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and Vegetation at Radioactive-Waste Disposal
Area G during the 1996 Growing Season*

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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 ^3H , ^{90}Sr , ^{238}Pu , ^{239}Pu , ^{137}Cs , ^{234}U , ^{235}U , ^{238}U , ^{232}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 ^3H 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 $14,744\text{ pCi mL}^{-1}$ 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 ^3H , ^{90}Sr , ^{238}Pu , ^{239}Pu , ^{137}Cs , ^{234}U , ^{235}U , ^{238}U , ^{106}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 ^3H , $\mu\text{g g}^{-1}$ dry for ^{106}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 ^3H 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 ^3H , ^{90}Sr , ^{238}Pu , ^{239}Pu , ^{137}Cs , ^{234}U , ^{235}U , ^{238}U , ^{106}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 ^3H , $\mu\text{g g}^{-1}$ ash for ^{101}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 vaporization atomic absorption (ETVAA) for As and Se; and by cold vapor atomic absorption (CVAA) for Hg. Heavy metal results in vegetation were reported in $\mu\text{g g}^{-1}$ 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 ^3H 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 ^3H shafts (sites #1 and #2) contained the highest levels of ^3H , 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 ^3H , 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 ^3H in overstory and understory vegetation from the ^3H 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 ^3H concentration ($14,744 \text{ pCi mL}^{-1}$) in vegetation at Area G, in fact, was detected in unwashed vegetation at site #6 (TRU waste pad #4).

Table 5 shows results of ^3H 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 versus 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 ^3H concentrations than washed vegetation; this was probably due to the washing of vegetation before it was processed prior to ^3H 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 (0.58) ⁶	171.18 (0.97)	1.21 (0.29)	0.20 (0.28)	7.89 (0.36)	18.10 (0.44)	1.80 (0.30)	-0.41 (0.27)	0.13 (0.26)	6.34 ²	260.0
²³⁸ Pu (pCi/g)	0.011 (0.001)	0.004 (0.001)	0.021 (0.004)	0.013 (0.002)	0.007 (0.001)	0.007 (0.001)	0.007 (0.001)	0.001 (0.001)	0.000 (0.000)	0.008 ²	27.0
²³⁹ Pu (pCi/g)	0.025 (0.002)	0.042 (0.003)	0.045 (0.006)	0.066 (0.004)	0.022 (0.002)	0.099 (0.005)	0.013 (0.002)	0.013 (0.002)	0.015 (0.002)	0.028 ²	24.0
⁹⁰ Sr (pCi/g)	0.1 (0.2)	0.2 (0.2)	0.3 (0.2)	0.4 (0.2)	0.0 (0.2)	0.2 (0.2)	0.2 (0.2)	0.4 (0.2)	0.3 (0.2)	0.82 ²	4.4
²³⁴ U (pCi/g)	1.182 (0.054)	1.328 (0.056)	0.940 (0.042)	1.088 (0.051)	1.072 (0.044)	1.123 (0.050)	1.253 (0.053)	1.075 (0.052)	1.185 (0.052)	1.289 ³	13.0
²³⁵ U (pCi/g)	0.061 (0.009)	0.049 (0.007)	0.049 (0.007)	0.041 (0.008)	0.037 (0.006)	0.045 (0.007)	0.053 (0.007)	0.053 (0.008)	0.040 (0.007)	0.054 ³	10.0
²³⁸ U (pCi/g)	1.346 (0.060)	1.311 (0.055)	1.038 (0.046)	1.089 (0.050)	1.022 (0.042)	1.123 (0.050)	1.239 (0.052)	1.197 (0.056)	1.196 (0.052)	1.300 ³	67.0
¹⁰⁶ U (μg/g) ⁷	4.059 (0.184)	3.948 (0.168)	3.131 (0.141)	3.279 (0.153)	3.077 (0.129)	3.383 (0.153)	3.735 (0.159)	3.609 (0.168)	3.60 (0.16)	4.05 ²	29.0
²²⁸ Ac (pCi/g)	1.56 (0.17)	1.52 (0.17)	1.45 (0.17)	1.63 (0.18)	1.69 (0.18)	1.73 (0.19)	1.44 (0.16)	1.42 (0.15)	1.22 (0.15)	1.52 ³	
²¹⁴ Bi (pCi/g)	1.16 (0.12)	1.20 (0.12)	1.41 (0.13)	1.15 (0.11)	1.22 (0.12)	1.40 (0.13)	1.30 (0.12)	0.97 (0.10)	1.03 (0.10)	1.23 ³	
⁶⁰ Co (pCi/g)	0.16 (0.03)	0.08 (0.12)	0.08 (0.11)	0.06 (0.02)	0.09 (0.03)	0.25 (0.04)	0.16 (0.03)	0.09 (0.02)	0.09 (0.02)	0.13 ³	1.1
¹³⁷ Cs (pCi/g)	0.44 (0.05)	0.96 (0.09)	0.49 (0.05)	0.50 (0.06)	0.11 (0.02)	0.07 (0.02)	0.11 (0.16)	0.42 (0.05)	0.44 (0.05)	1.13 ²	5.1
⁴⁰ K (pCi/g)	22.4 (1.90)	19.7 (1.7)	21.4 (1.8)	24.10 (2.00)	26.30 (2.20)	26.40 (2.20)	19.90 (1.70)	15.9 (1.40)	13.9 (1.30)	16.5 ³	12.0

