surrounding environment. One important component of this program is the assessment of vegetation growing within and around Area G for radiological contamination; the uptake of isotopes by vegetation, for example, may give some insight into surface (Hanson et al. 1980) and subsurface (Wenzel et al. 1987) contaminant pathways to humans from waste disposal areas. Trees, in particular, have been shown to be excellent indicators of subterranean tritium migration out of low-level radioactive-waste disposal sites (Rickard and Kirby 1987).

The objective of this annual study is to determine the concentrations of selected radionuclides in soil (surface) and in washed and unwashed overstory and understory vegetation within (inside the fence) and around (outside the fence) Area G during the 1996 growing season. These data were compared with radionuclide concentrations in soils and vegetation collected from a background location south and upwind of the Laboratory. Also, analyses of heavy metals in vegetation were conducted.

II. METHODS

In August of 1996, the Soils and Foodstuffs Environmental Surveillance Program Team of LANL's Ecology Group (ESH-20) collected eight soil-surface and 12 vegetation samples from areas within and around Area G at TA-54 (Figure 2). The eight sampling locations were: (#1) south of the tritium shafts just outside the fence, (#2) west of the tritium shafts just outside the fence, (#3) east of the new waste pit inside the fence, (#4) north of the transuranic (TRU) waste pads (#3 and 4) just outside the fence, (#5) TRU waste pad #3, (#6) TRU waste pad #4, (#7), Pits #17 and #18 (southeastern portions), and (#8) expansion area (west of Area G outside present fence). Background samples were also collected south and upwind of the Laboratory on Bandelier National Monument land (research area).

At each site, 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). 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. Samples were then

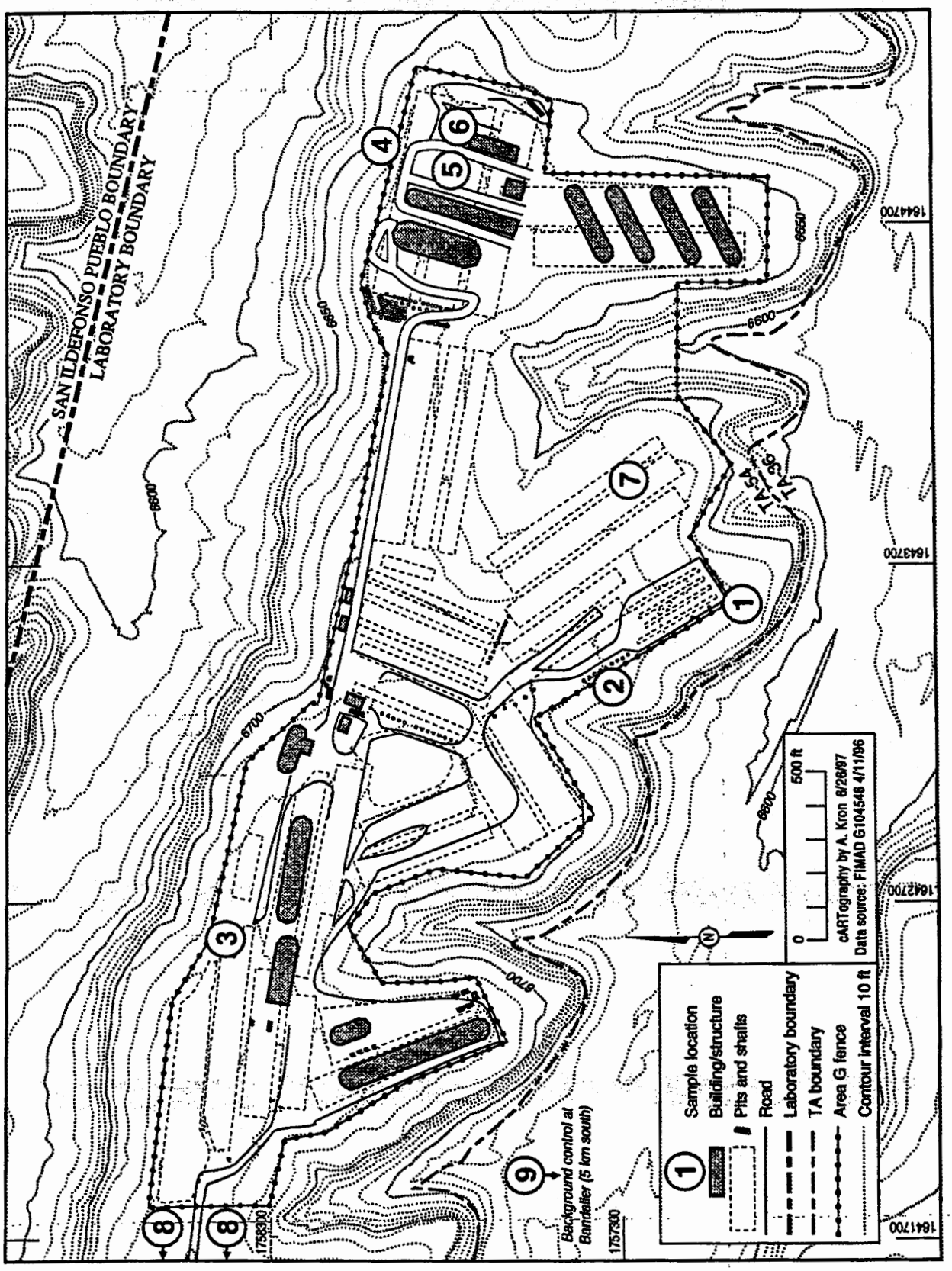

Figure 2. Site/sample locations of soils and vegetation at Area G. Site #8 is located farther west and Site #9 is located farther south than what is shown here.

poured into 500-mL poly bottles and submitted under full chain-of-custody to the Environmental Chemistry Group (CST-9) for the analysis of ^{3}H, ^{90}Sr, ^{238}Pu, ^{239}Pu, ^{137}Cs, ^{234}U, ^{235}U, ^{238}U, ^{tot}U, ^{228}Ac, ^{214}Bi, ^{60}Co, ^{40}K, ^{54}Mn, ^{22}Na, ^{214}Pb, and ^{208}Tl. All methods of radiochemical analyses have been described previously (Fresquez et al. 1996a). Radionuclide results were reported in pCi mL^{-1} (of tissue moisture) for ^{3}H, $\mu g\ g^{-1}$ dry for ^{tot}U, and pCi g^{-1} dry for all the other isotopes.

Vegetation samples were collected from either overstory (pinon pine) or understory (grasses and forbs) vegetation or both. Pinon pine (*Pinus edulis*) is the most typical overstory tree in the Area G vicinity (Tierney and Foxx 1982). Overstory samples consisted of tree-shoot tips approximately 2.5 to 5.1 cm (1 to 2 in.) in length at the 1.3- to 1.6-m (4- to 5-ft) height. Understory samples consisted of grass and forb (top growth) subsamples from the center and corners of a 10- by 10-m (32- by 32-ft) area. The pinon pine trees acted as the center of the square.

Collectors of samples wore plastic gloves and used clean shears. 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, vegetation samples from each bag were divided in half--one sample was rinsed with water to assess root uptake and the other was not washed to assess the total amount of radionuclides, be it from root uptake and/or from plant surface deposition (wind-borne and splash), on the plant-to-herbivore pathway that would be attributable to Area G operations (re-suspension of soil [contaminated] particles onto plant surfaces by traffic is but one of these activities). Each sample was then divided further into three subsets to provide analysis material for tritium, heavy metals, and other radionuclides.

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) (Fresquez et al. 1990). The rest of the subsample set(s) were placed in 1-L glass beakers and slowly ashed to 500°C for 120 h; after ashing, the sample was pulverized and homogenized, transferred to labeled 500-mL poly bottles, and submitted with the distillate (water) samples under full chain-of-custody to CST-9 for the analysis of ^{3}H, ^{90}Sr, ^{238}Pu, ^{239}Pu, ^{137}Cs, ^{234}U, ^{235}U, ^{238}U, ^{tot}U, ^{228}Ac, ^{214}Bi, ^{60}Co, ^{40}K, ^{54}Mn, ^{22}Na, ^{214}Pb, and ^{208}Tl. All methods of radiochemical analyses have been described previously (Fresquez et al. 1996b). Radionuclide results were reported in pCi mL^{-1} (of

tissue moisture) for ^{3}H, $\mu g\ g^{-1}$ ash for ^{tot}U, and pCi g^{-1} ash for all the other isotopes. Results in grams of ash are usually two to four orders of magnitude higher than live (wet) weight.

For heavy metal analysis, the vegetation was first digested with nitric or a combination of nitric and hydrochloric acid. The heavy metal content in the vegetation was determined by inductively coupled plasma atomic emission spectrometry (ICPES) for Ag, Ba, Be, Cd, Cr, Ni, and Pb; by inductively coupled plasma mass spectrometry (ICPMS) for Sb and Tl; by electrothermal vaporation atomic absorption (ETVAA) for As and Se; and by cold vapor atomic absorption (CVAA) for Hg. Heavy metal results in vegetation were reported in $\mu g\ g^{-1}$ dry.

III. RESULTS

Radionuclide and Heavy Metal Concentrations in Soil. Results of radionuclide and heavy metal concentrations in soil can be found in Tables 1 and 2, respectively. The actual CST-9 analytical reports are included in Appendix A for radionuclides and Appendix B for heavy metals. In general, most radionuclide concentrations in soils collected from within and around Area G, with the exception of ^{3}H and ^{239}Pu, were within or just above the regional statistical reference level (RSRL). The RSRL is the upper limit background concentration (mean + 2 sigma) from soils collected from regional locations from 1974 to 1994 (Fresquez et al. 1996a). Soil collected near the ^{3}H shafts (sites #1 and #2) contained the highest levels of ^{3}H, and the highest concentrations of ^{239}Pu were found associated with the TRU waste pads; 0.066 and 0.099 pCi g^{-1} dry of ^{239}Pu were detected in soils collected on the north side of pads #3 and #4 just outside the fence (site #4) and within TRU waste pad #4 (site #6), respectively. All radionuclides in soils collected from the Area G vicinity, however, were far below LANL screening action levels (SALs)--a concentration derived from residential exposure assumptions and a 10-mrem y^{-1} dose limit (FIMAD 1997)--and are considered of no concern. Most heavy metals in soils collected from within and around the perimeter of Area G were within RSRLs. Only one site, #3 which is east of the new waste pit, contained Cr and Ni in the soil in concentrations that were moderately higher than background. These concentrations, however, were far from LANL SALs and are of no concern.

Radionuclide and Heavy Metal Concentrations in Vegetation. Results of radionuclide concentrations in washed and unwashed vegetation collected from within and around Area G during the 1996 growing season are presented in

Tables 3 through 7. The CST-9 analytical reports are included in Appendix C for washed vegetation and Appendix E for unwashed vegetation. In general, most radionuclide concentrations, with the exception of ^{3}H, in washed and unwashed overstory and understory vegetation collected from within and around Area G were close to RSRLs (Tables 3 and 4, respectively). The RSRL was calculated from 1994 (Fresquez et al. 1995), 1995 (Fresquez et al. 1996b), and/or present radionuclide data sets. As in past years, concentrations of ^{3}H in overstory and understory vegetation from the ^{3}H shaft field (sites #1 and #2) and, especially from the TRU waste pad area (sites #5 and #6), were significantly higher than RSRLs (Tables 3 and 4). The highest ^{3}H concentration (14,744 pCi mL^{-1}) in vegetation at Area G, in fact, was detected in unwashed vegetation at site #6 (TRU waste pad #4).

Table 5 shows results of ^{3}H and ^{239}Pu in vegetation at Area G over time. Tritium in vegetation collected at sites #1, #2, #5, and #6 shows generally increasing trends and ^{239}Pu in vegetation at most sites remains unchanged. A statistical trend analysis (e.g., Mann-Kendall test) will be accomplished next year with the addition of more data (i.e., four years of data is the minimum number that can be used to perform a trend analysis). Also, a more thorough analysis of washed verses unwashed vegetation will be accomplished in the next year with the addition of more data. Based on the present data, however, it was clear that (1) unwashed overstory and understory vegetation from most sites were strikingly higher in ^{3}H concentrations than washed vegetation; this was probably due to the washing of vegetation before it was processed prior to ^{3}H distillation and washing undoubtedly affected (diluted) the results and (2) radionuclide concentrations varied considerably between washed and unwashed vegetation.

Most metals in washed and unwashed overstory and understory vegetation collected from within and around Area G were within background and/or RSRLs (Tables 6 and 7). The CST-9 analytical reports are included in Appendix D for washed vegetation and Appendix F for unwashed vegetation.

IV. ACKNOWLEDGMENT

Thanks to Paul Torrez, an undergraduate student, for his help in tabulating the data.

Table 1. Radionuclide concentrations in soils (dry weight) collected from Area G in 1996.

Element	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL	SAL[4]
^{3}H (pCi/mL)[5]	43.18	171.18	1.21	0.20	7.89	18.10	1.80	-0.41	0.13	6.34[2]	260.0
	(0.58)[6]	(0.97)	(0.29)	(0.28)	(0.36)	(0.44)	(0.30)	(0.27)	(0.26)		
^{238}Pu (pCi/g)	0.011	0.004	0.021	0.013	0.007	0.007	0.007	0.001	0.000	0.008[2]	27.0
	(0.001)	(0.001)	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)		
^{239}Pu (pCi/g)	0.025	0.042	0.045	0.066	0.022	0.099	0.013	0.013	0.015	0.028[2]	24.0
	(0.002)	(0.003)	(0.006)	(0.004)	(0.002)	(0.005)	(0.002)	(0.002)	(0.002)		
^{90}Sr (pCi/g)	0.1	0.2	0.3	0.4	0.0	0.2	0.2	0.4	0.3	0.82[2]	4.4
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)		
^{234}U (pCi/g)	1.182	1.328	0.940	1.088	1.072	1.123	1.253	1.075	1.185	1.289[3]	13.0
	(0.054)	(0.056)	(0.042)	(0.051)	(0.044)	(0.050)	(0.053)	(0.052)	(0.052)		
^{235}U (pCi/g)	0.061	0.049	0.049	0.041	0.037	0.045	0.053	0.053	0.040	0.054[3]	10.0
	(0.009)	(0.007)	(0.007)	(0.008)	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)		
^{238}U (pCi/g)	1.346	1.311	1.038	1.089	1.022	1.123	1.239	1.197	1.196	1.300[3]	67.0
	(0.060)	(0.055)	(0.046)	(0.050)	(0.042)	(0.050)	(0.052)	(0.056)	(0.052)		
^{tot}U (μg/g)[7]	4.059	3.948	3.131	3.279	3.077	3.383	3.735	3.609	3.60	4.05[2]	29.0
	(0.184)	(0.168)	(0.141)	(0.153)	(0.129)	(0.153)	(0.159)	(0.168)	(0.16)		
^{228}Ac (pCi/g)	1.56	1.52	1.45	1.63	1.69	1.73	1.44	1.42	1.22	1.52[3]	
	(0.17)	(0.17)	(0.17)	(0.18)	(0.18)	(0.19)	(0.16)	(0.15)	(0.15)		
^{214}Bi (pCi/g)	1.16	1.20	1.41	1.15	1.22	1.40	1.30	0.97	1.03	1.23[3]	
	(0.12)	(0.12)	(0.13)	(0.11)	(0.12)	(0.13)	(0.12)	(0.10)	(0.10)		
^{60}Co (pCi/g)	0.16	0.08	0.08	0.06	0.09	0.25	0.16	0.09	0.09	0.13[3]	1.1
	(0.03)	(0.12)	(0.11)	(0.02)	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)		
^{137}Cs (pCi/g)	0.44	0.96	0.49	0.50	0.11	0.07	0.11	0.42	0.44	1.13[2]	5.1
	(0.05)	(0.09)	(0.05)	(0.06)	(0.02)	(0.02)	(0.16)	(0.05)	(0.05)		
^{40}K (pCi/g)	22.4	19.7	21.4	24.10	26.30	26.40	19.90	15.9	13.9	16.5[3]	12.0
	(1.90)	(1.7)	(1.8)	(2.00)	(2.20)	(2.20)	(1.70)	(1.40)	(1.30)		

Table 1 (Continued).

^{54}Mn (pCi/g)	0.11	0.03	0.11	0.09	0.06	0.11	0.05	0.10	0.13	0.17[3]	3.5
	(0.02)	(0.04)	(0.02)	(0.02)	(0.09)	(0.02)	(0.01)	(0.02)	(0.02)		
^{22}Na (pCi/g)	0.05	0.09	0.01	0.08	0.00	0.16	0.13	0.14	0.13	0.17[3]	1.3
	(0.02)	(0.14)	(0.02)	(0.02)	(0.05)	(0.24)	(0.03)	(0.02)	(0.02)		
^{214}Pb (pCi/g)	1.08	1.11	1.17	1.17	1.24	1.31	1.09	0.95	0.96	1.14[3]	
	(0.10)	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)	(0.10)	(0.09)	(0.09)		
^{208}Tl (pCi/g)	0.54	0.55	0.52	0.52	0.61	0.52	0.46	0.43	0.50	0.60[3]	
	(0.05)	(0.06)	(0.05)	(0.05)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)		

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (south eastern portions), #8=expansion area, and BG=background (south and upwind of LANL).
[2]Regional Statistical Reference Level=mean + 2 std dev from long-term data (Fresquez et al. 1996a).
[3]Regional Statistical Reference Level=mean + 2 counting uncertainties from short-term data.
[4]Screening Action Level (FIMAD 1997).
[5]soil moisture.
[6](± one counting uncertainty).
[7]Total U was calculated from U isotope activity.

Table 2. Heavy metal concentrations ($\mu g\ g^{-1}$ dry) in soils collected from Area G in 1996.

Element	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL[2]	SAL[3]
Ag	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	2.0	400.0
As	1.00	1.00	2.70	0.90	0.30	0.40	2.00	2.30	2.40	6.1	6.1
Ba	50.50	54.70	61.50	50.50	14.50	9.50	149.00	168.00	192.00	187.0	5600.0
Be	0.47	0.46	0.52	0.45	0.19	0.06*	1.00	0.92	0.99	0.99	0.99
Cd	0.13*	0.13*	0.47	0.28	0.13*	0.13*	0.13*	0.51	0.33	0.25	80.0
Cr	5.84	3.10	76.00	3.60	0.63*	1.06	12.10	11.50	12.90	14.55	400.0
Hg	0.03*	0.03*	0.03*	0.03*	0.03*	0.03*	0.03*	0.03*	0.03*	0.03	24.0
Ni	5.70	2.95	44.00	3.39	2.80	1.91	9.10	23.00	11.00	10.80	1600.0
Pb	5.70	11.60	9.90	5.30	1.70	3.50	6.60	7.70	9.30	15.18	500.0
Sb	0.30*	0.30*	0.30*	0.30*	0.30*	0.30*	0.30*	0.30*	0.30*	0.20	32.0
Se	0.50	0.40	0.50	0.30	0.30	0.40	0.40	0.30	0.40	0.76	400.0
Tl	0.30*	0.30*	0.30*	0.30*	0.30*	0.30*	0.30	0.30*	0.30*	1.44	6.4

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (southeastern portions), #8=expansion area, and BG=background (south and upwind of LANL).

[2]Regional Statistical Reference Level=mean + 2 std dev from long-term data.

[3]Screening Action Level (FIMAD 1997).

*Results were reported in < values; thus, concentrations were reduced by one-half concentration (shown).

Table 3. Radionuclide concentrations in washed vegetation collected from Area G in 1996.

Nuclide	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL[2]
^{3}H (pCi mL^{-1})[3]										
os[4]	130.0	2382.0	1.9	1.5				0.9	0.4	0.8
	(0.80)[5]	(10.0)	(0.2)	(0.2)				(0.0)	(0.2)	
us	420.0	609.0	0.9	2.1	696.0	1528.0	4.7	0.4	0.5	0.9
	(4.0)	(6.0)	(0.2)	(0.4)	(6.0)	(8.0)	(0.4)	(0.2)	(0.2)	
^{238}Pu (pCi g^{-1} ash)										
os	0.003	0.002	0.009	0.023	0.002	0.003	0.003	0.001	0.001	0.003
	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	
us	0.004	0.002	0.002	0.030				-0.000	0.001	0.003
	(0.002)	(0.002)	(0.002)	(0.006)				(0.000)	(0.001)	
^{239}Pu (pCi g^{-1} ash)										
os	0.011	0.007	0.071	0.062				0.001	0.002	0.004
	(0.004)	(0.003)	(0.011)	(0.007)				(0.001)	(0.001)	
us	0.008	0.004	0.053	0.095	0.013	0.008	0.018	0.003	0.001	0.003
	(0.002)	(0.002)	(0.009)	(0.012)	(0.004)	(0.002)	(0.005)	(0.002)	(0.001)	
^{90}Sr (pCi g^{-1} ash)										
os	4.5	6.8	1.7	18.3				4.1	5.6	6.4
	(0.2)	(0.5)	(0.2)	(1.2)				(0.3)	(0.4)	
us	1.8	2.5	2.6	9.9	1.7	1.3	0.6	1.8	1.3	1.5
	(0.1)	(0.2)	(0.2)	(0.7)	(0.2)	(0.4)	(0.2)	(0.1)	(0.1)	
^{234}U (pCi g^{-1} ash)										
os	0.315	0.299	0.976	0.398				0.180	0.185	0.225
	(0.033)	(0.029)	(0.076)	(0.032)				(0.017)	(0.020)	
us	0.313	0.178	0.385	0.184	0.230	0.332	0.292	0.226	0.196	0.236
	(0.027)	(0.019)	(0.033)	(0.021)	(0.024)	(0.028)	(0.026)	(0.023)	(0.020)	

Table 3 (Continued)

^{235}U (pCi g^{-1} ash)										
os	0.014	0.013	0.039	0.014				0.010	0.007	0.013
	(0.006)	(0.005)	(0.009)	(0.004)				(0.003)	(0.003)	
us	0.017	0.006	0.015	0.007	0.010	0.013	0.012	0.011	0.009	0.015
	(0.004)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	
^{238}U (pCi g^{-1} ash)										
os	0.341	0.300	0.824	0.396				0.226	0.228	0.274
	(0.034)	(0.029)	(0.066)	(0.032)				(0.020)	(0.023)	
us	0.311	0.156	0.294	0.171	0.205	0.292	0.249	0.249	0.177	0.213
	(0.026)	(0.017)	(0.027)	(0.020)	(0.023)	(0.025)	(0.023)	(0.025)	(0.018)	
^{tot}U[4] (µg g^{-1} ash)[6]										
os	1.028	0.904	2.485	1.193				0.682	0.686	0.826
	(0.106)	(0.089)	(0.202)	(0.098)				(0.061)	(0.070)	
us	0.939	0.470	0.887	0.515	0.619	0.880	0.752	0.751	0.534	0.664
	(0.080)	(0.052)	(0.083)	(0.062)	(0.071)	(0.077)	(0.071)	(0.077)	(0.055)	
^{228}Ac (pCi g^{-1} ash)										
os	<0.43	3.41	2.26	<0.73				1.34	2.44	4.04
		(0.94)	(0.80)					(0.54)	(0.80)	
us	2.11	2.27	<1.47	<0.47	4.81	3.33	3.49	1.82	2.50	3.90
	(0.68)	(0.70)			(1.28)	(0.98)	(1.04)	(0.68)	(0.70)	
^{7}Be (pCi g^{-1} ash)										
os	56.4	50.4	45.9	43.8				42.6	67.9	88.7
	(8.2)	(7.8)	(7.6)	(6.8)				(6.8)	(10.4)	
us	24.5	21.5	24.8	22.3	21.4	26.3	27.7	25.8	25.3	34.1
	(4.0)	(3.8)	(4.4)	(4.4)	(4.4)	(4.6)	(5.0)	(4.4)	(4.4)	
^{214}Bi (pCi g^{-1} ash)										
os	1.46	2.46	1.62	0.89				1.76	1.93	2.97
	(0.38)	(0.58)	(0.48)	(0.26)				(0.44)	(0.52)	