Table 1 (Continued).

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

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).

²Regional Statistical Reference Level=mean + 2 std dev from long-term data (Fresquez et al. 1996a).

³Regional Statistical Reference Level=mean + 2 counting uncertainties from short-term data.

⁴Screening Action Level (FIMAD 1997).

⁵soil moisture.

⁶(± one counting uncertainty).

⁷Total U was calculated from U isotope activity.

Table 2. Heavy metal concentrations ($\mu\text{g g}^{-1}$ 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).

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

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

Table 3 (Continued)

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

Table 3 (Continued)

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

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).

²Regional Statistical Reference Level=mean + 2 std dev from present BG data.

³tissue moisture.

⁴os=overstory (trees) and us=understory (grasses/forbs).

⁵(± one counting uncertainty).

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

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)	
$^{\text{tot}}\text{U}^4$ (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 (0.24)	1.03 (0.30)	-0.06 (0.30)	-0.09 (0.30)	-0.11 (0.30)	0.42 (0.16)	0.74 (1.48)	-0.09 (0.30)	0.21 (0.42)	0.63
¹³⁷ Cs (pCi g ⁻¹ ash)										
os	0.29 (0.12)	0.20 (0.40)	0.43 (0.86)	0.25 (0.12)				0.43 (0.14)	0.27 (0.12)	1.65
us	0.22 (0.10)	0.36 (0.12)	0.60 (0.18)	0.32 (0.12)	0.20 (0.10)	0.55 (0.20)	0.34 (0.14)	0.34 (0.12)	0.61 (0.22)	0.94
⁴⁰ K (pCi g ⁻¹ ash)										
os	103.00 (18.00)	90.00 (16.80)	131.00 (24.00)	96.60 (18.60)				114.00 (20.00)	147.00 (26.00)	173.0
us	202.00 (32.00)	166.00 (28.00)	234.00 (38.00)	134.00 (24.00)	269.00 (42.00)	241.00 (38.00)	203.00 (34.00)	130.00 (22.00)	312.00 (50.00)	362.0
⁵⁴ Mn (pCi g ⁻¹ ash)										
os	0.12 (0.24)	0.34 (0.12)	0.44 (0.20)	-0.19 (0.18)				-0.08 (0.18)	-0.12 (0.18)	0.06
us	0.30 (0.12)	0.03 (0.06)	0.16 (0.32)	0.17 (0.34)	-0.06 (0.18)	-0.08 (0.18)	-0.14 (0.18)	-0.05 (0.18)	-0.02 (0.18)	0.16
²² Na (pCi g ⁻¹ ash)										
os	0.66 (0.24)	0.39 (0.78)	0.80 (0.28)	0.44 (0.20)				0.50 (0.20)	0.76 (0.26)	1.02
us	-0.12 (0.26)	-0.10 (0.26)	-0.19 (0.26)	0.36 (0.16)	0.56 (1.12)	0.25 (0.50)	0.03 (0.06)	0.29 (0.58)	0.37 (0.20)	0.57
²¹⁴ Pb (pCi g ⁻¹ ash)										
os	1.51 (0.42)	2.03 (0.48)	3.37 (0.74)	2.77 (0.70)				2.46 (0.58)	2.13 (0.56)	2.69
us	2.05 (0.50)	1.41 (0.36)	2.06 (4.12)	1.53 (0.42)	2.31 (0.54)	3.27 (0.74)	3.38 (0.74)	1.26 (2.52)	2.04 (0.64)	2.68

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).

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

³tissue moisture.

⁴os=overstory (trees) and us=understory (grasses/forbs).

⁵(± one counting uncertainty).

⁶Total U was calculated from U isotope activity.