Table 3 (Continued)

us	1.86	1.72	1.95	1.33	2.11	2.63	1.82	1.54	1.46	2.18
	(0.42)	(0.40)	(0.48)	(0.44)	(0.52)	(0.60)	(0.46)	(0.40)	(0.36)	
^{57}Co (pCi g^{-1} ash)										
os	<0.12	0.72	0.29	<0.10				0.57	0.19	0.35
		(0.16)	(0.10)					(0.12)	(0.08)	
us	0.52	0.55	<0.16	<0.20	0.53	0.68	0.70	0.46	0.43	0.63
	(0.10)	(0.12)			(0.14)	(0.16)	(0.16)	(0.12)	(0.10)	
^{58}Co (pCi g^{-1} ash)										
os	<0.08	0.41	<0.18	<0.22				<0.26	<0.12	
		(0.16)								
us	<0.21	<0.26	0.17	<0.21	<0.43	<0.35	0.49	<0.27	<0.26	
			(0.10)				(0.16)			
^{60}Co (pCi g^{-1} ash)										
os	<0.28	0.80	0.34	<0.28				<0.47	<0.36	
		(0.30)	(0.20)							
us	0.35	1.13	<0.50	0.54	1.25	<0.45	<0.55	<0.39	0.80	1.00
	(0.16)	(0.36)		(0.18)	(0.40)				(0.20)	
^{137}Cs (pCi g^{-1} ash)										
os	0.37	<0.27	0.41	0.30				0.38	0.48	0.84
	(0.12)		(0.16)	(0.10)				(0.14)	(0.18)	
us	0.47	0.70	0.35	0.40	<0.36	0.74	1.00	0.78	<0.24	
	(0.16)	(0.20)	(0.14)	(0.14)		(0.24)	(0.28)	(0.22)		
^{40}K (pCi g^{-1} ash)										
os	103.00	141.00	129.00	106.00				103.00	162.00	214.0
	(16.00)	(22.00)	(20.00)	(16.00)				(16.00)	(26.00)	
us	194.00	192.00	239.00	176.00	317.00	208.00	209.00	162.00	186.00	238.0
	(26.00)	(26.00)	(34.00)	(26.00)	(42.00)	(30.00)	(30.00)	(24.00)	(26.00)	

Table 3 (Continued)

^{54}Mn (pCi g^{-1} ash)										
os	<0.11	0.31 (0.12)	<0.25	<0.21				0.32 (0.12)	0.94 (0.26)	01.46
us	<0.22	<0.22	<0.29	<0.24	1.00 (0.28)	<0.25	<0.21	0.69 (0.20)	0.26 (0.10)	0.46
^{214}Pb (pCi g^{-1} ash)										
os	1.75 (0.42)	2.68 (0.56)	2.47 (0.58)	1.38 (0.36)				0.44 (0.16)	<0.43	
us	1.46 (0.34)	1.54 (0.34)	1.31 (0.40)	<0.43	2.24 (0.50)	2.05 (0.50)	1.08 (0.30)	1.18 (0.34)	1.35 (0.30)	1.95
^{208}Tl (pCi g^{-1} ash)										
os	0.30 (0.10)	0.79 (0.22)	0.68 (0.20)	0.28 (0.10)				0.27 (0.10)	0.32 (0.16)	0.64
us	0.68 (0.18)	<0.29	0.46 (0.16)	0.70 (0.22)	1.66 (0.44)	<0.31	<0.26	<0.29	0.71 (0.20)	1.11

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (southeastern portions), #8=expansion area, and BG=background (south and upwind of LANL).
[2]Regional Statistical Reference Level=mean + 2 std dev from present BG data.
[3]tissue moisture.
[4]os=overstory (trees) and us=understory (grasses/forbs).
[5](± one counting uncertainty).
[6]Total U was calculated from U isotope activity.

Table 4. Radionuclide concentrations in unwashed vegetation collected from Area G in 1996.

Nuclide	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL[2]
^{3}H (pCi mL^{-1})[3]										
os[4]	1342.0	7569.0	0.71	0.87				0.21	-0.25	1.87[1]
	(8.0)[5]	(18.0)	(0.28)	(0.28)				(0.28)	(0.28)	
us	8279.0	4890.0	0.70	0.82	3788.0	14744.0	2.87	-0.00	0.37	1.56
	(20.0)	(16.0)	(0.28)	(0.28)	(14.0)	(26.0)	(0.32)	(0.28)	(0.28)	
^{238}Pu (pCi g^{-1} ash)										
os	0.001	0.002	0.011	0.001				0.001	0.025	0.038
	(0.001)	(0.002)	(0.006)	(0.001)				(0.001)	(0.006)	
us	0.006	0.002	0.005	0.057	0.000	0.004	0.003	0.001	0.001	0.005
	(0.003)	(0.001)	(0.002)	(0.009)	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)	
^{239}Pu (pCi g^{-1} ash)										
os	0.005	0.004	0.078	0.003				0.002	0.051	0.075
	(0.002)	(0.002)	(0.017)	(0.002)				(0.002)	(0.009)	
us	0.011	0.007	0.023	0.150	0.013	0.009	0.014	0.005	0.008	0.011
	(0.003)	(0.002)	(0.005)	(0.016)	(0.003)	(0.002)	(0.004)	(0.002)	(0.003)	
^{90}Sr (pCi g^{-1} ash)										
os	2.8	4.6	1.5	6.5				2.2	13.9	
	(0.2)	(0.3)	(0.2)	(0.4)				(0.2)	(0.9)	
us	1.6	2.6	0.2	6.4	0.5	0.7	1.6	2.3	1.8	
	(0.2)	(0.2)	(0.2)	(0.4)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	
^{234}U (pCi g^{-1} ash)										
os	0.670	0.209	1.166	0.193				0.192	0.407	0.441
	(0.050)	(0.021)	(0.082)	(0.024)				(0.019)	(0.034)	
us	0.174	0.262	0.482	0.229	0.317	0.305	0.281	0.355	0.372	0.407
	(0.016)	(0.022)	(0.036)	(0.020)	(0.029)	(0.026)	(0.023)	(0.029)	(0.035)	

Table 4 (Continued)

^{235}U (pCi g^{-1} ash)										
os	0.028	0.008	0.043	0.009				0.009	0.014	0.018
	(0.006)	(0.003)	(0.008)	(0.005)				(0.003)	(0.004)	
us	0.006	0.009	0.019	0.011	0.012	0.013	0.011	0.013	0.015	0.020
	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	
^{238}U (pCi g^{-1} ash)										
os	0.690	0.214	0.975	0.259				0.264	0.403	0.437
	(0.051)	(0.021)	(0.070)	(0.029)				(0.024)	(0.034)	
us	0.157	0.263	0.396	0.231	0.269	0.313	0.287	0.376	0.385	0.421
	(0.015)	(0.022)	(0.031)	(0.020)	(0.025)	(0.026)	(0.024)	(0.030)	(0.036)	
^{tot}U[4] (μg g^{-1} ash)[6]										
os	2.079	0.645	2.939	0.779				0.794	1.214	1.63
	(0.156)	(0.064)	(0.214)	(0.089)				(0.073)	(0.104)	
us	0.473	0.791	1.195	0.697	0.811	0.943	0.864	1.132	1.16	1.53
	(0.046)	(0.064)	(0.095)	(0.064)	(0.077)	(0.079)	(0.073)	(0.091)	(0.11)	
^{228}Ac (pCi g^{-1} ash)										
os	2.40	3.47	5.61	1.28				-0.03	2.12	2.90
	(0.78)	(0.98)	(1.48)	(0.54)				(0.62)	(0.78)	
us	4.00	3.00	2.63	1.47	2.98	3.30	3.04	-0.13	3.13	4.07
	(1.02)	(0.88)	(0.86)	(0.48)	(0.86)	(0.94)	(6.08)	(0.62)	(0.94)	
^{214}Bi (pCi g^{-1} ash)										
os	1.74	1.22	2.10	1.38				1.41	1.83	2.35
	(0.48)	(0.42)	(0.58)	(0.42)				(0.42)	(0.52)	
us	1.60	0.41	1.01	1.53	2.61	2.43	4.28	0.49	1.29	1.83
	(0.44)	(0.82)	(0.34)	(0.42)	(0.62)	(0.58)	(0.90)	(0.20)	(0.54)	
^{60}Co (pCi g^{-1} ash)										
os	-0.05	-0.02	0.66	0.15				-0.06	0.37	0.61
	(0.30)	(0.30)	(1.32)	(0.30)				(0.30)	(0.24)	

Table 4 (Continued)

us	0.12	1.03	-0.06	-0.09	-0.11	0.42	0.74	-0.09	0.21	0.63
	(0.24)	(0.30)	(0.30)	(0.30)	(0.30)	(0.16)	(1.48)	(0.30)	(0.42)	
^{137}Cs (pCi g^{-1} ash)										
os	0.29	0.20	0.43	0.25				0.43	0.27	1.65
	(0.12)	(0.40)	(0.86)	(0.12)				(0.14)	(0.12)	
us	0.22	0.36	0.60	0.32	0.20	0.55	0.34	0.34	0.61	0.94
	(0.10)	(0.12)	(0.18)	(0.12)	(0.10)	(0.20)	(0.14)	(0.12)	(0.22)	
^{40}K (pCi g^{-1} ash)										
os	103.00	90.00	131.00	96.60				114.00	147.00	173.0
	(18.00)	(16.80)	(24.00)	(18.60)				(20.00)	(26.00)	
us	202.00	166.00	234.00	134.00	269.00	241.00	203.00	130.00	312.00	362.0
	(32.00)	(28.00)	(38.00)	(24.00)	(42.00)	(38.00)	(34.00)	(22.00)	(50.00)	
^{54}Mn (pCi g^{-1} ash)										
os	0.12	0.34	0.44	-0.19				-0.08	-0.12	0.06
	(0.24)	(0.12)	(0.20)	(0.18)				(0.18)	(0.18)	
us	0.30	0.03	0.16	0.17	-0.06	-0.08	-0.14	-0.05	-0.02	0.16
	(0.12)	(0.06)	(0.32)	(0.34)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	
^{22}Na (pCi g^{-1} ash)										
os	0.66	0.39	0.80	0.44				0.50	0.76	1.02
	(0.24)	(0.78)	(0.28)	(0.20)				(0.20)	(0.26)	
us	-0.12	-0.10	-0.19	0.36	0.56	0.25	0.03	0.29	0.37	0.57
	(0.26)	(0.26)	(0.26)	(0.16)	(1.12)	(0.50)	(0.06)	(0.58)	(0.20)	
^{214}Pb (pCi g^{-1} ash)										
os	1.51	2.03	3.37	2.77				2.46	2.13	2.69
	(0.42)	(0.48)	(0.74)	(0.70)				(0.58)	(0.56)	
us	2.05	1.41	2.06	1.53	2.31	3.27	3.38	1.26	2.04	2.68
	(0.50)	(0.36)	(4.12)	(0.42)	(0.54)	(0.74)	(0.74)	(2.52)	(0.64)	

Table 4 (Continued)

^{208}Tl (pCi g^{-1} ash)										
os	0.68	0.40	1.33	0.44				0.30	0.76	1.02
	(0.20)	(0.14)	(0.34)	(0.16)				(0.14)	(0.26)	
us	0.96	0.66	0.41	0.42	0.62	0.62	0.05	-0.07	0.41	0.59
	(0.26)	(0.18)	(0.14)	(0.14)	(0.20)	(0.22)	(0.10)	(0.22)	(0.18)	

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (southeastern portions), #8=expansion area, and BG=background (south and upwind of LANL).
[2]Regional Statistical Reference Level=mean + 2 std dev from long-term data.
[3]tissue moisture.
[4]os=overstory (trees) and us=understory (grasses/forbs).
[5](± one counting uncertainty).
[6]Total U was calculated from U isotope activity.

Table 5. Comparison of past and present ^{3}H and ^{239}Pu data in (unwashed) vegetation collected at similar sites within and around Area G.

Sites	^{3}H pCi mL^{-1}	^{239}Pu pCi g^{-1} ash
#1 Tritium shafts (south of the shafts just outside fence)		
Understory		
Past[a]	1450.0	0.03
Present		
1994[b]	201.0	0.02
1995[c]	1400.0	0.01
1996	8279.0	0.01
#2 Tritium shafts (west of the shafts just outside the fence)		
Overstory		
Past[d]	2200.0 to 4800.0	0.01
Present		
1994[b]	5800.0	0.01
1995[c]	418.0	0.00
1996	7569.0	0.00
Understory		
Past[e]	0.4	0.27
Present		
1994[a]	328.0	0.01
1995[b]	4200.0	0.01
1996	4890.0	0.01
#4 TRU waste pads (north of pad #3 and #4 just outside fence)		
Overstory		
Past[e]	14.4	0.57 to 3.28
Present		
1994[b]	2.5	0.01
1995[c]	4.3	0.06
1996	0.9	0.00
Understory		
Past[e]	3860.0 to 19100.0	0.52 to 1.55
Present		
1994[b]	35.6	0.15
1995[c]	3.7	0.13
1996	0.8	0.15
#5 TRU waste pads (pad #3)		
Understory		
Past[e]	392.0 to 101000.0	
Present		
1994[b]	177.3	0.01
1995[c]	7300.0	0.01
1996	3788.0	0.01
#6 TRU waste pads (pad #4)		
Understory		
Past[e]	1028.0	0.95
Present		
1994[b]	952.5	0.01
1995[c]	2700.0	0.01
1996	14744.0	0.01

[a]Data from Mayfield and Hanson (1983), [b]Data from Fresquez et al. (1995), [c] Data from Fresquez et al. (1996b), [d]Data in 1985 from Jacobson (1992), and [e]Data from Purtymun (1973).

Table 6. Heavy metal concentrations (μg g^{-1} dry) in washed vegetation collected from Area G in 1996.

Element	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL[2]
Ag										
os[3]	1.00*	1.00*	1.00*	1.00*				1.00*	1.00*	
us	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	
As										
os	0.15*	0.15*	0.15*	0.15*				0.15*	0.15*	
us	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.30	
Ba										
os	7.70	4.60	3.20	5.40				10.00	12.70	
us	14.00	11.00	18.70	13.00	23.00	18.70	13.00	12.00	17.00	
Be										
os	0.50*	0.50*	0.50*	3.00				0.50*	0.50*	
us	0.50*	0.50*	0.50*	0.50*	0.50*	0.50*	0.50	0.50*	0.50*	
Cd										
os	0.60*	0.60*	0.60*	3.20				0.60*	0.60*	
us	0.60*	0.60*	0.60*	0.60*	0.60*	0.60*	0.60	0.60*	0.60*	
Cr										
os	0.50*	0.50*	0.50*	2.24				0.50*	0.50*	
us	0.50*	0.50*	0.50*	0.50*	0.50*	0.50*	0.50	0.50*	0.50	
Hg										
os	0.10	0.05*	0.05*	0.05*				0.05*	0.05*	
us	0.05*	0.05*	0.05*	0.05*	0.05*	0.10	0.05*	0.05*	0.05*	
Ni										
os	4.70	1.50*	3.30	1.50*				3.70	7.70	
us	20.00	1.50*	1.50*	4.60	4.70	1.50*	1.50*	1.50*	1.50*	
Pb										
os	0.32	0.33	0.87	0.25				0.02	0.33	
us	2.95	0.24	0.35	0.49	0.38	0.27	0.23	0.25	0.87	

Table 6 (Continued)

Sb									
os	0.18	0.02*	0.02*	0.22				0.02*	0.02*
us	0.02*	0.02*	0.02*	0.07	0.02*	0.02*	0.02*	0.02*	0.02*
Se									
os	0.10	0.20	0.10	0.10				0.05*	0.10
us	0.20	0.10	0.10	0.05*	0.10	0.10	0.05*	0.05*	0.05*
Tl									
os	24.00*	24.00*	24.00*	24.00*				24.00*	24.00*
us	24.00*	24.00*	24.00*	24.00*	24.00*	24.00*	24.00*	24.00*	24.00*

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (southeastern portions), #8=expansion area, and BG=background (south and upwind of LANL).

[2]Regional Statistical Reference Level=mean + 2 std dev from long-term data; however, since this was the first year no statistics could be calculated.

[3]os=overstory (trees) and us=understory (grasses/forbs).

*Results were reported in < values; thus, concentrations were reduced by one-half concentration (shown).

Table 7. Heavy metal concentrations (μg g^{-1} dry) in unwashed vegetation collected from Area G in 1996.

Element	#1[1]	#2	#3	#4	#5	#6	#7	#8	BG	RSRL[2]
Ag										
os[3]	0.13*	0.13*	0.57	0.35				0.13*	0.13*	0.84
us	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.13*	0.84
As										
os	0.10*	0.10*	0.10*	0.10*				0.10*	0.10*	0.10
us	0.10*	0.10*	0.10*	0.10*	0.20	0.20	0.10*	0.20	0.10*	0.10
Ba										
os	17.50	25.30	10.90	20.20				26.90	32.50	52.16
us	40.30	40.80	38.00	24.70	56.80	35.10	57.80	64.10	69.00	122.02
Be										
os	0.06*	0.06*	0.06*	0.06*				0.06*	0.06*	0.08
us	0.06*	0.06*	0.06*	0.06*	0.06*	0.06*	0.06*	0.06*	0.06*	0.08
Cd										
os	0.13*	0.13*	0.13*	0.13*				0.13*	0.13*	0.26
us	0.13*	0.13*	0.34	0.31	0.13*	0.13*	0.13	0.33	0.25	0.30
Cr										
os	0.63*	0.63*	0.63*	0.63*				1.37	0.63	0.98
us	0.82*	0.63*	0.63*	0.63*	0.63*	0.63*	0.63*	0.63*	0.63*	0.98
Hg										
os	0.05*	0.05*	0.05*	0.05*				0.05*	0.05*	0.05
us	0.05*	0.05*	0.05*	0.05*	0.05*	0.05*	0.05*	0.05*	0.05*	0.05
Ni										
os	18.30	1.13*	1.13*	1.13*				1.13*	1.13*	1.71
us	1.13*	1.13*	1.13*	1.13	1.13*	1.13*	1.13*	1.13*	1.13*	1.71
Pb										
os	4.40	0.90	0.50	0.60				0.70	0.40	3.46
us	0.60	0.80	0.60	1.20	0.70	0.60	0.40	0.90	0.70	3.19

Table 7 (Continued)

Sb										
os	0.40	0.30*	0.15*	0.15*				0.15*	0.15*	0.82
us	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.15*	0.82
Se										
os	0.20	0.30	0.20	0.20				0.20	0.20	0.29
us	0.40	0.20	0.20	0.10	0.40	0.30	0.40	0.20	0.20	3.65
Tl										
os	10.35*	10.38*	10.35*	10.35*				10.35*	10.35*	19.36
us	10.35*	10.35*	10.35*	10.35*	10.35*	10.35*	10.35*	10.35*	10.35*	19.36

[1]#1=tritium shafts (south of the shafts just outside the fence), #2=tritium shafts (west of the shafts just outside the fence), #3=waste pits (east of the new pit inside the fence), #4=TRU waste pads (north of pads #3 and 4 just outside the fence), #5=TRU waste pad #3, #6=TRU waste pad #4, #7=Pits #17 and 18 (southeastern portions), #8=expansion area, and BG=background (south and upwind of LANL).

[2]Regional Statistical Reference Level=mean + 2 std dev from long-term data.

[3]Screening Action Level (FIMAD 1997).

*Results were reported in < values; thus, concentrations were reduced by one-half concentration (shown).

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APPENDIX A

CST ANALYTICAL REPORTS OF SOIL SURFACE SAMPLES: RADIONUCLIDES

REPORT NUMBER: 41757

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

Prepared by: CAH on 27-Sep-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: M306

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
1	96.06390	PU-238	RAS	0.0111	0.0012	PCI/G	9/19/96	93%
1	96.06390	PU-239	RAS	0.0251	0.0019	PCI/G	9/19/96	93%
2	96.06391	PU-238	RAS	0.0035	0.0008	PCI/G	9/19/96	81%
2	96.06391	PU-239	RAS	0.0423	0.0029	PCI/G	9/19/96	81%
3	96.06392	PU-238	RAS	0.021	0.004	PCI/G	9/19/96	80%
3	96.06392	PU-239	RAS	0.045	0.006	PCI/G	9/19/96	80%
4	96.06393	PU-238	RAS	0.0133	0.0016	PCI/G	9/19/96	62%
4	96.06393	PU-239	RAS	0.0662	0.0039	PCI/G	9/19/96	62%
5	96.06394	PU-238	RAS	0.0065	0.001	PCI/G	9/19/96	90%
5	96.06394	PU-239	RAS	0.0219	0.0019	PCI/G	9/19/96	90%
6	96.06395	PU-238	RAS	0.0071	0.0012	PCI/G	9/19/96	88%
6	96.06395	PU-239	RAS	0.0985	0.005	PCI/G	9/19/96	88%
7	96.06396	PU-238	RAS	0.0069	0.0014	PCI/G	9/19/96	65%
7	96.06396	PU-239	RAS	0.0127	0.0019	PCI/G	9/19/96	65%
8	96.06397	PU-238	RAS	0.0009	0.0005	PCI/G	9/19/96	83%
8	96.06397	PU-239	RAS	0.0125	0.0016	PCI/G	9/19/96	83%
BG	96.06398	PU-238	RAS	0.0002	0.0003	PCI/G	9/19/96	70%
BG	96.06398	PU-239	RAS	0.0147	0.0018	PCI/G	9/19/96	70%

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
3	96.06392	PU-238	RAS	0.017	0.002	PCI/G	9/27/96	76%
3	96.06392	PU-239	RAS	0.046	0.003	PCI/G	9/27/96	76%

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27a

REPORT NUMBER: 41757 (continued)

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

Prepared by: CAH on 27-Sep-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD PETERS PROGRAM CODE: M306

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
1	96.06390	PU-242T	4.11	3.8223	PCI/SAMPLE	7/31/96	93%
2	96.06391	PU-242T	4.11	3.3291	PCI/SAMPLE	7/31/96	81%
3	96.06392	PU-242T	4.11	1.1919	PCI/SAMPLE	7/31/96	29%
4	96.06393	PU-242T	4.11	2.5482	PCI/SAMPLE	7/31/96	62%
5	96.06394	PU-242T	4.11	3.699	PCI/SAMPLE	7/31/96	90%
6	96.06395	PU-242T	4.11	3.6168	PCI/SAMPLE	7/31/96	88%
7	96.06396	PU-242T	4.11	2.6715	PCI/SAMPLE	7/31/96	65%
8	96.06397	PU-242T	4.11	3.4113	PCI/SAMPLE	7/31/96	83%
BG	96.06398	PU-242T	4.11	2.877	PCI/SAMPLE	7/31/96	70%
00.33908	96.06403	PU-242T	4.11	3.8634	PCI/SAMPLE	7/31/96	94%

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		9/27/96	UNDER CONTROL
00.22777	PU-239	0.0	0.001	PCI/G	0.0		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
96.06403	PU-238	0.5145	0.0158	PCI/G	0.59	0.02	9/19/96	WARNING 2-3 SIG
96.06403	PU-239	0.7272	0.0211	PCI/G	0.83	0.026	9/19/96	OUT OF CONTROL

REPORT NUMBER: 41757	RJP	SJG	SJG	mag
	Analyst	Reviewer	Team Leader	QA Officer
	27 Sept 96	10/02/96	10/02/96	10/2/96
	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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27c

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

Prepared by: EBAID on 20-Nov-1996

ANALYSIS: SR-90 REQUEST NUMBER: 23685 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
1	96.06390	0.1	0.2	PCI\G	10/29/96	
2	96.06391	0.2	0.2	PCI\G	10/29/96	
3	96.06392	0.3	0.2	PCI\G	10/29/96	
4	96.06393	0.4	0.2	PCI\G	10/29/96	
5	96.06394	0.0	0.2	PCI\G	10/29/96	
6	96.06395	0.2	0.2	PCI\G	10/29/96	
7	96.06396	0.2	0.2	PCI\G	10/29/96	
8	96.06397	0.4	0.2	PCI\G	10/29/96	
BG	96.06398	0.3	0.2	PCI\G	10/29/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
4	96.06393	0.5	0.1	PCI\G	10/29/96	

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

Prepared by: EBAID on 20-Nov-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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.

___ 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
96.06401	26.3	1.5	PCI/G	34.9	1.05	10/29/96	OUT OF CONTROL

REPORT NUMBER: 42296	YI	Eroy	SJG	mag
	Analyst	Reviewer	Team Leader	QA Officer
	11-20-96	1-24-97	1/27/97	1/28/97
	Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

e 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: 41699

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

Prepared by: CEA on 20-Sep-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
1	96.06390	U-234	RAS	1.182	0.054	PCI/G	9/20/96	68%
1	96.06390	U-235	RAS	0.0608	0.0086	PCI/G	9/20/96	68%
1	96.06390	U-238	RAS	1.346	0.0597	PCI/G	9/20/96	68%
	96.06391	U-234	RAS	1.328	0.0556	PCI/G	9/20/96	77%
2	96.06391	U-235	RAS	0.0489	0.0072	PCI/G	9/20/96	77%
2	96.06391	U-238	RAS	1.311	0.0549	PCI/G	9/20/96	77%
3	96.06392	U-234	RAS	0.9402	0.0423	PCI/G	9/20/96	72%
3	96.06392	U-235	RAS	0.0489	0.0071	PCI/G	9/20/96	72%
3	96.06392	U-238	RAS	1.038	0.0455	PCI/G	9/20/96	72%
4	96.06393	U-234	RAS	1.088	0.0505	PCI/G	9/20/96	68%
4	96.06393	U-235	RAS	0.0405	0.0077	PCI/G	9/20/96	68%
4	96.06393	U-238	RAS	1.089	0.0504	PCI/G	9/20/96	68%
5	96.06394	U-234	RAS	1.0719	0.0436	PCI/G	9/20/96	87%
5	96.06394	U-235	RAS	0.0365	0.0055	PCI/G	9/20/96	87%
5	96.06394	U-238	RAS	1.0219	0.0421	PCI/G	9/20/96	87%
6	96.06395	U-234	RAS	1.123	0.0496	PCI/G	9/20/96	75%
6	96.06395	U-235	RAS	0.0446	0.007	PCI/G	9/20/96	75%
6	96.06395	U-238	RAS	1.123	0.0496	PCI/G	9/20/96	75%
7	96.06396	U-234	RAS	1.253	0.0526	PCI/G	9/20/96	73%
7	96.06396	U-235	RAS	0.0526	0.0074	PCI/G	9/20/96	73%
7	96.06396	U-238	RAS	1.239	0.0521	PCI/G	9/20/96	73%
8	96.06397	U-234	RAS	1.075	0.0516	PCI/G	9/20/96	66%
8	96.06397	U-235	RAS	0.0533	0.0082	PCI/G	9/20/96	66%
8	96.06397	U-238	RAS	1.197	0.056	PCI/G	9/20/96	66%
BG	96.06398	U-234	RAS	1.185	0.0518	PCI/G	9/20/96	77%
BG	96.06398	U-235	RAS	0.0404	0.0066	PCI/G	9/20/96	77%
BG	96.06398	U-238	RAS	1.196	0.0522	PCI/G	9/20/96	77%

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
5	96.06394	U-234	RAS	1.2381	0.0521	PCI/G	9/20/96	79%
5	96.06394	U-235	RAS	0.0521	0.0073	PCI/G	9/20/96	79%
5	96.06394	U-238	RAS	1.1742	0.05	PCI/G	9/20/96	79%

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REPORT NUMBER: 41699 (continued)

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

Prepared by: CEA on 20-Sep-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
1	96.06390	U-232T	2.66	1.8088	PCI/SAMPLE	7/31/96	68%
2	96.06391	U-232T	2.66	2.0482	PCI/SAMPLE	7/31/96	77%
3	96.06392	U-232T	2.66	1.9152	PCI/SAMPLE	7/31/96	72%
4	96.06393	U-232T	2.66	1.8088	PCI/SAMPLE	7/31/96	68%
5	96.06394	U-232T	2.66	2.1014	PCI/SAMPLE	7/31/96	79%
6	96.06395	U-232T	2.66	1.995	PCI/SAMPLE	7/31/96	75%
7	96.06396	U-232T	2.66	1.9418	PCI/SAMPLE	7/31/96	73%
8	96.06397	U-232T	2.66	1.7556	PCI/SAMPLE	7/31/96	66%
BG	96.06398	U-232T	2.66	2.0482	PCI/SAMPLE	7/31/96	77%
00.00742	96.06402	U-232T	2.66	2.1546	PCI/SAMPLE	7/31/96	81%

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	U-234	- 0.0013	0.0017	PCI/G	0.0		9/20/96	UNDER CONTROL
00.22777	U-235	- 0.0003	0.0008	PCI/G	0.0		9/20/96	UNDER CONTROL
00.22777	U-238	- 0.0017	0.0007	PCI/G	0.0		9/20/96	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
96.06402	U-234	0.8597	0.0385	PCI/G	0.896		9/20/96	UNDER CONTROL
96.06402	U-235	0.0279	0.0054	PCI/G	0.046		9/20/96	WARNING 2 S

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96.06402 U-238	0.7529	0.0349	PCI/G	0.832	9/20/96 UNDER CONTROL

REPORT NUMBER: 41699

Analyst	Reviewer	Team Leader	QA Officer
9/20/96	9/24/96	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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27h

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

Prepared by: ROBINSON on 27-Sep-1996

ANALYSIS: H-3 REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
1	96.06390	43183.	288.	PCI/L	9/26/96	
2	96.06391	171175.	483.	PCI/L	9/26/96	
3	96.06392	1206.	146.	PCI/L	9/26/96	
4	96.06393	204.	139.	PCI/L	9/26/96	
5	96.06394	7894.	181.	PCI/L	9/26/96	
6	96.06395	18098.	220.	PCI/L	9/26/96	
7	96.06396	1802.	150.	PCI/L	9/26/96	
8	96.06397	406.	135.	PCI/L	9/26/96	
BG	96.06398	129.	139.	PCI/L	9/26/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
2	96.06391	174330.	492.	PCI/L	9/26/96	

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

Prepared by: ROBINSON on 27-Sep-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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	- 620.	133.	PCI/L	0.0		9/26/96	UNDER CONTROL
00.34094	- 181.	136.	PCI/L	0.0		9/26/96	UNDER CONTROL
00.34094	- 217.	136.	PCI/L	0.0		9/26/96	UNDER CONTROL
00.34094	- 220.	136.	PCI/L	0.0		9/26/96	UNDER CONTROL
00.34094	- 268.	136.	PCI/L	0.0		9/26/96	UNDER CONTROL
00.34094	289.	140.	PCI/L	0.0		9/26/96	WARNING 2-3 SIG
00.34098	13204.	203.	PCI/L	14014.	1401.	9/26/96	UNDER CONTROL
00.34098	12800.	201.	PCI/L	14014.	1401.	9/26/96	UNDER CONTROL
00.34098	14603.	208.	PCI/L	14014.	1401.	9/26/96	UNDER CONTROL
00.34098	13119.	202.	PCI/L	14014.	1401.	9/26/96	UNDER CONTROL
00.34098	13662.	204.	PCI/L	14014.	1401.	9/26/96	UNDER CONTROL
00.34098	13433.	204.	PCI/L	14014.	1401.	9/26/96	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
96.05728	12.535	0.2	NCI/L	11.92	0.44	9/26/96	UNDER CONTROL
96.06399	28760.	252.	PCI/L	31700.	824.	9/26/96	OUT OF CONTROL
96.06467	9779.	186.	PCI/L	7930.	206.	9/23/96	OUT OF CONTROL

REPORT NUMBER: 41752

Analyst	Reviewer	Team Leader	QA Officer
093096	111896	11/19/96	11/25/96
Date	Date	Date	Date

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REPORT NUMBER: 42033

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

Prepared by: SRG on 25-Oct-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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

NOTEBOOKAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1	96.06390	AC-228	G	1.56	0.17	PCI/G	10/25/96	
1	96.06390	AM-241	G	0.61	0.91	PCI/G	10/25/96	
1	96.06390	BI-214	G	1.16	0.12	PCI/G	10/25/96	
1	96.06390	CO-60	G	0.16	0.03	PCI/G	10/25/96	
1	96.06390	CS-137	G	0.44	0.05	PCI/G	10/25/96	
1	96.06390	K-40	G	22.4	1.9	PCI/G	10/25/96	
1	96.06390	MN-54	G	0.11	0.02	PCI/G	10/25/96	
1	96.06390	NA-22	G	0.05	0.02	PCI/G	10/25/96	
1	96.06390	PB-214	G	1.08	0.1	PCI/G	10/25/96	
1	96.06390	TL-208	G	0.54	0.05	PCI/G	10/25/96	
2	96.06391	AC-228	G	1.52	0.17	PCI/G	10/25/96	
2	96.06391	AM-241	G	0.51	0.11	PCI/G	10/25/96	
2	96.06391	BI-214	G	1.2	0.12	PCI/G	10/25/96	
2	96.06391	CO-60	G	0.08	0.12	PCI/G	10/25/96	
2	96.06391	CS-137	G	0.96	0.09	PCI/G	10/25/96	
2	96.06391	K-40	G	19.7	1.7	PCI/G	10/25/96	
2	96.06391	MN-54	G	0.03	0.04	PCI/G	10/25/96	
2	96.06391	NA-22	G	0.09	0.14	PCI/G	10/25/96	
2	96.06391	PB-214	G	1.11	0.11	PCI/G	10/25/96	
2	96.06391	TL-208	G	0.55	0.06	PCI/G	10/25/96	
3	96.06392	AC-228	G	1.45	0.17	PCI/G	10/25/96	
3	96.06392	AM-241	G	0.95	0.19	PCI/G	10/25/96	
3	96.06392	BI-214	G	1.41	0.13	PCI/G	10/25/96	
3	96.06392	CO-60	G	0.08	0.11	PCI/G	10/25/96	
3	96.06392	CS-137	G	0.49	0.05	PCI/G	10/25/96	
3	96.06392	K-40	G	21.4	1.8	PCI/G	10/25/96	
3	96.06392	MN-54	G	0.11	0.02	PCI/G	10/25/96	
3	96.06392	NA-22	G	0.01	0.02	PCI/G	10/25/96	
3	96.06392	PB-214	G	1.17	0.11	PCI/G	10/25/96	
3	96.06392	TL-208	G	0.52	0.05	PCI/G	10/25/96	
4	96.06393	AC-228	G	1.63	0.18	PCI/G	10/25/96	
4	96.06393	AM-241	G	0.69	1.03	PCI/G	10/25/96	
4	96.06393	BI-214	G	1.15	0.11	PCI/G	10/25/96	
4	96.06393	CO-60	G	0.06	0.02	PCI/G	10/25/96	
4	96.06393	CS-137	G	0.5	0.06	PCI/G	10/25/96	
4	96.06393	K-40	G	24.1	2.	PCI/G	10/25/96	
4	96.06393	MN-54	G	0.09	0.02	PCI/G	10/25/96	

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4	96.06393	NA-22	G	0.08	0.02	PCI/G	10/25/96
4	96.06393	PB-214	G	1.17	0.11	PCI/G	10/25/96
4	96.06393	TL-208	G	0.52	0.05	PCI/G	10/25/96
5	96.06394	AC-228	G	1.69	0.18	PCI/G	10/25/96
5	96.06394	AM-241	G	0.64	0.96	PCI/G	10/25/96
5	96.06394	BI-214	G	1.22	0.12	PCI/G	10/25/96
5	96.06394	CO-60	G	0.09	0.03	PCI/G	10/25/96
5	96.06394	CS-137	G	0.11	0.02	PCI/G	10/25/96
5	96.06394	K-40	G	26.3	2.2	PCI/G	10/25/96
5	96.06394	MN-54	G	0.06	0.09	PCI/G	10/25/96
5	96.06394	NA-22	G	0.0	0.05	PCI/G	10/25/96
5	96.06394	PB-214	G	1.24	0.12	PCI/G	10/25/96
5	96.06394	TL-208	G	0.61	0.07	PCI/G	10/25/96
6	96.06395	AC-228	G	1.73	0.19	PCI/G	10/25/96
6	96.06395	AM-241	G	0.87	1.31	PCI/G	10/25/96
6	96.06395	BI-214	G	1.4	0.13	PCI/G	10/25/96
6	96.06395	CO-60	G	0.25	0.04	PCI/G	10/25/96
6	96.06395	CS-137	G	0.07	0.02	PCI/G	10/25/96
6	96.06395	K-40	G	26.4	2.2	PCI/G	10/25/96
6	96.06395	MN-54	G	0.11	0.02	PCI/G	10/25/96
6	96.06395	NA-22	G	0.16	0.24	PCI/G	10/25/96
6	96.06395	PB-214	G	1.31	0.12	PCI/G	10/25/96
6	96.06395	TL-208	G	0.52	0.06	PCI/G	10/25/96
7	96.06396	AC-228	G	1.44	0.16	PCI/G	10/25/96
7	96.06396	AM-241	G	0.17	0.06	PCI/G	10/25/96
7	96.06396	BI-214	G	1.3	0.12	PCI/G	10/25/96
7	96.06396	CO-60	G	0.16	0.03	PCI/G	10/25/96
7	96.06396	CS-137	G	0.11	0.16	PCI/G	10/25/96
7	96.06396	K-40	G	19.9	1.7	PCI/G	10/25/96
7	96.06396	MN-54	G	0.05	0.01	PCI/G	10/25/96
7	96.06396	NA-22	G	0.13	0.03	PCI/G	10/25/96
7	96.06396	PB-214	G	1.09	0.1	PCI/G	10/25/96
7	96.06396	TL-208	G	0.46	0.05	PCI/G	10/25/96
8	96.06397	AC-228	G	1.42	0.15	PCI/G	10/25/96
8	96.06397	AM-241	G	0.45	0.68	PCI/G	10/25/96
8	96.06397	BI-214	G	0.97	0.1	PCI/G	10/25/96
8	96.06397	CO-60	G	0.09	0.02	PCI/G	10/25/96
8	96.06397	CS-137	G	0.42	0.05	PCI/G	10/25/96
8	96.06397	K-40	G	15.9	1.4	PCI/G	10/25/96
8	96.06397	MN-54	G	0.1	0.02	PCI/G	10/25/96
8	96.06397	NA-22	G	0.14	0.02	PCI/G	10/25/96
8	96.06397	PB-214	G	0.95	0.09	PCI/G	10/25/96
8	96.06397	TL-208	G	0.43	0.05	PCI/G	10/25/96
BG	96.06398	AC-228	G	1.22	0.15	PCI/G	10/25/96
BG	96.06398	AM-241	G	0.43	0.65	PCI/G	10/25/96
BG	96.06398	BI-214	G	1.03	0.1	PCI/G	10/25/96
BG	96.06398	CO-60	G	0.09	0.02	PCI/G	10/25/96
BG	96.06398	CS-137	G	0.44	0.05	PCI/G	10/25/96
BG	96.06398	K-40	G	13.9	1.3	PCI/G	10/25/96
BG	96.06398	MN-54	G	0.13	0.02	PCI/G	10/25/96
BG	96.06398	NA-22	G	0.13	0.02	PCI/G	10/25/96
BG	96.06398	PB-214	G	0.96	0.09	PCI/G	10/25/96
BG	96.06398	TL-208	G	0.5	0.05	PCI/G	10/25/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT

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1	96.06390	AC-228	G	1.69	0.18	PCI/G	10/25/96
1	96.06390	AM-241	G	0.1	0.15	PCI/G	10/25/96
1	96.06390	BI-214	G	1.2	0.12	PCI/G	10/25/96
1	96.06390	CO-60	G	0.13	0.02	PCI/G	10/25/96
1	96.06390	CS-137	G	0.51	0.06	PCI/G	10/25/96
1	96.06390	K-40	G	22.	1.9	PCI/G	10/25/96
1	96.06390	MN-54	G	0.01	0.03	PCI/G	10/25/96
1	96.06390	NA-22	G	0.07	0.11	PCI/G	10/25/96
1	96.06390	PB-214	G	1.16	0.11	PCI/G	10/25/96
1	96.06390	TL-208	G	0.56	0.06	PCI/G	10/25/96

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27m

REPORT NUMBER: 42033 (continued)

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

Prepared by: SRG on 25-Oct-1996

REQUEST NUMBER: 23685 MATRIX: SS ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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

NOTEBOOKAGE:

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	AM-241	0.09	0.24	PCI/G	0.0		10/25/96	UNDER CONTROL
00.22777	CS-137	0.01	0.02	PCI/G	0.0		10/25/96	UNDER CONTROL
00.33404	AM-241	5.1	0.45	PCI/G	5.	0.22	10/25/96	UNDER CONTROL
00.33404	CS-137	5.32	0.38	PCI/G	4.98	0.16	10/25/96	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
96.06400	CS-137	27.1	1.8	PCI/G	30.	0.99	10/25/96	UNDER CONTROL

REPORT NUMBER: 42033

Analyst	Reviewer	Team Leader	QA Officer
10/25/96	10/26/96	10/25/96	10/25/96
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. 1, pp. 19-20.

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APPENDIX B

CST ANALYTICAL REPORTS OF SOIL SURFACE SAMPLES: HEAVY METALS

REPORT NUMBER: 41822

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

Prepared by: LRB on 2-Oct-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: AAS PROGRAM CODE: M306

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

NOTEBOOK: CST9130 PAGE: 56

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1	96.06390	AS	ETVAA	1.	0.3	UG/G	9/21/96	
1	96.06390	HG	CVAA	< 0.05		UG/G	10/02/96	
1	96.06390	SE	ETVAA	0.5	0.1	UG/G	9/19/96	
2	96.06391	AS	ETVAA	1.	0.5	UG/G	9/21/96	
2	96.06391	HG	CVAA	< 0.05		UG/G	10/02/96	
2	96.06391	SE	ETVAA	0.4	0.1	UG/G	9/19/96	
3	96.06392	AS	ETVAA	2.7	0.3	UG/G	9/21/96	
3	96.06392	HG	CVAA	< 0.05		UG/G	10/02/96	
3	96.06392	SE	ETVAA	0.5	0.1	UG/G	9/19/96	
4	96.06393	AS	ETVAA	0.9	0.3	UG/G	9/21/96	
4	96.06393	HG	CVAA	< 0.05		UG/G	10/02/96	
4	96.06393	SE	ETVAA	0.3	0.1	UG/G	9/19/96	
5	96.06394	AS	ETVAA	0.3	0.3	UG/G	9/21/96	
5	96.06394	HG	CVAA	< 0.05		UG/G	10/02/96	
5	96.06394	SE	ETVAA	0.3	0.1	UG/G	9/19/96	
6	96.06395	AS	ETVAA	0.4	0.3	UG/G	9/21/96	
6	96.06395	HG	CVAA	< 0.05		UG/G	10/02/96	
6	96.06395	SE	ETVAA	0.4	0.1	UG/G	9/19/96	
7	96.06396	AS	ETVAA	2.	0.3	UG/G	9/21/96	
7	96.06396	HG	CVAA	< 0.05		UG/G	10/02/96	
7	96.06396	SE	ETVAA	0.4		UG/G	9/19/96	
8	96.06397	AS	ETVAA	2.3	0.4	UG/G	9/21/96	
8	96.06397	HG	CVAA	< 0.05		UG/G	10/02/96	
8	96.06397	SE	ETVAA	0.3	0.1	UG/G	9/19/96	
BG	96.06398	AS	ETVAA	2.4	0.3	UG/G	9/21/96	
BG	96.06398	HG	CVAA	< 0.05		UG/G	10/02/96	
BG	96.06398	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
1	96.06390	HG	CVAA	< 0.05		UG/G	10/02/96	
1	96.06390	HG	CVAA	< 0.05		UG/G	10/02/96	
2	96.06391	HG	CVAA	< 0.05		UG/G	10/02/96	

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2	96.06391	HG	CVAA	< 0.05	UG/G	10/02/96
3	96.06392	HG	CVAA	< 0.05	UG/G	10/02/96
3	96.06392	HG	CVAA	< 0.05	UG/G	10/02/96
4	96.06393	HG	CVAA	< 0.05	UG/G	10/02/96
4	96.06393	HG	CVAA	< 0.05	UG/G	10/02/96
5	96.06394	HG	CVAA	< 0.05	UG/G	10/02/96
5	96.06394	HG	CVAA	< 0.05	UG/G	10/02/96
6	96.06395	HG	CVAA	< 0.05	UG/G	10/02/96
6	96.06395	HG	CVAA	< 0.05	UG/G	10/02/96
7	96.06396	HG	CVAA	< 0.05	UG/G	10/02/96
7	96.06396	HG	CVAA	< 0.05	UG/G	10/02/96
8	96.06397	HG	CVAA	< 0.05	UG/G	10/02/96
8	96.06397	HG	CVAA	< 0.05	UG/G	10/02/96
BG	96.06398	HG	CVAA	< 0.05	UG/G	10/02/96
BG	96.06398	HG	CVAA	< 0.05	UG/G	10/02/96

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
1	96.06390	HG	CVAA	0.417	0.348	UG/G	10/02/96	

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REPORT NUMBER: 41822 (continued)

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

Prepared by: LRB on 2-Oct-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: AAS PROGRAM CODE: M306

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

NOTEBOOK: CST9130 PAGE: 56

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	124.	4.	MG/KG	128.	71.	9/21/96	UNDER CONTROL
00.30469	HG	4.7	0.4	MG/KG	4.85	2.4	10/02/96	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
96.06388	AS	1400.	300.	NG/G	730.	370.	9/21/96	UNDER CONTROL
96.06388	SE	900.	100.	NG/G	194.	5.	9/19/96	OUT OF CONTROL
96.06389	HG	5.64	2.8	UG/G	6.25	0.19	10/02/96	UNDER CONTROL
96.06389	HG	3.65	2.8	UG/G	6.25	0.19	10/02/96	UNDER CONTROL

REPORT NUMBER: 41822			
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.