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

Sites	^3H pCi mL ⁻¹	^{239}Pu pCi g ⁻¹ ash
#1 Tritium shafts (south of the shafts just outside fence)		
<u>Understory</u>		
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)		
<u>Overstory</u>		
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
<u>Understory</u>		
Past ^a	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)		
<u>Overstory</u>		
Past ^a	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
<u>Understory</u>		
Past ^a	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)		
<u>Understory</u>		
Past ^c	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)		
<u>Understory</u>		
Past ^a	1028.0	0.95
Present		
1994 ^b	952.5	0.01
1995 ^c	2700.0	0.01
1996	14744.0	0.01

^aData from Mayfield and Hanson (1983), ^bData from Fresquez et al. (1995), ^cData from Fresquez et al. (1996b), ^dData in 1985 from Jacobson (1992), and ^eData from Purtymun (1973).

Table 6. Heavy metal concentrations ($\mu\text{g g}^{-1}$ 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).

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

³os=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 ($\mu\text{g g}^{-1}$ 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).

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

³Screening 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**

***** 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%

***** 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

JJP
Analyst

SLG
Reviewer

SLG
Team Leader

mag
QA Officer

27 Sept 96
Date

10/02/96
Date

10/02/96
Date

10/2/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

***** 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	

***** 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
- ☒ 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
AnalystEng
ReviewerSJR
Team Leadermag
QA Officer11-20-96
Date1-24-97
Date1/27/97
Date1/28/97
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.

***** 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 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 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%

***** 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

REPORT NUMBER: 41699

CEA
Analyst

Eney
Reviewer

SY
Team Leader

mag
QA Officer

9/20/96
Date

9/26/96
Date

10/01/96
Date

10/1/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

***** 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	

***** 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

[Signature]
Analyst

[Signature]
Reviewer

[Signature]
Team Leader

[Signature]
QA Officer

093096
Date

111896
Date

11/19/96
Date

11/25/96
Date

***** 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	

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	ANALYTICAL 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 MM-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

***** 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
Date

10/20/96
Date

10/25/96
Date

10/25/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

APPENDIX B

**CST ANALYTICAL REPORTS OF SOIL SURFACE SAMPLES:
HEAVY METALS**

***** 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	

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	

***** 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

Brashaw
Analyst

M. Kelly
Reviewed

K. Doon
Team Leader

mag
QA Officer

10/2/96
Date

10/2/96
Date

10/3/96
Date

10/3/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in
'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. 1, pp. 19-20.

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***** 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 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

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

***** 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

JAR
Analyst

imr
Reviewer

1200m
Team Leader

mag
QA Officer

10/1/96
Date

9-30-96
Date

10/3/96
Date

10/3/96
Date

No Sample Discrepancies Noted by Sample Management Section

284

***** 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 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	

***** 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
Date
Date
Date
Date

No Sample Discrepancies Noted by Sample Management Section

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

APPENDIX 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	

***** 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
- ☒ 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

AS
Analystewg
ReviewerSDG
Team LeaderNK/MAG
QA Officer2/27/97
Date2/27/97
Date3/7/97
Date3/10/97
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.

***** CST ANALYTICAL 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:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS 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%

***** 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

CEA
Analyst

Ereg
Reviewer

STG
Team Leader

mag
QA Officer

11/5/96
Date

11-8-96
Date

11/12/96
Date

11/12/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

2ae

***** 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
W1-O	96.06289	H-3	LS	130.	0.4	NCI/L	9/16/96	PCI mL ⁻¹ (10) 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 (0.1)
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)

***** 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

Philip R. Fresquez
Analyst

Richard Robinson
Reviewer

STG
Team Leader

OK for MAG
QA Officer

09/19/96
Date

09/18/96
Date

9/19/96
Date

9/29/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. 1, pp. 19-20.

***** 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 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%

W-B-U	96.06719 U-235	RAS	0.0106	0.0021	PCI/G	10/28/96	63%
W-B-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%

***** 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☒ 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

29.1

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

SEA
Analyst

Erey
Reviewer

Erey
Team Leader

mag
QA Officer

10/28/96
Date

10/29/96
Date

10/29/96
Date

10/29/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in
'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. 1, pp. 19-20.