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REPORT NUMBER: 41797

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

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: OES PROGRAM CODE: M306

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
1	96.06390	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
1	96.06390	BA	ICPES	50.5	0.8	UG/G	9/30/96	
1	96.06390	BE	ICPES	0.47	0.12	UG/G	9/30/96	
1	96.06390	CD	ICPES	< 0.25		UG/G	9/30/96	0.13
1	96.06390	CR	ICPES	5.84	1.25	UG/G	9/30/96	
1	96.06390	NI	ICPES	5.7	5.4	UG/G	9/30/96	
2	96.06391	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
2	96.06391	BA	ICPES	54.7	0.12	UG/G	9/30/96	
2	96.06391	BE	ICPES	0.46	0.15	UG/G	9/30/96	
2	96.06391	CD	ICPES	< 0.25		UG/G	9/30/96	0.13
2	96.06391	CR	ICPES	3.1	1.4	UG/G	9/30/96	
2	96.06391	NI	ICPES	2.95	2.31	UG/G	9/30/96	
3	96.06392	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
3	96.06392	BA	ICPES	61.5	0.4	UG/G	9/30/96	
3	96.06392	BE	ICPES	0.52	0.12	UG/G	9/30/96	
3	96.06392	CD	ICPES	0.47	0.25	UG/G	9/30/96	
3	96.06392	CR	ICPES	76.	2.	UG/G	9/30/96	
3	96.06392	NI	ICPES	44.	3.	UG/G	9/30/96	
4	96.06393	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
4	96.06393	BA	ICPES	50.5	1.9	UG/G	9/30/96	
4	96.06393	BE	ICPES	0.45	0.12	UG/G	9/30/96	
4	96.06393	CD	ICPES	0.28	0.25	UG/G	9/30/96	
4	96.06393	CR	ICPES	3.6	2.1	UG/G	9/30/96	
4	96.06393	NI	ICPES	3.39	2.25	UG/G	9/30/96	
5	96.06394	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
5	96.06394	BA	ICPES	14.5	0.5	UG/G	9/30/96	
5	96.06394	BE	ICPES	0.19	0.12	UG/G	9/30/96	
5	96.06394	CD	ICPES	< 0.25		UG/G	9/30/96	0.13
5	96.06394	CR	ICPES	< 1.25		UG/G	9/30/96	0.63
5	96.06394	NI	ICPES	2.8	2.8	UG/G	9/30/96	
6	96.06395	AG	ICPES	< 0.25		UG/G	9/30/96	0.13
6	96.06395	BA	ICPES	9.5	0.4	UG/G	9/30/96	
6	96.06395	BE	ICPES	< 0.125		UG/G	9/30/96	0.06
6	96.06395	CD	ICPES	< 0.25		UG/G	9/30/96	0.13
6	96.06395	CR	ICPES	1.06	0.27	UG/G	9/30/96	
6	96.06395	NI	ICPES	1.91	1.91	UG/G	9/30/96	
7	96.06396	AG	ICPES	< 0.25		UG/G	9/30/96	0.13

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7	96.06396	BA	ICPES	149.	5.	UG/G	9/30/96
7	96.06396	BE	ICPES	1.	0.12	UG/G	9/30/96
7	96.06396	CD	ICPES	< 0.25		UG/G	9/30/96 0.13
7	96.06396	CR	ICPES	12.1	0.8	UG/G	9/30/96
7	96.06396	NI	ICPES	9.1	4.8	UG/G	9/30/96
8	96.06397	AG	ICPES	< 0.25		UG/G	9/30/96 0.13
8	96.06397	BA	ICPES	168.	5.	UG/G	9/30/96
8	96.06397	BE	ICPES	0.92	0.12	UG/G	9/30/96
8	96.06397	CD	ICPES	0.51	0.51	UG/G	9/30/96
8	96.06397	CR	ICPES	11.5	1.5	UG/G	9/30/96
8	96.06397	NI	ICPES	23.	5.	UG/G	9/30/96
BG	96.06398	AG	ICPES	< 0.25		UG/G	9/30/96 0.13
BG	96.06398	BA	ICPES	192.	6.	UG/G	9/30/96
BG	96.06398	BE	ICPES	0.99	0.12	UG/G	9/30/96
BG	96.06398	CD	ICPES	0.33	0.33	UG/G	9/30/96
BG	96.06398	CR	ICPES	12.9	1.2	UG/G	9/30/96
BG	96.06398	NI	ICPES	11.	4.	UG/G	9/30/96

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REPORT NUMBER: 41797 (continued)

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

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: OES PROGRAM CODE: M306

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.	6.	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	93.5	3.	MG/KG	102.	56.5	9/30/96	UNDER CONTROL
00.30469	CR	145.	4.	MG/KG	154.	73.	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
96.06388	AG	< 250.		NG/G	110.	27.	9/30/96	UNDER CONTROL
96.06388	BA	23.1	0.5	UG/G	61.	23.	9/30/96	UNDER CONTROL
96.06388	BE	340.	120.	NG/G	610.	240.	9/30/96	UNDER CONTROL
96.06388	CD	370.	250.	NG/G	168.	31.	9/30/96	UNDER CONTROL
96.06388	CR	134.	4.	UG/G	430.	80.	9/30/96	OUT OF CONTROL
96.06388	NI	119.	4.	UG/G	193.	18.	9/30/96	OUT OF CONTROL

REPORT NUMBER: 41797

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

No Sample Discrepancies Noted by Sample Management Section

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REPORT NUMBER: 41792

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

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: IMS PROGRAM CODE: M306

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
								<0.6 = 0.3*
1	96.06390	PB	ICPMS	5.7	0.6	UG/G	9/27/96	
1	96.06390	SB	ICPMS	< 0.6		UG/G	9/27/96	
1	96.06390	TL	ICPMS	< 0.6		UG/G	9/27/96	
2	96.06391	PB	ICPMS	11.6	0.6	UG/G	9/27/96	
2	96.06391	SB	ICPMS	< 0.6		UG/G	9/27/96	
2	96.06391	TL	ICPMS	< 0.6		UG/G	9/27/96	
3	96.06392	PB	ICPMS	9.9	0.6	UG/G	9/27/96	
3	96.06392	SB	ICPMS	< 0.6		UG/G	9/27/96	
3	96.06392	TL	ICPMS	< 0.6		UG/G	9/27/96	
4	96.06393	PB	ICPMS	5.3	0.6	UG/G	9/27/96	
4	96.06393	SB	ICPMS	< 0.6		UG/G	9/27/96	
4	96.06393	TL	ICPMS	< 0.6		UG/G	9/27/96	
5	96.06394	PB	ICPMS	1.7	0.6	UG/G	9/27/96	
5	96.06394	SB	ICPMS	< 0.6		UG/G	9/27/96	
5	96.06394	TL	ICPMS	< 0.6		UG/G	9/27/96	
6	96.06395	PB	ICPMS	3.5	0.6	UG/G	9/27/96	
6	96.06395	SB	ICPMS	< 0.6		UG/G	9/27/96	
6	96.06395	TL	ICPMS	< 0.6		UG/G	9/27/96	
7	96.06396	PB	ICPMS	6.6	0.6	UG/G	9/27/96	
7	96.06396	SB	ICPMS	< 0.6		UG/G	9/27/96	
7	96.06396	TL	ICPMS	< 0.6		UG/G	9/27/96	
8	96.06397	PB	ICPMS	7.7	0.6	UG/G	9/27/96	
8	96.06397	SB	ICPMS	< 0.6		UG/G	9/27/96	
8	96.06397	TL	ICPMS	< 0.6		UG/G	9/27/96	
BG	96.06398	PB	ICPMS	9.3	0.6	UG/G	9/27/96	
BG	96.06398	SB	ICPMS	< 0.6		UG/G	9/27/96	
BG	96.06398	TL	ICPMS	< 0.6		UG/G	9/27/96	

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REPORT NUMBER: 41792 (continued)

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

Prepared by: MKOBY on 30-Sep-1996

REQUEST NUMBER: 23683 MATRIX: SS ANALYST: IMS PROGRAM CODE: M306

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
96.06388	PB	2.2	0.6	UG/G	10.	4.	9/27/96	UNDER CONTROL
96.06388	SB	< 600.		NG/G	860.	160.	9/27/96	UNDER CONTROL
96.06388	TL	< 600.		NG/G	55.	15.	9/27/96	UNDER CONTROL

REPORT NUMBER: 41792

Analyst	Reviewer	Team Leader	QA Officer
10/1/96	10/1/96	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.

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APPENDIX C

CST ANALYTICAL REPORTS OF WASHED VEGETATION SAMPLES: RADIONUCLIDES

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

Prepared by: AKS on 27-Feb-1997

ANALYSIS: SR-90 REQUEST NUMBER: 23728 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
W-1-O	96.06707	4.5	0.2	PCI/G	2/11/97	
W-1-U	96.06708	1.8	0.1	PCI/G	2/11/97	
W-2-O	96.06709	6.8	0.5	PCI/G	2/11/97	
W-2-U	96.06710	2.5	0.2	PCI/G	2/11/97	
W-3-O	96.06711	1.7	0.2	PCI/G	2/12/97	
W-3-U	96.06712	2.6	0.2	PCI/G	2/12/97	
W-4-O	96.06713	18.3	1.2	PCI/G	2/12/97	
W-4-U	96.06714	9.9	0.7	PCI/G	2/12/97	
W-5-U	96.06715	1.7	0.2	PCI/G	2/11/97	
W-6-U	96.06716	1.3	0.4	PCI/G	2/11/97	
W-7-U	96.06717	0.6	0.2	PCI/G	2/11/97	
W-8-O	96.06718	4.1	0.3	PCI/G	2/11/97	
W-8-U	96.06719	1.8	0.1	PCI/G	2/11/97	
W-BG-O	96.06720	5.6	0.4	PCI/G	2/11/97	
W-BG-U	96.06721	1.3	0.1	PCI/G	2/11/97	

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

Prepared by: AKS on 27-Feb-1997

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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.

___ 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
96.06801	6.8	0.8	PCI/G	8.12	0.26	2/10/97	UNDER CONTROL
96.06802	4.	0.6	PCI/G	4.88	0.156	2/10/97	UNDER CONTROL

REPORT NUMBER: 43255

Analyst	Reviewer	Team Leader	QA Officer
2/27/97	3/7/97	3/7/97	3/10/97
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

he 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: 42168

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

Prepared by: CEA on 5-Nov-1996

REQUEST NUMBER: 23728 MATRIX: SV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
W-1-O	96.06707	PU-238	RAS	0.0033	0.0011	PCI/G	10/28/96	88%
W-1-O	96.06707	PU-239	RAS	0.011	0.002	PCI/G	10/28/96	88%
W-1-U	96.06708	PU-238	RAS	0.0043	0.0009	PCI/G	10/28/96	76%
W-1-U	96.06708	PU-239	RAS	0.0077	0.0012	PCI/G	10/28/96	76%
W-2-O	96.06709	PU-238	RAS	0.0017	0.0008	PCI/G	10/28/96	65%
W-2-O	96.06709	PU-239	RAS	0.0067	0.0015	PCI/G	10/28/96	65%
W-2-U	96.06710	PU-238	RAS	0.0021	0.0007	PCI/G	10/28/96	71%
W-2-U	96.06710	PU-239	RAS	0.0039	0.0009	PCI/G	10/28/96	71%
W-3-O	96.06711	PU-238	RAS	0.0088	0.0021	PCI/G	10/28/96	50%
W-3-O	96.06711	PU-239	RAS	0.0713	0.0057	PCI/G	10/28/96	50%
W-3-U	96.06712	PU-238	RAS	0.0015	0.0008	PCI/G	10/28/96	59%
W-3-U	96.06712	PU-239	RAS	0.0527	0.0045	PCI/G	10/28/96	59%
W-4-O	96.06713	PU-238	RAS	0.0228	0.0019	PCI/G	10/28/96	92%
W-4-O	96.06713	PU-239	RAS	0.0622	0.0033	PCI/G	10/28/96	92%
W-4-U	96.06714	PU-238	RAS	0.0295	0.0032	PCI/G	10/28/96	81%
W-4-U	96.06714	PU-239	RAS	0.0949	0.0059	PCI/G	10/28/96	81%
W-5-U	96.06715	PU-238	RAS	0.0017	0.0008	PCI/G	10/28/96	55%
W-5-U	96.06715	PU-239	RAS	0.0126	0.0021	PCI/G	10/28/96	55%
W-6-U	96.06716	PU-238	RAS	0.0028	0.0007	PCI/G	10/28/96	79%
W-6-U	96.06716	PU-239	RAS	0.0084	0.0012	PCI/G	10/28/96	79%
W-7-U	96.06717	PU-238	RAS	0.0032	0.0011	PCI/G	10/28/96	52%
W-7-U	96.06717	PU-239	RAS	0.0176	0.0024	PCI/G	10/28/96	52%
W-8-O	96.06718	PU-238	RAS	0.0005	0.0004	PCI/G	10/28/96	71%
W-8-O	96.06718	PU-239	RAS	0.001	0.0005	PCI/G	10/28/96	71%
W-8-U	96.06719	PU-238	RAS	0.0001	0.0002	PCI/G	10/28/96	76%
W-8-U	96.06719	PU-239	RAS	0.0034	0.0008	PCI/G	10/28/96	76%
W-BG-O	96.06720	PU-238	RAS	0.0005	0.0005	PCI/G	10/28/96	93%
W-BG-O	96.06720	PU-239	RAS	0.0018	0.0007	PCI/G	10/28/96	93%
W-BG-U	96.06721	PU-238	RAS	0.0009	0.0006	PCI/G	10/28/96	81%
W-BG-U	96.06721	PU-239	RAS	0.0014	0.0006	PCI/G	10/28/96	81%

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REPORT NUMBER: 42168 (continued)

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

Prepared by: CEA on 5-Nov-1996

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
W-1-O	96.06707	PU-242T	3.89	3.4232	PCI/SAMPLE	8/14/96	88%
W-1-U	96.06708	PU-242T	3.89	2.9564	PCI/SAMPLE	8/14/96	76%
W-2-O	96.06709	PU-242T	3.89	2.5285	PCI/SAMPLE	8/14/96	65%
W-2-U	96.06710	PU-242T	3.89	2.7619	PCI/SAMPLE	8/14/96	71%
W-3-O	96.06711	PU-242T	3.89	1.945	PCI/SAMPLE	8/14/96	50%
W-3-U	96.06712	PU-242T	3.89	2.2951	PCI/SAMPLE	8/14/96	59%
W-4-O	96.06713	PU-242T	3.89	3.5788	PCI/SAMPLE	8/14/96	92%
W-4-U	96.06714	PU-242T	3.89	3.1509	PCI/SAMPLE	8/14/96	81%
W-5-U	96.06715	PU-242T	3.89	2.1395	PCI/SAMPLE	8/14/96	55%
W-6-U	96.06716	PU-242T	3.89	3.0731	PCI/SAMPLE	8/14/96	79%
W-7-U	96.06717	PU-242T	3.89	2.0228	PCI/SAMPLE	8/14/96	52%
W-8-O	96.06718	PU-242T	3.89	2.7619	PCI/SAMPLE	8/14/96	71%
W-8-U	96.06719	PU-242T	3.89	2.9564	PCI/SAMPLE	8/14/96	76%
W-BG-O	96.06720	PU-242T	3.89	3.6177	PCI/SAMPLE	8/14/96	93%
W-BG-U	96.06721	PU-242T	3.89	3.1509	PCI/SAMPLE	8/14/96	81%
00.34721	96.06799	PU-242T	3.89	2.4896	PCI/SAMPLE	8/14/96	64%
00.34719	96.06800	PU-242T	3.89	2.3729	PCI/SAMPLE	8/14/96	61%

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	2.9263	0.0911	PCI/SAMPLE	3.2	0.1	10/28/96	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
96.06799	PU-238	4.876	0.1531	PCI/G	8.1	0.28	10/28/96	OUT OF CONTROL
96.06799	PU-239	1.15	0.0526	PCI/G	1.75	0.06	10/28/96	OUT OF CONTROL
96.06800	PU-238	1.844	0.0625	PCI/G	1.74	0.06	10/28/96	UNDER CONTROL
96.06800	PU-239	2.919	0.0975	PCI/G	3.3	0.11	10/28/96	WARNING 2-3 SIG

REPORT NUMBER: 42168

Analyst	Reviewer	Team Leader	QA Officer
11/5/96	11-8-96	11/12/96	11/12/96
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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page

REPORT NUMBER: 41649

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

Prepared by: JBR on 18-Sep-1996

REQUEST NUMBER: 23671 MATRIX: W ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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 pCi mL⁻¹ (1σ)
W1-O	96.06289	H-3	LS	130.	0.4	NCI/L	9/16/96	130.0 (0.4)
W1-U	96.06290	H-3	LS	420.	2.	NCI/L	9/16/96	420.0 (2.0)
W2-O	96.06291	H-3	LS	2382.	5.	NCI/L	9/16/96	2382.0 (5.0)
W2-U	96.06292	H-3	LS	609.	3.	NCI/L	9/16/96	609.0 (3.0)
W3-O	96.06294	H-3	LS	1907.	144.	PCI/L	9/16/96	1.9 (0.1)
W3-U	96.06295	H-3	LS	897.	137.	PCI/L	9/16/96	0.9 (0.1)
W4-O	96.06296	H-3	LS	1478.	141.	PCI/L	9/16/96	1.5 (0.1)
W4-U	96.06298	H-3	LS	2085.	145.	PCI/L	9/16/96	2.1 (0.2)
W5-U	96.06299	H-3	LS	696.	3.	NCI/L	9/16/96	696.0 (3.0)
W6-U	96.06300	H-3	LS	1528.	4.	NCI/L	9/16/96	1528.0 (4.0)
W7-U	96.06301	H-3	LS	4697.	160.	PCI/L	9/16/96	4.7 (0.2)
W8-O	96.06302	H-3	LS	857.	72.	PCI/L	9/16/96	0.9 (0.0)
W8-U	96.06303	H-3	LS	393.	134.	PCI/L	9/16/96	0.4 (0.1)
WBG-O	96.06304	H-3	LS	418.	134.	PCI/L	9/16/96	0.4 (0.1)
WBG-U	96.06306	H-3	LS	469.	134.	PCI/L	9/16/96	0.5 (0.1)

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REPORT NUMBER: 41649 (continued)

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

Prepared by: JBR on 18-Sep-1996

REQUEST NUMBER: 23671 MATRIX: W ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
00.34094	H-3	- 433.	137.	PCI/L	0.0		9/16/96	UNDER CONTROL
00.34098	H-3	13971.	207.	PCI/L	14014.	1401.	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
96.06287	H-3	10.59	0.122	NCI/L	10.69	0.4	9/16/96	UNDER CONTROL
96.06288	H-3	14.652	0.2	NCI/L	14.38	0.53	9/16/96	UNDER CONTROL

REPORT NUMBER: 41649

Analyst	Reviewer	Team Leader	QA Officer
		STG	DK for MAG
091996	091896	9/19/96	9/20/96
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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REPORT NUMBER: 42069

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

Prepared by: CEA on 28-Oct-1996

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
W-1-O	96.06707	U-234	RAS	0.3153	0.0163	PCI/G	10/28/96	79%
W-1-O	96.06707	U-235	RAS	0.014	0.0028	PCI/G	10/28/96	79%
W-1-O	96.06707	U-238	RAS	0.3412	0.0172	PCI/G	10/28/96	79%
W-1-U	96.06708	U-234	RAS	0.3131	0.0133	PCI/G	10/28/96	77%
W-1-U	96.06708	U-235	RAS	0.0165	0.0021	PCI/G	10/28/96	77%
W-1-U	96.06708	U-238	RAS	0.3105	0.0132	PCI/G	10/28/96	77%
W-2-O	96.06709	U-234	RAS	0.2994	0.0147	PCI/G	10/28/96	73%
W-2-O	96.06709	U-235	RAS	0.0125	0.0023	PCI/G	10/28/96	73%
W-2-O	96.06709	U-238	RAS	0.2995	0.0147	PCI/G	10/28/96	73%
W-2-U	96.06710	U-234	RAS	0.1781	0.0094	PCI/G	10/28/96	63%
W-2-U	96.06710	U-235	RAS	0.0057	0.0014	PCI/G	10/28/96	63%
W-2-U	96.06710	U-238	RAS	0.1559	0.0085	PCI/G	10/28/96	63%
W-3-O	96.06711	U-234	RAS	0.9762	0.038	PCI/G	10/28/96	73%
W-3-O	96.06711	U-235	RAS	0.0385	0.0044	PCI/G	10/28/96	73%
W-3-O	96.06711	U-238	RAS	0.8243	0.0329	PCI/G	10/28/96	73%
W-3-U	96.06712	U-234	RAS	0.3848	0.0165	PCI/G	10/28/96	81%
W-3-U	96.06712	U-235	RAS	0.0151	0.0023	PCI/G	10/28/96	81%
W-3-U	96.06712	U-238	RAS	0.2944	0.0135	PCI/G	10/28/96	81%
W-4-O	96.06713	U-234	RAS	0.3983	0.0161	PCI/G	10/28/96	84%
W-4-O	96.06713	U-235	RAS	0.0141	0.002	PCI/G	10/28/96	84%
W-4-O	96.06713	U-238	RAS	0.3962	0.016	PCI/G	10/28/96	84%
W-4-U	96.06714	U-234	RAS	0.184	0.0107	PCI/G	10/28/96	74%
W-4-U	96.06714	U-235	RAS	0.0072	0.0019	PCI/G	10/28/96	74%
W-4-U	96.06714	U-238	RAS	0.1713	0.0102	PCI/G	10/28/96	74%
W-5-U	96.06715	U-234	RAS	0.2303	0.0122	PCI/G	10/28/96	72%
W-5-U	96.06715	U-235	RAS	0.0103	0.0021	PCI/G	10/28/96	72%
W-5-U	96.06715	U-238	RAS	0.2052	0.0113	PCI/G	10/28/96	72%
W-6-U	96.06716	U-234	RAS	0.332	0.014	PCI/G	10/28/96	82%
W-6-U	96.06716	U-235	RAS	0.0132	0.0019	PCI/G	10/28/96	82%
W-6-U	96.06716	U-238	RAS	0.2917	0.0126	PCI/G	10/28/96	82%
W-7-U	96.06717	U-234	RAS	0.2916	0.0128	PCI/G	10/28/96	83%
W-7-U	96.06717	U-235	RAS	0.0119	0.0019	PCI/G	10/28/96	83%
W-7-U	96.06717	U-238	RAS	0.2485	0.0114	PCI/G	10/28/96	83%
W-8-O	96.06718	U-234	RAS	0.1803	0.0087	PCI/G	10/28/96	81%
W-8-O	96.06718	U-235	RAS	0.0095	0.0016	PCI/G	10/28/96	81%
W-8-O	96.06718	U-238	RAS	0.2261	0.0102	PCI/G	10/28/96	81%
W-8-U	96.06719	U-234	RAS	0.2257	0.0116	PCI/G	10/28/96	63%

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W-8-U	96.06719	U-235	RAS	0.0106	0.0021	PCI/G	10/28/96	63%
W-8-U	96.06719	U-238	RAS	0.2491	0.0124	PCI/G	10/28/96	63%
W-BG-O	96.06720	U-234	RAS	0.185	0.0098	PCI/G	10/28/96	83%
W-BG-O	96.06720	U-235	RAS	0.0074	0.0016	PCI/G	10/28/96	83%
W-BG-O	96.06720	U-238	RAS	0.2278	0.0113	PCI/G	10/28/96	83%
W-BG-U	96.06721	U-234	RAS	0.1961	0.0098	PCI/G	10/28/96	75%
W-BG-U	96.06721	U-235	RAS	0.009	0.0017	PCI/G	10/28/96	75%
W-BG-U	96.06721	U-238	RAS	0.1766	0.0091	PCI/G	10/28/96	75%

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REPORT NUMBER: 42069 (continued)

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

Prepared by: CEA on 28-Oct-1996

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
W-1-O	96.06707	U-232T	2.66	2.1014	PCI/SAMPLE	8/14/96	79%
W-1-U	96.06708	U-232T	2.66	2.0482	PCI/SAMPLE	8/14/96	77%
W-2-O	96.06709	U-232T	2.66	1.9418	PCI/SAMPLE	8/14/96	73%
W-2-U	96.06710	U-232T	2.66	1.6758	PCI/SAMPLE	8/14/96	63%
W-3-O	96.06711	U-232T	2.66	1.9418	PCI/SAMPLE	8/14/96	73%
W-3-U	96.06712	U-232T	2.66	2.1546	PCI/SAMPLE	8/14/96	81%
W-4-O	96.06713	U-232T	2.66	2.2344	PCI/SAMPLE	8/14/96	84%
W-4-U	96.06714	U-232T	2.66	1.9684	PCI/SAMPLE	8/14/96	74%
W-5-U	96.06715	U-232T	2.66	1.9152	PCI/SAMPLE	8/14/96	72%
W-6-U	96.06716	U-232T	2.66	2.1812	PCI/SAMPLE	8/14/96	82%
W-7-U	96.06717	U-232T	2.66	2.2078	PCI/SAMPLE	8/14/96	83%
W-8-O	96.06718	U-232T	2.66	2.1546	PCI/SAMPLE	8/14/96	81%
W-8-U	96.06719	U-232T	2.66	1.6758	PCI/SAMPLE	8/14/96	63%
W-BG-O	96.06720	U-232T	2.66	2.2078	PCI/SAMPLE	8/14/96	83%
W-BG-U	96.06721	U-232T	2.66	1.995	PCI/SAMPLE	8/14/96	75%
00.34910	96.06803	U-232T	2.66	1.9684	PCI/SAMPLE	8/14/96	74%
00.34908	96.06804	U-232T	2.66	1.9418	PCI/SAMPLE	8/14/96	73%