***** 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: N887 PHONE: 7-0815

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
W-1-O	96.06707 AC-228	G	< 0.43		PCI/G	10/02/96	
W-1-O	96.06707 AM-241	G	< 1.23		PCI/G	10/02/96	
→ W-1-O	96.06707 BE-7	G	56.4	4.1	PCI/G	10/02/96	
W-1-O	96.06707 BI-214	G	1.46	0.19	PCI/G	10/02/96	
→ W-1-O	96.06707 CO-57	G	< 0.12		PCI/G	10/02/96	
→ W-1-O	96.06707 CO-58	G	< 0.08		PCI/G	10/02/96	
W-1-O	96.06707 CO-60	G	< 0.28		PCI/G	10/02/96	
W-1-O	96.06707 CS-137	G	0.37	0.06	PCI/G	10/02/96	
W-1-O	96.06707 K-40	G	103.	8.	PCI/G	10/02/96	
W-1-O	96.06707 MN-54	G	< 0.11		PCI/G	10/02/96	
→ W-1-O	96.06707 PB-212	G	1.42	0.17	PCI/G	10/02/96	
W-1-O	96.06707 PB-214	G	1.75	0.21	PCI/G	10/02/96	
W-1-O	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-O	96.06709 AC-228	G	3.41	0.47	PCI/G	10/02/96	
W-2-O	96.06709 AM-241	G	< 0.43		PCI/G	10/02/96	
W-2-O	96.06709 BE-7	G	50.4	3.9	PCI/G	10/02/96	
W-2-O	96.06709 BI-214	G	2.46	0.29	PCI/G	10/02/96	
W-2-O	96.06709 CO-57	G	0.72	0.08	PCI/G	10/02/96	
W-2-O	96.06709 CO-58	G	0.41	0.08	PCI/G	10/02/96	
W-2-O	96.06709 CO-60	G	0.8	0.15	PCI/G	10/02/96	
W-2-O	96.06709 CS-137	G	< 0.27		PCI/G	10/02/96	
W-2-O	96.06709 K-40	G	141.	11.	PCI/G	10/02/96	
W-2-O	96.06709 MN-54	G	0.31	0.06	PCI/G	10/02/96	
W-2-O	96.06709 PB-212	G	2.72	0.26	PCI/G	10/02/96	

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

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

W-B-U	96.06719 AM-241	G	1.59	0.26	PCI/G	10/02/96
W-B-U	96.06719 BE-7	G	25.8	2.2	PCI/G	10/02/96
W-B-U	96.06719 BI-214	G	1.54	0.2	PCI/G	10/02/96
W-B-U	96.06719 CO-57	G	0.46	0.06	PCI/G	10/02/96
W-B-U	96.06719 CO-58	G	< 0.27		PCI/G	10/02/96
W-B-U	96.06719 CO-60	G	< 0.39		PCI/G	10/02/96
W-B-U	96.06719 CS-137	G	0.78	0.11	PCI/G	10/02/96
W-B-U	96.06719 K-40	G	162.	12.	PCI/G	10/02/96
W-B-U	96.06719 MN-54	G	0.69	0.1	PCI/G	10/02/96
W-B-U	96.06719 PB-212	G	< 0.14		PCI/G	10/02/96
W-B-U	96.06719 PB-214	G	1.18	0.17	PCI/G	10/02/96
W-B-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

***** 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
Date

10/4/96
Date

10/7/96
Date

10/7/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

APPENDIX D
CST ANALYTICAL REPORTS OF WASHED VEGETATION SAMPLES:
HEAVY METALS

***** 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 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

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

***** 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

AK
Analyst

EMH
Reviewer

Debbie Fogg
Team Leader

mag
QA Officer

10/23/96
Date

10/23/96
Date

10/31/96
Date

11/1/96
Date

***** 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	

***** 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

hBrashaw
Analyst

K. J. Lew
Reviewer

Debbie Fager
Team Leader

mag
QA Officer

10/28/96
Date

10/28/96
Date

10/31/96
Date

11/1/96
Date

No Sample Discrepancies Noted by Sample Management Section

***** 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 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 TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
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30h

W-1-0	96.06896 PB	ICPMS	0.3	0.02	UG/G	10/09/96
W-1-0	96.06896 SB	ICPMS	0.1	0.03	UG/G	10/09/96

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
W-1-0	96.06896 PB		ICPMS	4.95	3.39	UG/G	10/09/96	
W-1-0	96.06896 SB		ICPMS	4.95	2.85	UG/G	10/09/96	

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

Prepared by: KLA0 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

KLA0
Analyst

MURK
Reviewer

Debbie Foy
Team Leader

mag
QA Officer

10/10/96
Date

10/10/96
Date

10/31/96
Date

11/1/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in

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	
8G-O	96.06735	13.9	0.9	PCI/G	2/12/97	
8G-U	96.06736	1.8	0.1	PCI/G	2/12/97	