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

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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
96.06803	U-234	1.932	0.0764	PCI/G	1.65	0.165	10/28/96	UNDER CONTROL
96.06803	U-235	0.0873	0.0097	PCI/G	0.079	0.0079	10/28/96	UNDER CONTROL
96.06803	U-238	2.065	0.0808	PCI/G	1.65	0.165	10/28/96	WARNING 2-3 SIG
96.06804	U-234	1.019	0.0464	PCI/G	0.83	0.083	10/28/96	UNDER CONTROL
96.06804	U-235	0.0517	0.0076	PCI/G	0.039	0.0039	10/28/96	UNDER CONTROL
96.06804	U-238	0.9918	0.0454	PCI/G	0.83	0.083	10/28/96	UNDER CONTROL

REPORT NUMBER: 42069

Analyst	Reviewer	Team Leader	QA Officer
CEA	Eny	Eny	mag
10/28/96	10/29/96	10/29/96	10/29/96
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: 41846

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

Prepared by: SRG on 4-Oct-1996

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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
W-1-0	96.06707	AC-228	G	< 0.43		PCI/G	10/02/96	
W-1-0	96.06707	AM-241	G	< 1.23		PCI/G	10/02/96	
W-1-0	96.06707	BE-7	G	56.4	4.1	PCI/G	10/02/96	
W-1-0	96.06707	BI-214	G	1.46	0.19	PCI/G	10/02/96	
W-1-0	96.06707	CO-57	G	< 0.12		PCI/G	10/02/96	
W-1-0	96.06707	CO-58	G	< 0.08		PCI/G	10/02/96	
W-1-0	96.06707	CO-60	G	< 0.28		PCI/G	10/02/96	
W-1-0	96.06707	CS-137	G	0.37	0.06	PCI/G	10/02/96	
W-1-0	96.06707	K-40	G	103.	8.	PCI/G	10/02/96	
W-1-0	96.06707	MN-54	G	< 0.11		PCI/G	10/02/96	
W-1-0	96.06707	PB-212	G	1.42	0.17	PCI/G	10/02/96	
W-1-0	96.06707	PB-214	G	1.75	0.21	PCI/G	10/02/96	
W-1-0	96.06707	TL-208	G	0.3	0.05	PCI/G	10/02/96	
W-1-U	96.06708	AC-228	G	2.11	0.34	PCI/G	10/02/96	
W-1-U	96.06708	AM-241	G	< 1.01		PCI/G	10/02/96	
W-1-U	96.06708	BE-7	G	24.5	2.	PCI/G	10/02/96	
W-1-U	96.06708	BI-214	G	1.86	0.21	PCI/G	10/02/96	
W-1-U	96.06708	CO-57	G	0.52	0.05	PCI/G	10/02/96	
W-1-U	96.06708	CO-58	G	< 0.21		PCI/G	10/02/96	
W-1-U	96.06708	CO-60	G	0.35	0.08	PCI/G	10/02/96	
W-1-U	96.06708	CS-137	G	0.47	0.08	PCI/G	10/02/96	
W-1-U	96.06708	K-40	G	194.	13.	PCI/G	10/02/96	
W-1-U	96.06708	MN-54	G	< 0.22		PCI/G	10/02/96	
W-1-U	96.06708	PB-212	G	0.63	0.09	PCI/G	10/02/96	
W-1-U	96.06708	PB-214	G	1.46	0.17	PCI/G	10/02/96	
W-1-U	96.06708	TL-208	G	0.68	0.09	PCI/G	10/02/96	
W-2-0	96.06709	AC-228	G	3.41	0.47	PCI/G	10/02/96	
W-2-0	96.06709	AM-241	G	< 0.43		PCI/G	10/02/96	
W-2-0	96.06709	BE-7	G	50.4	3.9	PCI/G	10/02/96	
W-2-0	96.06709	BI-214	G	2.46	0.29	PCI/G	10/02/96	
W-2-0	96.06709	CO-57	G	0.72	0.08	PCI/G	10/02/96	
W-2-0	96.06709	CO-58	G	0.41	0.08	PCI/G	10/02/96	
W-2-0	96.06709	CO-60	G	0.8	0.15	PCI/G	10/02/96	
W-2-0	96.06709	CS-137	G	< 0.27		PCI/G	10/02/96	
W-2-0	96.06709	K-40	G	141.	11.	PCI/G	10/02/96	
W-2-0	96.06709	MN-54	G	0.31	0.06	PCI/G	10/02/96	
W-2-0	96.06709	PB-212	G	2.72	0.26	PCI/G	10/02/96	

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W-2-O	96.06709	PB-214	G	2.68	0.28	PCI/G	10/02/96
W-2-O	96.06709	TL-208	G	0.79	0.11	PCI/G	10/02/96
W-2-U	96.06710	AC-228	G	2.27	0.35	PCI/G	10/02/96
W-2-U	96.06710	AM-241	G	< 0.53		PCI/G	10/02/96
W-2-U	96.06710	BE-7	G	21.5	1.9	PCI/G	10/02/96
W-2-U	96.06710	BI-214	G	1.72	0.2	PCI/G	10/02/96
W-2-U	96.06710	CO-57	G	0.55	0.06	PCI/G	10/02/96
W-2-U	96.06710	CO-58	G	< 0.26		PCI/G	10/02/96
W-2-U	96.06710	CO-60	G	1.13	0.18	PCI/G	10/02/96
W-2-U	96.06710	CS-137	G	0.7	0.1	PCI/G	10/02/96
W-2-U	96.06710	K-40	G	192.	13.	PCI/G	10/02/96
W-2-U	96.06710	MN-54	G	< 0.22		PCI/G	10/02/96
W-2-U	96.06710	PB-212	G	1.72	0.17	PCI/G	10/02/96
W-2-U	96.06710	PB-214	G	1.54	0.17	PCI/G	10/02/96
W-2-U	96.06710	TL-208	G	< 0.29		PCI/G	10/02/96
W-3-O	96.06711	AC-228	G	2.26	0.4	PCI/G	10/02/96
W-3-O	96.06711	AM-241	G	5.45	0.67	PCI/G	10/02/96
W-3-O	96.06711	BE-7	G	45.9	3.8	PCI/G	10/02/96
W-3-O	96.06711	BI-214	G	1.62	0.24	PCI/G	10/02/96
W-3-O	96.06711	CO-57	G	0.29	0.05	PCI/G	10/02/96
W-3-O	96.06711	CO-58	G	< 0.18		PCI/G	10/02/96
W-3-O	96.06711	CO-60	G	0.34	0.1	PCI/G	10/02/96
W-3-O	96.06711	CS-137	G	0.41	0.08	PCI/G	10/02/96
W-3-O	96.06711	K-40	G	129.	10.	PCI/G	10/02/96
W-3-O	96.06711	MN-54	G	< 0.25		PCI/G	10/02/96
W-3-O	96.06711	PB-212	G	2.3	0.24	PCI/G	10/02/96
W-3-O	96.06711	PB-214	G	2.47	0.29	PCI/G	10/02/96
W-3-O	96.06711	TL-208	G	0.68	0.1	PCI/G	10/02/96
W-3-U	96.06712	AC-228	G	< 1.47		PCI/G	10/02/96
W-3-U	96.06712	AM-241	G	4.98	0.61	PCI/G	10/02/96
W-3-U	96.06712	BE-7	G	24.8	2.2	PCI/G	10/02/96
W-3-U	96.06712	BI-214	G	1.95	0.24	PCI/G	10/02/96
W-3-U	96.06712	CO-57	G	< 0.16		PCI/G	10/02/96
W-3-U	96.06712	CO-58	G	0.17	0.05	PCI/G	10/02/96
W-3-U	96.06712	CO-60	G	< 0.5		PCI/G	10/02/96
W-3-U	96.06712	CS-137	G	0.35	0.07	PCI/G	10/02/96
W-3-U	96.06712	K-40	G	239.	17.	PCI/G	10/02/96
W-3-U	96.06712	MN-54	G	< 0.29		PCI/G	10/02/96
W-3-U	96.06712	PB-212	G	1.7	0.19	PCI/G	10/02/96
W-3-U	96.06712	PB-214	G	1.31	0.2	PCI/G	10/02/96
W-3-U	96.06712	TL-208	G	0.46	0.08	PCI/G	10/02/96
W-4-O	96.06713	AC-228	G	< 0.73		PCI/G	10/02/96
W-4-O	96.06713	AM-241	G	5.29	0.58	PCI/G	10/02/96
W-4-O	96.06713	BE-7	G	43.8	3.4	PCI/G	10/02/96
W-4-O	96.06713	BI-214	G	0.89	0.13	PCI/G	10/02/96
W-4-O	96.06713	CO-57	G	< 0.1		PCI/G	10/02/96
W-4-O	96.06713	CO-58	G	< 0.22		PCI/G	10/02/96
W-4-O	96.06713	CO-60	G	< 0.28		PCI/G	10/02/96
W-4-O	96.06713	CS-137	G	0.3	0.05	PCI/G	10/02/96
W-4-O	96.06713	K-40	G	106.	8.	PCI/G	10/02/96
W-4-O	96.06713	MN-54	G	< 0.21		PCI/G	10/02/96
W-4-O	96.06713	PB-212	G	2.01	0.19	PCI/G	10/02/96
W-4-O	96.06713	PB-214	G	1.38	0.18	PCI/G	10/02/96
W-4-O	96.06713	TL-208	G	0.28	0.05	PCI/G	10/02/96
W-4-U	96.06714	AC-228	G	< 0.47		PCI/G	10/02/96
W-4-U	96.06714	AM-241	G	< 1.1		PCI/G	10/02/96
W-4-U	96.06714	BE-7	G	22.3	2.2	PCI/G	10/02/96
W-4-U	96.06714	BI-214	G	1.33	0.22	PCI/G	10/02/96
W-4-U	96.06714	CO-57	G	< 0.2		PCI/G	10/02/96
W-4-U	96.06714	CO-58	G	< 0.21		PCI/G	10/02/96

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W-4-U	96.06714	CO-60	G	0.54	0.09	PCI/G	10/02/96
W-4-U	96.06714	CS-137	G	0.4	0.07	PCI/G	10/02/96
W-4-U	96.06714	K-40	G	176.	13.	PCI/G	10/02/96
W-4-U	96.06714	MN-54	G	< 0.24		PCI/G	10/02/96
W-4-U	96.06714	PB-212	G	1.34	0.17	PCI/G	10/02/96
W-4-U	96.06714	PB-214	G	< 0.43		PCI/G	10/02/96
W-4-U	96.06714	TL-208	G	0.7	0.11	PCI/G	10/02/96
W-5-U	96.06715	AC-228	G	4.81	0.64	PCI/G	10/02/96
W-5-U	96.06715	AM-241	G	< 1.58		PCI/G	10/02/96
W-5-U	96.06715	BE-7	G	21.4	2.2	PCI/G	10/02/96
W-5-U	96.06715	BI-214	G	2.11	0.26	PCI/G	10/02/96
W-5-U	96.06715	CO-57	G	0.53	0.07	PCI/G	10/02/96
W-5-U	96.06715	CO-58	G	< 0.43		PCI/G	10/02/96
W-5-U	96.06715	CO-60	G	1.25	0.2	PCI/G	10/02/96
W-5-U	96.06715	CS-137	G	< 0.36		PCI/G	10/02/96
W-5-U	96.06715	K-40	G	317.	21.	PCI/G	10/02/96
W-5-U	96.06715	MN-54	G	1.	0.14	PCI/G	10/02/96
W-5-U	96.06715	PB-212	G	2.46	0.26	PCI/G	10/02/96
W-5-U	96.06715	PB-214	G	2.24	0.25	PCI/G	10/02/96
W-5-U	96.06715	TL-208	G	1.66	0.22	PCI/G	10/02/96
W-6-U	96.06716	AC-228	G	3.33	0.49	PCI/G	10/02/96
W-6-U	96.06716	AM-241	G	< 0.92		PCI/G	10/02/96
W-6-U	96.06716	BE-7	G	26.3	2.3	PCI/G	10/02/96
W-6-U	96.06716	BI-214	G	2.63	0.3	PCI/G	10/02/96
W-6-U	96.06716	CO-57	G	0.68	0.08	PCI/G	10/02/96
W-6-U	96.06716	CO-58	G	< 0.35		PCI/G	10/02/96
W-6-U	96.06716	CO-60	G	< 0.45		PCI/G	10/02/96
W-6-U	96.06716	CS-137	G	0.74	0.12	PCI/G	10/02/96
W-6-U	96.06716	K-40	G	208.	15.	PCI/G	10/02/96
W-6-U	96.06716	MN-54	G	< 0.25		PCI/G	10/02/96
W-6-U	96.06716	PB-212	G	1.12	0.16	PCI/G	10/02/96
W-6-U	96.06716	PB-214	G	2.05	0.25	PCI/G	10/02/96
W-6-U	96.06716	TL-208	G	< 0.31		PCI/G	10/02/96
W-7-U	96.06717	AC-228	G	3.49	0.52	PCI/G	10/02/96
W-7-U	96.06717	AM-241	G	1.42	0.26	PCI/G	10/02/96
W-7-U	96.06717	BE-7	G	27.7	2.5	PCI/G	10/02/96
W-7-U	96.06717	BI-214	G	1.82	0.23	PCI/G	10/02/96
W-7-U	96.06717	CO-57	G	0.7	0.08	PCI/G	10/02/96
W-7-U	96.06717	CO-58	G	0.49	0.08	PCI/G	10/02/96
W-7-U	96.06717	CO-60	G	< 0.55		PCI/G	10/02/96
W-7-U	96.06717	CS-137	G	1.	0.14	PCI/G	10/02/96
W-7-U	96.06717	K-40	G	209.	15.	PCI/G	10/02/96
W-7-U	96.06717	MN-54	G	< 0.21		PCI/G	10/02/96
W-7-U	96.06717	PB-212	G	1.42	0.16	PCI/G	10/02/96
W-7-U	96.06717	PB-214	G	1.08	0.15	PCI/G	10/02/96
W-7-U	96.06717	TL-208	G	< 0.26		PCI/G	10/02/96
W-8-O	96.06718	AC-228	G	1.34	0.27	PCI/G	10/02/96
W-8-O	96.06718	AM-241	G	2.41	0.31	PCI/G	10/02/96
W-8-O	96.06718	BE-7	G	42.6	3.4	PCI/G	10/02/96
W-8-O	96.06718	BI-214	G	1.76	0.22	PCI/G	10/02/96
W-8-O	96.06718	CO-57	G	0.57	0.06	PCI/G	10/02/96
W-8-O	96.06718	CO-58	G	< 0.26		PCI/G	10/02/96
W-8-O	96.06718	CO-60	G	< 0.47		PCI/G	10/02/96
W-8-O	96.06718	CS-137	G	0.38	0.07	PCI/G	10/02/96
W-8-O	96.06718	K-40	G	103.	8.	PCI/G	10/02/96
W-8-O	96.06718	MN-54	G	0.32	0.06	PCI/G	10/02/96
W-8-O	96.06718	PB-212	G	0.56	0.08	PCI/G	10/02/96
W-8-O	96.06718	PB-214	G	0.44	0.08	PCI/G	10/02/96
W-8-O	96.06718	TL-208	G	0.27	0.05	PCI/G	10/02/96
W-8-U	96.06719	AC-228	G	1.82	0.34	PCI/G	10/02/96

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W-8-U	96.06719	AM-241	G	1.59	0.26	PCI/G	10/02/96
W-8-U	96.06719	BE-7	G	25.8	2.2	PCI/G	10/02/96
W-8-U	96.06719	BI-214	G	1.54	0.2	PCI/G	10/02/96
W-8-U	96.06719	CO-57	G	0.46	0.06	PCI/G	10/02/96
W-8-U	96.06719	CO-58	G	< 0.27		PCI/G	10/02/96
W-8-U	96.06719	CO-60	G	< 0.39		PCI/G	10/02/96
W-8-U	96.06719	CS-137	G	0.78	0.11	PCI/G	10/02/96
W-8-U	96.06719	K-40	G	162.	12.	PCI/G	10/02/96
W-8-U	96.06719	MN-54	G	0.69	0.1	PCI/G	10/02/96
W-8-U	96.06719	PB-212	G	< 0.14		PCI/G	10/02/96
W-8-U	96.06719	PB-214	G	1.18	0.17	PCI/G	10/02/96
W-8-U	96.06719	TL-208	G	< 0.29		PCI/G	10/02/96
W-BG-O	96.06720	AC-228	G	2.44	0.4	PCI/G	10/02/96
W-BG-O	96.06720	AM-241	G	3.34	0.43	PCI/G	10/02/96
W-BG-O	96.06720	BE-7	G	67.9	5.2	PCI/G	10/02/96
W-BG-O	96.06720	BI-214	G	1.93	0.26	PCI/G	10/02/96
W-BG-O	96.06720	CO-57	G	0.19	0.04	PCI/G	10/02/96
W-BG-O	96.06720	CO-58	G	< 0.12		PCI/G	10/02/96
W-BG-O	96.06720	CO-60	G	< 0.36		PCI/G	10/02/96
W-BG-O	96.06720	CS-137	G	0.48	0.09	PCI/G	10/02/96
W-BG-O	96.06720	K-40	G	162.	13.	PCI/G	10/02/96
W-BG-O	96.06720	MN-54	G	0.94	0.13	PCI/G	10/02/96
W-BG-O	96.06720	PB-212	G	0.78	0.14	PCI/G	10/02/96
W-BG-O	96.06720	PB-214	G	< 0.43		PCI/G	10/02/96
W-BG-O	96.06720	TL-208	G	0.32	0.08	PCI/G	10/02/96
W-BG-U	96.06721	AC-228	G	2.5	0.35	PCI/G	10/02/96
W-BG-U	96.06721	AM-241	G	1.91	0.26	PCI/G	10/02/96
W-BG-U	96.06721	BE-7	G	25.3	2.2	PCI/G	10/02/96
W-BG-U	96.06721	BI-214	G	1.46	0.18	PCI/G	10/02/96
W-BG-U	96.06721	CO-57	G	0.43	0.05	PCI/G	10/02/96
W-BG-U	96.06721	CO-58	G	< 0.26		PCI/G	10/02/96
W-BG-U	96.06721	CO-60	G	0.8	0.1	PCI/G	10/02/96
W-BG-U	96.06721	CS-137	G	< 0.24		PCI/G	10/02/96
W-BG-U	96.06721	K-40	G	186.	13.	PCI/G	10/02/96
W-BG-U	96.06721	MN-54	G	0.26	0.05	PCI/G	10/02/96
W-BG-U	96.06721	PB-212	G	1.73	0.18	PCI/G	10/02/96
W-BG-U	96.06721	PB-214	G	1.35	0.15	PCI/G	10/02/96
W-BG-U	96.06721	TL-208	G	0.71	0.1	PCI/G	10/02/96

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REPORT NUMBER: 41846 (continued)

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

Prepared by: SRG on 4-Oct-1996

REQUEST NUMBER: 23728 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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
00.22785	CS-137	0.02	3.75	PCI/G	0.0		10/02/96	UNDER CONTROL
00.33114	CS-137	45.7	2.5	PCI/G	42.	1.4	10/02/96	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
96.06805	CS-137	53.6	2.9	PCI/G	48.5	1.6	10/02/96	UNDER CONTROL
96.06806	CS-137	37.	2.1	PCI/G	33.37	1.1	10/02/96	UNDER CONTROL

REPORT NUMBER: 41846

Analyst	Reviewer	Team Leader	QA Officer
10/4/96	10/4/96	10/7/96	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 D

CST ANALYTICAL REPORTS OF WASHED VEGETATION SAMPLES: HEAVY METALS

REPORT NUMBER: 41991

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

Prepared by: E.M.HODGE on 22-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: OES PROGRAM CODE: M306

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

NOTEBOOK: 9138 PAGE: 66

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06896	AG	ICPES	< 2.		UG/G	10/09/96	
W-1-O	96.06896	BA	ICPES	7.7	1.3	UG/G	10/09/96	
W-1-O	96.06896	BE	ICPES	< 1.		UG/G	10/09/96	
W-1-O	96.06896	CD	ICPES	< 1.2		UG/G	10/09/96	
W-1-O	96.06896	CR	ICPES	< 1.		UG/G	10/09/96	
W-1-O	96.06896	CU	ICPES	< 1.		UG/G	10/09/96	
W-1-O	96.06896	NI	ICPES	4.7	4.7	UG/G	10/09/96	
W-1-O	96.06896	TL	ICPES	< 48.		UG/G	10/09/96	
W-1-O	96.06896	ZN	ICPES	9.8	1.5	UG/G	10/09/96	
W-1-U	96.06897	AG	ICPES	< 2.		UG/G	10/09/96	
W-1-U	96.06897	BA	ICPES	14.	1.3	UG/G	10/09/96	
W-1-U	96.06897	BE	ICPES	< 1.		UG/G	10/09/96	
W-1-U	96.06897	CD	ICPES	< 1.2		UG/G	10/09/96	
W-1-U	96.06897	CR	ICPES	< 1.		UG/G	10/09/96	
W-1-U	96.06897	CU	ICPES	4.7	1.	UG/G	10/09/96	
W-1-U	96.06897	NI	ICPES	20.	5.	UG/G	10/09/96	
W-1-U	96.06897	TL	ICPES	< 48.		UG/G	10/09/96	
W-1-U	96.06897	ZN	ICPES	19.5	6.	UG/G	10/09/96	
W-2-O	96.06898	AG	ICPES	< 2.		UG/G	10/09/96	
W-2-O	96.06898	BA	ICPES	4.6	1.3	UG/G	10/09/96	
W-2-O	96.06898	BE	ICPES	< 1.		UG/G	10/09/96	
W-2-O	96.06898	CD	ICPES	< 1.2		UG/G	10/09/96	
W-2-O	96.06898	CR	ICPES	< 1.		UG/G	10/09/96	
W-2-O	96.06898	CU	ICPES	< 1.		UG/G	10/09/96	
W-2-O	96.06898	NI	ICPES	< 3.		UG/G	10/09/96	
W-2-O	96.06898	TL	ICPES	< 48.		UG/G	10/09/96	
W-2-O	96.06898	ZN	ICPES	9.	3.	UG/G	10/09/96	
W-2-U	96.06899	AG	ICPES	< 2.		UG/G	10/09/96	
W-2-U	96.06899	BA	ICPES	11.	1.3	UG/G	10/09/96	
W-2-U	96.06899	BE	ICPES	< 1.		UG/G	10/09/96	
W-2-U	96.06899	CD	ICPES	< 1.2		UG/G	10/09/96	
W-2-U	96.06899	CR	ICPES	< 1.		UG/G	10/09/96	
W-2-U	96.06899	CU	ICPES	2.3	1.2	UG/G	10/09/96	
W-2-U	96.06899	NI	ICPES	< 3.		UG/G	10/09/96	
W-2-U	96.06899	TL	ICPES	< 48.		UG/G	10/09/96	
W-2-U	96.06899	ZN	ICPES	16.	3.	UG/G	10/09/96	
W-3-O	96.06900	AG	ICPES	< 2.		UG/G	10/11/96	

W-3-O	96.06900	BA	ICPES	3.2	1.3	UG/G	10/11/96
W-3-O	96.06900	BE	ICPES	< 1.		UG/G	10/11/96
W-3-O	96.06900	CD	ICPES	< 1.2		UG/G	10/11/96
W-3-O	96.06900	CR	ICPES	< 1.		UG/G	10/11/96
W-3-O	96.06900	CU	ICPES	1.3	1.5	UG/G	10/11/96
W-3-O	96.06900	NI	ICPES	3.3	3.	UG/G	10/11/96
W-3-O	96.06900	TL	ICPES	< 48.		UG/G	10/11/96
W-3-O	96.06900	ZN	ICPES	10.3	1.2	UG/G	10/11/96
W-3-U	96.06901	AG	ICPES	< 2.		UG/G	10/11/96
W-3-U	96.06901	BA	ICPES	18.7	1.3	UG/G	10/11/96
W-3-U	96.06901	BE	ICPES	< 1.		UG/G	10/11/96
W-3-U	96.06901	CD	ICPES	< 1.2		UG/G	10/11/96
W-3-U	96.06901	CR	ICPES	< 1.		UG/G	10/11/96
W-3-U	96.06901	CU	ICPES	3.2	1.	UG/G	10/11/96
W-3-U	96.06901	NI	ICPES	< 3.		UG/G	10/11/96
W-3-U	96.06901	TL	ICPES	< 48.		UG/G	10/11/96
W-3-U	96.06901	ZN	ICPES	20.4	3.	UG/G	10/11/96
W-4-O	96.06905	AG	ICPES	< 2.		UG/G	10/11/96
W-4-O	96.06905	BA	ICPES	5.4	1.3	UG/G	10/11/96
W-4-O	96.06905	BE	ICPES	3.	3.	UG/G	10/11/96
W-4-O	96.06905	CD	ICPES	3.2	3.	UG/G	10/11/96
W-4-O	96.06905	CR	ICPES	2.24	4.2	UG/G	10/11/96
W-4-O	96.06905	CU	ICPES	< 1.		UG/G	10/11/96
W-4-O	96.06905	NI	ICPES	< 3.		UG/G	10/11/96
W-4-O	96.06905	TL	ICPES	< 48.		UG/G	10/11/96
W-4-O	96.06905	ZN	ICPES	12.	2.	UG/G	10/11/96
W-4-U	96.06907	AG	ICPES	< 2.		UG/G	10/11/96
W-4-U	96.06907	BA	ICPES	13.	1.3	UG/G	10/11/96
W-4-U	96.06907	BE	ICPES	< 1.		UG/G	10/11/96
W-4-U	96.06907	CD	ICPES	< 1.2		UG/G	10/11/96
W-4-U	96.06907	CR	ICPES	< 1.		UG/G	10/11/96
W-4-U	96.06907	CU	ICPES	2.4	1.	UG/G	10/15/96
W-4-U	96.06907	NI	ICPES	4.6	3.	UG/G	10/15/96
W-4-U	96.06907	TL	ICPES	< 48.		UG/G	10/15/96
W-4-U	96.06907	ZN	ICPES	10.8	6.	UG/G	10/11/96
W-5-U	96.06909	AG	ICPES	< 2.		UG/G	10/15/96
W-5-U	96.06909	BA	ICPES	23.	1.3	UG/G	10/15/96
W-5-U	96.06909	BE	ICPES	< 1.		UG/G	10/15/96
W-5-U	96.06909	CD	ICPES	< 1.2		UG/G	10/15/96
W-5-U	96.06909	CR	ICPES	< 1.		UG/G	10/15/96
W-5-U	96.06909	CU	ICPES	5.3	1.5	UG/G	10/15/96
W-5-U	96.06909	NI	ICPES	4.7	4.7	UG/G	10/15/96
W-5-U	96.06909	TL	ICPES	< 48.		UG/G	10/15/96
W-5-U	96.06909	ZN	ICPES	28.	4.	UG/G	10/15/96
W-6-U	96.06910	AG	ICPES	< 2.		UG/G	10/15/96
W-6-U	96.06910	BA	ICPES	18.7	1.3	UG/G	10/15/96
W-6-U	96.06910	BE	ICPES	< 1.		UG/G	10/15/96
W-6-U	96.06910	CD	ICPES	< 1.2		UG/G	10/15/96
W-6-U	96.06910	CR	ICPES	< 1.		UG/G	10/15/96
W-6-U	96.06910	CU	ICPES	3.1	1.	UG/G	10/15/96
W-6-U	96.06910	NI	ICPES	< 3.		UG/G	10/15/96
W-6-U	96.06910	TL	ICPES	< 48.		UG/G	10/15/96
W-6-U	96.06910	ZN	ICPES	14.	2.	UG/G	10/15/96
W-7-U	96.06911	AG	ICPES	< 2.		UG/G	10/15/96
W-7-U	96.06911	BA	ICPES	13.	1.3	UG/G	10/15/96
W-7-U	96.06911	BE	ICPES	< 1.		UG/G	10/15/96
W-7-U	96.06911	CD	ICPES	< 1.2		UG/G	10/15/96
W-7-U	96.06911	CR	ICPES	< 1.		UG/G	10/15/96
W-7-U	96.06911	CU	ICPES	2.7	1.5	UG/G	10/15/96
W-7-U	96.06911	NI	ICPES	< 3.		UG/G	10/15/96

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W-1-0	96.06896 AG	ICPES	25.	7.	UG/G	10/09/96
W-1-0	96.06896 BA	ICPES	25.	8.	UG/G	10/09/96
W-1-0	96.06896 BE	ICPES	25.	8.	UG/G	10/09/96
W-1-0	96.06896 CD	ICPES	25.	7.	UG/G	10/09/96
W-1-0	96.06896 CR	ICPES	25.	8.	UG/G	10/09/96
W-1-0	96.06896 CU	ICPES	25.	13.	UG/G	10/09/96
W-1-0	96.06896 NI	ICPES	25.	12.	UG/G	10/09/96
W-1-0	96.06896 TL	ICPES	5.	5.	UG/G	10/09/96
W-1-0	96.06896 ZN	ICPES	25.	6.	UG/G	10/09/96

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REPORT NUMBER: 41991 (continued)

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

Prepared by: E.M.HODGE on 22-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: OES PROGRAM CODE: M306

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

NOTEBOOK: 9138 PAGE: 66

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	13.	1.3	UG/G	21.	3.	10/15/96	WARNING 2-3 SIG
00.00580	BE	1000.	1000.	NG/G	6.9	0.8	10/15/96	UNDER CONTROL
00.00580	CD	128.	13.	NG/G	30.	10.	10/15/96	OUT OF CONTROL
00.00580	CR	201.	20.1	NG/G	800.	200.	10/15/96	WARNING 2-3 SIG
00.00580	CU	10.	1.	UG/G	16.5	1.	10/15/96	OUT OF CONTROL
00.00580	NI	3000.	3000.	NG/G	600.	300.	10/15/96	UNDER CONTROL
00.00580	TL	48000.	48000.	NG/G	< 10.		10/15/96	UNDER CONTROL
00.00580	ZN	18.	2.	UG/G	29.	2.	10/15/96	OUT OF 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: 41991

Analyst	Reviewer	Team Leader	QA Officer
10/23/96	10/23/96	10/31/96	11/1/96
Date	Date	Date	Date

30d

REPORT NUMBER: 42058

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

Prepared by: LRB on 28-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: AAS PROGRAM CODE: M306

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

NOTEBOOK: CST9129 PAGE: 21

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06896	AS	ETVAA	< 0.3		UG/G	9/25/96	
W-1-O	96.06896	HG	CVAA	0.1		UG/G	10/25/96	
W-1-O	96.06896	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-1-U	96.06897	AS	ETVAA	< 0.3		UG/G	9/25/96	
W-1-U	96.06897	HG	CVAA	< 0.1		UG/G	10/25/96	
W-1-U	96.06897	SE	ETVAA	0.2	0.1	UG/G	9/25/96	
W-2-O	96.06898	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-2-O	96.06898	HG	CVAA	< 0.1		UG/G	10/25/96	
W-2-O	96.06898	SE	ETVAA	0.2	0.1	UG/G	9/25/96	
W-2-U	96.06899	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-2-U	96.06899	HG	CVAA	< 0.1		UG/G	10/25/96	
W-2-U	96.06899	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-3-O	96.06900	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-3-O	96.06900	HG	CVAA	< 0.1		UG/G	10/25/96	
W-3-O	96.06900	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-3-U	96.06901	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-3-U	96.06901	HG	CVAA	< 0.1		UG/G	10/25/96	
W-3-U	96.06901	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-4-O	96.06905	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-4-O	96.06905	HG	CVAA	< 0.1		UG/G	10/25/96	
W-4-O	96.06905	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-4-U	96.06907	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-4-U	96.06907	HG	CVAA	< 0.1		UG/G	10/25/96	
W-4-U	96.06907	SE	ETVAA	< 0.1		UG/G	9/25/96	
W-5-U	96.06909	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-5-U	96.06909	HG	CVAA	< 0.1		UG/G	10/25/96	
W-5-U	96.06909	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-6-U	96.06910	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-6-U	96.06910	HG	CVAA	0.1	0.2	UG/G	10/25/96	
W-6-U	96.06910	SE	ETVAA	0.1	0.1	UG/G	9/25/96	
W-7-U	96.06911	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-7-U	96.06911	HG	CVAA	< 0.1		UG/G	10/25/96	
W-7-U	96.06911	SE	ETVAA	< 0.1		UG/G	9/25/96	
W-8-O	96.06912	AS	ETVAA	< 0.3		UG/G	9/26/96	
W-8-O	96.06912	HG	CVAA	< 0.1		UG/G	10/25/96	
W-8-O	96.06912	SE	ETVAA	< 0.1		UG/G	9/25/96	
W-8-U	96.06913	AS	ETVAA	< 0.3		UG/G	9/26/96	

W-8-U	96.06913	HG	CVAA	< 0.1		UG/G	10/25/96
W-8-U	96.06913	SE	ETVAA	< 0.1		UG/G	9/25/96
W-BG-O	96.06914	AS	ETVAA	< 0.3		UG/G	9/26/96
W-BG-O	96.06914	HG	CVAA	< 0.1		UG/G	10/25/96
W-BG-O	96.06914	SE	ETVAA	0.1	0.1	UG/G	9/25/96
W-BG-U	96.06915	AS	ETVAA	0.3	0.3	UG/G	9/26/96
W-BG-U	96.06915	HG	CVAA	< 0.1		UG/G	10/25/96
W-BG-U	96.06915	SE	ETVAA	< 0.1		UG/G	9/25/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06896	AS	ETVAA	< 0.3		UG/G	9/25/96	
W-1-O	96.06896	HG	CVAA	< 0.1		UG/G	10/25/96	
W-1-O	96.06896	SE	ETVAA	0.2	0.1	UG/G	9/25/96	
W-1-U	96.06897	HG	CVAA	< 0.1		UG/G	10/25/96	
W-2-O	96.06898	HG	CVAA	< 0.1		UG/G	10/25/96	
W-2-U	96.06899	HG	CVAA	< 0.1		UG/G	10/25/96	
W-3-O	96.06900	HG	CVAA	< 0.1		UG/G	10/25/96	
W-3-U	96.06901	HG	CVAA	< 0.1		UG/G	10/25/96	
W-4-O	96.06905	HG	CVAA	< 0.1		UG/G	10/25/96	
W-4-U	96.06907	HG	CVAA	< 0.1		UG/G	10/25/96	
W-5-U	96.06909	HG	CVAA	< 0.1		UG/G	10/25/96	
W-6-U	96.06910	HG	CVAA	0.1	0.2	UG/G	10/25/96	
W-7-U	96.06911	HG	CVAA	< 0.1		UG/G	10/25/96	
W-8-O	96.06912	HG	CVAA	< 0.1		UG/G	10/25/96	
W-8-U	96.06913	HG	CVAA	< 0.1		UG/G	10/25/96	
W-BG-O	96.06914	HG	CVAA	< 0.1		UG/G	10/25/96	
W-BG-U	96.06915	HG	CVAA	< 0.1		UG/G	10/25/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06896	AS	ETVAA	4.95	3.53	UG/G	9/26/96	
W-1-O	96.06896	HG	CVAA	9.88	0.08	UG/G	10/25/96	
W-1-O	96.06896	SE	ETVAA	4.95	2.7	UG/G	9/25/96	

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REPORT NUMBER: 42058 (continued)

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

Prepared by: LRB on 28-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: AAS PROGRAM CODE: M306

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

NOTEBOOK: CST9129 PAGE: 21

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	2.7	0.3	UG/G	3.1	0.3	9/26/96	UNDER CONTROL
00.00580	SE	100.	100.	NG/G	25.		9/25/96	UNDER CONTROL
00.35052	HG	5.1	0.2	UG/L	5.85	1.	10/25/96	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: 42058

Analyst	Reviewer	Team Leader	QA Officer
10/28/96	10/28/96	10/31/96	11/1/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

REPORT NUMBER: 41923

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

Prepared by: KLAO on 10-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: IMS PROGRAM CODE: M306

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
W-1-O	96.06896	PB	ICPMS	0.32	0.03	UG/G	10/09/96	
W-1-O	96.06896	SB	ICPMS	0.18	0.03	UG/G	10/09/96	
W-1-U	96.06897	PB	ICPMS	2.95	0.03	UG/G	10/09/96	
W-1-U	96.06897	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-2-O	96.06898	PB	ICPMS	0.33	0.03	UG/G	10/09/96	
W-2-O	96.06898	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-2-U	96.06899	PB	ICPMS	0.24	0.03	UG/G	10/09/96	
W-2-U	96.06899	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-3-O	96.06900	PB	ICPMS	0.87	0.03	UG/G	10/09/96	
W-3-O	96.06900	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-3-U	96.06901	PB	ICPMS	0.35	0.06	UG/G	10/09/96	
W-3-U	96.06901	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-4-O	96.06905	PB	ICPMS	0.25	0.03	UG/G	10/09/96	
W-4-O	96.06905	SB	ICPMS	0.22	0.03	UG/G	10/09/96	
W-4-U	96.06907	PB	ICPMS	0.49	0.03	UG/G	10/09/96	
W-4-U	96.06907	SB	ICPMS	0.07	0.03	UG/G	10/09/96	
W-5-U	96.06909	PB	ICPMS	0.38	0.03	UG/G	10/09/96	
W-5-U	96.06909	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-6-U	96.06910	PB	ICPMS	0.27	0.03	UG/G	10/09/96	
W-6-U	96.06910	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-7-U	96.06911	PB	ICPMS	0.23	0.03	UG/G	10/09/96	
W-7-U	96.06911	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-8-O	96.06912	PB	ICPMS	0.022	0.03	UG/G	10/09/96	
W-8-O	96.06912	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-8-U	96.06913	PB	ICPMS	0.25	0.03	UG/G	10/09/96	
W-8-U	96.06913	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-BG-O	96.06914	PB	ICPMS	0.33	0.03	UG/G	10/09/96	
W-BG-O	96.06914	SB	ICPMS	< 0.03		UG/G	10/09/96	
W-BG-U	96.06915	PB	ICPMS	0.87	0.03	UG/G	10/09/96	
W-BG-U	96.06915	SB	ICPMS	< 0.03		UG/G	10/09/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	NALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT

30h

W-1-O	96.06896	PB	ICPMS	0.3	0.02	UG/G	10/09/96
W-1-O	96.06896	SB	ICPMS	0.1	0.03	UG/G	10/09/96

MA[illegible] SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06896	PB	ICPMS	4.95	3.39	UG/G	10/09/96	
W-1-O	96.06896	SB	ICPMS	4.95	2.85	UG/G	10/09/96	

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REPORT NUMBER: 41923 (continued)

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

Prepared by: KLAO on 10-Oct-1996

REQUEST NUMBER: 23740 MATRIX: BA ANALYST: IMS PROGRAM CODE: M306

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	10.45	0.07	UG/G	13.	2.	10/09/96	UNDER CONTROL
00.00580	SB	40.	30.	NG/G	40.		10/09/96	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: 41923

Analyst	Reviewer	Team Leader	QA Officer
10/10/96	10/10/96	10/31/96	11/1/96
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

APPENDIX E

CST ANALYTICAL REPORTS OF UNWASHED VEGETATION SAMPLES: RADIONUCLIDES

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

Prepared by: AKS on 21-Feb-1997

ANALYSIS: SR-90 REQUEST NUMBER: 23730 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
1-O	96.06722	2.8	0.2	PCI/G	2/12/97	
1-U	96.06723	1.6	0.2	PCI/G	2/12/97	
2-O	96.06724	4.6	0.3	PCI/G	2/12/97	
2-U	96.06725	2.6	0.2	PCI/G	2/12/97	
3-O	96.06726	1.5	0.2	PCI/G	2/21/97	
3-U	96.06727	0.2	0.2	PCI/G	2/21/97	
4-O	96.06728	6.5	0.4	PCI/G	2/21/97	
4-U	96.06729	6.4	0.4	PCI/G	2/21/97	
5-U	96.06730	0.5	0.2	PCI/G	2/12/97	
6-U	96.06731	0.7	0.2	PCI/G	2/12/97	
7-U	96.06732	1.6	0.2	PCI/G	2/12/97	
8-O	96.06733	2.2	0.2	PCI/G	2/12/97	
8-U	96.06734	2.3	0.2	PCI/G	2/12/97	
BG-O	96.06735	13.9	0.9	PCI/G	2/12/97	
BG-U	96.06736	1.8	0.1	PCI/G	2/12/97	

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

Prepared by: AKS on 21-Feb-1997

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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.

___ 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
96.06808	10.6	1.2	PCI/G	8.93	0.286	2/12/97	UNDER CONTROL

REPORT NUMBER: 43174

Analyst	Reviewer	Team Leader	QA Officer
AKS	Eng	STG	mag
2/21/97	2/21/97	2/24/97	2/24/97
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: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

REPORT NUMBER: 42180

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

Prepared by: SRG on 5-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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
1-O	96.06722	AC-228	G	2.4	0.39	PCI/G	11/05/96	
1-O	96.06722	AM-241	G	2.43	0.32	PCI/G	11/05/96	
1-O	96.06722	BE-7	G	72.1	6.3	PCI/G	11/05/96	
1-O	96.06722	BI-214	G	1.74	0.24	PCI/G	11/05/96	
1-O	96.06722	CO-60	G	0.05	0.15	PCI/G	11/05/96	
·O	96.06722	CS-137	G	0.29	0.06	PCI/G	11/05/96	
1-O	96.06722	K-40	G	103.	9.	PCI/G	11/05/96	
1-O	96.06722	MN-54	G	0.12	0.12	PCI/G	11/05/96	
1-O	96.06722	NA-22	G	0.66	0.12	PCI/G	11/05/96	
1-O	96.06722	PB-214	G	1.51	0.21	PCI/G	11/05/96	
1-O	96.06722	TL-208	G	0.68	0.1	PCI/G	11/05/96	
1-U	96.06723	AC-228	G	4.	0.51	PCI/G	11/05/96	
1-U	96.06723	AM-241	G	2.46	0.46	PCI/G	11/05/96	
1-U	96.06723	BE-7	G	33.7	3.1	PCI/G	11/05/96	
1-U	96.06723	BI-214	G	1.6	0.22	PCI/G	11/05/96	
1-U	96.06723	CO-60	G	0.12	0.12	PCI/G	11/05/96	
1-U	96.06723	CS-137	G	0.22	0.05	PCI/G	11/05/96	
1-U	96.06723	K-40	G	202.	16.	PCI/G	11/05/96	
1-U	96.06723	MN-54	G	0.3	0.06	PCI/G	11/05/96	
1-U	96.06723	NA-22	G	0.12	0.13	PCI/G	11/05/96	
1-U	96.06723	PB-214	G	2.05	0.25	PCI/G	11/05/96	
1-U	96.06723	TL-208	G	0.96	0.13	PCI/G	11/05/96	
2-O	96.06724	AC-228	G	3.47	0.49	PCI/G	11/05/96	
2-O	96.06724	AM-241	G	3.11	0.47	PCI/G	11/05/96	
2-O	96.06724	BE-7	G	56.5	5.1	PCI/G	11/05/96	
2-O	96.06724	BI-214	G	1.22	0.21	PCI/G	11/05/96	
2-O	96.06724	CO-60	G	0.02	0.15	PCI/G	11/05/96	
2-O	96.06724	CS-137	G	0.2	0.2	PCI/G	11/05/96	
2-O	96.06724	K-40	G	90.	8.4	PCI/G	11/05/96	
2-O	96.06724	MN-54	G	0.34	0.06	PCI/G	11/05/96	
2-O	96.06724	NA-22	G	0.39	0.39	PCI/G	11/05/96	
2-O	96.06724	PB-214	G	2.03	0.24	PCI/G	11/05/96	
2-O	96.06724	TL-208	G	0.4	0.07	PCI/G	11/05/96	
2-U	96.06725	AC-228	G	3.	0.44	PCI/G	11/05/96	
2-U	96.06725	AM-241	G	0.25	0.25	PCI/G	11/05/96	
2-U	96.06725	BE-7	G	25.7	2.5	PCI/G	11/05/96	
2-U	96.06725	BI-214	G	0.41	0.41	PCI/G	11/05/96	

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2-U	96.06725	CO-60	G	1.03	0.15	PCI/G	11/05/96
2-U	96.06725	CS-137	G	0.36	0.06	PCI/G	11/05/96
2-U	96.06725	K-40	G	166.	14.	PCI/G	11/05/96
2-U	96.06725	MN-54	G	0.03	0.03	PCI/G	11/05/96
2-U	96.06725	NA-22	G	0.1	0.13	PCI/G	11/05/96
2-U	96.06725	PB-214	G	1.41	0.18	PCI/G	11/05/96
2-U	96.06725	TL-208	G	0.66	0.09	PCI/G	11/05/96
3-O	96.06726	AC-228	G	5.61	0.74	PCI/G	11/05/96
3-O	96.06726	AM-241	G	4.89	0.64	PCI/G	11/05/96
3-O	96.06726	BE-7	G	67.9	6.2	PCI/G	11/05/96
3-O	96.06726	BI-214	G	2.1	0.29	PCI/G	11/05/96
3-O	96.06726	CO-60	G	0.66	0.66	PCI/G	11/05/96
3-O	96.06726	CS-137	G	0.43	0.43	PCI/G	11/05/96
3-O	96.06726	K-40	G	131.	12.	PCI/G	11/05/96
3-O	96.06726	MN-54	G	0.44	0.1	PCI/G	11/05/96
3-O	96.06726	NA-22	G	0.8	0.14	PCI/G	11/05/96
3-O	96.06726	PB-214	G	3.37	0.37	PCI/G	11/05/96
3-O	96.06726	TL-208	G	1.33	0.17	PCI/G	11/05/96
3-U	96.06727	AC-228	G	2.63	0.43	PCI/G	11/05/96
3-U	96.06727	AM-241	G	2.06	2.06	PCI/G	11/05/96
3-U	96.06727	BE-7	G	31.9	3.2	PCI/G	11/05/96
3-U	96.06727	BI-214	G	1.01	0.17	PCI/G	11/05/96
3-U	96.06727	CO-60	G	0.06	0.15	PCI/G	11/05/96
3-U	96.06727	CS-137	G	0.6	0.09	PCI/G	11/05/96
3-U	96.06727	K-40	G	234.	19.	PCI/G	11/05/96
3-U	96.06727	MN-54	G	0.16	0.16	PCI/G	11/05/96
3-U	96.06727	NA-22	G	0.19	0.13	PCI/G	11/05/96
3-U	96.06727	PB-214	G	2.06	2.06	PCI/G	11/05/96
3-U	96.06727	TL-208	G	0.41	0.07	PCI/G	11/05/96
4-O	96.06728	AC-228	G	1.28	0.27	PCI/G	11/05/96
4-O	96.06728	AM-241	G	1.4	0.31	PCI/G	11/05/96
4-O	96.06728	BE-7	G	49.8	4.8	PCI/G	11/05/96
4-O	96.06728	BI-214	G	1.38	0.21	PCI/G	11/05/96
4-O	96.06728	CO-60	G	0.15	0.15	PCI/G	11/05/96
4-O	96.06728	CS-137	G	0.25	0.06	PCI/G	11/05/96
4-O	96.06728	K-40	G	96.6	9.3	PCI/G	11/05/96
4-O	96.06728	MN-54	G	0.19	0.09	PCI/G	11/05/96
4-O	96.06728	NA-22	G	0.44	0.1	PCI/G	11/05/96
4-O	96.06728	PB-214	G	2.77	0.35	PCI/G	11/05/96
4-O	96.06728	TL-208	G	0.44	0.08	PCI/G	11/05/96
4-U	96.06729	AC-228	G	1.47	0.24	PCI/G	11/05/96
4-U	96.06729	AM-241	G	3.76	0.5	PCI/G	11/05/96
4-U	96.06729	BE-7	G	20.4	2.2	PCI/G	11/05/96
4-U	96.06729	BI-214	G	1.53	0.21	PCI/G	11/05/96
4-U	96.06729	CO-60	G	0.09	0.15	PCI/G	11/05/96
4-U	96.06729	CS-137	G	0.32	0.06	PCI/G	11/05/96
4-U	96.06729	K-40	G	134.	12.	PCI/G	11/05/96
4-U	96.06729	MN-54	G	0.17	0.17	PCI/G	11/05/96
4-U	96.06729	NA-22	G	0.36	0.08	PCI/G	11/05/96
4-U	96.06729	PB-214	G	1.53	0.21	PCI/G	11/05/96
4-U	96.06729	TL-208	G	0.42	0.07	PCI/G	11/05/96
5-U	96.06730	AC-228	G	2.98	0.43	PCI/G	11/05/96
5-U	96.06730	AM-241	G	0.26	0.56	PCI/G	11/05/96
5-U	96.06730	BE-7	G	25.2	2.5	PCI/G	11/05/96
5-U	96.06730	BI-214	G	2.61	0.31	PCI/G	11/05/96
5-U	96.06730	CO-60	G	0.11	0.15	PCI/G	11/05/96
5-U	96.06730	CS-137	G	0.2	0.05	PCI/G	11/05/96
5-U	96.06730	K-40	G	269.	21.	PCI/G	11/05/96
5-U	96.06730	MN-54	G	0.06	0.09	PCI/G	11/05/96
5-U	96.06730	NA-22	G	0.56	0.56	PCI/G	11/05/96