***** 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
- ☒ 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

AKS
AnalystErg
ReviewerSTG
Team Leadermag
QA Officer2/21/97
Date2/21/97
Date2/24/97
Date2/24/97
Date

No Sample Discrepancies Noted by Sample Management Section

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

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

Prepared by: SRG on 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	
1-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	0.13	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	

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

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

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 MM-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

***** 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
Date

11/5/96
Date

11/6/96
Date

11/6/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

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

Prepared by: ROBINSON on 5-Dec-1996

ANALYSIS: N-3 REQUEST NUMBER: 23670 MATRIX: W ANALYST: RICHARD ROBINSON

PROGRAM CODE: K306

OWNER: Philip R. Fresquez GROUP: ESH-20 MAIL-STOP: N887 PHONE: 7-0815

ANALYTICAL TECHNIQUE: LS

ANALYTICAL PROCEDURE:

NOTEBOOK:

PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE
1-O	96.06270	1342.	4.	NCI/L	9/25/96
1-U	96.06271	8279.	10.	NCI/L	9/25/96
2-O	96.06272	7569.	9.	NCI/L	9/25/96
2-U	96.06273	4890.	8.	NCI/L	9/25/96
3-O	96.06274	714.	141.	PCI/L	9/25/96
3-U	96.06275	678.	141.	PCI/L	9/25/96
4-O	96.06276	870.	142.	PCI/L	9/25/96
4-U	96.06277	823.	142.	PCI/L	9/25/96
5-U	96.06278	3788.	7.	NCI/L	9/25/96
6-U	96.06279	14744.	13.	NCI/L	9/25/96
7-U	96.06280	2896.	155.	PCI/L	9/25/96
8-O	96.06281	208.	137.	PCI/L	9/25/96
8-U	96.06282	- 2.	136.	PCI/L	9/25/96
8G-O	96.06283	- 246.	134.	PCI/L	9/25/96
8G-U	96.06284	368.	139.	PCI/L	9/26/96

COMMENT

pg/mL (10)
1342.0 (4.0)
8279.0 (10.0)
7569.0 (9.0)
4890.0 (8.0)
0.71 (0.14)
0.70 (0.14)
0.87 (0.14)
0.82 (0.14)
3788.0 (7.0)
14744.0 (13.0)
2.87 (0.16)
0.21 (0.14)
- 0.00 (0.14)
- 0.25 (0.14)
0.57 (0.14)

31h

***** 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. Frequez 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

312

REPORT NUMBER: 42452

P. J. ...
Analyst

E. ...
Reviewer

SG
Team Leader

mag
QA Officer

120596
Date

1205-96
Date

12/6/96
Date

12/6/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceding 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.

***** 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 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%

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%

***** 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%
2-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
- ☒ Only Blind QC samples run with this sample batch.
- ☐ No QC samples run with this sample batch.
- ☐ No QC samples for this constituent and matrix type available within CST

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

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
96.06813	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

JEH
Analyst

Eug
Reviewer

SLG
Team Leader

mag
QA Officer

11/4/96
Date

11-7-96
Date

11/08/96
Date

11/8/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

***** 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%

***** 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

PLA
Analyst

Emy
Reviewer

STG
Team Leader

NK/MAG
QA Officer

11/12/96
Date

11-14-96
Date

11/15/96
Date

11/19/96
Date

No Sample Discrepancies Noted by Sample Management Section

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

APPENDIX F

**CST ANALYTICAL REPORTS OF UNWASHED VEGETATION SAMPLES:
HEAVY METALS**

***** CST ANALYTICAL 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

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	

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	

***** 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
00.35052 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

Michael B. Gross
Analyst

[Signature]
Reviewer

[Signature]
Team Leader

mag
QA Officer

11-6-96
Date

11/6/96
Date

11/7/96
Date

11/7/96
Date

No Sample Discrepancies Noted by Sample Management Section

***** 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 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 TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
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32 cl

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

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS 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	

***** 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

1/15/96
Analyst

Dubrova/Fagg
Reviewer

A. J. Dorn
Team Leader

mag
QA Officer

10/15/96
Date

10/15/96
Date

11/7/96
Date

11/8/96
Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in

***** 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	

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	ANALYTICAL ANALYSIS 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	ANALYTICAL ANALYSIS TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
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322

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 HI	ICPES	24.6		UG/G	10/07/96
1-0	96.06917 ZN	ICPES	24.6	17.6	UG/G	10/07/96

***** 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
00.00580	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

JAK
Analyst

dtles
Reviewer

LSR
Team Leader

mag
QA Officer

11-7-96
Date

11/7/96
Date

11/7/96
Date

11/8/96
Date