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5-U	96.06730	PB-214	G	2.31	0.27	PCI/G	11/05/96
5-U	96.06730	TL-208	G	0.62	0.1	PCI/G	11/05/96
6-U	96.06731	AC-228	G	3.3	0.47	PCI/G	11/05/96
6-U	96.06731	AM-241	G	0.04	0.56	PCI/G	11/05/96
6-U	96.06731	BE-7	G	35.4	3.4	PCI/G	11/05/96
6-U	96.06731	BI-214	G	2.43	0.29	PCI/G	11/05/96
6-U	96.06731	CO-60	G	0.42	0.08	PCI/G	11/05/96
6-U	96.06731	CS-137	G	0.55	0.1	PCI/G	11/05/96
6-U	96.06731	K-40	G	241.	19.	PCI/G	11/05/96
6-U	96.06731	MN-54	G	0.08	0.09	PCI/G	11/05/96
6-U	96.06731	NA-22	G	0.25	0.25	PCI/G	11/05/96
6-U	96.06731	PB-214	G	3.27	0.37	PCI/G	11/05/96
6-U	96.06731	TL-208	G	0.62	0.11	PCI/G	11/05/96
7-U	96.06732	AC-228	G	3.04	3.04	PCI/G	11/05/96
7-U	96.06732	AM-241	G	1.37	0.36	PCI/G	11/05/96
7-U	96.06732	BE-7	G	26.4	2.6	PCI/G	11/05/96
7-U	96.06732	BI-214	G	4.28	0.45	PCI/G	11/05/96
7-U	96.06732	CO-60	G	0.74	0.74	PCI/G	11/05/96
7-U	96.06732	CS-137	G	0.34	0.07	PCI/G	11/05/96
7-U	96.06732	K-40	G	203.	17.	PCI/G	11/05/96
7-U	96.06732	MN-54	G	0.14	0.09	PCI/G	11/05/96
7-U	96.06732	NA-22	G	0.03	0.03	PCI/G	11/05/96
7-U	96.06732	PB-214	G	3.38	0.37	PCI/G	11/05/96
7-U	96.06732	TL-208	G	0.05	0.05	PCI/G	11/05/96
8-O	96.06733	AC-228	G	0.03	0.31	PCI/G	11/05/96
8-O	96.06733	AM-241	G	4.29	0.57	PCI/G	11/05/96
8-O	96.06733	BE-7	G	52.3	4.8	PCI/G	11/05/96
8-O	96.06733	BI-214	G	1.41	0.21	PCI/G	11/05/96
8-O	96.06733	CO-60	G	0.06	0.15	PCI/G	11/05/96
8-O	96.06733	CS-137	G	0.43	0.07	PCI/G	11/05/96
8-O	96.06733	K-40	G	114.	10.	PCI/G	11/05/96
8-O	96.06733	MN-54	G	0.08	0.09	PCI/G	11/05/96
8-O	96.06733	NA-22	G	0.5	0.1	PCI/G	11/05/96
8-O	96.06733	PB-214	G	2.46	0.29	PCI/G	11/05/96
8-O	96.06733	TL-208	G	0.3	0.07	PCI/G	11/05/96
8-U	96.06734	AC-228	G	0.13	0.31	PCI/G	11/05/96
8-U	96.06734	AM-241	G	3.94	0.55	PCI/G	11/05/96
8-U	96.06734	BE-7	G	24.	2.5	PCI/G	11/05/96
8-U	96.06734	BI-214	G	0.49	0.1	PCI/G	11/05/96
8-U	96.06734	CO-60	G	0.09	0.15	PCI/G	11/05/96
8-U	96.06734	CS-137	G	0.34	0.06	PCI/G	11/05/96
8-U	96.06734	K-40	G	130.	11.	PCI/G	11/05/96
8-U	96.06734	MN-54	G	0.05	0.09	PCI/G	11/05/96
8-U	96.06734	NA-22	G	0.29	0.29	PCI/G	11/05/96
8-U	96.06734	PB-214	G	1.26	1.26	PCI/G	11/05/96
8-U	96.06734	TL-208	G	0.07	0.11	PCI/G	11/05/96
BG-O	96.06735	AC-228	G	2.12	0.39	PCI/G	11/05/96
BG-O	96.06735	AM-241	G	1.16	1.16	PCI/G	11/05/96
BG-O	96.06735	BE-7	G	94.5	8.2	PCI/G	11/05/96
BG-O	96.06735	BI-214	G	1.83	0.26	PCI/G	11/05/96
BG-O	96.06735	CO-60	G	0.37	0.12	PCI/G	11/05/96
BG-O	96.06735	CS-137	G	0.27	0.06	PCI/G	11/05/96
BG-O	96.06735	K-40	G	147.	13.	PCI/G	11/05/96
BG-O	96.06735	MN-54	G	0.12	0.09	PCI/G	11/05/96
BG-O	96.06735	NA-22	G	0.76	0.13	PCI/G	11/05/96
BG-O	96.06735	PB-214	G	2.13	0.28	PCI/G	11/05/96
BG-O	96.06735	TL-208	G	0.76	0.13	PCI/G	11/05/96
BG-U	96.06736	AC-228	G	3.13	0.47	PCI/G	11/05/96
BG-U	96.06736	AM-241	G	3.96	0.7	PCI/G	11/05/96
BG-U	96.06736	BE-7	G	34.2	3.3	PCI/G	11/05/96

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BG-U	96.06736	BI-214	G	1.97	0.27	PCI/G	11/05/96
BG-U	96.06736	CO-60	G	0.21	0.21	PCI/G	11/05/96
BG-U	96.06736	CS-137	G	0.61	0.11	PCI/G	11/05/96
BG-U	96.06736	K-40	G	312.	25.	PCI/G	11/05/96
BG-U	96.06736	MN-54	G	0.02	0.09	PCI/G	11/05/96
BG-U	96.06736	NA-22	G	0.37	0.1	PCI/G	11/05/96
BG-U	96.06736	PB-214	G	2.04	0.32	PCI/G	11/05/96
BG-U	96.06736	TL-208	G	0.41	0.09	PCI/G	11/05/96

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REPORT NUMBER: 42180 (continued)

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

Prepared by: SRG on 5-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: SAMMY GARCIA PROGRAM CODE: M306

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
00.22785	CS-137	0.11	0.11	PCI/G	0.0		11/05/96	UNDER CONTROL
00.33114	CS-137	45.7	3.2	PCI/G	42.	1.4	11/05/96	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
96.06814	CS-137	69.9	4.8	PCI/G	57.6	1.9	11/05/96	WARNING 2-3 SIG

REPORT NUMBER: 42180

Analyst	Reviewer	Team Leader	QA Officer
11/5/96	11/5/96	11/6/96	11/6/96
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: 42452

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

Prepared by: ROBINSON on 5-Dec-1996

ANALYSIS: H-3 REQUEST NUMBER: 23670 MATRIX: W ANALYST: RICHARD ROBINSON PROG AN CODE: M306

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	pCi/mL (1σ)
1-O	96.06270	1342.	4.	NCI/L	9/25/96		1342.0 (4.0)
1-U	96.06271	8279.	10.	NCI/L	9/25/96		8279.0 (10.0)
2-O	96.06272	7569.	9.	NCI/L	9/25/96		7569.0 (9.0)
2-U	96.06273	4890.	8.	NCI/L	9/25/96		4890.0 (8.0)
3-O	96.06274	714.	141.	PCI/L	9/25/96		0.71 (0.14)
3-U	96.06275	678.	141.	PCI/L	9/25/96		0.70 (0.14)
4-O	96.06276	870.	142.	PCI/L	9/25/96		0.87 (0.14)
4-U	96.06277	823.	142.	PCI/L	9/25/96		0.82 (0.14)
5-U	96.06278	3788.	7.	NCI/L	9/25/96		3788.0 (7.0)
6-U	96.06279	14744.	13.	NCI/L	9/25/96		14744.0 (13.0)
7-U	96.06280	2896.	155.	PCI/L	9/25/96		2.87 (0.16)
8-O	96.06281	208.	137.	PCI/L	9/25/96		0.21 (0.14)
8-U	96.06282	- 2.	136.	PCI/L	9/25/96		- 0.00 (0.14)
BG-O	96.06283	- 246.	134.	PCI/L	9/25/96		- 0.25 (0.14)
BG-U	96.06284	368.	139.	PCI/L	9/26/96		0.37 (0.14)

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

Prepared by: ROBINSON on 5-Dec-1996

REQUEST NUMBER: 23670 MATRIX: W ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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	- 157.	135.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34094	776.	141.	PCI/L	0.0		9/25/96	OUT OF CONTROL
00.34094	849.	142.	PCI/L	0.0		9/25/96	OUT OF CONTROL
00.34094	55.	136.	PCI/L	0.0		9/25/96	UNDER 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	- 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	- 277.	134.	PCI/L	0.0		9/25/96	UNDER CONTROL
00.34098	13582.	203.	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	13443.	202.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	13501.	203.	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
00.34098	13371.	202.	PCI/L	14014.	1401.	9/25/96	UNDER CONTROL
00.34098	14783.	207.	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

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REPORT NUMBER: 42452

Analyst	Reviewer	Team Leader	QA Officer
120596	12-05-96	12/6/96	12/6/96
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: 42163

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

Prepared by: CEA on 4-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
1-O	96.06722	U-234	RAS	0.6697	0.0248	PCI/G	11/04/96	83%
1-O	96.06722	U-235	RAS	0.0283	0.0029	PCI/G	11/04/96	83%
1-O	96.06722	U-238	RAS	0.6902	0.0255	PCI/G	11/04/96	83%
1-U	96.06723	U-234	RAS	0.1744	0.0081	PCI/G	11/04/96	79%
1-U	96.06723	U-235	RAS	0.0058	0.0012	PCI/G	11/04/96	79%
1-U	96.06723	U-238	RAS	0.1567	0.0075	PCI/G	11/04/96	79%
2-O	96.06724	U-234	RAS	0.2088	0.0103	PCI/G	11/04/96	81%
2-O	96.06724	U-235	RAS	0.0083	0.0016	PCI/G	11/04/96	81%
2-O	96.06724	U-238	RAS	0.2144	0.0104	PCI/G	11/04/96	81%
2-U	96.06725	U-234	RAS	0.2618	0.0109	PCI/G	11/04/96	77%
2-U	96.06725	U-235	RAS	0.0094	0.0014	PCI/G	11/04/96	77%
2-U	96.06725	U-238	RAS	0.2626	0.0109	PCI/G	11/04/96	77%
3-O	96.06726	U-234	RAS	1.166	0.0409	PCI/G	11/04/96	86%
3-O	96.06726	U-235	RAS	0.0427	0.004	PCI/G	11/04/96	86%
3-O	96.06726	U-238	RAS	0.975	0.0349	PCI/G	11/04/96	86%
3-U	96.06727	U-234	RAS	0.4824	0.018	PCI/G	11/04/96	85%
3-U	96.06727	U-235	RAS	0.0192	0.0022	PCI/G	11/04/96	85%
3-U	96.06727	U-238	RAS	0.3957	0.0153	PCI/G	11/04/96	85%
4-O	96.06728	U-234	RAS	0.1926	0.012	PCI/G	11/04/96	61%
4-O	96.06728	U-235	RAS	0.0092	0.0023	PCI/G	11/04/96	61%
4-O	96.06728	U-238	RAS	0.2593	0.0146	PCI/G	11/04/96	61%
4-U	96.06729	U-234	RAS	0.2293	0.0098	PCI/G	11/04/96	85%
4-U	96.06729	U-235	RAS	0.0113	0.0016	PCI/G	11/04/96	85%
4-U	96.06729	U-238	RAS	0.2308	0.0098	PCI/G	11/04/96	85%
5-U	96.06730	U-234	RAS	0.3166	0.0145	PCI/G	11/04/96	64%
5-U	96.06730	U-235	RAS	0.0124	0.0019	PCI/G	11/04/96	64%
5-U	96.06730	U-238	RAS	0.2693	0.0127	PCI/G	11/04/96	64%
6-U	96.06731	U-234	RAS	0.3051	0.0129	PCI/G	11/04/96	81%
6-U	96.06731	U-235	RAS	0.0131	0.0018	PCI/G	11/04/96	81%
6-U	96.06731	U-238	RAS	0.3129	0.0131	PCI/G	11/04/96	81%
7-U	96.06732	U-234	RAS	0.2811	0.0117	PCI/G	11/04/96	84%
7-U	96.06732	U-235	RAS	0.0113	0.0016	PCI/G	11/04/96	84%
7-U	96.06732	U-238	RAS	0.2874	0.0119	PCI/G	11/04/96	84%
8-O	96.06733	U-234	RAS	0.1923	0.0097	PCI/G	11/04/96	80%
8-O	96.06733	U-235	RAS	0.009	0.0017	PCI/G	11/04/96	80%
8-O	96.06733	U-238	RAS	0.2637	0.0122	PCI/G	11/04/96	80%
8-U	96.06734	U-234	RAS	0.3546	0.0143	PCI/G	11/04/96	80%

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8-U	96.06734	U-235	RAS	0.0125	0.0017	PCI/G	11/04/96	80%
8-U	96.06734	U-238	RAS	0.3756	0.015	PCI/G	11/04/96	80%
BG-O	96.06735	U-234	RAS	0.407	0.0171	PCI/G	11/04/96	87%
BG-O	96.06735	U-235	RAS	0.0141	0.0022	PCI/G	11/04/96	87%
BG-O	96.06735	U-238	RAS	0.4026	0.017	PCI/G	11/04/96	87%
BG-U	96.06736	U-234	RAS	0.3715	0.0174	PCI/G	11/04/96	59%
BG-U	96.06736	U-235	RAS	0.0152	0.0024	PCI/G	11/04/96	59%
BG-U	96.06736	U-238	RAS	0.3853	0.0179	PCI/G	11/04/96	59%

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REPORT NUMBER: 42163 (continued)

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

Prepared by: CEA on 4-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: RICHARD ROBINSON PROGRAM CODE: M306

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
1-O	96.06722	U-232T	2.66	2.2078	PCI/SAMPLE	8/14/96	83%
1-U	96.06723	U-232T	2.66	2.1014	PCI/SAMPLE	8/14/96	79%
2-O	96.06724	U-232T	2.66	2.1546	PCI/SAMPLE	8/14/96	81%
-U	96.06725	U-232T	2.66	2.0482	PCI/SAMPLE	8/14/96	77%
3-O	96.06726	U-232T	2.66	2.2876	PCI/SAMPLE	8/14/96	86%
3-U	96.06727	U-232T	2.66	2.261	PCI/SAMPLE	8/14/96	85%
4-O	96.06728	U-232T	2.66	1.6226	PCI/SAMPLE	8/14/96	61%
4-U	96.06729	U-232T	2.66	2.261	PCI/SAMPLE	8/14/96	85%
5-U	96.06730	U-232T	2.66	1.7024	PCI/SAMPLE	8/14/96	64%
6-U	96.06731	U-232T	2.66	2.1546	PCI/SAMPLE	8/14/96	81%
7-U	96.06732	U-232T	2.66	2.2344	PCI/SAMPLE	8/14/96	84%
8-O	96.06733	U-232T	2.66	2.128	PCI/SAMPLE	8/14/96	80%
8-U	96.06734	U-232T	2.66	2.128	PCI/SAMPLE	8/14/96	80%
BG-O	96.06735	U-232T	2.66	2.3142	PCI/SAMPLE	8/14/96	87%
BG-U	96.06736	U-232T	2.66	1.5694	PCI/SAMPLE	8/14/96	59%
00.34906	96.06813	U-232T	2.66	2.1812	PCI/SAMPLE	8/14/96	82%

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

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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
96.06813	U-234	0.2551	0.0174	PCI/G	0.25	0.025	11/04/96	UNDER CONTROL
96.06813	U-235	0.0073	0.003	PCI/G	0.012	0.0012	11/04/96	UNDER CONTROL
96.06813	U-238	0.2323	0.0163	PCI/G	0.25	0.025	11/04/96	UNDER CONTROL

REPORT NUMBER: 42163

Analyst	Reviewer	Team Leader	QA Officer
11/4/96	11-7-96	11/08/96	11/8/96
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: 42212

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

Prepared by: CEA on 12-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
1-O	96.06722	PU-238	RAS	0.0006	0.0005	PCI/G	11/12/96	71%
1-O	96.06722	PU-239	RAS	0.0047	0.0011	PCI/G	11/12/96	71%
1-U	96.06723	PU-238	RAS	0.006	0.0013	PCI/G	11/12/96	54%
1-U	96.06723	PU-239	RAS	0.011	0.0017	PCI/G	11/12/96	54%
2-O	96.06724	PU-238	RAS	0.0023	0.0008	PCI/G	11/12/96	69%
2-O	96.06724	PU-239	RAS	0.0041	0.0011	PCI/G	11/12/96	69%
2-U	96.06725	PU-238	RAS	0.0021	0.0006	PCI/G	11/12/96	82%
2-U	96.06725	PU-239	RAS	0.0073	0.0011	PCI/G	11/12/96	82%
3-O	96.06726	PU-238	RAS	0.0107	0.0032	PCI/G	11/12/96	23%
3-O	96.06726	PU-239	RAS	0.0776	0.0084	PCI/G	11/12/96	23%
3-U	96.06727	PU-238	RAS	0.0048	0.0011	PCI/G	11/12/96	59%
3-U	96.06727	PU-239	RAS	0.0225	0.0024	PCI/G	11/12/96	59%
4-O	96.06728	PU-238	RAS	0.0009	0.0007	PCI/G	11/12/96	78%
4-O	96.06728	PU-239	RAS	0.0025	0.001	PCI/G	11/12/96	78%
4-U	96.06729	PU-238	RAS	0.0571	0.0045	PCI/G	11/12/96	44%
4-U	96.06729	PU-239	RAS	0.1497	0.008	PCI/G	11/12/96	44%
5-U	96.06730	PU-238	RAS	0.0	0.0002	PCI/G	11/12/96	61%
5-U	96.06730	PU-239	RAS	0.0132	0.0017	PCI/G	11/12/96	61%
6-U	96.06731	PU-238	RAS	0.004	0.0008	PCI/G	11/12/96	86%
6-U	96.06731	PU-239	RAS	0.0089	0.0012	PCI/G	11/12/96	86%
7-U	96.06732	PU-238	RAS	0.0029	0.0009	PCI/G	11/12/96	59%
7-U	96.06732	PU-239	RAS	0.0142	0.002	PCI/G	11/12/96	59%
8-O	96.06733	PU-238	RAS	0.0005	0.0004	PCI/G	11/12/96	72%
8-O	96.06733	PU-239	RAS	0.0022	0.0008	PCI/G	11/12/96	72%
8-U	96.06734	PU-238	RAS	0.0008	0.0005	PCI/G	11/12/96	65%
8-U	96.06734	PU-239	RAS	0.0046	0.001	PCI/G	11/12/96	65%
BG-O	96.06735	PU-238	RAS	0.0249	0.003	PCI/G	11/12/96	63%
BG-O	96.06735	PU-239	RAS	0.0511	0.0043	PCI/G	11/12/96	63%
BG-U	96.06736	PU-238	RAS	0.0006	0.0004	PCI/G	11/12/96	74%
BG-U	96.06736	PU-239	RAS	0.0078	0.0013	PCI/G	11/12/96	74%

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REPORT NUMBER: 42212 (continued)

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

Prepared by: CEA on 12-Nov-1996

REQUEST NUMBER: 23730 MATRIX: BV ANALYST: EDWARD GONZALES PROGRAM CODE: M306

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
1-O	96.06722	PU-242T	3.89	2.7619	PCI/SAMPLE	8/14/96	71%
1-U	96.06723	PU-242T	3.89	2.1006	PCI/SAMPLE	8/14/96	54%
2-O	96.06724	PU-242T	3.89	2.6841	PCI/SAMPLE	8/14/96	69%
2-U	96.06725	PU-242T	3.89	3.1898	PCI/SAMPLE	8/14/96	82%
3-O	96.06726	PU-242T	3.89	0.8947	PCI/SAMPLE	8/14/96	23%
3-U	96.06727	PU-242T	3.89	2.2951	PCI/SAMPLE	8/14/96	59%
4-O	96.06728	PU-242T	3.89	3.0342	PCI/SAMPLE	8/14/96	78%
4-U	96.06729	PU-242T	3.89	1.7116	PCI/SAMPLE	8/14/96	44%
5-U	96.06730	PU-242T	3.89	2.3729	PCI/SAMPLE	8/14/96	61%
6-U	96.06731	PU-242T	3.89	3.3454	PCI/SAMPLE	8/14/96	86%
7-U	96.06732	PU-242T	3.89	2.2951	PCI/SAMPLE	8/14/96	59%
8-O	96.06733	PU-242T	3.89	2.8008	PCI/SAMPLE	8/14/96	72%
8-U	96.06734	PU-242T	3.89	2.5285	PCI/SAMPLE	8/14/96	65%
BG-O	96.06735	PU-242T	3.89	2.4507	PCI/SAMPLE	8/14/96	63%
BG-U	96.06736	PU-242T	3.89	2.8786	PCI/SAMPLE	8/14/96	74%
00.34716	96.06810	PU-242T	3.89	3.501	PCI/SAMPLE	8/14/96	90%

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	3.049	0.0873	PCI/SAMPLE	3.2	0.1	11/12/96	UNDER CONTROL

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

SAMPLE	ANALYTICAL	ANALYTICAL	QC	QC	COMPLETION

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NUM	ANALYSIS	RESULT	UNCERTAINTY	UNITS	VALUE	UNCERTAINTY	DATE	COMMENT
96.06810	PU-238	8.211	0.2122	PCI/G	9.6	0.33	11/12/96	OUT OF CONTROL
96.06810	PU-239	7.034	0.185	PCI/G	8.	0.26	11/12/96	OUT OF CONTROL

REPORT NUMBER: 42212

Analyst	Reviewer	Team Leader	QA Officer
			NK for MAG
11/12/96	11-14-96	11/15/96	11/19/96
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. 1, pp. 19-20.

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APPENDIX F

CST ANALYTICAL REPORTS OF UNWASHED VEGETATION SAMPLES: HEAVY METALS

REPORT NUMBER: 42188

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

Prepared by: KLAO on 6-Nov-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: AAS PROGRAM CODE: N306

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

NOTEBOOK: CST9130 PAGE: 64

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1-O	96.06917	AS	ETVAA	< 0.2		UG/G	10/10/96	
1-O	96.06917	HG	CVAA	< 0.1		UG/G	11/01/96	
1-O	96.06917	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
1-U	96.06918	AS	ETVAA	< 0.2		UG/G	10/10/96	
1-U	96.06918	HG	CVAA	< 0.1		UG/G	11/01/96	
1-U	96.06918	SE	ETVAA	0.4	0.1	UG/G	10/15/96	
2-O	96.06919	AS	ETVAA	< 0.2		UG/G	10/10/96	
2-O	96.06919	HG	CVAA	< 0.1		UG/G	11/01/96	
2-O	96.06919	SE	ETVAA	0.3	0.1	UG/G	10/15/96	
2-U	96.06920	AS	ETVAA	< 0.2		UG/G	10/10/96	
2-U	96.06920	HG	CVAA	< 0.1		UG/G	11/01/96	
2-U	96.06920	SE	ETVAA	0.2	0.2	UG/G	10/15/96	
3-O	96.06921	AS	ETVAA	< 0.2		UG/G	10/10/96	
3-O	96.06921	HG	CVAA	< 0.1		UG/G	11/01/96	
3-O	96.06921	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
3-U	96.06922	AS	ETVAA	< 0.2		UG/G	10/10/96	
3-U	96.06922	HG	CVAA	< 0.1		UG/G	11/01/96	
3-U	96.06922	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
4-O	96.06923	AS	ETVAA	< 0.2		UG/G	10/10/96	
4-O	96.06923	HG	CVAA	< 0.1		UG/G	11/01/96	
4-O	96.06923	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
4-U	96.06924	AS	ETVAA	< 0.2		UG/G	10/10/96	
4-U	96.06924	HG	CVAA	< 0.1		UG/G	11/01/96	
4-U	96.06924	SE	ETVAA	0.1	0.1	UG/G	10/15/96	
5-U	96.06925	AS	ETVAA	0.2	0.2	UG/G	10/10/96	
5-U	96.06925	HG	CVAA	< 0.1		UG/G	11/01/96	
5-U	96.06925	SE	ETVAA	0.4	0.1	UG/G	10/15/96	
6-U	96.06926	AS	ETVAA	0.2	0.2	UG/G	10/10/96	
6-U	96.06926	HG	CVAA	< 0.1		UG/G	11/01/96	
6-U	96.06926	SE	ETVAA	0.3	0.1	UG/G	10/15/96	
7-U	96.06927	AS	ETVAA	< 0.2		UG/G	10/10/96	
7-U	96.06927	HG	CVAA	< 0.1		UG/G	11/01/96	
7-U	96.06927	SE	ETVAA	0.4	0.1	UG/G	10/15/96	
8-O	96.06928	AS	ETVAA	< 0.2		UG/G	10/10/96	
8-O	96.06928	HG	CVAA	< 0.1		UG/G	11/01/96	
8-O	96.06928	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
8-U	96.06929	AS	ETVAA	0.2	0.2	UG/G	10/10/96	

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8-U	96.06929	HG	CVAA	< 0.1		UG/G	11/01/96
8-U	96.06929	SE	ETVAA	0.2	0.1	UG/G	10/15/96
BG-O	96.06930	AS	ETVAA	< 0.2		UG/G	10/16/96
BG-O	96.06930	HG	CVAA	< 0.1		UG/G	11/01/96
BG-O	96.06930	SE	ETVAA	0.2	0.1	UG/G	10/15/96
BG-U	96.06931	AS	ETVAA	< 0.2		UG/G	10/16/96
BG-U	96.06931	HG	CVAA	< 0.1		UG/G	11/01/96
BG-U	96.06931	SE	ETVAA	0.2	0.1	UG/G	10/15/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1-O	96.06917	AS	ETVAA	< 0.2		UG/G	10/10/96	
1-O	96.06917	HG	CVAA	< 0.1		UG/G	11/01/96	
1-O	96.06917	SE	ETVAA	0.2	0.1	UG/G	10/15/96	
1-U	96.06918	HG	CVAA	< 0.1		UG/G	11/01/96	
2-O	96.06919	HG	CVAA	< 0.1		UG/G	11/01/96	
2-U	96.06920	HG	CVAA	< 0.1		UG/G	11/01/96	
3-O	96.06921	HG	CVAA	< 0.1		UG/G	11/01/96	
3-U	96.06922	HG	CVAA	< 0.1		UG/G	11/01/96	
4-O	96.06923	HG	CVAA	< 0.1		UG/G	11/01/96	
4-U	96.06924	HG	CVAA	< 0.1		UG/G	11/01/96	
5-U	96.06925	HG	CVAA	< 0.1		UG/G	11/01/96	
6-U	96.06926	HG	CVAA	< 0.1		UG/G	11/01/96	
7-U	96.06927	HG	CVAA	< 0.1		UG/G	11/01/96	
8-O	96.06928	HG	CVAA	< 0.1		UG/G	11/01/96	
8-U	96.06929	HG	CVAA	< 0.1		UG/G	11/01/96	
BG-O	96.06930	HG	CVAA	< 0.1		UG/G	11/01/96	
BG-U	96.06931	HG	CVAA	< 0.1		UG/G	11/01/96	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
1-O	96.06917	AS	ETVAA	4.9	5.1	UG/G	10/10/96	
1-O	96.06917	HG	CVAA	0.973	0.9	UG/G	11/01/96	
1-O	96.06917	SE	ETVAA	4.9	4.7	UG/G	10/15/96	

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REPORT NUMBER: 42188 (continued)

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

Prepared by: KLAO on 6-Nov-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: AAS PROGRAM CODE: M306

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

NOTEBOOK: CST9130 PAGE: 64

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	5.	2.	UG/G	3.1	0.3	10/15/96	UNDER CONTROL
00.00580	SE	< 1000.		NG/G	25.		10/16/96	UNDER CONTROL
).35052	HG	5.3	0.1	UG/L	5.85	1.	11/01/96	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: 42188

Analyst	Reviewer	Team Leader	QA Officer
Michael B. Gross	[illegible]	[illegible]	mag
11-6-96	11/6/96	11/7/96	11/7/96
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

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REPORT NUMBER: 41943

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

Prepared by: IMS on 15-Oct-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: IMS PROGRAM CODE: M306

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
1-O	96.06917	PB	ICPMS	4.4	0.3	UG/G	10/10/96	
1-O	96.06917	SB	ICPMS	0.4	0.3	UG/G	10/10/96	
1-U	96.06918	PB	ICPMS	0.6	0.3	UG/G	10/10/96	
1-U	96.06918	SB	ICPMS	< 0.3		UG/G	10/10/96	
2-O	96.06919	PB	ICPMS	0.9	0.3	UG/G	10/10/96	
2-O	96.06919	SB	ICPMS	< 0.6		UG/G	10/10/96	
2-U	96.06920	PB	ICPMS	0.8	0.3	UG/G	10/10/96	
2-U	96.06920	SB	ICPMS	< 0.3		UG/G	10/10/96	
3-O	96.06921	PB	ICPMS	0.5	0.3	UG/G	10/10/96	
3-O	96.06921	SB	ICPMS	< 0.3		UG/G	10/10/96	
3-U	96.06922	PB	ICPMS	0.6	0.3	UG/G	10/10/96	
3-U	96.06922	SB	ICPMS	< 0.3		UG/G	10/10/96	
4-O	96.06923	PB	ICPMS	0.6	0.3	UG/G	10/10/96	
4-O	96.06923	SB	ICPMS	< 0.3		UG/G	10/10/96	
4-U	96.06924	PB	ICPMS	1.2	0.3	UG/G	10/10/96	
4-U	96.06924	SB	ICPMS	< 0.3		UG/G	10/10/96	
5-U	96.06925	PB	ICPMS	0.7	0.3	UG/G	10/10/96	
5-U	96.06925	SB	ICPMS	< 0.3		UG/G	10/10/96	
6-U	96.06926	PB	ICPMS	0.6	0.3	UG/G	10/10/96	
6-U	96.06926	SB	ICPMS	< 0.3		UG/G	10/10/96	
7-U	96.06927	PB	ICPMS	0.4	0.3	UG/G	10/10/96	
7-U	96.06927	SB	ICPMS	< 0.3		UG/G	10/10/96	
8-O	96.06928	PB	ICPMS	0.7		UG/G	10/10/96	
8-O	96.06928	SB	ICPMS	< 0.3		UG/G	10/10/96	
8-U	96.06929	PB	ICPMS	0.9	0.3	UG/G	10/10/96	
8-U	96.06929	SB	ICPMS	< 0.3		UG/G	10/10/96	
BG-O	96.06930	PB	ICPMS	0.4	0.3	UG/G	10/10/96	
BG-O	96.06930	SB	ICPMS	< 0.3		UG/G	10/10/96	
BG-U	96.06931	PB	ICPMS	0.7	0.3	UG/G	10/10/96	
BG-U	96.06931	SB	ICPMS	< 0.3		UG/G	10/10/96	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT

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1-0	96.06917	PB	ICPMS	4.1	0.3	UG/G	10/10/96
1-0	96.06917	SB	ICPMS	< 0.3		UG/G	10/10/96

TRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
1-0	96.06917	PB	ICPMS	4.9	1.4	UG/G	10/10/96	
1-0	96.06917	SB	ICPMS	4.9	3.7	UG/G	10/10/96	

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REPORT NUMBER: 41943 (continued)

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

Prepared by: IMS on 15-Oct-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: IMS PROGRAM CODE: M306

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	16.	0.3	UG/G	13.	2.	10/10/96	UNDER CONTROL
00.00580	SB	< 300.		NG/G	40.		10/10/96	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: 41943

Analyst	Reviewer	Team Leader	QA Officer
10/15/96	10/15/96	11/7/96	11/8/96
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

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REPORT NUMBER: 42199

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

Prepared by: J.A. KENNISON on 7-Nov-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: OES PROGRAM CODE: M306

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

NOTEBOOK: 9138 PAGE: 60

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1-O	96.06917	AG	ICPES	< 0.25		UG/G	10/07/96	
1-O	96.06917	BA	ICPES	17.5	0.6	UG/G	10/07/96	
1-O	96.06917	BE	ICPES	< 0.125		UG/G	10/07/96	
1-O	96.06917	CD	ICPES	< 0.25		UG/G	10/07/96	
1-O	96.06917	CR	ICPES	< 1.25		UG/G	10/07/96	
1-O	96.06917	CU	ICPES	2.1	1.63	UG/G	10/07/96	
1-O	96.06917	NI	ICPES	18.3	2.25	UG/G	10/07/96	
1-O	96.06917	TL	ICPES	< 20.7		UG/G	10/07/96	
1-O	96.06917	ZN	ICPES	16.6	2.	UG/G	10/07/96	
1-U	96.06918	AG	ICPES	< 0.25		UG/G	10/07/96	
1-U	96.06918	BA	ICPES	40.3	2.	UG/G	10/07/96	
1-U	96.06918	BE	ICPES	< 0.125		UG/G	10/07/96	
1-U	96.06918	CD	ICPES	< 0.25		UG/G	10/07/96	
1-U	96.06918	CR	ICPES	< 1.63		UG/G	10/07/96	
1-U	96.06918	CU	ICPES	9.55	1.63	UG/G	10/07/96	
1-U	96.06918	NI	ICPES	< 2.25		UG/G	10/07/96	
1-U	96.06918	TL	ICPES	< 20.7		UG/G	10/07/96	
1-U	96.06918	ZN	ICPES	38.	2.	UG/G	10/07/96	
2-O	96.06919	AG	ICPES	< 0.25		UG/G	10/07/96	
2-O	96.06919	BA	ICPES	25.3	1.	UG/G	10/07/96	
2-O	96.06919	BE	ICPES	< 0.125		UG/G	10/07/96	
2-O	96.06919	CD	ICPES	< 0.25		UG/G	10/07/96	
2-O	96.06919	CR	ICPES	< 1.25		UG/G	10/07/96	
2-O	96.06919	CU	ICPES	3.2	1.6	UG/G	10/21/96	
2-O	96.06919	NI	ICPES	< 2.25		UG/G	10/07/96	
2-O	96.06919	TL	ICPES	< 20.75		UG/G	10/07/96	
2-O	96.06919	ZN	ICPES	27.7	2.	UG/G	10/07/96	
2-U	96.06920	AG	ICPES	< 0.25		UG/G	10/07/96	
2-U	96.06920	BA	ICPES	40.8	0.8	UG/G	10/07/96	
2-U	96.06920	BE	ICPES	< 0.125		UG/G	10/07/96	
2-U	96.06920	CD	ICPES	< 0.25		UG/G	10/07/96	
2-U	96.06920	CR	ICPES	< 1.25		UG/G	10/07/96	
2-U	96.06920	CU	ICPES	7.77	1.63	UG/G	10/07/96	
2-U	96.06920	NI	ICPES	< 2.25		UG/G	10/07/96	
2-U	96.06920	TL	ICPES	< 20.7		UG/G	10/07/96	
2-U	96.06920	ZN	ICPES	44.3	2.	UG/G	10/07/96	
3-O	96.06921	AG	ICPES	0.57	0.25	UG/G	10/07/96	

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3-O	96.06921 BA	ICPES	10.9	0.2	UG/G	10/07/96
3-O	96.06921 BE	ICPES	< 0.125		UG/G	10/07/96
3-O	96.06921 CD	ICPES	< 0.25		UG/G	10/07/96
3-O	96.06921 CR	ICPES	< 1.25		UG/G	10/07/96
3-O	96.06921 CU	ICPES	4.65	1.63	UG/G	10/07/96
3-O	96.06921 NI	ICPES	< 2.25		UG/G	10/07/96
3-O	96.06921 TL	ICPES	< 20.7		UG/G	10/07/96
3-O	96.06921 ZN	ICPES	36.7	2.	UG/G	10/07/96
3-U	96.06922 AG	ICPES	< 0.25		UG/G	10/07/96
3-U	96.06922 BA	ICPES	38.	2.	UG/G	10/07/96
3-U	96.06922 BE	ICPES	< 0.125		UG/G	10/07/96
3-U	96.06922 CD	ICPES	0.34	0.25	UG/G	10/07/96
3-U	96.06922 CR	ICPES	< 1.25		UG/G	10/07/96
3-U	96.06922 CU	ICPES	10.9	1.63	UG/G	10/07/96
3-U	96.06922 NI	ICPES	< 2.25		UG/G	10/07/96
3-U	96.06922 TL	ICPES	< 20.7		UG/G	10/07/96
3-U	96.06922 ZN	ICPES	38.	2.	UG/G	10/07/96
4-O	96.06923 AG	ICPES	0.35	0.25	UG/G	10/07/96
4-O	96.06923 BA	ICPES	20.2	0.9	UG/G	10/07/96
4-O	96.06923 BE	ICPES	< 0.125		UG/G	10/07/96
4-O	96.06923 CD	ICPES	< 0.25		UG/G	10/07/96
4-O	96.06923 CR	ICPES	< 1.25		UG/G	10/07/96
4-O	96.06923 CU	ICPES	2.21	1.63	UG/G	10/07/96
4-O	96.06923 NI	ICPES	< 2.25		UG/G	10/07/96
4-O	96.06923 TL	ICPES	< 20.7		UG/G	10/07/96
4-O	96.06923 ZN	ICPES	24.6	3.5	UG/G	10/07/96
4-U	96.06924 AG	ICPES	< 0.25		UG/G	10/07/96
4-U	96.06924 BA	ICPES	24.7	1.4	UG/G	10/07/96
4-U	96.06924 BE	ICPES	< 0.125		UG/G	10/07/96
4-U	96.06924 CD	ICPES	0.31	0.25	UG/G	10/07/96
4-U	96.06924 CR	ICPES	< 1.25		UG/G	10/07/96
4-U	96.06924 CU	ICPES	7.2	1.63	UG/G	10/07/96
4-U	96.06924 NI	ICPES	< 2.25		UG/G	10/07/96
4-U	96.06924 TL	ICPES	< 20.7		UG/G	10/07/96
4-U	96.06924 ZN	ICPES	22.2	2.	UG/G	10/07/96
5-U	96.06925 AG	ICPES	< 0.25		UG/G	10/07/96
5-U	96.06925 BA	ICPES	56.8	2.2	UG/G	10/07/96
5-U	96.06925 BE	ICPES	< 0.125		UG/G	10/07/96
5-U	96.06925 CD	ICPES	< 0.25		UG/G	10/07/96
5-U	96.06925 CR	ICPES	< 1.25		UG/G	10/07/96
5-U	96.06925 CU	ICPES	14.5	1.63	UG/G	10/07/96
5-U	96.06925 NI	ICPES	< 2.25		UG/G	10/07/96
5-U	96.06925 TL	ICPES	< 20.7		UG/G	10/07/96
5-U	96.06925 ZN	ICPES	59.1	5.2	UG/G	10/07/96
6-U	96.06926 AG	ICPES	< 0.25		UG/G	10/07/96
6-U	96.06926 BA	ICPES	35.1	1.2	UG/G	10/07/96
6-U	96.06926 BE	ICPES	< 0.125		UG/G	10/07/96
6-U	96.06926 CD	ICPES	< 0.25		UG/G	10/07/96
6-U	96.06926 CR	ICPES	< 1.25		UG/G	10/07/96
6-U	96.06926 CU	ICPES	9.92	1.63	UG/G	10/07/96
6-U	96.06926 NI	ICPES	< 2.25		UG/G	10/07/96
6-U	96.06926 TL	ICPES	< 20.7		UG/G	10/07/96
6-U	96.06926 ZN	ICPES	43.6	3.6	UG/G	10/07/96
7-U	96.06927 AG	ICPES	< 0.25		UG/G	10/07/96
7-U	96.06927 BA	ICPES	57.8	0.4	UG/G	10/07/96
7-U	96.06927 BE	ICPES	< 0.125		UG/G	10/07/96
7-U	96.06927 CD	ICPES	< 0.25		UG/G	10/07/96
7-U	96.06927 CR	ICPES	< 1.25		UG/G	10/07/96
7-U	96.06927 CU	ICPES	10.9	1.63	UG/G	10/07/96
7-U	96.06927 NI	ICPES	< 2.25		UG/G	10/07/96

7-U	96.06927	TL	ICPES	< 20.7		UG/G	10/07/96
7-U	96.06927	ZN	ICPES	44.7	3.3	UG/G	10/07/96
8-O	96.06928	AG	ICPES	< 0.25		UG/G	10/07/96
8-O	96.06928	BA	ICPES	26.9	0.5	UG/G	10/07/96
8-O	96.06928	BE	ICPES	< 0.125		UG/G	10/07/96
8-O	96.06928	CD	ICPES	< 0.25		UG/G	10/07/96
8-O	96.06928	CR	ICPES	1.37	1.25	UG/G	10/07/96
8-O	96.06928	CU	ICPES	2.2	1.63	UG/G	10/07/96
8-O	96.06928	NI	ICPES	< 2.25		UG/G	10/07/96
8-O	96.06928	TL	ICPES	< 20.7		UG/G	10/07/96
8-O	96.06928	ZN	ICPES	29.5	2.	UG/G	10/07/96
8-U	96.06929	AG	ICPES	< 0.25		UG/G	10/07/96
8-U	96.06929	BA	ICPES	64.1	1.4	UG/G	10/07/96
8-U	96.06929	BE	ICPES	< 0.125		UG/G	10/07/96
8-U	96.06929	CD	ICPES	0.33	0.25	UG/G	10/07/96
8-U	96.06929	CR	ICPES	< 1.25		UG/G	10/07/96
8-U	96.06929	CU	ICPES	8.17	1.63	UG/G	10/07/96
8-U	96.06929	NI	ICPES	< 2.25		UG/G	10/07/96
8-U	96.06929	TL	ICPES	< 20.7		UG/G	10/07/96
8-U	96.06929	ZN	ICPES	22.4	2.	UG/G	10/07/96
BG-O	96.06930	AG	ICPES	< 0.25		UG/G	10/07/96
BG-O	96.06930	BA	ICPES	32.5	0.66	UG/G	10/07/96
BG-O	96.06930	BE	ICPES	< 0.125		UG/G	10/07/96
BG-O	96.06930	CD	ICPES	< 0.25		UG/G	10/07/96
BG-O	96.06930	CR	ICPES	< 1.25		UG/G	10/07/96
BG-O	96.06930	CU	ICPES	3.28	1.63	UG/G	10/07/96
BG-O	96.06930	NI	ICPES	< 2.25		UG/G	10/07/96
BG-O	96.06930	TL	ICPES	< 20.7		UG/G	10/07/96
BG-O	96.06930	ZN	ICPES	24.	3.	UG/G	10/07/96
BG-U	96.06931	AG	ICPES	< 0.25		UG/G	10/07/96
BG-U	96.06931	BA	ICPES	69.	2.	UG/G	10/07/96
BG-U	96.06931	BE	ICPES	< 0.125		UG/G	10/07/96
BG-U	96.06931	CD	ICPES	0.252	0.25	UG/G	10/07/96
BG-U	96.06931	CR	ICPES	< 1.25		UG/G	10/07/96
BG-U	96.06931	CU	ICPES	12.1	1.63	UG/G	10/07/96
BG-U	96.06931	NI	ICPES	< 2.25		UG/G	10/07/96
BG-U	96.06931	TL	ICPES	< 20.7		UG/G	10/07/96
BG-U	96.06931	ZN	ICPES	26.5	2.	UG/G	10/07/96

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
1-O	96.06917	AG	ICPES	< 0.25		UG/G	10/07/96	
1-O	96.06917	BA	ICPES	17.5	0.6	UG/G	10/07/96	
1-O	96.06917	BE	ICPES	< 0.125		UG/G	10/07/96	
1-O	96.06917	CD	ICPES	< 0.25		UG/G	10/07/96	
1-O	96.06917	CR	ICPES	< 1.25		UG/G	10/07/96	
1-O	96.06917	CU	ICPES	2.1	1.63	UG/G	10/07/96	
1-O	96.06917	NI	ICPES	17.4	4.	UG/G	10/07/96	
1-O	96.06917	TL	ICPES	< 20.7		UG/G	10/07/96	
1-O	96.06917	ZN	ICPES	16.5	2.	UG/G	10/07/96	

MATRIX SPIKES:

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

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1-0	96.06917 AG	ICPES	24.6	16.9	UG/G	10/07/96
1-0	96.06917 BA	ICPES	24.6	20.2	UG/G	10/07/96
1-0	96.06917 BE	ICPES	24.6	18.9	UG/G	10/07/96
1-0	96.06917 CD	ICPES	24.6	16.6	UG/G	10/07/96
1-0	96.06917 CR	ICPES	24.6	18.3	UG/G	10/07/96
1-0	96.06917 CU	ICPES	24.6	19.	UG/G	10/07/96
1-0	96.06917 NI	ICPES	24.6		UG/G	10/07/96
1-0	96.06917 ZN	ICPES	24.6	17.6	UG/G	10/07/96

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REPORT NUMBER: 42199 (continued)

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

Prepared by: J.A. KENNISON on 7-Nov-1996

REQUEST NUMBER: 23742 MATRIX: BV ANALYST: OES PROGRAM CODE: M306

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

NOTEBOOK: 9138 PAGE: 60

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	19.7	2.	UG/G	21.	3.	10/07/96	UNDER CONTROL
00.00580	CD	< 250.		NG/G	30.	10.	11/07/96	UNDER CONTROL
00.00580	CR	< 1250.		NG/G	800.	200.	11/07/96	UNDER CONTROL
.00580	CU	14.2	1.4	UG/G	16.5	1.	10/07/96	UNDER CONTROL
00.00580	NI	510.	51.	NG/G	600.	300.	10/07/96	UNDER CONTROL
00.00580	ZN	22.1	2.2	UG/G	29.	2.	10/07/96	WARNING 2-3 SIG

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: 42199

Analyst	Reviewer	Team Leader	QA Officer
11-7-96	11/7/96	11/7/96	11/8/96
Date	Date	Date	Date

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